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## Chapter

# 1

# FOOD : WHERE DOES IT COME FROM?

## INTRODUCTION

### FOOD

Food is essential for all the living organisms. Plants prepare their own food and store in their special organs as fruits, tubers, seeds etc. Animals and human beings depend on this stored food of plant. Bigger animals depend on smaller animals for their food. Human beings also depend on animals for their food.

### IMPORTANCE OF FOOD

- Food provides energy.
- Food is needed for growth.
- Food helps in maintaining good health.
- Food maintains body functions.
- Food is necessary to heal wounds.

### INGREDIENTS

Food comprises of ingredients. An ingredient is a part of mixture that is added to prepare a dish. Ingredients vary with different types of food. Ingredients can be obtained from plant sources and animal sources.

### NUTRIENTS

Food comprises of essential nutrients namely, carbohydrates, proteins, fats, vitamins and minerals. Carbohydrates and fats are known as energy providing food. Proteins are called body-building food. Vitamins and minerals are called protective food.

To keep a car engine running properly, it should be supplied with right amount of fuel and oxygen. Similarly to keep our body working properly, it must be supplied with right amount of right chemicals in food. These chemical substances in food that our body needs is called **nutrients**.

### Functions of Food

Food has 3 main functions:

- It provides energy for various activities of the body.
- It helps the body to grow and replace old cells.
- It protects the body from various diseases and keeps it fit and healthy.



**Proteins rich food**

We eat different kinds of food, we eat grains, pulses, vegetables, fruits, fish, eggs, meat and different dairy products. Different food contain different nutrients. Some nutrients help us grow, some give energy and some help in completing diseases.

India is a vast country and people in different regions cook different dishes. A basic dish like boiled rice contain only rice and water. A vegetable pulao/biryani contain rice, vegetables, spices, water, salt and oil. It has number of ingredients. These ingredients come from two sources – plants and animals.



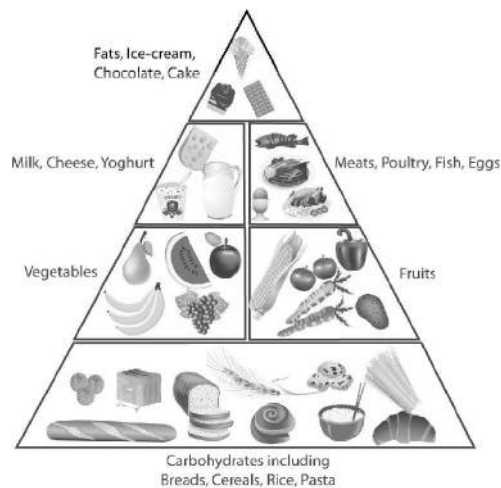
**Boiled rice**

Boiled rice has 2 ingredients



**Veg pulao/biryani**

Vegetable pulao has many ingredients



**Different food items containing carbohydrates, fats, proteins, vitamins, minerals, etc.**



**Fruits & Vegetables**

### SOURCES OF FOOD

**Food from plants :** Green plants prepare their own food with the help of carbondioxide, water and sunlight by the process of photosynthesis. Green plants are therefore called **producers**. They prepare some extra food than they need. This extra food is stored in various parts of the plant.

**NOTE:** Where does our food come from?

- Cropland: Provide 77% (mostly grain) of the world food.
- Rangebuds (meats) supply 16%.
- Oceanic fisheries (fish and shellfish) 7%.

## PLANTS PARTS THAT ARE EATEN

**Roots :** We eat roots of carrot, radish, sweet potato and beetroot. In Rajasthan roots of Khejri tree is eaten when the crops fail. It is considered to be very nutritious.



*Roots of Boobab tree are eaten during famine.*

**Stem :** Some plants like potato, onion and ginger store food in their stems. Banana shoots and lotus stem are also eaten.

**Seeds :** All the cereals like rice, wheat, maize and pulses like lentils, gram, moong are seeds. Pea is also a seed. The cereals give us energy and pulses are rich sources of proteins that help in growth. We also get oil from seeds of mustard and sunflower.

**Leaves :** Some common leaves that are eaten by people are spinach, cabbage, coriander, mint, neem, etc.

**Flowers :** We eat cauliflower and broccoli. Flowers of plants like drumstick, banana and pumpkin are eaten by people in some parts of India. rose petals are used to make rose water (gulabjal) and a sweet called gulkand.

People of Assam & West Bengal make delicacies out of this.



Banana flower

**NOTE:** Source of food:

- Primary Plants: Wheat, Corn and Rice.
- Primary animals: Fish, Beef, Pork and Chicken.
- 14 plants and 8 animals species provide 90% of the global food calories.

## FOOD FROM PLANTS

### Roots

Pic of radish, carrot turnip

### Stem

Onion, Potato, Sugarcane

### Leaves

Spinach, Cabbage, Methi

### Flowers

Cauliflower, Broccoli, Lotus

### Fruits

(Common fruits)

### Vegetables

(Common veg)

### Oil

Mustard, Ground nut, Sunflower

### Seeds

Wheat, Rice, Pea

**Fruits :** Common fruits are mango, apple, banana, orange, litchi, papaya, guava, grapes, etc. These are rich sources of vitamins and minerals. They also provide water and roughage.

**Vegetables :** Common vegetables are onion, potato, radish, carrot, spinach, methi, tomato, brinjal, etc.

*Vegetables and fruits are good sources of vitamins and minerals. Both keep us healthy and prevent us from deficiency diseases.*

**Sugar :** Food is incomplete without sugar. We get sugar from sugarcane & beetroot. Sugarcane is stem while beetroot is root. Sugar gives energy.

**Oil :** Oil is the medium of cooking. We get oil from seeds of mustard, sunflower, soyabean, cotton, coconut and groundnut.

**Spices :** Spices add flavor to the food. Different parts of plants are used as spices. Ginger (Adrak), Coriander (Dhania), Fennel (Saunf), Thyme (Ajwain), Cumin (Jeera), Fenugreek (Methi), Clove (Laung), Cardamom (Elaichi), Nutmeg (Jaiphal), etc.



Common spices



**Sprouts :** Sprouted seeds of moong, chickpea (Bengal gram) is very nutritious. Sprouting is done by soaking seeds in water and then draining the water after about 7-8 hour. Then they are left overnight to germinate. Sprouts can be eaten raw as well as cooked.

Sprout provide instant energy and are high on protein.

### Animals as a source of food

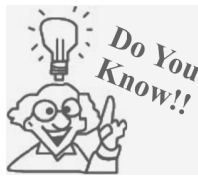
Animals also provide us food in the form of milk, meat, fish, eggs and honey.

**Milk :** Milk is rich in proteins. It is very beneficial to children and elderly. Main milk yielding animals are cows, sheep, buffaloes, goat, camel, yak etc. such animals are called Milching animals.

Milk is a complete food. It is rich in Calcium and is required for bones and teeth.



Sprout salad



#### Food Facts

- India is the largest producer of bananas in the world.
- Humans cultivate 2000 varieties of plants for food.

#### Health corner



- Some plants are poisonous.
- Do not eat berries, seeds or nuts from plants you do not know.

Products made from milk are known as dairy products.

(i) **Paneer (Cottage Cheese) :** It is prepared by adding vinegar or lemon to milk. This process is called curdling of milk.

(ii) **Cheese :** These are made from curdled milk of cow, goat, sheet or buffalo.

(iii) **Cream :** It is made by collecting the top fatty layer of milk.

(iv) **Butter :** This is made by churning fresh creams.

(v) **Ghee :** When butter is heated and the solid matter is removed, ghee separates out.

(vi) **Curd :** Small amount of milk is added to warm milk and left for sometime. The bacteria (Lacto bacillus) helps in setting the milk. It is a microorganism.



Cow



Milk



People in deserts drink camels milk. In hilly regions

**Meat :** The main sources of meat are goat, pig, sheep, poultry. Birds like hen, duck, turkey also give meat. Meats are rich in proteins.

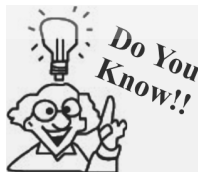
An egg laying hen is called layer and hens reared for chicken meat is called broiler.

**Egg :** Different kinds of eggs

Egg are mainly obtained from hens and ducks.



Chicken



#### Health Corner

Yolk of an egg is rich in fats and lipids, while white is rich in proteins.

**Fish :** Fish is a good source of animal protein. It is highly digestible. Fishes may be fresh water or sea water fish. Both are equally good. Cod liver oil is rich in vitamin D



Cod Fish

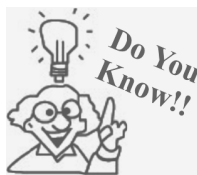


Fish Oil



Honey

**Honey :** It is obtained from bees (insects). It is not only nutritious but also has medicinal value. Honeybees collect nectar from flowers and store in their hive. Honey is used to cure sore throat and cold.




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*Apiculture is the art of bee cultivation to get honey and wax. A place where beehives are kept is called Apiary.*

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### A Balanced Diet

It is important that we consume all nutrients, but it is equally important that we consume them in adequate quantity. This makes our diet a balanced diet.



Carbohydrates



Proteins



Fats

Protein source Fats Minerals + Vitamins Carbohydrates A Balanced Diet

"A balanced diet is one which contains all the nutrients in proper amount."

People of different age need different nutrients in different quantities. Growing children need more proteins for muscle growth and repair of cells of all the food items, milk is considered complete food. It has vitamins, minerals and protein.

### Cooking of Food

We cannot eat food like grains, cereals, meat, fish etc without cooking. Cooking helps in following ways :

1. It makes food edible.
2. It makes food soft, easily chewable and digestible.
3. It improves tastes of food.
4. It kills germs and other microbes found in raw food.

**Food habits of animals :** Animals cannot prepare their own food. They depend directly or indirectly on plants for their food. Different animals eat different kinds of foods. Based on their feeding habits, animals can be divided into three groups:

**Herbivores :** These are animals that eat plants. e.g. are cows, deer, horses, buffaloes.

Herbi + vores → plant eater



Cow eating the grass



Elephant eating the plants



Squirrel eating a nut

These animals have sharp, cutting teeth in front and flat grinding teeth at the back.

- Squirrels have sharp front teeth to grow food items like nuts.
- Cows and Buffaloes have a strange habit of eating. They graze grass and swallow the food without chewing it. Later, they bring it back to the mouth and chew it properly this is called 'Chewing the cud'.
- Elephants are also herbivores. They have largest teeth on the planet! the tusks but these are not used for chewing. They have four massive molars, one in each side of both jaws, that are used for grinding food.

## Carnivores

Carni + vores → meat eater

These are animals that eat flesh of other animals. eg. Lions, Tigers, Wolves, Dogs, Snakes, Eagles, Vultures.

- These animals have strong, pointed and sharp teeth. The birds have pointed beak to tear the flesh. [Snakes have tiny teeth which are used to swallow the prey as a whole.]



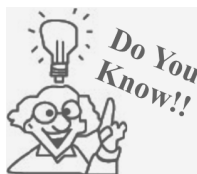
Snake swallowing



Lion eating flesh



Frog catching insects



### Insectivorous

**Plant :** There are some plants that eat insects. e.g. venus fly trap, pitcher plant.

- Lizards and frogs do not have teeth. They have long sticky tongues so that they can catch flies & insects.

Turtles and tortoises also do not have teeth

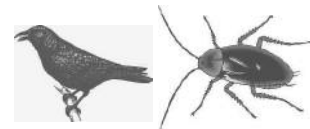
- Carnivore fish like sharks have several small teeth that help them eat flesh.

**Omnivores :** There are animals which eat both plants and flesh of animals. e.g., humans and bears. Omni + vores → all eater

These are also omnivores.

Omnivores have different types of teeth that help them to eat both plant parts and meat.

**Scavengers :** Some animals eat dead bodies of animals and help in keeping the environment clean. E.g. crows, jackals, hyenas, vultures.



Crow & Cockroach

**Parasites :** These are small animals that depend on other living animals. E.g. mosquito, roundworm, tapeworm, fleas, leeches.

Mosquitoes have long sharp pipe through which they suck blood.

**Decomposers :** Bacteria and fungi help in decay of dead organic matter. They help in maintaining the balance of nutrients in nature.

**Health corner :** Some mushrooms are good sources of proteins.

**Food chain :** In nature there are large number of organisms. They are all dependent on one another. One organism eats another animal and in turn is eaten by a third animal. Thus there is a link between the various organisms based on their food requirements. The whole cycle of who eats whom forms the food chain.



Mosquito



Fungi (Mushrooms)



Food chain : Grass → grasshopper → frog → peacock ← snake

An Example of food chain

A typical food chain in a pond is :

Algae (small plants) → small fish → large fish

All animals are dependent on green plants for food either directly or indirectly. Plants are the producers and are called Autotrophs.

Food Habits of People of different regions of India.

- (i) **North India :** People of Punjab, Haryana, Rajasthan, Himachal Pradesh grow lot of wheat, so they eat chapatis, paranthas, pulses and drink lassi. They have lot of dairy products in their diet.
- (ii) **East India :** In Bihar, Odisha, West Bengal, Assam people mainly eat rice and fish. Odisha and West Bengal produce lot of fish and sea food.
- (iii) **West India :** In Maharashtra, Goa and Gujarat, people consume lot of fish and rice. They also have dhokla, pulses and groundnut. They use cotton oil.
- (iv) **South India :** Rice is grown in plenty in this region so people eat rice, fish and sea food. Their favourite items are idli, dosa, sambhar, coconut chutney. Coconut oil is used in cooking.

## KEYWORDS

**Food :** It refers to a substance that provides energy and material for growth and repair.

**Nutrient :** A substance that an organism obtains from food to get energy and material for growth and repair.

**Ingredients :** Refers to different materials that are needed to prepare a food item.

**Herbivore :** An animal that eats plants and plant products.

**Carnivore :** An animal that eats other animals.

**Omnivore :** An animal that eats both plants and animals.

**Autotrophs :** Green plants that manufacture their own food.

**Heterotrophs :** Animals that are dependent on plants and other animals for food.

**Milch animals :** Animals that provide milk.

**Microorganisms :** Tiny organisms that can be seen only with the help of microscope.

## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- In paddy crop, we eat ..... part of plant.
- Ingredient of boiled egg is only .....
- From sugarcane and beet root we get .....
- Cow and Yak are ..... giving animals.
- Wheat and maize are the sources of .....
- Man, crow and pig are ..... animals.
- Animals that eat other animals are called .....
- ..... feed only on plants and plant products.
- ..... protects the body against diseases.
- Food is ..... for all living organisms.

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- Crow is an omnivore.
- Potato is the root of a plant that we eat.
- We get sugar from beet root.
- Both Water and Atta are the ingredients of Chapatti.
- Deer is a carnivorous animal.
- All living things except plants need food.
- Mushroom is not a food.
- Food is not necessary for good health.
- Paneer is an animal product.
- Goat is a mammal.
- All animals living in jungle are carnivores.
- Rats are herbivores animals.
- Sprouts are more nutritious.
- Dog is a mammal.
- Milk is derived from trees.
- Cream, cheese and desi ghee are not animal products.
- Egg and oil are ingredients of omlette.

- Cat is a herbivorous animal.
- Chilli is the root part of a plant.
- Groundnut is the fruit of a plant.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched. Statement (A, B, C and D) in column I have to be matched with statements (p, q, r and s) in column II.

- |    |                                        |                         |
|----|----------------------------------------|-------------------------|
| 1. | <b>Column I</b>                        | <b>Column II</b>        |
|    | (A) Cow and goat                       | (p) Scavengers          |
|    | (B) Lion and tiger                     | (q) Carnivores          |
|    | (C) Crow and jackal                    | (r) Herbivores          |
|    | (D) Carrot and radish                  | (s) Underground stem    |
|    | (E) Onion and potato                   | (t) Roots               |
| 2. | <b>Column I</b>                        | <b>Column II</b>        |
|    | (A) Milk, egg and curd                 | (p) Carnivores          |
|    | (B) Eat plants and plant products only | (q) Omnivores           |
|    | (C) Humans                             | (r) All animal products |
|    | (D) Snakes                             | (s) Autotrophs          |
|    | (E) Green plants                       | (t) Herbivores          |
| 3. | <b>Column I</b>                        | <b>Column II</b>        |
|    | (A) Honey                              | (p) Nutritious food     |
|    | (B) Hen and Duck                       | (q) Animal protein      |
|    | (C) Sprouted seeds                     | (r) Honey bee           |
|    | (E) Milk and meat                      | (s) Eggs                |
|    | (E) Nectar                             | (t) Beehive             |

## Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

- How many ingredients are needed to prepare a dish of boiled rice? Name the ingredients.



2. How will you make tasty snacks from moong or chana?
3. Why do we need food?
4. Is the flower's nectar available throughout the year?
5. Which cereal-fields have row of plants?
7. How do we obtain sprouts? How are they beneficial for health?
8. Write the edible part of onion, brinjal and tea.
9. Name the different sources of food. Write two examples of fats obtained from each source.
10. How do plants obtain their food?

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. How can we produce honey?
2. Describe sprouted seeds? How are they eaten?
3. Define omnivores. Give two examples?
4. What are the main sources of our food? Write four food items that we get from animals.
5. Why is more than one dish preferred in single meal? Write a reason besides taste.
6. Where do bees store their food and in which form?

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. Write the functions of food?
2. (a) Why is milk good for bones?  
(b) Name four milk products used in our daily diet.  
(c) What do you mean by 'ingredients'?
3. Write five unusual parts of plants that are edible. Give examples of each.

## 2 EXERCISE

### Text Book Questions

1. Do you find that all living beings need the same kind of food?
2. Name five plants and their parts that we eat.
3. Match the items given in Column I with that in Column II.

#### Column I

- (A) Milk, curd, paneer, ghee  
(B) Spinach, cauliflower, carrot  
(C) Lion and tigers  
(D) Herbivores

#### Column II

- (p) eat other animals  
(q) eat plants and plant products  
(r) are vegetables  
(s) are all animal products

4. Fill up the blanks with the words given: **herbivore, plant, milk, sugarcane, carnivore**  
(a) Tiger is a \_\_\_\_\_ because it eats only meat.  
(b) Deer eats only plant products and so, is called \_\_\_\_\_.  
(c) Parrot eats only \_\_\_\_\_ products.

- (d) The \_\_\_\_\_ that we drink, which comes from cows, buffaloes and goats is an animal product.  
(e) We get sugar from \_\_\_\_\_.

### NCERT Exemplar Questions

1. Why do boiled seeds fail to sprout?
2. Where do bees store honey?
3. Name two ingredients in our food that are not obtained from plants and animals. Mention one source for each ingredient.
4. Why should we avoid wastage of food?
5. Why do organisms need food? Write two reasons.
6. Match the organisms given in Column I with their part/product in Column II that is used by human beings as food.

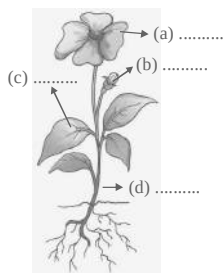
#### Column I

- (A) Mustard plant  
(B) Goat  
(C) Hen  
(D) Smoke  
(E) Wind

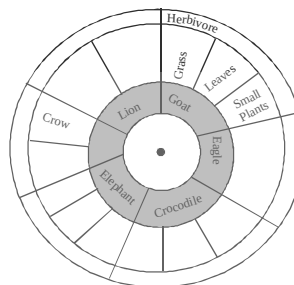
#### Column II

- (p) Meat  
(q) Fruits and Vegetables  
(r) Seed  
(s) Direction of air flow  
(t) Prevent dust particles

7. Label and colour the different parts of the plant given below.



8. Read the names of animals written in the inner ring of figure. Within the second ring write the types of food they eat and the category to which they belong (based on the eating habit) in the outermost ring. One example has been worked out for you. Use red, green and blue colours for writing.



### HOTS Questions

- With the help of a flow chart show various contributors involved when we eat a chapatti.
- Make flow charts for the preparation of honey and ghee.
- Differentiate between herbivores, carnivores and omnivores. Give two examples of each.
- Name the different parts of a banana plant that are used as food.
  - Animal food we get from water resources.
  - Four fruits which we eat as vegetables.

## 3

## EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

- The first link in all food chains is:—
  - herbivore
  - Carnivore
  - Plants
  - Omnivores
- Which of these ingredients is not obtained from plants or animals?
  - Salt
  - honey
  - wheat
  - milk
- Which of the following animals does not have teeth?
  - snake
  - lion
  - mosquito
  - elephant
- Which of the following animals is a parasite?
  - tapeworm
  - snake
  - eagle
  - crow
- Identify the spice
  - Nutmeg
  - Wheat
  - Banana
  - Salt
- Sugar is obtained from
  - sugarcane
  - beetroot
  - Both (a) and (b)
  - none
- Fruits provide
  - vitamins
  - Minerals
  - water
  - All the three
- Which of the following flowers is edible?
  - Drumstick
  - Banana
  - Pumpkin
  - All the above
- Which of the following stems are edible?
  - Ginger, onion, potato
  - Carrot, radish, pumpkin
  - Carrot, ginger, onion
  - Onion, potato, garlic
- Mushrooms are rich sources of :
  - Roughage
  - Proteins
  - Roots
  - Carbohydrates
- People of Rajasthan eat roots of khijri trees during
  - festivals
  - drought
  - flood
  - None of these



12. Milk giving animals are called:-  
 (a) Dairy animals (b) Milch animals  
 (c) Milk animals (d) None of these
13. What is added to milk to set curd?  
 (a) Bacteria (b) Virus  
 (c) Fungi (d) Lemon
14. When lemon/vinegar is added to warm milk, it is called:-  
 (a) setting of milk (b) curdling of milk  
 (c) pasteurization (d) creaming
15. Hens reared for eggs are called  
 (a) Broilers (b) Layers  
 (c) Both (a) and (b) (d) None of these
16. Look at the following food chain  
 Grass → Zebra → Lion

Here grass is a \_\_\_\_\_

- (a) herbivore (b) omnivore  
 (c) producer (d) None of these
17. Study the following food chain. What is wrongly depicted in this food chain?  
 Plants → Grasshopper → frog → Snake → Eagle
- (a) grasshopper eating frog  
 (b) frog eating grasshopper  
 (c) snake eating eagle  
 (d) eagle eating snake
18. Which of the following is an insectivorous plant?



I. Orchid



II. Venus Flytrap



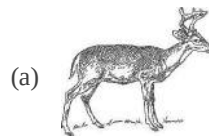
III. Pitcher plant



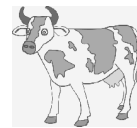
IV. Water lily

- (a) only II (b) only I  
 (c) II and III (d) III and IV
19. Which of the following is a function food?  
 (a) Food keeps us healthy and fit  
 (b) Food keeps us free from diseases

- (c) Food given us energy to do work  
 (d) All of the above
20. Germination of seeds is known as  
 (a) sapling (b) sprouts  
 (c) vegetation (d) None of these
21. Identify a carnivore from the following



(a)



(b)



(c)



(d)

22. The following parts of banana plant are used as food

- (a) roots, fruits  
 (b) stem, leaves, fruits  
 (c) stem, fruits, flower  
 (d) flower, fruits
23. Anita's mother soaked some gram seeds in water and left them overnight. Next day, she removed the water and tied the seeds in a wet cloth. Next day Anita saw some white structures will develop into
- (a) root (c) flowers  
 (b) leaves (d) stems

24. Which of the following food is obtained from the roots of the plant?

- (a) Radish, carrot, turnip  
 (b) Potato, ginger, onion  
 (c) Spinach, lettuce, mint  
 (d) Sugarcane, onion, ginger
25. Food is stored in different parts of a plant. Choose the parts of the plant from which the following food items (P,Q,R & S) are obtained and select the correct option

|     | P      | Q    | R      | S      |
|-----|--------|------|--------|--------|
| (a) | Root   | stem | leaf   | flower |
| (b) | Stem   | leaf | flower | seed   |
| (c) | Fruit  | leaf | flower | seed   |
| (d) | Flower | stem | leaf   | fruit  |

26. How do decomposers obtain their food ?

- (a) Hunting and killing prey for food
- (b) Changing carbon dioxide and water into food.
- (c) Absorbing food from dead organisms
- (d) Producing food from oxygen and sunlight

27. Living things are classified as producers or consumers according to

- (a) their speed of movement
- (b) the size of their communities
- (c) how they obtain food
- (d) how they reproduce

28. Grasses, shrubs, trees are called producers because they make

- (a) water (b) minerals
- (c) food (d) carbon dioxide

29. Which of the following is a seed containing stored food ?

- (a) Mango



- (b) Corn



- (c) Apple



- (d) Carrot



30. When you are eating sugarcane, you are actually eating.

- (a) fruit of sugarcane
- (b) root of sugarcane
- (c) stem of sugarcane
- (d) grains of sugarcane

31. Which one of the following does not belong to the group formed by the others ?

- (a) Ginger



- (b) Potato



- (c) Onion



- (d) Carrot



32. Which of the following is not an ingredient for preparing dal?

- (a) Pulses (b) Kerosene
- (c) Oil/ghee (d) Salt

33. The ingredients of kheer cooked at house are obtained from

- (a) plants
- (b) animals
- (c) both plants and animals
- (d) None of these

34. The process of taking in food and utilizing it for the growth and development is known as

- (a) nutrient (b) nutrition
- (c) ingredient (d) None of these

35. Brinjal is an important ingredient for preparation of brinjal curry. The part of brinjal plant that is source of this ingredient is

- (a) root (b) stem
- (c) flower (d) fruit

36. Which plant part is the source of chilli used as spices?

- (a) Stem (b) Root
- (c) Seed (d) Fruit

37. The soyabean oil is obtained from which part of the plant?

- (a) Root (b) Seed
- (c) Fruit (d) Stem

38. Which of the following is **not** of animal source?

- (a) Prawns (b) Pork
- (c) Beef (d) None of these

39. Which of the following is **not** a milk product?

- (a) Butter (b) Cheese
- (c) Curd (d) None of these

40. The source of honey (a food article) is  
(a) plant (b) animal  
(c) human beings (d) Both (a) and (b)
41. Clove and saffron are obtained from which plant part?  
(a) Roots (b) Stems  
(c) Flower (d) Fruits
42. Sugar is extracted from  
(a) fruits (b) stems  
(c) roots (d) All of these
43. The two underground stems used as food are  
(a) radish and potato  
(b) onion and arvi  
(c) carrot and onion  
(d) arvi and asparagus
44. Which of the following leaves are used as spices?  
(a) Coriander (b) Peppermint  
(c) Turmeric (d) Red chillies
45. Which of the following is added to food to make it tasty and to add flavour?  
(a) Oil (b) Tea  
(c) Coffee (d) Spices
46. Herbivores do not eat meat but they can eat  
(a) steak (b) fish  
(c) beef (d) fruits
47. Which part of the plant is cabbage?  
(a) Root (b) Stem  
(c) Flower (d) Fruit
48. Cereals are  
(a) seeds mostly obtained from grasses  
(b) fruits mostly obtained from grasses  
(c) vegetables  
(d) animal products
49. Cocoa tree is the source of natural chocolate flavour, which part of the tree is the source?  
(a) Roots (b) Stem  
(c) Seeds (d) Leaves
50. Nectar is  
(a) a place where bees live  
(b) honey  
(c) sweet juice of flowers.  
(d) name of queen bee.
51. Milk, curd, paneer and ghee  
(a) are all animal products  
(b) are vegetables  
(c) are plant products  
(d) None of the above
52. Read the following two statements carefully and choose the correct options.  
I. Carrot and radish are underground roots.  
II. Potato and ginger are underground stems.  
(a) Statement I is correct while statements II is incorrect  
(b) Statement I is incorrect while statement II is correct  
(c) Both statements are correct.  
(d) Both statements are incorrect.
53. Read the following statements and identify the true statement  
A – Frog is a herbivorous animal as it eats only plants.  
B – Man is a herbivore  
C – Animals like tiger, snake are carnivores  
D – Cow is a herbivore  
(a) Both B and D are correct  
(b) Only D is correct  
(c) C and D are correct  
(d) None of these
54. Cooking of food  
I. makes food edible  
II. make food soft and dilatable  
III. make food tasty  
IV. adds gems to food  
(a) Both I and II are correct  
(b) I, II and III are correct  
(c) All are correct  
(d) Only I is correct
55. A balanced diet should have  
I. only proteins  
II. only vitamins and minerals  
III. only carbohydrates and fats  
IV. only roughage  
(a) Both I and II are correct  
(b) All are correct  
(c) I, II and III are correct  
(d) None of these

56. We eat ..... kind of food at ..... times.  
(a) same, different  
(b) different, different  
(c) different, same  
(d) same, same
57. Things that are used to prepare a dish are called.  
(a) Nutrients (b) Ingredients  
(c) Vegetables (d) food
58. When we prepare a food item we always need .....  
(a) one ingredient (b) two ingredients  
(c) many ingredients (d) no ingredient
59. Which of the following ingredients are used in making dal?  
(a) pulses and water  
(b) pulses, water, salt  
(c) pulses, spices, oil, salt, water  
(d) rice and pulses.
60. Salt is an important ingredient common to many dishes. Where does it come from?  
(a) sea water (b) shops  
(c) plants (d) animals
61. Identify the food that is obtained from animals?  
(a) cereal and eggs (b) butter and cheese  
(c) eggs and spices (d) meat and sugar
62. Which of the following is not a milk product?  
(a) curd (b) paneer  
(c) cream (d) oil
63. Which of the following is a plant product?  
(a) prawns (b) beef  
(c) grains (d) pork
64. Which part of mustard plant is used to extract oil?  
(a) Flowers (b) Seeds  
(c) leaves (d) stem
65. Animals which depend on both plants and animals for food are called .....  
(a) Herbivores (b) Omnivores  
(c) Carnivores (d) Parasites
- (b) Statement (ii) is correct while statement (i) is incorrect.  
(c) Both (i) and (ii) are correct.  
(d) Both (i) and (ii) are incorrect.
2. (i) All the ingredient are either of plant or animals origin.  
(ii) Honey is obtains from bees.  
(a) St (i) is correct but (ii) is incorrect.  
(b) St (i) is incorrect but (ii) is correct.  
(c) Both are correct.  
(d) Both are incorrect.
3. (i) Chillli is an important spice used as an ingredient in Indian cooking.  
(ii) Chillli is obtained from seeds of chilli plants.  
(a) St (i) is correct but (ii) is incorrect.  
(b) St (i) is incorrect but (ii) is correct.  
(c) Both are correct.  
(d) Both are incorrect.
4. (i) Milk and milk products are used only in India.  
(ii) Cream, cheese, curd, butter are made from milk.  
(a) St (i) is correct but (ii) is incorrect.  
(b) St (i) is incorrect but (ii) is correct.  
(c) Both are correct.  
(d) Both are incorrect.
5. (i) We use flowers, fruits and stems of banana for cooking.  
(ii) Only seeds of maize are edible.  
(a) St (i) is correct but (ii) is incorrect.  
(b) St (i) is incorrect but (ii) is correct.  
(c) Both are correct.  
(d) Both are incorrect.
6. (i) All plants are edible  
(ii) Only fruits of a plant are edible  
(iii) Some plants are poisonous  
(a) Only Statement (i) is correct.  
(b) St (i) and (ii) are correct.  
(c) St (iii) is correct.  
(d) All are incorrect.
7. (i) The small white structures on moong sprouts are leaves of moong.  
(ii) Moong sprouts can be eaten only raw.  
(a) Only Statement (i) is correct.  
(b) St (i) and (ii) are correct.  
(c) St (iii) is correct.  
(d) All are incorrect.

**Statement Based Questions**

**DIRECTIONS :** Read the following two statements carefully and choose the correct options.

1. (i) People living in different parts of India eat same kind of food.  
(ii) There is a great variety of food available in different parts of world.  
(a) Statement (i) is correct while statement (ii) is incorrect.

8. (i) Bees store nectar in beehive for future use.  
 (ii) Nectar is available through the year.  
 (a) Only Statement (i) is correct.  
 (b) St (i) and (ii) are correct.  
 (c) St (iii) is correct.  
 (d) All are incorrect.
9. (i) Parrots are carnivores.  
 (ii) Bear is a herbivore  
 (a) Only Statement (i) is correct.  
 (b) St (i) and (ii) are correct.  
 (c) St (iii) is correct.  
 (d) All are incorrect.
10. (i) There is sufficient food available to everyone in India.  
 (ii) We should not waste/spoil food  
 (a) Only Statement (i) is correct.  
 (b) St (i) and (ii) are correct.  
 (c) St (ii) is correct.  
 (d) All are incorrect.

### Figure/Diagram Based Questions

**DIRECTIONS :** Carefully observe the following pictures and answer the questions.

1. Identify the correct statement  
 (a) We eat same food everyday.  
 (b) We eat different food at different times.  
 (c) People eat different food in different states  
 (d) Both (b) and (c)



How many ingredients are used to prepare this dish?

- (a) only 1 (b) Only 2  
 (c) many (d) more than 2



What are the sources of ingredients in this dish?

- (a) Only plants  
 (b) Both plants and animals  
 (c) Only animals  
 (d) none

4. 

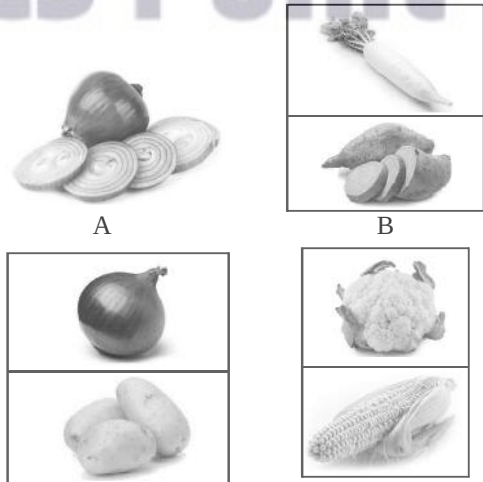
This is a paddy field. It is a source of a cereal called .....

- (a) wheat (b) Rice  
 (c) maize (d) Barley

5. 

Where does eggs come from?

- (a) Plants  
 (b) Hen  
 (c) Duck  
 (d) Both (b) and (c)

6. 

A

B

C

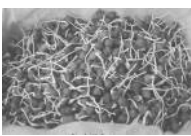
D

Which two underground stems we eat as vegetables?

- (a) A (b) B  
 (c) C (d) D

7. Identify the seeds which are edible



- A
- 
- B
- 
- C
- 
- (a) A and B  
(c) C and A
- (b) B and C  
(d) all of these

8.

Which process has caused the formation of white structures on these seeds?

- (a) Soaking in water  
(b) wrapping in wet cloth  
(c) keeping undisturbed for sometime  
(d) sprouting

9.



What is used by bees to make honey?

- (a) water  
(c) soil
- (b) nectar  
(d) flower

10.



What according to you is the food of the animals shown in the figure?

- (a) Grass  
(c) mud
- (b) nuts  
(d) insects

### Matching Based Questions

**DIRECTIONS :** Match Columns I and II and select the correct answer using the code given below the columns.

1.

- | Column I       | Column II            |
|----------------|----------------------|
| (A) Chicken    | (p) Plants / Animals |
| (B) Spices     | (q) Earth            |
| (C) Oil / Ghee | (r) Plants           |
| (D) Water      | (s) Animals          |

(a)  $A \rightarrow s$ ;  $B \rightarrow q$ ;  $C \rightarrow p$ ;  $D \rightarrow r$

(b)  $A \rightarrow p$ ;  $B \rightarrow r$ ;  $C \rightarrow s$ ;  $D \rightarrow q$

(c)  $A \rightarrow s$ ;  $B \rightarrow r$ ;  $C \rightarrow p$ ;  $D \rightarrow q$

(d)  $A \rightarrow q$ ;  $B \rightarrow p$ ;  $C \rightarrow s$ ;  $D \rightarrow p$

2.

Column I

Column II

- |             |                    |
|-------------|--------------------|
| (A) Milk    | (p) hen, duck      |
| (B) Meat    | (q) rice, barley   |
| (C) Egg     | (r) cow, goat      |
| (D) Cereals | (s) pig, hen, goat |
- (a)  $A \rightarrow s$ ;  $B \rightarrow q$ ;  $C \rightarrow r$ ;  $D \rightarrow p$   
 (b)  $A \rightarrow r$ ;  $B \rightarrow s$ ;  $C \rightarrow p$ ;  $D \rightarrow q$   
 (c)  $A \rightarrow p$ ;  $B \rightarrow r$ ;  $C \rightarrow q$ ;  $D \rightarrow s$   
 (d)  $A \rightarrow r$ ;  $B \rightarrow p$ ;  $C \rightarrow s$ ;  $D \rightarrow q$

3.

Column I

Column II

- |               |            |
|---------------|------------|
| (A) Mustard   | (p) Flower |
| (B) Banana    | (q) Fruit  |
| (C) Sugarcane | (r) Seeds  |
| (D) Chilli    | (s) Stem   |
- (a)  $A \rightarrow s$ ;  $B \rightarrow q$ ;  $C \rightarrow p$ ;  $D \rightarrow r$   
 (b)  $A \rightarrow r$ ;  $B \rightarrow p$ ;  $C \rightarrow r$ ;  $D \rightarrow q$   
 (c)  $A \rightarrow r$ ;  $B \rightarrow p$ ;  $C \rightarrow s$ ;  $D \rightarrow q$   
 (d)  $A \rightarrow p$ ;  $B \rightarrow q$ ;  $C \rightarrow s$ ;  $D \rightarrow r$

4.

Column I

Column II

- |            |             |
|------------|-------------|
| (A) Roots  | (p) Maize   |
| (B) Stem   | (q) cabbage |
| (C) Leaves | (r) carrot  |
| (D) Seeds  | (s) onion   |
- (a)  $A \rightarrow r$ ;  $B \rightarrow s$ ;  $C \rightarrow q$ ;  $D \rightarrow p$   
 (b)  $A \rightarrow s$ ;  $B \rightarrow r$ ;  $C \rightarrow q$ ;  $D \rightarrow p$   
 (c)  $A \rightarrow p$ ;  $B \rightarrow q$ ;  $C \rightarrow s$ ;  $D \rightarrow r$   
 (d)  $A \rightarrow q$ ;  $B \rightarrow p$ ;  $C \rightarrow s$ ;  $D \rightarrow s$

5.

Column I

Column II

- |               |                        |
|---------------|------------------------|
| A. Cereals    | (p) Cumin, clove       |
| B. Oil        | (q) Okra, pumpkin      |
| C. Spices     | (r) groundnut, mustard |
| D. Vegetables | (s) barley, rice       |
- (a)  $A \rightarrow r$ ;  $B \rightarrow p$ ;  $C \rightarrow q$ ;  $D \rightarrow s$   
 (b)  $A \rightarrow s$ ;  $B \rightarrow r$ ;  $C \rightarrow p$ ;  $D \rightarrow q$   
 (c)  $A \rightarrow s$ ;  $B \rightarrow r$ ;  $C \rightarrow q$ ;  $D \rightarrow p$   
 (d)  $A \rightarrow r$ ;  $B \rightarrow s$ ;  $C \rightarrow p$ ;  $D \rightarrow q$

6.

Column I

Column II

- |                    |               |
|--------------------|---------------|
| (A) Nectar         | (p) Moong     |
| (B) Honey          | (q) Poisonous |
| (C) Sprouts        | (r) Flowers   |
| (D) Unknown plants | (s) Beehive   |
- (a)  $A \rightarrow s$ ;  $B \rightarrow r$ ;  $C \rightarrow q$ ;  $D \rightarrow p$   
 (b)  $A \rightarrow q$ ;  $B \rightarrow s$ ;  $C \rightarrow p$ ;  $D \rightarrow r$   
 (c)  $A \rightarrow r$ ;  $B \rightarrow s$ ;  $C \rightarrow p$ ;  $D \rightarrow q$   
 (d)  $A \rightarrow r$ ;  $B \rightarrow s$ ;  $C \rightarrow q$ ;  $D \rightarrow p$



7. **Column I** **Column II**  
 (A) Herbivores (p) Eats only animals  
 (B) Carnivores (q) Eat both plants & animals  
 (C) Omnivores (r) Plants eating animals  
 (a)  $A \rightarrow p; B \rightarrow q; C \rightarrow r$   
 (b)  $A \rightarrow q; B \rightarrow r; C \rightarrow p$   
 (c)  $A \rightarrow r; B \rightarrow p; C \rightarrow q$   
 (d)  $A \rightarrow r; B \rightarrow q; C \rightarrow p$
8. **Column I** **Column II**  
 (A) Crow, humans (p) Herbivores  
 (B) deer, giraffe (q) Carnivores  
 (C) wolf, cheetah (r) Omnivores  
 (a)  $A \rightarrow r; B \rightarrow p; C \rightarrow q$   
 (b)  $A \rightarrow q; B \rightarrow r; C \rightarrow p$   
 (c)  $A \rightarrow p; B \rightarrow q; C \rightarrow r$   
 (d)  $A \rightarrow q; B \rightarrow r; C \rightarrow p$
9. **Column I** **Column II**  
 (A) Butterfly (p) Leftover food  
 (B) Spider (q) nectar  
 (C) Buffalo (r) small insects  
 (D) Rat (s) grass  
 (a)  $A \rightarrow q; B \rightarrow p; C \rightarrow s; D \rightarrow r$   
 (b)  $A \rightarrow q; B \rightarrow r; C \rightarrow s; D \rightarrow p$   
 (c)  $A \rightarrow r; B \rightarrow s; C \rightarrow p; D \rightarrow q$   
 (d)  $A \rightarrow s; B \rightarrow q; C \rightarrow p; D \rightarrow r$
10. **Column I** **Column II**  
 (A) Squirrel (p) insects  
 (B) pigeon (q) Nuts  
 (C) House Lizard (r) grains  
 (a)  $A \rightarrow r; B \rightarrow p; C \rightarrow q$   
 (b)  $A \rightarrow q; B \rightarrow q; C \rightarrow r$   
 (c)  $A \rightarrow q; B \rightarrow q; C \rightarrow r$   
 (d)  $A \rightarrow q; B \rightarrow r; C \rightarrow p$

### Passage Based Questions

**DIRECTIONS :** Read the passage (s) given below and answer the questions that follow.

#### Passage I

Look at the following food chain and then answer the questions that follow.

Grain  $\rightarrow$  grasshopper  $\rightarrow$  frogs  $\rightarrow$  snakes  $\rightarrow$  owls  $\rightarrow$  bacteria

1. Name a producer in this food chain  
 (a) grasshopper (b) owl  
 (c) grain (d) None of these
2. Which organism in this food chain is responsible for recycling nutrients?  
 (a) Snakes (b) Bacteria  
 (c) Owls (d) Grasshopper
3. Which of the following are consumers?  
 (a) Only frogs and snakes  
 (b) Grasshopper, frogs and snakes  
 (c) Owls and bacteria  
 (d) Grasshopper, frogs, snakes and owls

#### Passage II

For preparation of a dish of boiled rice, we take raw rice and boil it in water. Just two materials are needed to prepare a dish of boiled rice. However, in case of preparation of some food items we may need many ingredients.

4. Choose the ingredients used to prepare boiled rice  
 (a) raw rice (b) water  
 (c) Both (a) and (b) (d) None of these
5. Rice is  
 (a) a cereal (b) a plant product  
 (c) seed of plant (d) All of the above
6. For preparation of any food item we only need.  
 (a) always one ingredient  
 (b) always two ingredients  
 (c) always many ingredients  
 (d) None of these

#### Passage III

Plants are the sources of food ingredients like grains, cereals, vegetables and fruits. Animals provide us meat, meat products, eggs. Cows and buffaloes are milk providing animals.

7. Which of the following food items are not of plant source?  
 (a) Grains (b) Cereals  
 (c) Milk (d) Fruits
8. Egg is product  
 (a) of animal source  
 (b) of plant source  
 (c) Both (a) and (b)  
 (d) None of these



9. Which of the following came from animals source?

(a) Beef (b) Pork  
(c) Meat (d) All of these

**Passage IV**

You must have seen a beehive and the bees buzzing about it. Bees collect nectar from flowers and convert it into honey and store it in their hive.

10. Nectar is  
(a) collected from flowers by bees  
(b) stored by bees in their hive as such  
(c) Both (a) and (b)  
(d) None of these
11. We collect from bee hive  
(a) honey  
(b) nectar  
(c) Both (a) and (b)  
(d) None of these
12. The material for production of honey is obtained from which part of the plant?  
(a) Root (b) Stem  
(c) Leaves (d) Flower

**Assertion/Reason**

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if

the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.  
(b) Both A and R are true but R is not the correct explanation of A.  
(c) A is true but R is false.  
(d) A is false but R is true.

1. **Assertion (A) :** Various materials needed to prepare a food item are called ingredients.

**Reason (R) :** To prepare a dish of boiled rice we need just two materials.

2. **Assertion (A) :** Food provides energy for life activities and also protects the body from several diseases and keeps it fit and healthy.

**Reason (R) :** Rice and wheat are cereal foods. They are obtained from animal source.

3. **Assertion (A) :** We use different parts of plants as our food.

**Reason (R) :** In plants food is stored in root, stem, seeds, fruits but not in flowers.

4. **Assertion (A) :** Herbivores do not eat meat but they can eat fruits.

**Reason (R) :** Cow is a herbivores animal.

5. **Assertion (A) :** Dog is an omnivores animal.

**Reason (R) :** An omnivores animal is one that can eat both plant and animal products.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- |               |                  |
|---------------|------------------|
| 1. seed       | 2. egg and water |
| 3. sugar      | 4. milk          |
| 5. energy     | 6. omnivores     |
| 7. carnivores | 8. Herbivores    |
| 9. Food       | 10. essential    |

### True/False

- |           |           |
|-----------|-----------|
| 1. True   | 2. False  |
| 3. True   | 4. True   |
| 5. False  | 6. False  |
| 7. False  | 8. False  |
| 9. False  | 10. True  |
| 11. False | 12. False |
| 13. True  | 14. True  |
| 15. False | 16. False |
| 17. True  | 18. False |
| 19. False | 20. False |

### Match the Column

- |    |                                        |                          |
|----|----------------------------------------|--------------------------|
| 1. | <b>Column I</b>                        | <b>Column II</b>         |
|    | (A) Cow and goat                       | (r) Herbivores           |
|    | (B) Lion and tiger                     | (q) Carnivores           |
|    | (C) Crow and jackal                    | (p) Scavengers           |
|    | (D) Carrot and radish                  | (t) Roots                |
|    | (E) Onion and potato                   | (s) Underground stem     |
| 2. | <b>Column I</b>                        | <b>Column II</b>         |
|    | (A) Milk, egg and curd                 | (r) All animals products |
|    | (B) Eat plants and plant products only | (t) Herbivores           |
|    | (C) Humans                             | (q) Omnivores            |
|    | (D) Snakes                             | (p) Carnivores           |
|    | (E) Green plants                       | (s) Autotrophs           |

- |    |                    |                     |
|----|--------------------|---------------------|
| 3. | <b>Column I</b>    | <b>Column II</b>    |
|    | (A) Honey          | (t) Beehive         |
|    | (B) Hen and Duck   | (s) Eggs            |
|    | (C) Sprouted seeds | (p) Nutritious food |
|    | (D) Milk and meat  | (q) Animal protein  |
|    | (E) Nectar         | (r) Honey bee       |

### Very Short Answer Type Questions

- Two ingredients are needed to prepare a dish of boiled rice. They are rice and water.
- Tasty snacks from moong or chana can be made by boiling or sprouting them and then adding spices to it.
- We require energy to perform different activities and this energy is obtained from the food we eat which is oxidized in the cells to release energy.
- No, it is available only for a part of the year.
- Paddy and wheat.

### Short Answer Type Questions

- Many bees live in a beehive. These bees collect sweet juices (nectar) from the flowers. They convert the nectar into honey and store it into the hive.
- Sprouted seeds are the seeds with seedlings. Seeds are first soaked in water for one day. The water is drained and the seeds are kept wrapped in a wet cloth and left for one more day. After sprouting, they can be eaten raw. They can also be boiled. It can also be made into a tasty snack by adding spices into it.
- The animals that feed on both plants and animals are called omnivores, e.g., humans, crow.
- The main sources of our food are plants and animals. The food items which we get from animals are milk, eggs, meat and chicken.
- Different food items contain different types of nutrients in them. Thus, by eating more than one dish in a single meal, we get more nutrients for our body.
- Bees collect the nectar from flowers and then convert it into honey. The honey is stored in the

beehives can be used throughout the year.

7. Sprouts are obtained by keeping water soaked seeds in a vessel covered with a wet cloth overnight. On the availability of adequate moisture, the seeds of plants germinate to give out a small white structure. Sprouted seeds are rich in proteins, vitamins and minerals. So, they are beneficial for health.
8. (a) onion : bulb  
(b) brinjal : fruit  
(c) tea : leaves
9. Food is obtained from both animals and plants. Fats obtained from animals are ghee and cod (fish) liver oil. Mustard oil and groundnut oil are the fats obtained from plants.
10. Photosynthesis is the process by which green plants prepare their own food. In this process, green plants trap sunlight with the help of chlorophyll present in them and synthesize the sugar known as glucose from carbon dioxide and water. In the process, oxygen is given out from plants as a by-product.

### Long Answer Type Questions

1. The functions of food are as follows:
  - (i) It helps in the growth and development of a living organism.
  - (ii) It provides energy to do physical work.
  - (iii) It is needed for replacement and repairing of damaged body parts.
  - (iv) It gives us resistance against diseases and protects us from infections.
  - (v) It helps to provide energy to perform body functions, like breathing and circulation.
2. (a) Milk contains a lot of proteins and some amount of fat. Milk is a rich source of minerals like phosphorus and calcium, which are required for making the bones strong. It is known as an energy drink that helps to build up muscles and bones and also helps in body growth. Milk is considered as a complete food.  
(b) The milk products used in our daily diet are curd, cheese, butter and ghee.  
(c) The materials required to make a food item are known as its ingredients.
3. (a) Bulb : Onion      (b) Rhizome : Ginger  
(c) Stigma : Saffron    (d) Leaf bud : Cabbage  
(e) Corm : Arvi

## 2 EXERCISE

### Text Book Questions

1. No, different animals have different food requirements. Some fulfill their nutrient needs by eating animals and others need plants. Depending on the type of food living beings eat, they are classified into:
  - (i) **Herbivores:** Animals which eat only plants are called herbivores. Example, cow, goat, etc.
  - (ii) **Carnivores:** Animals which eat only animals are called carnivores. Example, tiger, lion, etc.
  - (iii) **Omnivores:** Animals which eat both plants as well as other animals are called omnivores. Example, man, dog, etc.
  - (iv) **Scavengers:** Animals which eat dead plants and animals are called scavengers. Example, vulture, hyena, etc.
2.
 

| Plant       | Their edible part |
|-------------|-------------------|
| Radish      | Root              |
| Potato      | Stem              |
| Tomato      | Fruit             |
| Pomegranate | Seed              |
| Cauliflower | Flower            |
3. **Milk, curd, paneer, ghee** - are all animal products  
**Spinach, cauliflower, carrot** - are vegetables  
**Lions and tigers** - eat other animals  
**Herbivores** - eat plants and plant products
4. (a) carnivore      (b) herbivore  
(c) plant      (d) milk  
(e) sugarcane

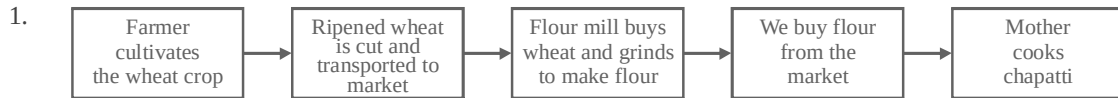
### NCERT Exemplar Questions

1. Boiling kills the seeds.
2. Bees store honey in beehives.
3. (i) **Salt** is obtained from sea water or rocks.  
(ii) **Water** is obtained from rivers, wells, taps, ponds, tubewells, rain.
4. For all of us enough food is not available it is very costly and poor people cannot afford to buy.
5. Food gives energy to do work, to grow and repair damaged parts, to protect the body against diseases.
6. (a) - (iii); (b) - (ii); (c) - (i); (d) - (v); (e) - (iv)
7. (a) Flower      (b) Bud  
(c) Leaf      (d) Stem

8. **Eagle** – birds / small animals / meat / others – Carnivore  
**Crocodile** – fish / snake / animals living near the river banks – Carnivore

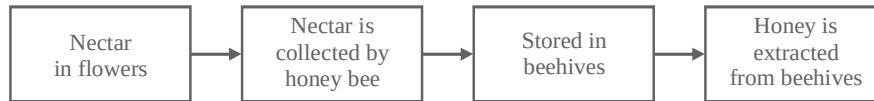
**Elephant** – grass / sugarcane / leaves / coconut / other — Herbivore  
**Crow** – food grains / sparrows – Omnivore  
**Lion** – zebra / deer – Carnivore

### HOTS Questions



Flow Chart

2. Preparation of honey.



Preparation of ghee:



3.

| Herbivores                                                                                                                               | Carnivores                                                                                    | Omnivores                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Animals which eat only plants, plant parts and plant products are called <i>herbivores</i> .<br><i>Example</i> : Cow, Deer and Elephant. | Animals which other animals are called <i>carnivores</i> .<br><i>Example</i> : Lion, Lizards. | Animals which eat both plants and animals are called <i>omnivores</i> .<br><i>Example</i> : Dog, Human beings. |

4. (i) Flower, fruit and stem of banana.  
 (ii) Fish, prawn, lobster and crabs.  
 (iii) Fruits of tomato, brinjal, ladyfinger (bhindi), cucumber (loki).

## 3 EXERCISE

### Multiple Choice Questions

- (c) Plants are the producers so all food chains start with plants.
- (a) Salt is obtained from sea water. It is not obtained from plants or animals.
- (c) A mosquito does not has teeth instead it has long, sharp pipe to pierce and suck human blood.
- (a) Tapeworm is a parasite as it lives inside the body of animals and eat food after it has been digested by the animals.
- (a) Nutmeg (jaiphal) is an Indian spice added to dishes to improve aroma.
- (c) Both beetroot and sugarcane are used to make sugar.
- (d) Fruits are rich sources of vitamins and minerals and they also provide water.
- (d) People in some pats of India eat flowers of drumstick, banana and pumpkin.
- (a) These are underground stems that store extra food.
- (b) Mushrooms are rich in proteins.
- (b) In Rajasthan when there is insufficient rainfall and crops fall, ie when there is drought, they dug the soil and eat root of khijri trees. These are very nutritious.
- (b) Cows, sheep, goat, yak, camel are called milch animals because they yield milk.
- (a) Bacteria called *Lactobacillus* is added to set milk into curd.
- (b) Paneer is made by this process this is called curdling of milk. Here, the milk protein separates out from the fat.

15. (b) Egg laying hens are called layers and those reared for chicken are called broilers.
16. (c) Grass can prepare food by photosynthesis. So it is a producer.
17. (c) Reason – An eagle can eat the snake but a snake will not eat eagle.
18. (c)      19. (d)      20. (c)      21. (c)
22. (c)      23. (a)      24. (a)      25. (b)
26. (c)      27. (c)      28. (c)      29. (b)
30. (c)
31. (d) Carrot is an underground root whereas other three are underground stems.
32. (b)
33. (c) Rice is obtained from plants and milk is obtained from animal source.
34. (b)
35. (d) We used fruit of brinjal for preparation of brinjal curry.
36. (d) Fruit of chilli is used as spice.
37. (b) Soybean oil is obtained from its seed.
38. (d) Prawn, pork and beef are all of animal source.
39. (d) Butter, cheese and curd are all milk products.
40. (b) Honey bees give us honey. Honey bees collect **nectar** (sweet juice) from flowers and convert it into honey.
41. (c) Clove and saffron (both are spices) are obtained from their flowers.
42. (b) Sugar is extracted from stem (sugar cane).
43. (b) Both **arvi** and onion are underground stems.
44. (b)
45. (d) Spices are added to food to make it tasty and to add flavour to it.
46. (d) Herbivores can eat fruits (plant source).
47. (c)
48. (a) Cereals are seeds mostly obtained from grasses.
49. (c) **Seed** is the part, that is a natural source of chocolate flavour.
50. (c) **Nectar** is the sweet juice of flowers.
51. (a) These are all animal products.
52. (c)
53. (c) Frog is a carnivore and man is omnivore.
54. (b) Food cannot be eaten raw, cooking improves the quality of food.
55. (c) A balanced diet is one that contain all the nutrients in proper amount. So it should contain right amount of protein, carbohydrate vitamins and minerals.
56. (b)
57. (b) Ingredients are needed to prepare a food item.
58. (c) Some food items are made with many ingredients.
59. (c) To prepare dal we use pulses, spices, oil, salt and water.
60. (a) Salt is obtained by evaporation of sea water.
61. (b) Butter and cheese are made from milk, which comes from animals like cows, goats, buffaloes etc.
62. (d) Oil is obtained from seeds of plants like sunflowers, mustard etc.
63. (c) Wheat and rice are examples of grains. They grow in fields.
64. (b) Seeds of mustard plant give us oil and the leaves are eaten as vegetable.
65. (b) Omnivores are animals which eat both plants and animals.

### Statement Based Questions

1. (b) People eat a variety of food in India and also in other parts of world.
2. (c)
3. (a) Chilli is obtained from fruits of chilli plants.
4. (b)
5. (c)
6. (c) All plants are not edible, some are poisonous, We eat flowers, fruits, roots, stems, leaves and seeds of plants.
7. (d) The small white structures on moong sprouts are actually roots of seedlings and they can be eaten both raw and boiled.
8. (a) Nectar is available only for a part of year when the flowers bloom. So, bees store extra honey in beehives for future use.
9. (d) Parrots are herbivores and bears are omnivores.
10. (c) There is a shortage of food in India, so it should not be wasted.

**Figure/Diagram Based Questions**

1. (d)
2. (b) Boiled rice can be prepared using only 2 things, rice and water.
3. (b) Chicken curry uses chicken, spices, oil, salt and water.
4. (b) Rice fields are called paddy.
5. (d) Hens and ducks give eggs.
6. (c) Potato and onion are modified underground stems that are eaten as vegetables.
7. (a) Maize and Pea are seeds.
8. (d) Sprouting involves soaking the seeds in water, then draining the water and leaving them undisturbed for some time till they germinate.
9. (b) Nectar or sweet juices from flowers are sucked by bees and then stored in hives where they turn into honey.
10. (b) Squirrels feed on nuts.

**Matching Based Questions**

- |        |         |
|--------|---------|
| 1. (c) | 2. (b)  |
| 3. (c) | 4. (a)  |
| 5. (b) | 6. (c)  |
| 7. (c) | 8. (a)  |
| 9. (b) | 10. (d) |

**Passage Based Questions**

1. (c) Grain comes from plants and so they are producer.
2. (b) Bacteria is a decomposer which convert dead organic matter into nutrients and releases the nutrients into the soil.
3. (d) All three are consumers.
4. (c) 5. (d)
6. (d) We need different number of ingredients to prepare food items of our choice.
7. (c) 8. (a) 9. (d)
10. (a) Nectar (sweet juice) is collected by bees from flowers. Then they convert it into honey and store it in their hive.
11. (a) 12. (d)

**Assertion/Reason**

1. (b)
2. (c) Rice and wheat are of plant source.
3. (c) In plants food is also stored in flowers e.g., cauliflowers, broccoli, etc.
4. (b)
5. (a)



## Chapter

# 2

# COMPONENTS OF FOOD

## INTRODUCTION

### COMPONENTS OF FOOD

The main components of foods are carbohydrates, protein, fats, vitamins and minerals. These are called nutrients.

**Carbohydrate:** Carbohydrates are also called energy giving food. It is the main sources of energy. It is made up of carbon, hydrogen, and oxygen. There are three types of carbohydrates:

- (a) **Sugar:** It is a simple carbohydrate having sweet taste. Sources of sugar are glucose, sugarcane, milk and fruits; such as banana, apple, grapes, etc.
- (b) **Starch:** It is a complex carbohydrate. It is a tasteless, colourless and white powder. Sources of starch are: Wheat, maize, potato and rice.
- (c) **Cellulose:** It is present in plant cell wall. It is a complex carbohydrate. Humans cannot digest cellulose.

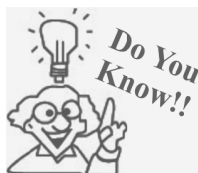
**Protein:** Protein helps in body growth and repairs the tissues so it is also called body building food. We get protein from milk, eggs, meat, fish and all kinds of pulse. Protein molecule is made of a large number of smaller molecules called amino acid. The daily requirement of protein for adults is 1 gram per kilogram of the body weight.

**Fat:** Fats are made up of carbon, hydrogen and oxygen. Butter, ghee, milk, egg-yolk, nuts and cooking oils are the major sources of fat in our food. An adult needs about 35 g fat every day. Our body stores the excess energy in the form of fat. This stored fat is used by the body for producing energy.

**Vitamin:** Vitamins are complex organic compounds which are essential for the growth and maintenance of our body. It does not provide energy. Our body requires vitamins A, C, D, E, K and B-complex. Our body can make only two vitamins, Vitamins D and K. So other vitamins must be present in our food.

**Mineral:** Minerals are required by our body in very small quantities. Iron, iodine, calcium, phosphorus, sodium and potassium are common minerals. The sources of these minerals are plants and animals.

required for all the biological processes in our body. Although, water doesn't have any nutritive value, it is very important component for the working of body.



*At the time when vitamins were discovered, their chemical compositions were unknown. Hence they were represented by the letters of English alphabet.*



Vitamin Rich Food

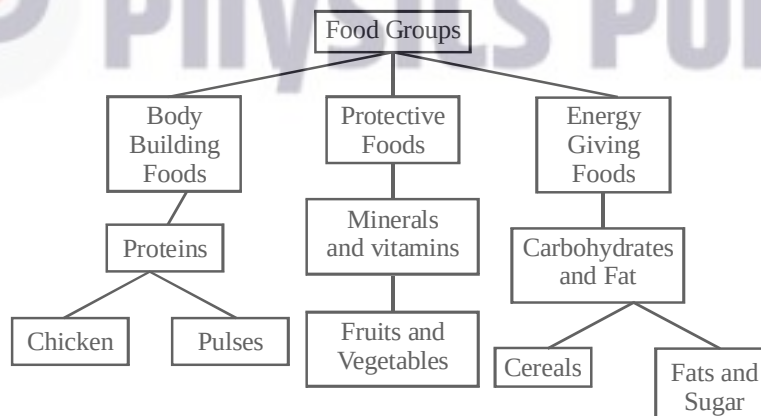
**Roughage :** It is the fibre content which we obtain from our food. Roughage helps in

- Retaining water needed in body.
- Adds bulk to our food.
- Helps proper working of our digestive system

Sources of roughage are salad, fruits and vegetables.

## FUNCTIONS OF FOOD

1. **Energy giving food :** These food items provide energy to our body to do work. *E.g.* sugar, cereals, jiggery, oil fats, starchy vegetables (potato, sweet potato) etc.
2. **Body building food :** These food items are growth promoting. *E.g.* milk, pulses, meat, egg, fish etc.
3. **Protective food :** Food items that protect our body against diseases fall under this category. *E.g.* vitamins and minerals present in milk, green leafy vegetables and fruits.



**NOTE:** (i) All these nutrients are not present in every food item.  
(ii) We can test, using simple methods, for the presence of one or more of these nutrients, in cooked food as also in raw ingredients.

### Test for presence of carbohydrates in food.

The main carbohydrates found in our food are (i) starch and (ii) sugar.

- (i) **Test for starch:** Put a few drops of iodine solution on the food item or ingredient taken in a test-tube. If a **blue-black colour** appears it confirms the presence of starch in the item under test.

**NOTE:** To prepare iodine solution, add a few drops of tincture iodine in a test-tube half-filled with water.

- (ii) **Test for proteins :** Make a paste of solid food item or powder and place some of it in a test-tube. Add 10 drops of water to it. Shake and then add 2 drops of copper sulphate solution and ten drops of caustic soda solution to it. Shake well and allow the test-tube to stand undisturbed for a few minutes. Appearance of **violet colour** indicates the presence of protein in the food item.

**NOTE:** (i) To prepare copper sulphate solution, dissolve 2g of copper sulphate in 100 ml of water.  
(ii) To prepare caustic soda solution, dissolve 10 g of caustic soda in 100 ml of water.

(iii) **Test for fats:** To test for the presence of fat in food item, wrap it in a piece of paper and crush it, Now, straighten the paper and observe carefully. An **oily patch** on the paper shows that the fat is present in the food item.

#### Functions of various nutrients in our body

##### (i) Functions of carbohydrates

- They are the **main source of energy** in our food. Starch and sugar provide most of energy (60-80%) to our body.
- Carbohydrates also help in the utilization of body fats.
- It also exerts a sparing effect and plays an important role in functions of intestinal tract.
- It also adds flavour to diet.

##### (ii) Functions of fats.

- They are the **sources of energy** and of **essential fatty acids** in the diet.
- The fat deposits in the body serve as insulation and provide protective cushion for the organs.
- Fats are also **solvents for the fat soluble vitamins** that are always naturally introduced into the diet in the fatty portion of the food.

**NOTE:** The fat soluble vitamins are vitamins A, D, E and K.

##### (iii) Functions of vitamins.

**Vitamins:** The organic compounds, other than carbohydrates, proteins and fats, that are necessary to maintain normal health, growth and nutrition.

**The function of vitamins are :**

- They act as catalysts in biological processes.
- Vitamins are regulatory substances, each performing a specific function. They are carried in blood stream to all parts of body.
- They help in protecting our body against diseases.
- They also help in keeping our eyes, bones, teeth and germs healthy.

**Types of vitamins:** Vitamins are classified as follows :

**Vitamin A, Vitamin C, Vitamin D, Vitamin E and Vitamin K.**

**Vitamin B – complex** is a group of vitamins.

**Functions of vitamin A :** It keeps our skin and eyes healthy.

**Functions of vitamin C :** It helps our body to fight against many diseases.

**Functions of vitamin D :** It helps our body to use calcium for bones and teeth.

(iv) **Functions of Proteins :** They provide **amino acids** for body to build new tissues and to maintain the tissue already formed (i.e., growth and repair).

Amino acids also help in formation of some other substances such as the enzymes, hormones, etc. which are essential to body function.

Proteins help in certain body regulating capacities and provide energy:

**NOTE:** Foods containing proteins are called “body building foods”

(v) **Functions of minerals :** The two roles carried out by minerals are :

- (a) building substances
- (b) regulatory substances

They serve in following three ways as structural constituents (building substances).

- As constituents of bone and teeth, giving rigidity and relative permanence to skeletal tissues.
- As essential of organic compounds which are the chief solid constituents of soft tissues (muscles, blood, cells, etc.)

- As components in compounds essential to the functioning of body e.g., iodine in thyroxine, zinc in insulin, cobalt in vitamin B<sub>12</sub>, etc.

In regulation of body processes their functions are :

- They ensure normal rhythm in the heartbeat.
- They help to maintain normal response of nerves to stimuli.
- They are essential for blood clot formation.

**(vi) Functions of water :** Various functions of water include

- It acts as a building material.
- It acts as a solvent.
- It acts as a lubricant.
- It acts as a temperature regulator.
- It helps to absorb nutrients from food.
- It helps in throwing out wastes from body as urine and sweat.

**(vii) Functions of dietary fibres or roughage**

- It adds to the bulk of our food and helps the body to get rid of undigested food.

**NOTE:** Roughage does not provide any nutrient to our body, but it is an essential component of our food.

**Sources of various nutrients:**

**(i) Carbohydrates:** Some sources of carbohydrates are:

Sweet-potato, potato, sugar cane, papaya, melon, mango, wheat, rice, bajra, maize

**(ii) Sources of fats.**

- **Plant sources :** Groundnuts, nuts, til, coconut oil, soyabean oil, mustard oil, sunflower oil.
- **Animal sources :** Ghee, butter, cream, milk, meat

**(iii) Sources of proteins**

- **Plant sources :** Peas, grams, moong, tur dal, beans, soyabeans.
- **Animal sources :** Meat, fish, milk, paneer, eggs.

**(iv) Sources of vitamins**

- **Sources of vitamin A :** Milk, fish oil
- **Sources of vitamin B :** Liver
- **Sources of vitamin C :** Orange, guava, tomato, lemon, amla
- **Sources of vitamin D :** Milk, butter, fish.

**NOTE:** Our body also makes vitamin D from sunlight.

**(v) Sources of minerals :**

- **Sources of Iodine:** Sea weeds and sea water
- **Sources of Phosphorus:** It is widely distributed both in plant and animal foods.  
Protein rich foods like meat, poultry, fish and eggs are good sources of phosphorus.  
Cereal grains provide phosphorus in good amount while whole grain have more than processed product.  
Dried beans and eggs contain appreciable amounts of phosphorus.  
Milk and dairy products are excellent sources of phosphorus.
- **Sources of Iron :** Liver is an excellent source of iron. Other meat products are good sources. Iron is present in yolk of egg, dried fruits like apricot and prunes, leafy green vegetables. Cereals also provide iron.
- **Sources of Calcium :** Milk and milk products are major sources of calcium. Other important

sources are leafy vegetables. *Broccoli* is a good source, citrus fruits and legumes are good sources.

Meat, grains and nuts provide very little calcium.

(vi) **Dietary Fibres** : These are mainly provided by plant products. Whole grains, pulses, potatoes, fresh fruits and vegetables are main sources.

(vii) **Sources of water**: We get most of the water that our body needs from liquids we drink - such as water, milk and tea. We also add water to most cooked foods.

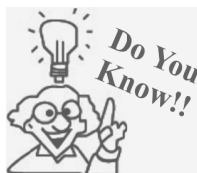
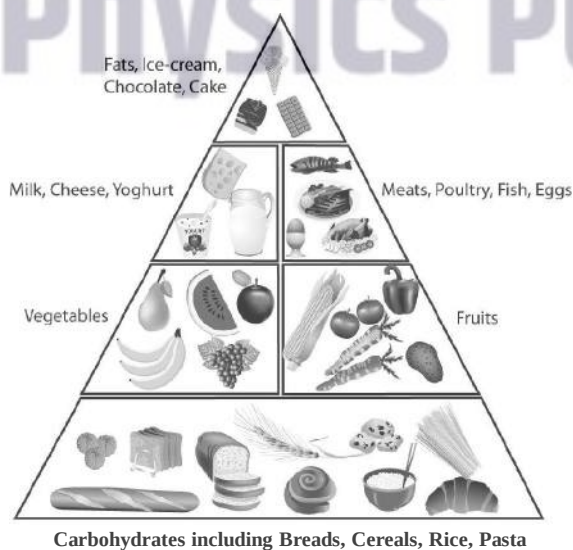
## THE ESSENTIALS OF A HEALTHY DIET

**Healthy Eating Habits** : A balanced diet and regular exercise are very important to students. A balanced diet refers to the selection of foods with appropriate portion to provide adequate nutrients and energy for the growth of body tissues, strengthening the immune system and keeping healthy body weight. Apart from taking sufficient fluid every day, eat according to the "Food Pyramid" to stay healthy.

In fact, the traditional Chinese diet where rice, vermicelli and noodles are staple food, with lots of vegetables and moderate amount of meat, minimal preserved and processed food, coupled with healthy cooking methods using little oil, is a perfectly balanced diet.



Fruits and Veggie



While playing or working in the hot sun, if a person loses too much water his body may get severely dehydrated. As a result blood becomes thick. This causes severe pain and cramps in the muscles.

### The Importance of Balanced Diet

1. A balanced diet provides energy and nutrients necessary for growth and helps maintain a healthy body weight.

- Nutrition replenishment is necessary to cope with the increased demand of energy for heavy homework and physical activities.
- A balanced diet can help prevent obesity, wasting, gastrointestinal diseases and anaemia, as well as reduce chances of developing chronic diseases such as heart disease, high blood pressure, diabetes and cancer.

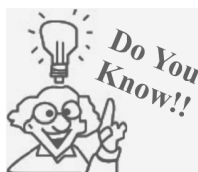
#### The types, functions and characteristics of food

| Type                                                                                                                    | Functions and characteristics                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Grains and Cereals</b> (e.g. Rice, vermicelli, noodles, bread, biscuits, cereals, corn flakes, whole-grain products) | Rich in starch, plant protein and moderate amounts of vitamin B and minerals. Main source of energy. Choose whole-grain food with high fibre content as it increases satiety and can prevent constipation.                                                                            |
| <b>Vegetables</b> (e.g. Green leafy vegetable, squash, mushrooms, eggplant)                                             | Rich in carotene, vitamin A and C and various minerals, able to strengthen the immune system and promote metabolism. Rich in fibre, which increases satiety, helps lower body cholesterol and prevents constipation.                                                                  |
| <b>Fruits</b> (e.g. Grapes, orange, apple, pear)                                                                        | Dark green leafy vegetables (Chinese flowering cabbage, Chinese white cabbage, kale and broccoli) compared with other vegetables are rich in calcium, which can strengthen teeth and maintain healthy bones.                                                                          |
| <b>Meat and Beans</b> (e.g. Beef, pork, lamb, poultry, fish, seafood, egg, beans, tofu)                                 | Meat, seafood and eggs are rich in animal protein, minerals (e.g. iron, zinc) and vitamin B complex. Beans and bean products are rich in plant protein and minerals (e.g. calcium, iron, phosphorus) Protein is the basic element of cells and helps promote growth and repair cells. |
| <b>Milk and milk products</b> (e.g. low fat or skimmed milk/milk powder)                                                | Choose lean meat, remove the skin and fat of poultry, eat less preserved food such as barbecued food, sausages and luncheon meat. Milk is rich in calcium, phosphorus and protein. Calcium and phosphorus help strengthen teeth and bones.                                            |
|                                                                                                                         | Choose low-fat or skimmed milk and milk products (including cheese, yogurt). Try not to use condensed milk.                                                                                                                                                                           |
| <b>Oil and Fats</b>                                                                                                     | Fat provides energy, maintains body temperature and facilitates absorption of vitamins A, D, E and K. It is also the basic component of cell membranes and hormones.                                                                                                                  |
|                                                                                                                         | Choose pure vegetable oil e.g. rapeseed oil, olive oil and avoid animal oil. Although pure vegetable oil does not contain cholesterol, but its fat and calories are equivalent to that of animal oil and will cause obesity if taken in excess.                                       |
| <b>Salt</b>                                                                                                             | Maintain balance of body fluid, but may cause high blood pressure if taken in excess.                                                                                                                                                                                                 |
| <b>Sugar</b>                                                                                                            | Provides calories, but contains little nutrients. May cause obesity and tooth decay if taken in excess.                                                                                                                                                                               |



**Malnutrition** : A person is said to be suffering from malnutrition if he is eating food having only one component i.e. rice, chapattis and potatoes only. Such people suffer from deficiency diseases.

**Under nutrition** : If a person is not getting sufficient amount of food as per his hunger, he is suffering from under nutrition.

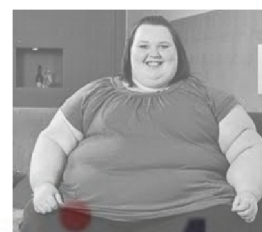


*Vitamin C gets destroyed during cooking due to heat. We should therefore eat raw fruits and vegetables to get adequate vitamin C.*

They occur mainly due to the deficiency of one or more nutrients in the diet over a long period of time. For example, wheat is rich in carbohydrates, but poor in **nutrients like proteins and fats**. Too much intake of wheat products results in a deficiency of proteins and fats, which reduces growth.

#### DEFICIENCY OF CARBOHYDRATE

All our energy requirement comes from carbohydrates and fats. People with carbohydrate deficiency are weak and lack stamina to do work. Too much of carbohydrate is not good for our health. The extra carbohydrate is stored as fat in the body. This leads to obesity and such people are prone to heart diseases.



A fat lady

#### PROTEIN DEFICIENCY DISEASES

Growing children need more protein for their growth and development and so they suffer maximum from this disease. This happens in two ways :

- (1) Lack of proteins or carbohydrates or both in the diet
- (2) More intake of carbohydrate than proteins.

This deficiency causes two types of diseases;

- (a) Kwashiorkor
- (b) Marasmus

**Kwashiorkor** : This disease is very common among the poor people, beggars and labourers. It makes children restless, miserable and they show stunted growth. Belly protrudes out and legs become long and thin. Hair loses luster.

**Marasmus** : This disease is very common in infants below one year of age. It is caused due to undernourishment of proteins and carbohydrates or both. The child suffers from digestive disorder and diarrhoea.

The child shows retarded mental and physical growth. The skin shows a number of foldings and ribs become prominent. Face looks thin and eyes get sunken.

**Prevention and control** : A protein rich diet which includes soya bean, jaggery, wheat, gram, meat etc., can cure the disease.



A protein-rich diet



Kwashiorkor



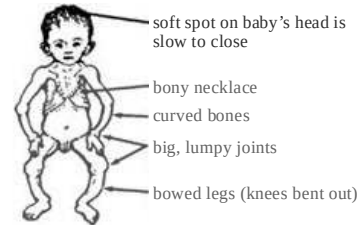
Marasmus

## MINERAL DEFICIENCY DISEASES

### 1. Rickets and osteomalacia

This is caused due to deficiency of vitamin D, calcium and phosphorus in the diet. Rickets occur in small children while osteomalacia occurs in adults. Symptoms include soft bones with deformities. Legs become bow shaped and chest becomes pigeon shaped. Loss of teeth may also occur. In osteomalacia bones become soft and tend to fracture easily.

**Prevention :** Cure lies in consuming animal fats, butter, ghee, milk and eggs. One should also take in plenty of sunlight to produce vitamin D.

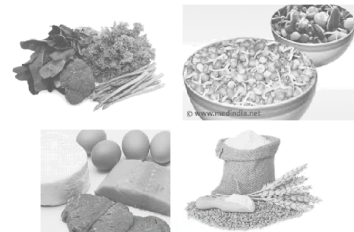


Signs of Rickets

### 2. Anaemia

This is caused due to deficiency of iron in our diet. The iron content in blood decreases due to which the blood is unable to carry full supply of oxygen to the cells of the body. Person suffering from this disease looks pale, gets tired easily and suffers from loss of appetite.

**Prevention :** The disease can be cured by having a diet rich in iron such as green leafy vegetables, eggs, meat, wheat sprouts, turnip, etc.



Iron-rich food

### 3. Goitre

It is caused due to deficiency of iodine in the body. Iodine is necessary for the formation of thyroxine, a hormone of thyroid gland. This hormone controls the growth and metabolic activities of our body. Symptoms include swollen thyroid gland, retarded physical and mental growth.

**Prevention :** Consumption of iodised salt and fish can help in reducing the incidence of goitre.



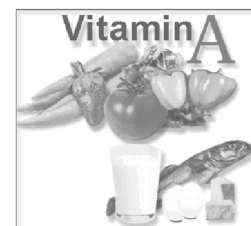
Goitre

## VITAMIN DEFICIENCY DISEASES

### 1. Night blindness

Caused due to deficiency of vitamin A. Person suffering from this disease can't see in dim light. Drying of eye balls occurs as the tear glands do not produce tears.

**Prevention :** Can be prevented by having vitamin A rich food like animal fats, liver, kidney, egg, milk and butter.



Vitamin A-rich diet

### 2. Beri beri

Caused due to deficiency of vitamin B<sub>1</sub>(thiamine). Patients suffering from this disease show extreme weakness and swelling and pain in legs. There is loss in appetite and shortness of breath. Can lead to enlarged heart and paralysis.

**Prevention :** Can be cured by having vitamin B<sub>1</sub> rich food like cereals, wheat, cabbage, carrots, milk and spinach.

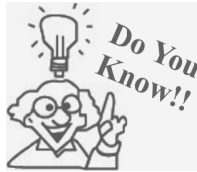


Vitamin B<sub>1</sub> (Thiamine) Rich Foods

### 3. Scurvy

Caused due to deficiency of vitamin C.

Symptoms include general weakness, pain in the joints, reduction in body weight, anaemia, loss of appetite and delay in healing of wounds.



*Scurvy was common among sailors in ancient times. In the 18th century, James Lind found out that eating citrus fruits reduced the occurrence of scurvy in sailors.*

**Prevention :** Can be cured by having vitamin C rich food like oranges, grapes, lemon, fruits, tomatoes, mangoes, amla and all green leafy vegetables.

**Deficiency of water :** Excess loss of water leads to dehydration in the body. The body becomes weak. To recover from dehydration the patient is given ORS (oral rehydration solution).

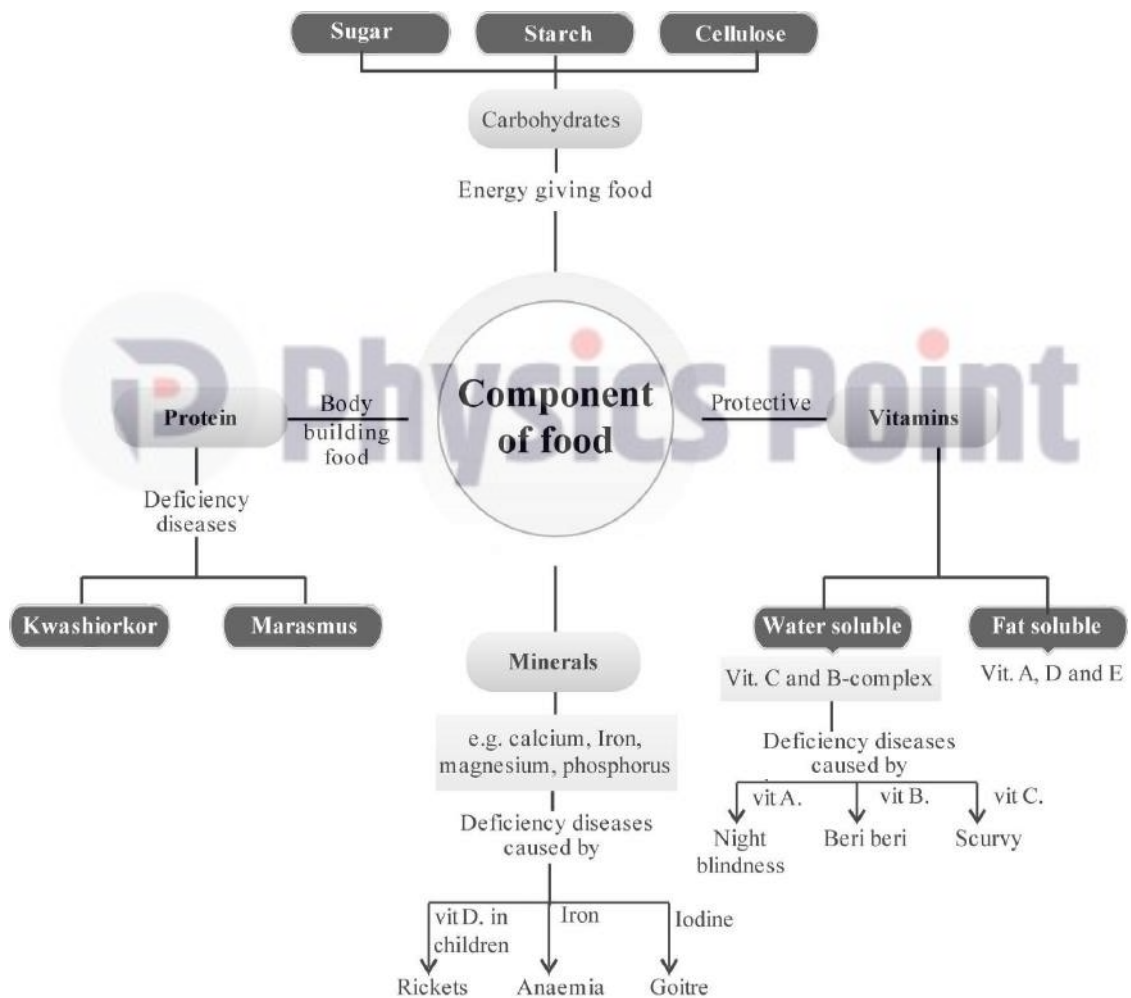


Citrus fruits rich in vit. C

#### Deficiency Diseases

|   | Vitamins/Minerals | Deficiency Diseases | Symptoms                                |
|---|-------------------|---------------------|-----------------------------------------|
| 1 | Vitamin A         | Night blindness     | Poor vision, loss of vision in darkness |
| 2 | Vitamin B1        | Beriberi            | Weak muscles, fatigue                   |
| 3 | Vitamin C         | Scurvy              | Bleeding gums                           |
| 4 | Vitamin D         | Rickets             | Bent bones                              |
| 5 | Calcium           | Osteomalacia        | Weak bones, tooth decay                 |
| 6 | Iodine            | Goitre              | Swelling in neck                        |
| 7 | Iron              | Anaemia             | General weakness, fatigue               |

## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- Components of food are called .....
- Raw potato is a good source of .....
- Amla is the best source of .....
- Food provide us .....
- ..... are rich in fats.
- The major nutrients in our food are ....., ..... and .....
- ..... and ..... provide energy to our body.
- ..... helps in protecting our body against diseases.
- ..... provides all nutrients that our body needs.
- ..... deficiency causes Beriberi diseases.

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

|     | Vitamin and Mineral                                                | Deficiency Disease | T/F |
|-----|--------------------------------------------------------------------|--------------------|-----|
| 1.  | Vitamin A                                                          | Rickets            | ( ) |
| 2.  | Vitamin B                                                          | Scurvy             | ( ) |
| 3.  | Iodine                                                             | Goitre             | ( ) |
| 4.  | Vitamin D                                                          | Rickets            | ( ) |
| 5.  | Iron                                                               | Anaemia            | ( ) |
| 6.  | By eating only vitamins, we cannot remain healthy.                 |                    |     |
| 7.  | By eating proper roughage, we can prevent anaemia.                 |                    |     |
| 8.  | Meat and fish do not make a perfect balanced diet.                 |                    |     |
| 9.  | We need good quantity of vitamins daily to keep ourselves healthy. |                    |     |
| 10. | Fat is not all necessary for good health. It causes obesity only.  |                    |     |

## Match the Column

**DIRECTIONS :** Each questions contains statements given in two columns which have to be matched. Statements (A, B, C, D and E) in column I have to be matched with statements (p, q, r, s and t) in column II.

- |    |                                          |                                                          |
|----|------------------------------------------|----------------------------------------------------------|
| 1. | <b>Column I<br/>(Disease)</b>            | <b>Column II<br/>(Deficient substance)</b>               |
|    | (A) Scurvy                               | (p) Iodine                                               |
|    | (B) Rickets                              | (q) Vitamin D                                            |
|    | (C) Goitre                               | (r) Vitamin A                                            |
|    | (D) Night blindness                      | (s) Vitamin C                                            |
| 2. | <b>Column I<br/>(Components of diet)</b> | <b>Column II<br/>(Functions)</b>                         |
|    | (A) Fats                                 | (p) Keeps our skin and eyes healthy                      |
|    | (B) Vitamin A                            | (q) Helps our body to use calcium for bones and teeth    |
|    | (C) Vitamin D                            | (r) Sources of energy and essential fatty acids in diet. |
|    | (D) Water                                | (s) Act as a lubricant                                   |
| 3. | <b>Column I<br/>(Mineral)</b>            | <b>Column II<br/>(Source)</b>                            |
|    | (A) Iron                                 | (p) Milk and milk products                               |
|    | (B) Calcium                              | (q) Leafy green vegetables                               |
|    | (C) Iodine                               | (r) Protein rich foods like meat, fish                   |
|    | (D) Phosphorus                           | (s) Sea weeds                                            |
| 4. | <b>Column I<br/>(Nutrients)</b>          | <b>Column II<br/>(Function)</b>                          |
|    | (A) Fats & carbohydrate                  | (p) Growth & repair                                      |
|    | (B) Proteins                             | (q) Protect our body against diseases                    |
|    | (C) Vitamins                             | (r) Help to get rid of undigested food                   |
|    | (D) Roughage                             | (s) Provide energy                                       |

- |    |                                |                                                               |
|----|--------------------------------|---------------------------------------------------------------|
| 5. | <b>Column I<br/>(Vitamins)</b> | <b>Column II<br/>(Found in)</b>                               |
|    | (A) A                          | (p) Amla, citrus fruits, tomato.                              |
|    | (B) B <sub>1</sub>             | (q) Sunlight, milk, cod liver oil.                            |
|    | (C) B <sub>2</sub>             | (r) Sea food, milk, cereals.                                  |
|    | (D) C                          | (s) Milk, butter, egg, leafy vegetables.                      |
|    | (E) D                          | (t) Yeast, egg, meat, peas.                                   |
| 6. | <b>Column I<br/>(Minerals)</b> | <b>Column II<br/>(Found in)</b>                               |
|    | (A) Iron                       | (p) Green and yellow vegetables.                              |
|    | (B) Calcium                    | (q) Seafood and iodized salt.                                 |
|    | (C) Potassium                  | (r) Liver, egg, green vegetables and germinated wheat grains. |
|    | (D) Sodium                     | (s) Common salt.                                              |
|    | (E) Iodine                     | (t) Milk, milk products, leafy vegetables.                    |

### Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

- Name the disease in which the patient is not able to see after evening?
- Name the vitamin which is responsible to keep our skin healthy?
- Which food provides instant energy?
- Name the essential component of food, from which an obese person should be restricted?
- Deficiency of which vitamin/mineral results in anaemia?
- Rickets in children is caused by which deficiency of vitamin?
- Which components of food are needed for the growth and repair of our body?
- Which, out of fat and carbohydrates, provides more energy to our body?
- Our body produces which vitamin in the presence of sunlight?
- Which component of food is the major source of energy to our body?
- Write the symptoms of rickets?
- How will you prevent the deficiency diseases?
- Define a balanced diet?
- Glucose is called a source of instant energy. Why?

### Short Answer Types Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

- Which components of food are known as protective food?
- Why proper cooking of food is necessary?
- How do we test fat and starch in food samples? Give one test for each?
- What is dehydration? Does body weight of person increase or decrease when suffering from dehydration?
- Write the symptoms, cause and cure of 'Beri-Beri' disease?
- What is the reason of Obesity?
- Name the disease caused by the deficiency of :  
(a) Iron (b) Vitaminic A  
(c) Vitamin B<sub>1</sub> (d) Vitamin C
- Why do living organisms need food?
- What are the major nutrients needed for the growth of our body?
- What are vitamins? State the functions of vitamin A and C in our body?
- What are dietary fibres? Explain their importance in our body?
- (a) What are carbohydrates? Give an example.  
(b) In which forms are carbohydrates found in our food?
- Why parents are advised to discourage their children to eat chips and junk foods?
- Why should we eat a balanced diet? Name the vitamin that gets destroyed on heating?
- What are nutrients?
- Why do deficiency diseases occur?
- How can we recover from deficiency diseases?
- If you do not take balanced diet, what will happen?
- If vitamin 'A' is lacking in a person's diet, which disease he may suffer?
- Name the deficiency disease due to the lack of calcium.
- Does roughage provide any nutrient to the body?

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

- How will you test the presence of proteins in food items?
- (a) Why do we need water in our food?  
(b) Why vegetables should not be washed after cutting? Why food should not be overcooked?



## 2

## EXERCISE

## Text Book Questions

- Name the major nutrients in our food.
- Name the following:
  - The nutrients which mainly give energy to our body.
  - The nutrients that are needed for the growth and maintenance of our body.
  - A vitamin required for maintaining good eyesight.
  - A mineral that is required for keeping our bones healthy.
- Name two foods each rich in:
  - Fats
  - Starch
  - Dietary fibre
  - Protein
- Tick (✓) the statements that are correct.
  - By eating rice alone, we can fulfill nutritional requirement of our body.
  - Deficiency diseases can be prevented by eating a balanced diet.
  - Balanced diet for the body should contain a variety of food items.
  - Meat alone is sufficient to provide all nutrients to the body.
- Fill in the blanks.
  - \_\_\_\_\_ is caused by deficiency of Vitamin D.
  - Deficiency of \_\_\_\_\_ causes a disease known as beri-beri.
  - Deficiency of Vitamin C causes a disease known as \_\_\_\_\_.
  - Night blindness is caused due to deficiency of \_\_\_\_\_ in our food.
- (f) tfa \_\_\_\_\_.
- Which of the following food items does not provide any nutrient?  
Milk, Water, Orange Juice, Tomato soup
- Read the items of food listed below. Classify them into carbohydrate rich, protein rich and fat rich foods.  
Moong dal, fish, mustard oil, sweet potato, milk, rice, egg, beans, butter, buttermilk (chhachh), cottage cheese (paneer), peas, maize, white bread
- Tasty food is not always nutritious and nutritious food may not always be tasty to eat. Comment with examples.
- While using iodine in the laboratory, some drops of iodine fell on Paheli's socks and some fell on her teacher's saree. The drops of iodine on the saree turned blue-black while their colour did not change on the socks. What can be the possible reason?
- Paheli and Boojho peeled some potatoes and cut them into small pieces. They washed and boiled them in water. They threw away the excess water and fried them in oil adding salt and spices. Although the potato dish tasted very good, its nutrient value was less. Suggest a method of cooking potatoes that will not lower the nutrients in them.
- Paheli avoids eating vegetables but likes to eat biscuits, noodles and white bread. She frequently complains of stomachache and constipation. What are the food items that she should include in her diet to get rid of the problem? Give reason for your answer.

## NCERT Exemplar Questions

- Unscramble the following words related to components of food and write them in the space provided.
  - Reinpot \_\_\_\_\_.
  - Menliars \_\_\_\_\_.
  - Tivanmi \_\_\_\_\_.
  - Bocatradyher \_\_\_\_\_.
  - Nitesturn \_\_\_\_\_.
- (i) List all those components of food that provide nutrients.  
(ii) Mention two components of food that do not provide nutrients.
- 'Minerals and vitamins are needed in very small quantities by our body as compared to other components, yet, they are an important part of a balanced diet.' Explain the statement.
- Water does not provide nutrients, yet it is an important component of food.' Explain.

11. Boojho was having difficulty in seeing things in dim light. The doctor tested his eyesight and prescribed a particular vitamin supplement. He also advised him to include a few food items in his diet.
- which deficiency disease is he suffering from?
  - Which food component may be lacking in his diet?
  - Suggest some food items that he should include in his diet. (any four)

### HOTS Questions

- Name three aquatic plants eaten by us as food?
- Why is milk considered as complete food?
- List three common plants having medicinal use?
- Does honey bee eat honey as a food?
- Why should we do not wash vegetable after cutting them?
- How can you prepare ORS with sugar and salts?
- Why should we do not drink cold drink like coca cola, pepsi?
- Make list of diet chart of pregnant women?

## 3

## EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

- Scurvy is
  - a deficiency disease caused due to deficiency of vitamin C.
  - a deficiency disease caused due to deficiency of vitamin D.
  - a deficiency disease caused due to deficiency of vitamin A.
  - a deficiency disease caused due to deficiency of minerals.
- Iron, a biological nutrient, is found in human body in
  - bones
  - blood
  - hair
  - All of these
- We consider eating fish to be healthy as compared to flesh of other animals because fish contains
  - essential vitamins
  - essential fatty acids
  - more carbohydrates and proteins
  - all the nutrients of food
- In addition to proteins and carbohydrates, the other elements of nutritional value in milk include
  - potassium and iron
  - calcium and potassium
  - calcium, potassium and iron
  - calcium and iron
- Two richest known sources of edible protein are
  - soyabean and groundnut
  - some algae and micro-organisms
  - meat and eggs
  - milk and leafy vegetables
- The vitamin containing cobalt is
  - B<sub>1</sub>
  - B<sub>2</sub>
  - B<sub>6</sub>
  - B<sub>12</sub>
- The main difference between raw soyabean and cooked soyabean is in respect of
  - protein content
  - biological value of proteins
  - amino acid composition
  - None of these
- Which of the following nutrients is provided by vegetables?
  - Fats
  - Sugars
  - Minerals
  - None of these
- A component of food is known as 'body building food'. It is called
  - proteins and is obtained from plant sources
  - proteins and is obtained from animal sources
  - proteins and is obtained both from plant sources and animal sources
  - minerals, and is obtained from both plant sources and animals source
- Select the component that is obtained only from plant sources.
  - Carbohydrates
  - Proteins
  - Roughages
  - Vitamins

11. Ghee and butter are major source of
  - (a) protein (b) fats
  - (c) vitamins (d) minerals
12. Choose the cereal among the following
  - (a) Mustard (b) Almond
  - (c) Wheat (d) Grain
13. Select the one that is rich in proteins.
  - (a) Cucumber (b) Gram
  - (c) Wheat (d) Maize
14. Carbohydrates and fats containing food are called
  - (a) protective foods
  - (b) fibrous foods
  - (c) body building foods
  - (d) energy giving foods
15. The deficiency of which of the following may cause the disease called scurvy?
  - (a) Vitamin A (b) Vitamin C
  - (c) Vitamin D (d) Calcium
16. Food rich in roughages are
  - (a) fried foods
  - (b) pulses
  - (c) noodles
  - (d) fruits and vegetables
17. Which one of the following minerals is needed for the proper functioning of thyroid gland?
  - (a) Iron (b) Iodine
  - (c) Calcium (d) Phosphorus
18. Mainly pulses are the source of
  - (a) protein (b) carbohydrate
  - (c) fat (d) None of these
19. The disease called anaemia is caused due to the deficiency of which of the following?
  - (a) Iron (b) Calcium
  - (c) Phosphorus (d) Vitamin A
20. Guava is a source of which of the following vitamins?
  - (a) Vitamin A (b) Vitamin B
  - (c) Vitamin C (d) Vitamin D
21. Starch is a kind of
  - (a) carbohydrate (b) fat
  - (c) protein (d) vitamin
22. A food sample is taken in a test-tube and a few drops of iodine solution were added to it. It was observed that the solution turned blue black. It shows the presence of which one of the following component in the food sample?
  - (a) Proteins (b) Carbohydrate
  - (c) Fat (d) Vitamins
23. A paste of food item was taken in a test-tube and to it was added a few drops of copper sulphate solution followed by caustic soda solution. A violet colour was observed in the test-tube after a few minutes. It shows the presence of which one of the following components in the food sample?
  - (a) Proteins (b) Carbohydrates
  - (c) Fats (d) None of these
24. Which of the following is correct about function of fats in our body?
  - (a) They are sources of energy.
  - (b) They are sources of essential fatty acids
  - (c) Both the above
  - (d) None of the above
25. Which is not correct?
  - (a) Sea weeds and sea water are sources of iodine.
  - (b) Protein rich foods like meat, fish, poultry are good sources of phosphorus.
  - (c) Cereal grains do not provide phosphorus.
  - (d) Dried beans and egg contain appreciable amounts of phosphorus.
26. Repeated washings of rice may result in loss of
  - (a) vitamins
  - (b) minerals
  - (c) both vitamins and minerals
  - (d) neither of vitamins nor of minerals
27. Use of excess water during cooking may cause loss of
  - (a) vitamins and minerals
  - (b) proteins and minerals
  - (c) vitamins and proteins
  - (d) None of these
28. Which of the following features belong to fats?
  - (a) They insulate our body against loss of heat
  - (b) They are the sources of energy in diet
  - (c) They are the sources of fatty acids in diet
  - (d) All of the above
29. A person takes more food than his requirement. He is too fat. He may be suffering from which one of the following diseases?
  - (a) Anaemia (b) Beri-beri
  - (c) Scurvy (d) Obesity
30. The fat soluble vitamins are
  - (a) vitamin B and vitamin C
  - (b) vitamin A, vitamin D, vitamin E
  - (c) vitamin A and vitamin B
  - (d) None of the above

31. Stunted growth, swelling of face, discolouration of hair, skin diseases and diarrhoea are the symptoms of  
 (a) protein deficiency  
 (b) fat deficiency  
 (c) imbalanced diet  
 (d) Both (a) and (c)
32. Swollen glands in neck, mental disability in children are the symptoms of deficiency of a mineral which is present in  
 (a) salt (b) sugar  
 (c) chilli (d) lemon
33. Find the odd one out.  
 (a) Maize (b) Sugarcane  
 (c) Grass (d) Cotton
34. What happens during digestion?  
 (a) Food is changed to different forms  
 (b) Soluble food is taken up by blood  
 (c) Blood supplies nutrients to the body  
 (d) Both (a) and (b)
35. Which of the following foodstuffs does not contain proteins?  
 (a) Egg-white (b) Curd  
 (c) Chana (d) Ragi
36. Which nutrient can be identified by using copper sulphate and caustic soda?  
 (a) Carbohydrates (b) Proteins  
 (c) Fats (d) Vitamins
37. Why should we have dietary fibres in our food?  
 (a) Fibres provide much more energy  
 (b) Fibres protect our body from diseases  
 (c) Fibres help to get rid of undigested food  
 (d) Fibres help in water retention
38. People who suffer from \_\_\_\_\_ may have too much sugar in their blood  
 (a) diabetes  
 (b) high blood pressure  
 (c) obesity  
 (d) Rickets
39. Excessive intake of sodium may lead to \_\_\_\_\_  
 (a) diabetes  
 (b) typhoid  
 (c) high blood pressure  
 (d) anaemia
40. Which of these give more nutrients?  
 I. Dalia  
 II. Fruit juice  
 III. Chapatis of maida  
 IV. Fruits and vegetables with peels  
 (a) Only II (b) Only I and II  
 (c) Only I, II and III (d) Only I, II and IV
41. Which of the following is the quickest source of energy?  
 (a) Sugar (c) Proteins  
 (b) Starch (d) Fats
42. If you did not eat fresh fruits and vegetables, your body would be deficient in  
 (a) Vitamin A (b) Vitamin C  
 (c) Vitamin B (d) Vitamin D
43. Which mineral is essential for formation of strong bones and muscles?  
 (a) Calcium (b) Phosphorus  
 (c) Iron (d) Potassium
44. Our body weight comprises most of \_\_\_\_\_  
 (a) fats (b) proteins  
 (c) carbohydrates (d) potassium
45. Raju is a 10 year old boy but he is obese. This is because he is \_\_\_\_\_  
 (a) overeating carbohydrates and fats  
 (b) not eating enough carbohydrates and fats  
 (c) overeating proteins  
 (d) not eating enough proteins
46. For strong bones and teeth which two minerals are needed the most?  
 (a) Iron and sodium  
 (b) Iron and calcium  
 (c) Iodine and fluorine  
 (d) Calcium and phosphorus
47. Iron is a \_\_\_\_\_  
 (a) vitamin (b) fat  
 (c) mineral (d) protein
48. Which one of the following is an excellent source of calcium?  
 (a) Broccoli (b) Nuts  
 (c) Meat (d) Grains
49. Deficiency of which vitamin causes rickets?  
 (a) Vitamin A (b) Vitamin D  
 (c) Vitamin B (d) Vitamin C
50. Deficiency of vitamin A causes \_\_\_\_\_  
 (a) beri beri (b) night blindness  
 (c) scurvy (d) rickets
51. Spinach is an excellent source of \_\_\_\_\_  
 (a) calcium (b) iron  
 (c) phosphorus (d) iodine
52. Choose an incorrect match
- | Minerals       | Deficiency disease |
|----------------|--------------------|
| (a) Calcium    | Scurvy             |
| (b) Iron       | Anaemia            |
| (c) Phosphorus | Rickets            |
| (d) Iodine     | Goitre             |

53. Which of the following nutrient if taken in excess can cause clogging of arteries?  
 (a) Oil yielding plants  
 (b) Medicinal plants  
 (c) Food plants  
 (d) None of these
54. Which of the following nutrient if taken in excess can cause clogging of arteries?  
 (a) Proteins (b) Fats  
 (c) Vitamins (d) Roughage
55. Which of the following have higher nutritive value and why?  
 (a) P, because it gives more energy  
 (b) Q because it gives more proteins  
 (c) P because it gives more proteins and energy  
 (d) Q because it gives more energy and proteins
56. A balanced diet is one which contain  
 (a) all nutrients that are body needs and that too in right proportions.  
 (b) all nutrients but more of carbo-hydrates and fats.  
 (c) Both (a) and (b)  
 (d) None of these
57. We must not use excess water during cooking as it may  
 (a) result in loss of carbohydrates  
 (b) result in loss of minerals and proteins  
 (c) result in loss of fats  
 (d) Both (b) and (c)
58. Obesity is caused when one takes more food than needed. It is caused because  
 (a) extra food is stored as fat  
 (b) extra food is not properly digested  
 (c) extra food is stored as starch  
 (d) None of these
59. Goitre is common in hilly areas because  
 (a) soil of hilly areas is poor in iodine content  
 (b) drinking water as well as food grown in these areas are deficient in iodine  
 (c) Both (a) and (b)  
 (d) None of these
60. How many grams of copper sulphate be dissolved in 100 ml of water to prepare copper sulphate solution for testing the presence of proteins in a food item?  
 (a) 1 (b) 2  
 (c) 3 (d) 4
61. Rajesh went to a dentist. He complained about swelling and bleeding gums. In your opinion he is suffering from which of the following diseases?  
 (a) Beri- beri  
 (b) Neurological disorder  
 (c) Scurvy  
 (d) Rickets
62. Select the features that belong to fats  
 (a) richest sources of energy  
 (b) insulate our body against loss of heat  
 (c) Both (a) and (b)  
 (d) None of these
63. Ritu often complains of dry skin and is unable to see properly in dim light. She is suffering from  
 (a) anaemia (b) night-blindness  
 (c) beri- beri (d) None of these
64. Which of the following helps our body to absorb nutrient from food and also helps in throwing out some wastes from body as urine and sweat?  
 (a) Carbohydrates (b) Fats  
 (c) Dietary fibres (d) Water
65. The essential components of food that are needed by our body are called \_\_\_\_\_.  
 (a) Ingredients (b) Nutrients  
 (c) Fruits and Vegetables (d) Minerals
66. Which of the following are major nutrients in our food?  
 (a) Carbohydrates, fats, proteins  
 (b) Dietary, fibre, water  
 (c) Minerals, Vitamins  
 (d) Both (a) and (c)
67. Starch and sugars are types of \_\_\_\_\_.  
 (a) Proteins (b) Fats  
 (c) Carbohydrates (d) Vitamins
68. Kamla puts 2-3 drops of Iodine solution on cooked rice. It turned blue-black. This shows that \_\_\_\_\_ is present.  
 (a) Fat (b) Protein  
 (c) Carbohydrate (d) Mineral
69. When \_\_\_\_\_ and \_\_\_\_\_ are added to food containing protein, it turns violet.  
 (a) Copper sulphate and calcium carbonate.  
 (b) Caustic soda and copper sulphate  
 (c) Sodium and copper carbonate  
 (d) Water and copper sulphate
70. An oily patch of a food item on paper shows the presence of \_\_\_\_\_.  
 (a) Carbohydrate (b) Vitamin  
 (c) Roughage (d) Fats
71. Foods rich in carbohydrates and fats are called \_\_\_\_\_.  
 (a) Body building food  
 (b) Energy giving food  
 (c) Protective food  
 (d) None



72. \_\_\_\_\_ helps in protecting our body from diseases and infections.  
 (a) Carbohydrate (b) Fats  
 (c) Vitamins (d) Proteins
73. Dietary fibres are also known as \_\_\_\_\_.  
 (a) Waste food  
 (b) Undigested food  
 (c) Roughage  
 (d) Digested food
74. Which of the following is/are the functions of water?  
 (a) It helps in keeping our skin moist.  
 (b) Transports materials inside our body  
 (c) Maintains body temperature  
 (d) All of these
75. Water helps in throwing out wastes from our body in the form of \_\_\_\_\_.  
 (a) Sweat (b) Urine  
 (c) both (a) & (b) (d) Blood
76. A well balanced diet is one that contains all \_\_\_\_\_ nutrients along with roughage and water.  
 (a) 4 (b) 3  
 (c) 2 (d) 5
77. Why is cooking essential?  
 (a) It improves the taste of food.  
 (b) Cooked food is easy to digest.  
 (c) Cooking destroys nutrients.  
 (d) Both (a) and (b).
78. Deficiency of Vitamin C causes \_\_\_\_\_.  
 (a) Loss of vision (b) Beri beri  
 (c) Scurvy (d) Rickets
79. Which of the following vitamins are produced in our body when exposed to sunlight in the morning?  
 (a) Vitamin A (b) Vitamin B  
 (c) Vitamin D (d) Vitamin K
80. Rickets is caused due to deficiency of \_\_\_\_\_.  
 (a) Calcium (b) Vitamin D  
 (c) Iron (d) Vitamin B
81. Which of the following vitamin is lost due to heating?  
 (a) Vitamin A (b) Vitamin C  
 (c) Vitamin B (d) Vitamin D
82. Which of the following symptoms is shown by a person whose diet lacks proteins?  
 (a) Obesity  
 (b) Loss of vision  
 (c) Weak bones  
 (d) Swelling of face
83. If there is a swelling in neck region, the person may be suffering from-  
 (a) Anaemia (b) Goitre  
 (c) Scurvy (d) Marasmus
84. Which of the following minerals is needed for strong bones?  
 (a) Sodium (b) Iron  
 (c) Calcium (d) Phosphorus

### Statement Based Questions

**DIRECTIONS :** Read the following statements carefully and choose the correct option.

- (i) Our body needs a variety of food.  
 (ii) Our meal may consist of chapati, dal, brinjal, curry, curd, pickle etc.  
 (iii) While travelling we may eat whatever is available on the way.  
 (a) Statement (i) is correct and (ii) & (iii) are false.  
 (b) Statement (iii) is true and (i) & (ii) are false.  
 (c) All are true.  
 (d) Statement (i) and (iii) is true and (ii) is false.
- (i) We can test the presence of starch using caustic soda solution.  
 (ii) Proteins can be tested using iodine.  
 (a) (i) is true but (ii) is false.  
 (b) Both are true.  
 (c) (i) is false but (ii) is true.  
 (d) Both are false.
- (i) Our food contains different types of carbohydrates.  
 (ii) Carbohydrates are body building foods.  
 (iii) Fruits and vegetables are rich sources of carbohydrates.  
 (a) (i) is true but (ii) & (iii) are false.  
 (b) All are true.  
 (c) (ii) is true but (i) and (iii) are false.  
 (d) All are false.
- (i) Fats give more energy than carbohydrates.  
 (ii) Oil, butter, milk contain fats.  
 (a) (i) is correct, (ii) is incorrect.  
 (b) (ii) is correct, (i) is correct.  
 (c) Both are correct.  
 (d) Both are incorrect.
- (i) Vitamins and minerals are needed in small quantities.  
 (ii) There are many kinds of vitamins.  
 (iii) Some vitamins are water soluble.  
 (a) (i) is true, (ii) and (iii) are false.  
 (b) (i) is false, (ii) and (iii) are true.  
 (c) All are true.  
 (d) All are false.
- (i) Carbohydrates and fats are needed in large quantities by our body.  
 (ii) Water and fibre are important to prevent constipation.  
 (a) (i) is correct but (ii) is incorrect.  
 (b) (i) is incorrect but (ii) is correct.



- (c) Both are correct.  
(c) Both are incorrect.
7. (i) In a given raw food, one nutrient is present in much larger quantity than others.  
(ii) Rice is a protein rich food.  
(iii) Potato is a carbohydrate rich food.  
(a) (i) is true but (ii) & (iii) are false.  
(b) (ii) is true but (i) & (iii) are false.  
(c) (i) and (iii) are true but (ii) is false.  
(d) All are true.
8. (i) Roughage helps in building and repairing of tissues.  
(ii) Whole grains, pulses, fruits and vegetables are rich sources of roughage.  
(a) (i) is true but (ii) is false.  
(b) Both are true  
(c) (ii) is true but (i) is false.  
(d) Both are false
9. We get most of water that our body needs from liquids that we drink such as milk, tea, juices etc.  
(i) Water is also present in some amount in all food items.  
(ii) About 70% of our body is water.  
(a) Only (i) is correct  
(b) (ii) and (iii) are only correct  
(c) Only (iii) is correct.  
(d) All are correct.
10. (i) The balance diet of each one is same.  
(ii) Eating a well balanced diet is very expensive.  
(a) Only (i) is correct.  
(b) Both are correct.  
(c) Only (ii) is correct.  
(d) Both are incorrect.
11. (i) Cooking is not at all essential.  
(ii) There is loss of some nutrients during cooking.  
(a) Only (i) is true  
(b) Only (ii) is true  
(c) Both are true  
(d) Both are false
12. (i) There is no harm if a child eats too much of junk food.  
(ii) Obesity is caused due to lack of proteins in diet.  
(a) Only (i) is correct  
(b) Only (ii) is correct  
(c) Both are correct  
(d) Both are incorrect
13. (i) Eating a mere balanced meal is very important to maintain a healthy body.  
(ii) Exercise and proper sleep is not very important for our health.  
(a) Only (i) is correct  
(b) Only (ii) is correct
- (c) Both are correct  
(d) Both are incorrect
14. (i) Lack of adequate protein leads to stunted growth.  
(ii) Lack of Vitamin C causes poor vision.  
(a) Only (i) is correct  
(b) Only (ii) is correct  
(c) Both are correct  
(d) Both are incorrect
15. (i) Iron is a mineral that is needed for haemoglobin in blood.  
(ii) Calcium helps in strengthening teeth and bones.  
(iii) Iodine deficiency causes scurvy  
(a) (i) and (ii) are true but (iii) is false.  
(b) (ii) and (iii) are true but (i) is false.  
(c) All are true.  
(d) All are false

### Figure/Diagram Based Questions

**DIRECTIONS :** Carefully observe the following pictures/figures and answer the questions.



1. Observe the above experiment carefully. What does this experiment prove?  
(a) Raw potato contains starch  
(b) Raw potato contains proteins  
(c) Raw potato contains fats  
(d) Raw potato contains Vitamins.
2. Look at the experiment being conducted by Raj. A colour indicates the presence of protein in the food item.



- (a) Blue black  
(b) Violet  
(c) Red  
(d) Green

3.



The food items shown in the figure are sources of mainly \_\_\_\_\_.

- (a) Fats (b) Carbohydrates  
(c) Vitamins (d) Proteins

4. Study the figure given below. Which group of food do they belong to.



- (a) Vitamins (b) Proteins  
(c) Fats (d) Carbohydrates

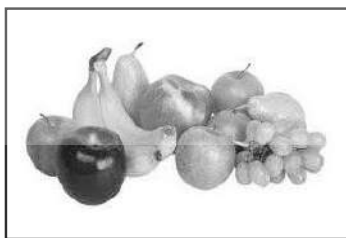
5.



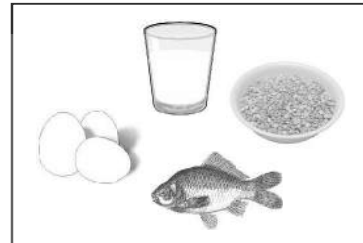
Identify the nutrients and the sources of nutrients present in these food items.

- (a) fats, plants  
(b) proteins, plants  
(c) proteins, animals  
(d) carbohydrates, plants

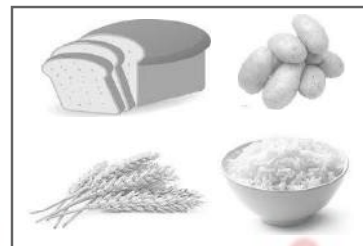
6. Study the figures given below. Which of these are protective foods?



P

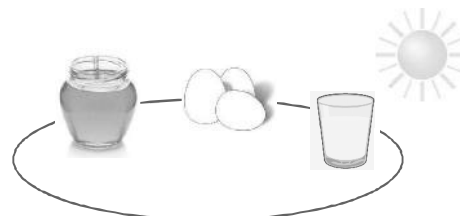


Q



R

- (a) P only (b) Q and P  
(c) R and Q (d) All of these
7. Which of the following vitamin is present in the given substances?



- (a) Vitamin E (b) Vitamin B  
(c) Vitamin D (d) Vitamin A
8. Match the following sources to the vitamins they are rich in.



(a) Vitamin C



(b) Vitamin A



(iii)

(c) Vitamin B



French fries

- (a) (i) → B; (ii) → C; (iii) → A  
 (b) (i) → C; (ii) → A; (iii) → B  
 (c) (i) → A; (ii) → C; (iii) → B  
 (d) (i) → B; (ii) → B; (iii) → C

- (a) Cola  
 (c) Cake

- (b) Oranges  
 (d) French fries

9.



Salt

Look at the above food items. These are rich in a mineral that is abundant in sea animals. Can you name the mineral.

- (a) Iron (b) Phosphorus  
 (c) Iodine (d) Calcium

10.



X

Y

Z

Look at the above food sources which one would you advise to strengthen bones.

- (a) Only X (b) Only Y  
 (c) Only Z (d) Both X and Y

11. Which of the following is needed to prevent constipation.



Cola

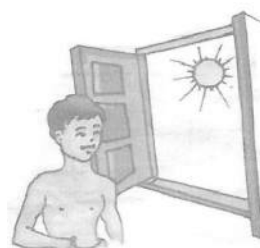


Oranges



Cake

12.



Manoj stands in the sun every morning so that his body can make \_\_\_\_\_.

- (a) Vitamin A (b) Vitamin C  
 (c) Vitamin D (d) Vitamin B

13. The food items shown in the figure are sources of mainly of

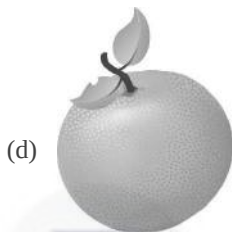
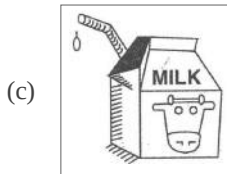
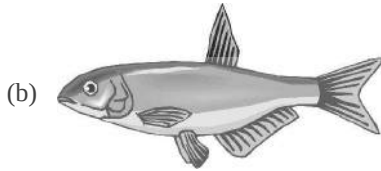


- (a) fats (b) carbohydrates  
 (c) proteins (d) vitamins.

14. You read a healthy diet that also contain fibre rich food in it. Can you identify the fibre rich food among the following

(a)

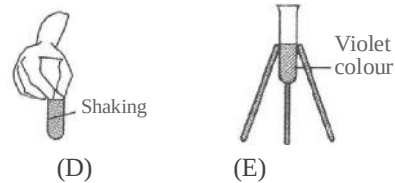
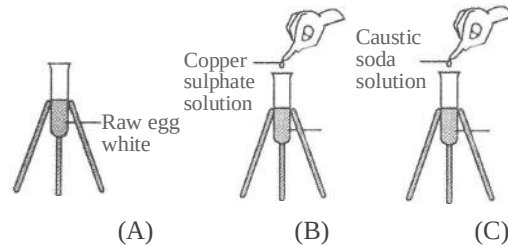




15. Select the one which is not a part of salad?

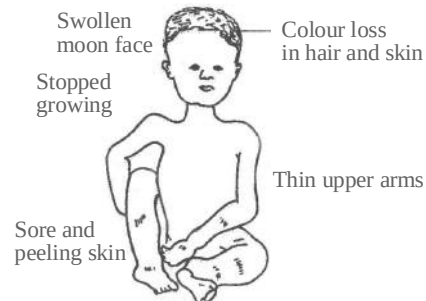


16. Observe the given experimental figures carefully. What does this experiment prove?



- (a) Raw egg white contains proteins
- (b) Raw egg white contains carbo-hydrates
- (c) Raw egg white contains fats
- (d) Raw egg white contains iodine

17. The child in the given figure is suffering from a deficiency disease. This disease is caused due to deficiency of



- (a) carbohydrates
- (b) proteins
- (c) fats
- (d) vitamins

### Matching Based Questions

**DIRECTIONS :** Match Column-I with Column-II and select the correct answer using the code given below the columns.

| 1.  | Column I   | Column II                  |
|-----|------------|----------------------------|
| (A) | Punjab     | (p) dhokla, thepla         |
| (B) | Tamil Nadu | (q) dal bati, churma       |
| (C) | Rajasthan  | (r) makki roti, sarso saag |
| (D) | Gujarat    | (s) idli, sambar           |

- (a) A → s; B → r; C → p; D → q  
 (b) A → r; B → s; C → p; D → q  
 (c) A → r; B → s; C → q; D → p  
 (d) A → q; B → s; C → p; D → r
2. **Column I** **Column II**  
 (A) Starch (p) Oily patch  
 (B) Protein (q) violet  
 (C) fats (r) blue-black  
 (a) A → p; B → q; C → r  
 (b) A → r; B → p; C → q  
 (c) A → q; B → p, C → q  
 (d) A → r; B → q; C → p
3. **Column I** **Column II**  
 (A) Energy giving food (p) Vitamin  
 (B) Body building food (q) Protein  
 (C) Protective food (r) Carbohydrate  
 (a) A → q; B → r; C → p  
 (b) A → p; B → r; C → q  
 (c) A → r; B → p; C → q  
 (d) A → r; B → q; C → p
4. **Column I** **Column II**  
 (A) Amla (p) Vitamin A  
 (B) Salt (q) Protein  
 (C) egg yolk (r) Vitamin C  
 (D) carrot (s) Iodine  
 (a) A → p; B → r; C → s; D → q  
 (b) A → r; B → s; C → q; D → p  
 (c) A → r; B → s; C → p; D → q  
 (d) A → q; B → p; C → s; D → r
5. **Column I** **Column II**  
 (A) Growth and repair (p) Fibre  
 (B) Gums and teeth (q) Fats  
 (C) Bowel movement (r) Vitamin  
 (D) Energy (s) Protein  
 (a) A → s; B → r; C → p; D → q  
 (b) A → q; B → s; C → p; D → r  
 (c) A → p; B → q; C → r; D → s  
 (d) A → r; B → s; C → q; D → p
6. **Column I** **Column II**  
 (A) Nuts (p) Vitamin  
 (B) Bajra (q) Protein  
 (C) Milk (r) Carbohydrate  
 (D) Tomato (s) Fats  
 (a) A → s; B → s; C → p; D → q  
 (b) A → s; B → r; C → q; D → p  
 (c) A → q; B → p; C → r; D → s  
 (d) A → s; B → q; C → s; D → r
7. **Column I** **Column II**  
 (A) Rickets (p) Iodine  
 (B) Anaemia (q) Vitamin B  
 (C) Beriberi (r) Vitamin D  
 (D) Goitre (s) Iron  
 (a) A → q; B → r; C → s; D → p  
 (b) A → s; B → p; C → q; D → r  
 (c) A → r; B → s; C → q; D → p  
 (d) A → p; B → q; C → r; D → s
8. **Column I** **Column II**  
 (A) Calcium (p) sea food  
 (B) Iron (q) milk  
 (C) Iodine (r) spinach  
 (a) A → r; B → p; C → q  
 (b) A → p; B → q; C → r  
 (c) A → q; B → p; C → r  
 (d) A → q; B → r; C → p
9. **Column I** **Column II**  
 (A) Vitamin A (p) Bones  
 (B) Vitamin K (q) Gums  
 (C) Vitamin C (r) Skin and eyes  
 (D) Vitamin D (s) Blood clotting  
 (a) A → s; B → p; C → q; D → r  
 (b) A → r; B → s; C → q; D → p  
 (c) A → q; B → r; C → p; D → s  
 (d) A → p; B → s; C → q; D → r
10. **Column I** **Column II**  
 (A)  (p) Iodine  
 (B)  (q) Vitamin B  
 (C)  (r) Vitamin D  
 (D)  (s) Iron  
 (a) A → p; B → r; C → q; D → s  
 (b) A → s; B → r; C → p; D → q  
 (c) A → s; B → p; C → q; D → r  
 (d) A → q; B → p; C → s; D → r



### Passage Based Questions

**DIRECTIONS :** Read the passage(s) given below and answer the following questions.

#### Passage I

Carbohydrates mainly provide energy to our body. Fats also give us energy. In fact, fats give much more energy as compared to the same amount of carbohydrates. Foods containing fats and carbohydrates are called energy giving foods.

- Which of the following is not a plant source of fats?  
(a) Ground nuts (b) Milk  
(c) Coconut oil (d) Til
- Which one will give more energy for the same quantity?  
(a) Mango (b) Melon  
(c) Maize (d) Milk
- Which cereal is called the “carbohydrate rich” source of food?  
(a) Wheat (b) Rice  
(c) Maize (d) Barley

#### Passage II

For growth and maintainance of good health, our diet should have all the nutrients that our body needs, in right quantities. The diet should also contain good amount of roughage and water. Such a diet is called balanced diet.

- India is a developing country and a large number of its population is not getting a balanced diet because  
(a) balanced diet is quite expensive.  
(b) balanced diet need not contain roughage and water.  
(c) roughages do not provide any nutrient to our body.  
(d) All of the above
- Some nutrients get lost in the process of cooking and preparations. Which of the following nutrients is generally lost if vegetables and fruits are washed after cutting or peeling them?  
(a) Carbohydrates (b) Proteins  
(c) Vitamins (d) All of these
- Which of the following gets easily destroyed by heat during cooking?  
(a) Vitamin A (b) Vitamin B  
(c) Vitamin C (d) Vitamin D

#### Passage III

Deficiency of one or more nutrients can cause diseases or disorders in our body. Diseases that occur due to

lack of nutrients over a long period are called deficiency diseases.

- The deficiency of iron in our diet results into a diseases called  
(a) rickets (b) goitre  
(c) scurvy (d) anaemia
- If a person does not get enough proteins in food for a long time. He is likely to have  
(a) stunted growth  
(b) swelling of face  
(c) discolouration of hair  
(d) All of the above
- Which of the following is a symptoms of deficiency of vitamin D?  
(a) Bones became soft and bent  
(b) Weak bones and tooth decay  
(c) Bleeding gums, wounds take longer time to heal  
(d) Poor vision

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as “assertion A” and the other labelled as “reason R”. You are to examine these two statements carefully and decide if the assertion A and reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

- Assertion (A) :** Deficiency of calcium causes rickets.

**Reason (R) :** In our diet milk and milk products are the major source of calcium.

- Assertion (A) :** Foods containing proteins are called body building foods.

**Reason (R) :** Paneer is a plant source of protein.

- Assertion (A) :** Dried beans and eggs contain appreciable amounts of phosphorus.

**Reason (R) :** Milk and dairy products are excellent sources of phosphorus.

- Assertion (A) :** Obesity occurs when one takes more food than requirement.

**Reason (R) :** The extra food gets stored as fat and the person becomes too fat.



# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- Nutrients
- Carbohydrate
- Vitamin C
- Energy
- Oil and ghee
- Proteins, Vitamins and Minerals
- Carbohydrates and fats
- Vitamins
- Balance diet
- Vitamin B 1

### True/False

- |          |           |
|----------|-----------|
| 1. False | 2. False  |
| 3. True  | 4. True   |
| 5. True  | 6. True   |
| 7. False | 8. True   |
| 9. False | 10. False |

### Match the Column

- A → (s); B → (q); C → (p); D → (r)
- A → (r); B → (p); C → (q); D → (s)
- A → (q); B → (p); C → (s); D → (r)
- A → (s); B → (p); C → (q); D → (r)
- A → (s); B → (r); C → (t); D → (p); E → (q)
- A → (r); B → (t); C → (p); D → (s); E → (q)

### Very Short Answer Type Questions

- Night blindness.
- Vitamin C.
- Glucose.
- Fat.
- Iron.
- Vitamin D.
- Carbohydrates and proteins.
- Fat.

- Vitamin D.
- Carbohydrate.
- Soft and bent bones.
- By eating a balanced diet.
- A diet that contains all the nutrients needed for the growth and maintenance of a good health is called a balanced diet. It should also contain good amount of roughage and water.
- Glucose directly enters the blood stream and produces energy through respiration immediately. Hence, it acts as a source of instant energy.

### Short Answer Type Questions

- Vitamins and minerals are called protective foods.  
They protect our body against diseases.
- Proper cooking is required because:
  - Proper cooking kills various germs.
  - It makes food easily digestible.
  - It makes food tasty.
- Take a small quantity of food item and wrap it in a piece of paper and crush it. An oily patch on paper shows the presence of fat in that food item.  
Starch testing is done by using iodine solution. Appearance of blue black colour shows presence of starch.
- Removal of water from body in excess quantity is called dehydration. It reduces body weight.
- In Beri-Beri, nervous system is affected which causes weak muscles and little energy to work. It is caused due to deficiency of vitamin B, found in seafood, milk, meat, peas, cereals and green vegetables.
- Eating too much of fat rich food is the reason for obesity. Food items like samosa, poori, malai and ghee causes obesity.
- |               |                    |
|---------------|--------------------|
| (a) Anaemia   | (b) Loss of vision |
| (c) Beri-Beri | (d) Scurvy         |

8. Living organisms need food for their survival, growth and to keep themselves healthy.
9. The major nutrients in our food needed for the growth of our body are carbohydrates, proteins, fats, vitamins, minerals, fibres and water.
10. Vitamins are complex organic compounds, that are essential for the growth of our body. They do not provide energy. Vitamin A keeps our skin and eyes healthy.  
Vitamin C helps the body to fight against diseases.
11. Dietary fibres are also known as roughage.  
Roughage is mainly provided by plant products in our food. Whole grains, pulses, potatoes, fruits and vegetables are the main sources of roughage. Roughage does not provide any nutrient to our body. But it is essential component of our food as it helps our body to get rid of undigested food.
12. (a) Carbohydrates are the compounds made up of carbon, hydrogen and oxygen. These are formed in plants during photosynthesis, e.g., glucose.  
(b) Carbohydrates found in our food are in the form of starch and sugar.
13. (i) Junk food makes the person obese.  
(ii) He may suffer from loss of appetite.  
(iii) He may develop the problems related to his/her physical or mental growth.  
(iv) It leads to wastage of money.  
We should understand the benefits of healthy food habits.
14. Our body needs all the nutrients in the right amount hence we should eat a balanced diet. Vitamin C gets destroyed on heating.
15. Essential components of our food like carbohydrates, vitamins etc., necessary for the growth and good health of our body are called nutrients.
16. If we take little/less quantity of nutrients in our food for a long time, a disease occurs which is known as deficiency disease.
17. Taking ample quantity of deficit nutrients, can help us to recover from deficiency diseases.
18. It will result in obesity or deficiency disease.

19. Night blindness.
20. Weak bones and tooth decay.
21. No, it does not provide any nutrient to body.

### Long Answer Type Questions

1. Take a small quantity of food item in a test tube. Add 10 drops of water into it and shake the test-tube. With the help of a dropper, add two drops of copper sulphate solution and 10 drops of caustic soda solution to the test-tube. Shake the test-tube and let it stand for a few minutes. The appearance of violet colour indicates the presence of proteins in the food item.
2. (a) We need water in our food because :  
(i) It helps in absorption of the nutrients in the body.  
(ii) It helps in removal of the wastes from the body.  
We get water from tea, coffee, fruits, vegetables, etc.  
(b) Vegetables contain vitamins and minerals which get washed away if vegetables are washed after cutting them. Hence, vegetables should not be washed after cutting. Food should not be overcooked to prevent the loss of nutrients from it.

## 2 EXERCISE

### Text Book Questions

1. Carbohydrates, vitamins, fat, proteins and minerals.
2. (i) Carbohydrates (ii) Proteins  
(iii) Vitamin A (iv) Calcium
3. (i) Groundnuts and butter  
(ii) Potato and bread  
(iii) Vegetables and fruits  
(iv) Egg and milk
4. (a) – (×), (b) – (✓), (c) – (✓), (d) – (×)
5. (a) Rickets (b) Vitamin B  
(c) scurvy (d) Vitamin A

### NCERT Exemplar Questions

1. (a) Protein (b) Minerals  
(c) Vitamins (d) Carbohydrates  
(e) Nutrients (f) Fat
2. Water

- | Carbohydrate Rich Food Item (A) | Protein Rich Food Item (B)                  | Fat Rich Food Item (C) |
|---------------------------------|---------------------------------------------|------------------------|
| Sweet potato                    | Moong dal                                   | Mustard Oil            |
| Rice                            | Fish                                        | Milk                   |
| Maize                           | Milk                                        | Egg                    |
| White bread                     | Egg, Beans, Buttermilk Cottage cheese, Peas | Butter                 |
3. Potato chips are tasty but they are not very nutritious.  
Boiled vegetables are nutritious but they are not very tasty.
  5. The saree of Paheli's teacher might have been starched, and starch turns blue black in colour with iodine solution. Paheli's socks did not have starch on it thereby showing no change.
  6. Washing, peeling, cutting and cooking the potatoes causes loss of nutrients. Cooking in a small amount of water and then frying in a small quantity of oil conserves the nutrients.
  7. Paheli must include whole grains, pulses, vegetables and fresh fruits in her diet as she seems to lack roughage.
  8. (i) Carbohydrates, proteins, fats, vitamins and minerals, are the components of food that provide nutrients.  
(ii) Water and roughage/dietary fibres, are the components of food that do not provide nutrients.
  9. Vitamins and minerals are very important because they help in protecting our body against diseases, growth of our body and in maintaining good health.
  10. Water helps in removing wastes such as urine and sweat helps our body to absorb nutrients from food also.
  11. (i) Night blindness  
(ii) Vitamin A  
(iii) Carrot, papaya, mango, milk and fish oil or any other (any four).

### HOTS Questions

1. Indian Lotus (*Nelumbo nucifera*), Water spinach (*Ipomoea aquatica*), Rice (*Oryza*).
2. Milk is considered to be a complete food because it contains all the essential nutrients such as sugars, proteins, vitamins and minerals. One glass of milk contains about 150 calories of energy.

3. Tulsi, Aloe Vera, Garlic, Peppermint
4. No, Honey bee eats nectar and pollen grains.
5. We do not wash vegetable after cutting to preserve the water soluble vitamins  
Or, Vegetables contain vitamins and minerals which get washed away if vegetables are washed after cutting them. Hence vegetables should not be washed after cutting.
6. Take one teaspoon of salt, eight teaspoons of sugar, one litre of clean drinking or boiled water after cooling. Stir the mixture till the salt and sugar dissolve.
7. Soft drinks do not have any nutritional value. They have higher sugar content, higher acidity, and more additives such as preservatives and colorings. So avoid drink like coca-cola, pepsi.
8. Green Vegetables, Pulses, Soyabean, Milk, Banana.

## 3 EXERCISE

### Multiple Choice Questions

1. (a)
2. (b) Haemoglobin of blood is a compound of iron.
3. (c) Fish contains more carbohydrates and proteins as compared to flesh of other animals.
4. (b)
5. (a) Soyabean and groundnut are two richest sources of edible proteins.
6. (d) Vitamin B<sub>12</sub> is cobaltamine.
7. (a) It is in their protein content. Cooked soyabean will have lesser protein content.
8. (c) Vegetables provide us minerals.
9. (c) Proteins are obtained both from plant sources and animal sources.  
[Foods containing proteins are called body building foods].
10. (a)
11. (b) Ghee and butter are major sources of fats.
12. (c) 13. (b)
14. (d) Foods containing carbohydrates and fats are called energy giving foods.
15. (b) The disease called scurvy is caused due to deficiency of vitamin C.

16. (d)
17. (b) For proper functioning of thyroid gland we need the mineral iodine in appropriate amount.
18. (a)
19. (a) Anaemia is caused due to deficiency of iron.
20. (c)
21. (a) The main carbohydrates found in our food are starch and sugar.
22. (b) It is a test for starch and starch is a carbohydrate.
23. (a) It is a test used to detect the presence of proteins in a given food sample.
24. (c) Fats are the main source of energy and of essential fatty acids in the diet.
25. (c) Cereal grains provide phosphorus in good amount.
26. (c) 27. (b)
28. (d) All the given options are features of fats.
29. (d) Since, he is taking more food than required he may suffer from obesity.
30. (b) Vitamins A, D and E are fat soluble. [Vitamin K is also fat soluble].
31. (a)
32. (a) Deficiency of iodine, iodine is present in iodized salt.
33. (d) 34. (a) 35. (d) 36. (b)
37. (c) Fibres in food help the food to move through the digestive canal. The fibre also helps to get rid of undigested food.
38. (a) 39. (c) 40. (d)
41. (a) Carbohydrates give quick energy. Sugars and starch are carbohydrates but sugars give immediate energy while starch releases energy more slowly.
42. (b) Fresh fruits and green vegetables are rich source of vitamin C.
43. (a) 44. (b) 45. (a) 46. (d)
47. (c) 48. (a) 49. (b) 50. (b)
51. (b) 52. (a) 53. (d) 54. (b)
55. (d) 56. (a)
57. (b) Many useful proteins and considerable amounts of minerals are lost if excess water is used.
58. (a) Extra food is stored as fat and the person becomes too fat.
59. (c)
60. (b) Dissolve 2g of copper sulphate in 100 ml of water.
61. (c) The symptoms (i.e., swelling and bleeding of gums) indicate the disease scurvy which is caused due to deficiency of vitamin C.
62. (c) Fats are rich sources of energy and they insulate our body against loss of heat.
63. (b) These are the symptoms of night-blindness caused due to deficiency of vitamin A.
64. (d)
65. (b) Nutrients are needed to maintain the health of our body and for growth of our body.
66. (d) There are 5 nutrients that are needed by our body; carbohydrates, fats, proteins, vitamins and minerals.
67. (c)
68. (c) This is the test for starch, a complex carbohydrate
69. (b) 2 drops of copper sulphate and 10 drops of caustic soda are used to test protein in a food item.
70. (b) A food item that contains fats, leaves an oily mark on paper.
71. (b) These nutrients give us energy to do work.
72. (c) Vitamins protect our body from diseases and infections.
73. (c) Roughage is important for our body for digestion.
74. (d) Water is helpful in getting rid of wastes and all these functions.
75. (c) Urine and sweat contain waste products of our body.
76. (d) There are 5 nutrients essential for our body.
77. (d)
78. (c) Vitamin C prevents bleeding of gums and swelling of joints.
79. (c) Vitamin D is also called the sunshine vitamin.
80. (b) In rickets the bones becomes weak.
81. (b) Vitamin C gets easily destroyed by heating.
82. (d) Such a person will have stunted growth and swollen face.
83. (b) Goitre occurs due to deficiency of iodine in diet. The thyroid gland in the neck becomes enlarged.
84. (c) Calcium is needed for healthy bones.

1. (a)
2. (d) Starch is tested using iodine and protein is tested using caustic soda and copper sulphate solution.
3. (a) Starch, sugar and cellulose are different types of carbohydrates.
4. (a)
5. (c) Vitamins B and C are water soluble.
6. (b) Fat is needed in a small quantity although carbohydrate is needed in large quantities.
7. (c) Rice is a carbohydrate rich food.
8. (c) Roughage helps in preventing constipation.
9. (d)
10. (d) Balance diet of each one depend on their energy requirement age and lifestyle. If one plans properly, eating a balanced diet is not at all expensive.
11. (c) **Cooking** is essential to make food soft, easy to chew, easy to digest and to kill germs.
12. (c)
13. (a) Besides a proper diet, **exercise and sleep** is also important to keep our **body** fit and healthy.
14. (a)
15. (a) Vitamin C deficiency causes scurvy.

1. (a) Iodine is used to test the presence of starch.
2. (b) The solution turns violet if protein is present in the food.
3. (b) Grains, sugarcane, potato etc. are rich in carbohydrates.
4. (c) All these are sources of fats.
5. (b) These are plant sources of proteins.
6. (a) Fruits contain vitamins and minerals. These protect us from diseases and infections.
7. (a)
8. (a)
9. (c) Sea salt and sea fish contain iodine.
10. (b)

11. (b) Oranges contain dietary fibres which prevent constipation.
12. (c)
13. (b)      14. (d)      15. (d)      16. (b)
17. (b)

1. (d)
2. (d) These are the colour changes in the test for presence of starch and proteins.
3. (d)
4. (b) Amla is rich in Vitamin C, salt contains iodine, egg yolk has protein and carrot has Vitamin A.
5. (a)
6. (b)
7. (c)
8. (d)
9. (b) Vitamin K is needed for clotting of blood.
10. (b)

1. (b) Milk is an animal source of fats.
2. (d) Milk is a source of fats whereas others are sources of carbohydrates. Fats provide more energy.
3. (b) Rice has more carbohydrates than other nutrients and so it is called “ carbohydrate rich” source of food.
4. (a)
5. (c) Vitamins may get lost.
6. (c) Vitamins C easily gets destroyed by heat during cooking.
7. (d) Anaemia is caused due to deficiency of iron.
8. (d) If person does not get enough protein in food for a long time, he is likely to show all the symptoms listed above.
9. (a) Deficiency of vitamins D causes rickets. Due to this the bones became soft and bent.

1. (b)
2. (c) Paneer is an animal source of protein.
3. (b)
4. (a)

## Chapter

# 3

# FIBRE TO FABRIC

## INTRODUCTION

We wear clothes to protect our body against heat, cold, rain, dust and insects. At the same time we wear clothes to look good. That is why many of us want to wear clothes that are in fashion. People in different regions of the world wear different kinds of clothes. The kind of clothes people wear mainly depends on the climate of the place. The traditional clothes worn by people in our country vary considerably from region to region.



Cotton fabric

People living in hot countries wear light clothing. During summer we should wear loose fitting clothes to keep our body cool. People living in cold countries wear woollen clothes like— coats, jerseys, socks, caps etc. Dark coloured clothes are worn in winters because they absorb heat and warm quickly.

### FABRICS

Fabrics are materials made from weaving, knitting, spinning fibres together. Often the fibres are spun or wound together to form a thread before being made into a fabric. The nature of a fabric will depend on the fibres from which it is made and the way that they are arranged, and its properties will determine the applications for which it is suitable. Cotton, wool, silk etc. are examples of fabrics.



Woolen fabric

### YARN

It is made up of fibres. Yarn is a long continuous length of interlocked fibres, suitable for use in the production of textiles, sewing, knitting, weaving, embroidery, and rope making. Thread is a type of yarn.



Yarn



**FIBRE TO FABRIC**

A material which is available in the form of thin and continuous strand is called **fibre**.

**Types of Fibre**

**Natural Fibre:** The fibers which are obtained from plants and animals are called natural fibers. Examples: cotton, jute, silk, wool.

**Plant Fibre:** Cotton and jute are plant fibre.

**Animal Fibre:** Silk and wool are animal fibre.

**Synthetic Fibre:** The fibre which are synthesized in industry from simple chemicals obtained from petroleum are called synthetic fibre. Examples: Nylon, Acrylic, Polyester.

**Cotton**

In India, cotton is cultivated mainly in Maharashtra, Gujarat, Haryana, Punjab, Rajasthan, Tamil Nadu and Madhya Pradesh.



Cotton plant



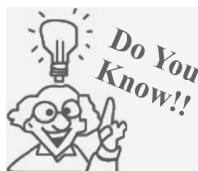
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*Some historians are of the opinion that the Egyptians had cotton as early as 14,000 years ago. The earliest written reference to cotton is in India. Cotton has been grown in India for more than three thousand years.*

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**Cultivation of cotton**

Cotton is **cultivated** in black clayey soil. It needs warm climate. The sowing of cotton crop is done in early spring. Cotton plants are bushy and about 1-2 meters tall. The plants start flowering in about 60 days and give whitish-yellow flowers. The flowers turn reddish in a few days. Flowers slowly grow into spherical walnut-like structures. These are called cotton ball. Fibres of cotton grow on these seeds. After some time green cotton balls turn brown. At maturity, the cotton bolls burst open and the white cotton fibre can be seen.

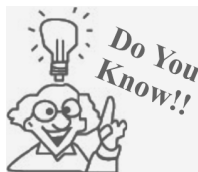


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*Cotton is one of the key raw materials to make khadi-the fabric that was the heart of Mahatma Gandhi's Freedom Movement. Khadi may also include silk and wool, which is why it is cool in summers and it also provides warmth in winters.*

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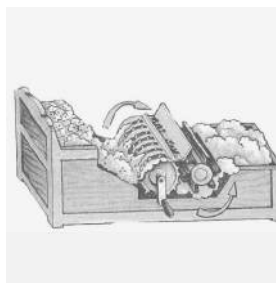
**Ginning of cotton :** It refers to the process of separation of cotton fibres from the seeds. Ginning of cotton was previously done by hand but these days machines called cotton gins are used for this purpose. A cotton gin is a machine that quickly and easily separates cotton fibers from their seeds.



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*China, India, U.S., Pakistan, Brazil are top five producers of the cotton in the world.*

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Cotton ginning by hand and machines

Cotton fibres are then combed, straightened and form rope like strands called **silver**.



*The earliest versions of the cotton gin consisted of a single roller made of iron or wood and a flat piece of stone or wood. Between the 12th and 14th centuries, dual-roller gins appeared in India and China.*

## Jute

It is a natural fibre obtained from jute plant. It is obtained from stem of jute plant. Jute is the cheapest natural fibre. It grows very well in alluvial and loamy soil.



**Retting**



**Jute plant and fibre**

It is cultivated during raining season. In India jute is mainly grown in states of West Bengal (W. B), Bihar, Assam. Jute plant is normally harvested when it is at flowering stage. To get jute, the stems of the harvested plants are immersed in water for a few days. The stems rot and then fibres are separated by hand. This process is called retting.



*Jute is a natural fibre with golden & silky shine, and hence nicknamed as The Golden Fibre.*

Jute is 100% bio-degradable and recyclable and thus environment-friendly. It can be an effective substitute for plastic bags.



*One hectare of Jute plants consumes over 15 tonnes of  $\text{CO}_2$ , several times higher than trees.*

It is used to make sacks, ropes, handmade clothes, wall hangings and for making strong packing materials.



*India with overall of ~66% of worlds production tops the production of jute. Bangladesh with ~25% lies at second position followed by China with ~3%.*

**SOME OTHER IMPORTANT PLANT FIBRES****Coir**

It is the fibre obtained from the outer cover of the fruit of the coconut palm. There are two types of coir: brown fibre, (from ripe coconut) and finer white fibre (from raw coconut). Coir is used in sacking and doormats, mattresses, for making finer brushes string, rope and fishing nets. India and Sri Lanka are major producers of coir.

**Coir fibre and products****Flax**

It is obtained from stem of flax plant. The fabric made from flax fibre is called linen. It is used for making clothes, ropes and high quality paper.

**Sisal**

Sisal fibres are obtained from the leaves of the sisal plant. These fibres are used in the production of ropes, nets and matting.

**Ramie**

Ramie is obtained from the stem of the Ramie plant. Ramie fibres are used in the production of canvas, sewing threads, fishing nets, and parachutes.

**Hemp**

Hemp fibres are obtained from the stem of the hemp plant. Hemp plants grow best in loamy soil. Hemp fibres are used in the production of ropes, carpets, nets, clothes, and paper. These fibres are also used to make a special kind of plastic.

**Hemp plant****ANIMAL FIBRES**

Wool and silk are examples of animal fibres.

**Wool**

Wool is the fibre derived from the hair of sheep and some other animals like angora rabbit, yak, Llama, camels and musk oxen.



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*Australia is the leading producer of wool in the world, followed by New Zealand and China. India is among the top ten wool producers of the world.*

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**Silk**

Silk is obtained from the cocoon of the silkworm. Silkworms are fed on the leaves of the mulberry trees. Cocoons are dissolved in boiling water in order to extract individual long fibres.



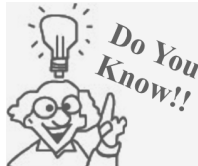
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*Silk was first developed in China, possibly 5000-8000 years ago. From China silk reached India, the Middle East, Europe and Africa.*

---

## SYNTHETIC FIBRES

Synthetic fibres are not obtained from plants or animals. These are made from chemical substances. Rayon, are examples of synthetic fibres.



*Nylon was the first synthetic fibre to be created from chemicals.*

### Advantages of Synthetic Fibres

Clothes made from synthetic fibres are strong and do not wrinkle easily. They also dry easily.

### Disadvantages of Synthetic Fibres

They have less air spaces in them than natural fibres. They also cannot absorb sweat easily. These properties make them unsuitable for hot and humid weather.

## FIBRE TO YARN

### Spinning

The process of making yarn from fibres is called spinning. To get cotton yarn, fibres from a mass of cotton wool are drawn out and twisted. This brings fibres together to form a yarn. Spinning wheel (Charkha) or hand spindle are used for spinning process.

**Hand spindle :** It is a simple device used for spinning of cotton. It is called **takli**.

**Charkha:** It is also a hand operated device used for spinning of cotton.



Charkha

**NOTE:** Spinning of yarn on a large scale is also done by machines.

The charkha was both a tool and a symbol of the Indian independence movement. When India was a colony of Britain, Indian cotton was shipped to Britain and the Indians had to buy it back as fabric. Gandhi promoted spinning as an act of independence. He encouraged people to wear self spun clothes and reject the cloth made in Britain.



Hand spindle and charkha

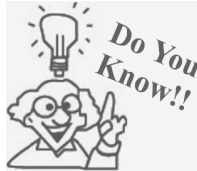
## YARN TO FABRICS

For making fabric from yarn following two processes are used

- (i) Weaving
- (ii) Knitting

## Weaving

The process of arranging two sets of yarns together to make a fabric is called weaving.



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*In weaving process the vertical threads are called the warp and the horizontal threads are the weft or filling.*

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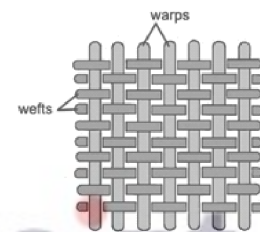
The device used for weaving is called looms. The looms are either hand operated called handlooms or power operated called power looms.



**Hand loom**



**Power loom**



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*The first power loom was designed in 1784 by Edmund Cartwright and first built in 1785.*

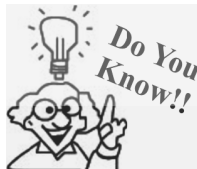
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## Knitting

For knitting, a single yarn is used to make a piece of fabric. Knitting is done by hands and also on machines. Different types of needles are used for knitting purpose.



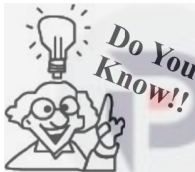
**Knitting**



- 
- One of the earliest known examples of knitting (formed on two sticks by pulling loops through loops) were a pair of cotton socks found in Egypt from the first millennium A.D.
  - The knitting machine was invented in 1589 (during the reign of Queen Elizabeth) by William Lee, a clergyman.
-

## HISTORY OF CLOTHING

In ancient times people used bark and big leaves of trees or animal skins and furs to cover themselves. About 30,000 years ago, people started using animal skins for clothing. Animal skins were either worn as capes thrown around the shoulders or as two skins tied at the shoulder.



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*It is believed that wool was the **first** animal fibre to be made into **cloth**. People started using sheep for wool about 6000 years ago.*

---

After people began to settle in agricultural communities. They learnt to weave twigs and grass into mats and baskets. Vines, animal fleece or hair were twisted together into long strands. These were woven into fabrics. Thousands of years ago, people learned how to obtain fibres from wild plants. These fibres were spun into thread and made into clothes.

Archaeologists have discovered fragments of plant fibres in Switzerland, which date back to around 8000 BC. It indicates that people began to weave fabrics around 8000 BC.

Early Indians wore cotton fabrics. In India cotton grew in the regions near river Ganga. Flax is a plant that gives natural fibre. In Egypt, in ancient times, cotton as well as flax were cultivated near river Nile.

## WAYS OF USING FABRICS

### Draping

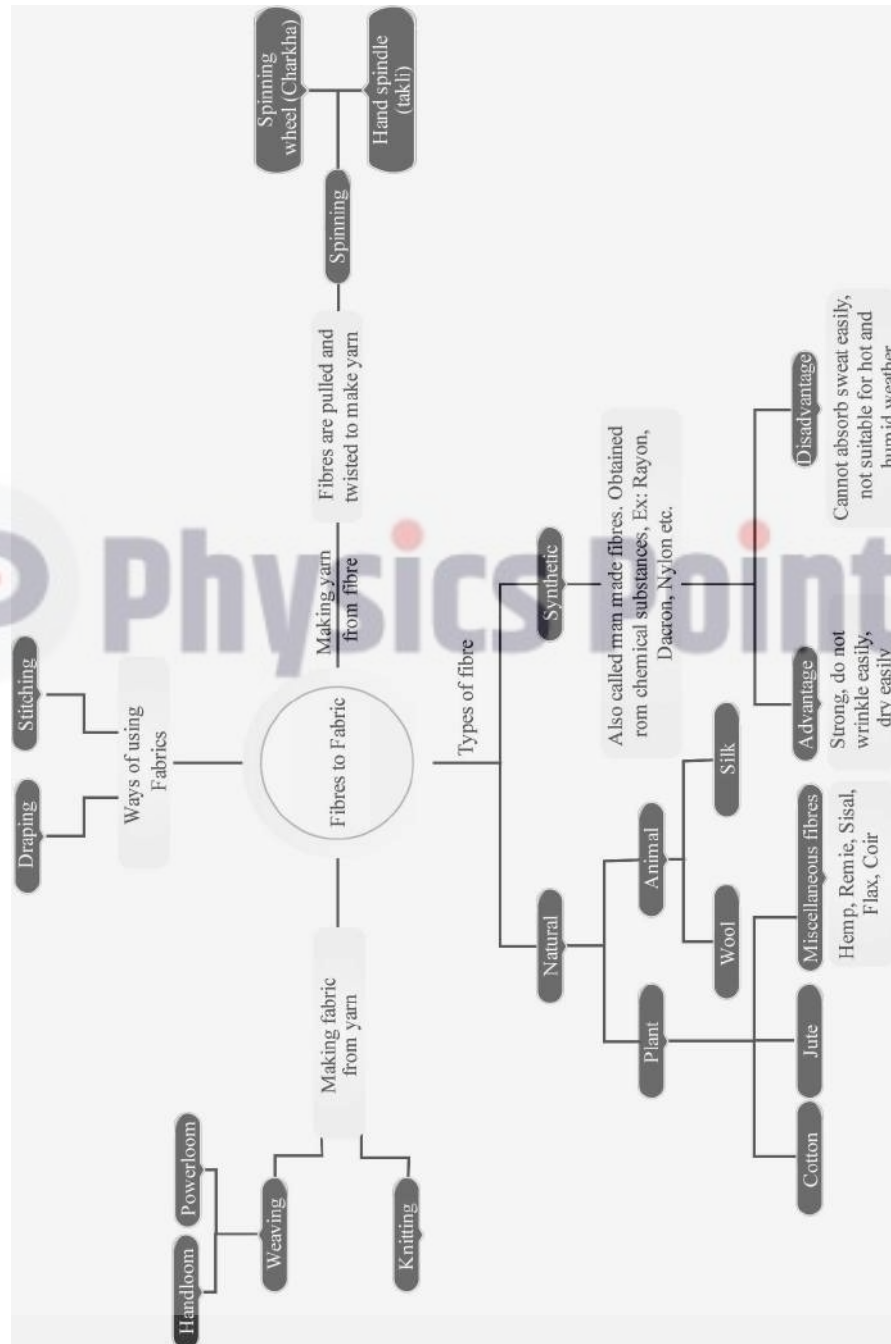
In ancient days, stitching was not known and people simply draped the fabrics around different parts of their body. Even today, saree, dhoti, lungi or turban is used unstitched.

### Stitching

After invention of stitching needle, people started stitching fabrics to make clothes.



## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- ..... soil is the best soil for growing cotton.
- ..... are tightly compressed bundles of cotton.
- ..... is excellent for coconut crop.
- The ..... fibre absorbs sweat, thus giving cooling effect.
- ..... and ..... are used for making yarns from fibre.
- ..... and ..... are obtained from plants.
- The process of making yarn from fibres is known as .....
- Fabric from yarns is made by ..... and .....
- Weaving of fabric is done on .....
- Cotton bolls usually picked by hand and separated from the seeds by combing, this process is known as .....

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- Jute and patsun are two types of fibres.
- Mechanised weaving is done on power looms.
- Ginning is the process of taking out fibre from cotton boll.
- Nylon and rayon are stronger than cotton.
- Flax is an artificial fabric.
- Bihar, West Bengal and Assam are major Jute producing states in India.
- Shearing is the process of obtaining wool from sheep.
- Fibres are made up to yarns.
- Silk is a natural fibre.

- Cotton keeps the body cool in all seasons.
- Fabrics are made of yarns arranged in different patterns.
- Coconut does not produce any fibre.
- The process of removing seeds from cotton bolls is known as ginning.
- Bamboo and banana have fibres in their stem.
- Silk and fur are two natural fabrics.
- Artificial fabrics are much stronger.
- Silk and wool are not infested by moths of moulds.
- Cotton and wool keep our body warm in winter.
- Rayon is a natural fibre.
- Jute crop is major crop in Punjab and Rajasthan.

## Match the column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched statements (A, B, C, D) in column I have to be matched with statement (p, q, r, s) in column II.

- |    |                             |                       |
|----|-----------------------------|-----------------------|
| 1. | <b>Column I</b>             | <b>Column II</b>      |
|    | (A) Jute and silk           | (p) Looms             |
|    | (B) Thin strands of threads | (q) Natural fibres    |
|    | (C) Weaving of fabric       | (r) Patsun            |
|    | (D) Jute                    | (s) One set of yarn   |
|    | (E) Knitting                | (t) Fibres            |
| 2. | <b>Column I</b>             | <b>Column II</b>      |
|    | (A) Silk                    | (p) Sheep             |
|    | (B) Polyester               | (q) Cocoons           |
|    | (C) Wool                    | (r) Charkha           |
|    | (D) Spinning                | (s) Synthetic fibre   |
|    | (E) Weaving                 | (t) Looms             |
| 3. | <b>Column I</b>             | <b>Column II</b>      |
|    | (A) Flax                    | (p) is made of fibres |
|    | (B) Charkha                 | (q) Ginning           |
|    | (C) Looms                   | (r) Synthetic fibre   |

- |                                                        |                                      |
|--------------------------------------------------------|--------------------------------------|
| (D) Yarn                                               | (s) A plant that gives natural fibre |
| (E) Fruits of cotton plant                             | (t) Animal fabric                    |
| (F) Process of removing seeds from cotton bolls        | (u) Stem                             |
| (G) Silk, wool, fur                                    | (v) Hand operated spinning device    |
| (H) Wool and silk                                      | (w) Natural fabric                   |
| (I) Nylon and polyester                                | (x) Weaving                          |
| (J) Process of making yarn from fibre                  | (y) Cotton bolls                     |
| (K) Which part of jute plant is used for making fibre. | (z) Knitting                         |

### Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

1. What is the other name of jute plant?
2. Name two synthetic fibres?
3. Give names of two fabrics obtained from animals?
4. Among natural and synthetic fibres, which are stronger?
5. Which country first invented silk?
6. Write two advantages of artificial fibre?
7. How many yarns are used for knitting?
8. Write the name of a cellulose fibre?
9. Write the name of an un-stitched piece of fabric?

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. What is retting?
2. What type of fabric do we use for flooring the houses and why?
3. Which is the best season for the cultivation of jute? In which part of India, jute is grown?
4. Cotton is widely used in hospitals. Which property makes it useful for this purpose?
5. Which part of banana has fibre?
6. What did people in ancient times use to cover their body?
7. Besides the textiles, what is the other major use of cotton?
8. In which part of India, coconut is grown? What type of soil and climate does it require to grow?
9. Why are coconut fibres used for making ropes? Write another use of coconut fibre.

10. What is weaving? Name the device that is used for weaving.
11. What are synthetic fibres? Give examples.
12. Name two hand operated devices that are used for spinning. Also, name the person who made the charkha popular?
13. What is spinning? Name two devices that are used for spinning.
14. What are natural fibres? Give two examples for each—plant and animal fibre?
15. Name the fruit of cotton plant. Which is the best suitable soil for the growth of cotton plant? Name the process in which seeds are separated by combing.
16. Write two uses of cotton and one use of jute.
17. How are synthetic fibres more advantageous and economical than natural fibres?
18. From where do we get wool?
19. Which fabric get better crease, cotton or synthetic?
20. What is the source of silk?
21. Name the process of removing seeds from cotton bolls?
22. Which part of jute plant is used to get its fibre?
23. Name the process of obtaining yarn from fibre.
24. Name two instruments used for spinning by hand.
25. What are the two processes of obtaining fabric from yarns?
26. How many yarns are used in weaving?
27. Which process will you adopt to get fabric by using only one yarn?
28. Where are looms used?
29. Name three Indian dresses for which we do not need stitching.
30. Name two plants that were used in ancient Egypt to get natural fibre.
31. Name two synthetic fabrics.
32. Name two animal fabrics.

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. How can the quality of cotton fabrics be improved?
2. Name two processes used for making fabric from yarn. Name the process used for making yarn from fibre. Name two fibres obtained from plants.
3. Classify the following fibres as natural and synthetic : Acrylic, Wool, Jute, Polyester, Rayon. Give reasons also.

# 2 EXERCISE

## Text Book Questions

- Classify the following fibres as natural or synthetic: nylon, wool, cotton, silk, polyester, jute.
- State whether the following statements are True or False. If false, correct them.
  - Yarn is made from fibres.
  - Spinning is a process of making fibres.
  - Jute is the outer covering of coconut.
  - The process of removing seed from cotton is called ginning.
  - Weaving of yarn makes a piece of fabric.
  - Silk fibre is obtained from the stem of a plant.
  - Polyester is a natural fibre.
- Fill in the blanks.
  - Plant fibres are obtained from \_\_\_\_\_ and \_\_\_\_\_.
  - Animal fibres are \_\_\_\_\_ and \_\_\_\_\_.
- From which parts of the plant cotton and jute are obtained?
- Name two items that are made from coconut fibre.
- Explain the process of making yarn from fibre.
- Match the articles given in Column I with the articles of Column II.
 

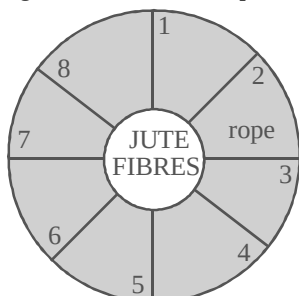
| Column I         | Column II     |
|------------------|---------------|
| (a) Sweater      | (i) Cotton    |
| (b) Cotton bolls | (ii) Wool     |
| (c) Dhoti        | (iii) Ginning |
| (d) Gunny bags   | (iv) Jute     |
- Match the terms given in Column I with the statements given in Column II.

## NCERT Exemplar Questions

- Yarn, fabric and fibres are related to each other. Show the relationship by filling the blanks in the following sentence.  
Fabric of cotton saree is made by weaving cotton which in turn is made by spinning thin cotton \_\_\_\_.
- State whether the following statements are true or false. If false, correct them.
  - Silk is a plant fibre.
  - Jute is obtained from the leaves of a plant.
  - Weaving is a process of arranging two sets of yarn together.
  - Cotton yarn on burning gives an odour similar to that of a burning paper.
- Once Paheli visited a tailor shop and brought home some cuttings of fabric to study their properties. She took two pieces and found that one of the pieces was shrinking when it was burnt with a candle. However, the other did not shrink on burning. Can you help her to find out which of the two was a cotton fabric and which a silk fabric?
- One way of making fabric from yarn is weaving, what is the other?
- Boojho with perfect eyesight was finding it difficult to pass a thread through the eye of a needle. What can be the possible reason for this?
- In ancient times stitching was not known. People used to simply drape the fabrics around different parts of their body. Even today a number of unstitched fabrics are used by both men and women. Can you give four such examples of clothes?
- Match the terms given in Column I with the statements given in Column II.
 

| Column I     | Column II                                                           |
|--------------|---------------------------------------------------------------------|
| (A) Weaving  | (p) A single yarn used to make a fabric                             |
| (B) Knitting | (q) Combing of cotton fibres to remove seeds                        |
| (C) Spinning | (r) Yarns are made from these thin strands                          |
| (D) Ginning  | (s) These are spun from fibres and then used to make fabrics        |
| (E) Fibre    | (t) Process of arranging two sets of yarn together to make a fabric |
| (F) Yarn     | (u) Process of making yarn from fibres                              |

9. Fill in the names of useful items made from jute fibres in figure. One such example is given.



10. A cotton shirt, before it reaches you, completes a long journey. Elaborate this journey starting from cotton bolls.

11. Describe the two main processes of making fabric from yarn.

### HOTS Questions

- Comment what happened to people when they began to settle in agricultural communities?
- When we burn wool why its smells like burnt hair?
- When we burn nylon, why it does not smell like burnt paper?
- How are yarns made from the cotton ball?
- What do you observe in tailoring shop?

## 3

## EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choice (a), (b), (c) and (d) out of which ONLY ONE is correct.

- Which one is thinner ?  
(a) Fabric  
(b) Yarn  
(c) Fibre  
(d) All are of same size
- Which one is a synthetic fabrics?  
(a) Silk  
(b) Wool  
(c) Acrylic  
(d) All of these
- Select the fibre that is obtained from a plant source.  
(a) wool  
(b) silk  
(c) cotton  
(d) both silk and cotton
- Natural fibres are obtained from  
(a) plant sources  
(b) animal sources  
(c) both plant and animal sources  
(d) None of the above is correct
- Wool is  
(a) a natural fibre  
(b) obtained from animal source  
(c) obtained from fleece of sheep or goat  
(d) All the above are correct
- Synthetic fibres are obtained from  
(a) plant sources  
(b) animal sources  
(c) both (a) and (b)  
(d) None of these
- Cotton bolls are  
(a) leaves of cotton plant  
(b) seeds of cotton plant  
(c) stem of cotton plant  
(d) fruits of cotton plant
- Cotton plant is grown in such places that have  
(a) black soil  
(b) warm climate  
(c) both black soil and warm climate  
(d) black soil and cool climate
- Fibres are separated from the seeds of cotton bolls by which one of the following process ?  
(a) Spinning  
(b) Weaving  
(c) Ginning  
(d) All of the above
- Jute is a natural fibre. It is obtained from which part of the jute plant?  
(a) Seed  
(b) Stem  
(c) Fruit  
(d) All of these
- Jute is generally cultivated during  
(a) summer  
(b) spring  
(c) winter  
(d) rainy season
- In which part of India is jute cultivated?  
(a) West Bengal  
(b) Bihar  
(c) Assam  
(d) All of these

13. The hand device used for spinning of yarn is called  
(a) takli (b) charkha  
(c) hand loom (d) both (a) and (b).
14. Flax is  
(a) an animal fibre (b) a plant fibre  
(c) a synthetic fibre (d) a fabric
15. The use of **charkha** for weaving of cotton was popularized by Mahatma Gandhi. This was done to encourage people to wear  
(a) imported cloth  
(b) clothes made of home spun yarn  
(c) both (a) and (b)  
(d) None of these
16. Lint is  
(a) a thread that is obtained by spinning fibres.  
(b) an electrically operated device used for spinning.  
(c) the fibrous material that is left after removing seed from cotton bolls.  
(d) the fruits of cotton plant
17. A hand spindle  
(a) is a simple device used for spinning of cotton.  
(b) is called charkha  
(c) is a mechanical device used for spinning of cotton  
(d) None of the above is correct
18. Which of the following processes are used for making fabric from yarn?  
(a) Weaving  
(b) Knitting  
(c) Both weaving and knitting  
(d) None of these
19. Loom is  
(a) a hand operated device used for weaving of fabrics.  
(b) a power operated device used for knitting of wool  
(c) a hand operated device used for knitting of wool.  
(d) None of the above is correct
20. After spinning yarn are used for making  
(a) fibres  
(b) fabrics  
(c) both fibres and fabrics  
(d) None of these
21. When is a jute plant normally harvested?  
(a) When the plant has not yet developed a stem  
(b) When the plant is at stem developing stage  
(c) When the plant is at flowering stage  
(d) None of the above
22. Which of the following were used by people, in ancient times, to cover themselves?  
(a) Bark (b) Leaves of trees  
(c) Animal skin (d) All of these
23. In which region was cotton grown by early Indian?  
(a) Regions near river Yamuna  
(b) Regions near river Ganga  
(c) Regions near river Narmada  
(d) Regions near river Saraswati
24. In which country was flax cultivated in ancient times?  
(a) India (b) Egypt  
(c) America (d) Russia
25. Which of the following are used unstitched even today?  
(a) Dhoti (b) Lungi  
(c) Turban (d) All of these
26. Which of the following is the first wholly synthetic fibre?  
(a) Rayon (b) Nylon  
(c) Wool (d) Teflon
27. Jute fibres are \_\_\_\_\_  
(a) obtained from root of jute plant  
(b) cultivated during summer season  
(c) mainly grown in north –east India  
(d) All of these
28. Now a days we do not need to depend upon plants for yarn. Why?  
(a) Today cutting trees is a crime by law.  
(b) Alternative natural yarns are available in the market.  
(c) There is no remarkable progress in textile industry.  
(d) Technology is developed to make synthetic yarn.
29. Choose the correct option from the following.  
(a) Nylon is man made fibre  
(b) Jute is plant fibre  
(c) Silk is a plant fibre  
(d) Both (a) and (b)



30. Silk  
(a) is a natural fibre obtained from an adult silk worm  
(b) is a natural fibre obtained from cocoon of silk worm  
(c) is an artificial fibre  
(d) None of the above is correct
31. Knitting is the process  
(a) used to make fabrics from fibres  
(b) used to make fabrics from yarn  
(c) in which two sets of yarns are used  
(d) used to make yarn from fibres
32. Spinning is the process of  
(a) making fabrics from yarn  
(b) making yarn from fibres  
(c) making fabrics from fibres  
(d) All the above
33. Synthetic fibres are those which are  
(a) obtained from natural sources  
(b) obtained from plant sources  
(c) made from chemical compounds  
(d) not easily converted to fabrics
34. Which of the following animal provide wool?  
(a) Llama (b) Cow  
(c) Angora rabbits (d) both (a) and (c)
35. Which of the following do not yield wool?  
(a) Yak (b) Camel  
(c) Goat (d) Woolly dog
36. Cotton and jute are \_\_\_\_\_ fibres.  
(a) Synthetic fibres (b) Plant fibres  
(c) Animal fibres (d) None of these
37. Which of the following part of cotton plant is used to obtain cotton fibre?  
(a) Fruit (b) Flower  
(c) Seed (d) Stem
38. The process of separation of jute fibre from jute plant is called \_\_\_\_\_.  
(a) ginning (b) knitting  
(c) retting (d) spinning
39. Which of the following device is used for weaving?  
(a) Charkha (b) Gin  
(c) Handloom (d) Hand spindle
40. Why in the process of spinning cotton fibres are twisted?  
(a) Cotton fibres are twisted to bring the fibres together to form fabric  
(b) Cotton fibres are twisted to bring the fibres together to form yarn  
(c) Cotton fibres are twisted to make rope like strands called silver  
(d) Cotton fibres are twisted to make designs.
41. Identify the odd one out.  
(a) cotton (b) wool  
(c) silk (c) plastic
42. How can we identify different kinds of fabrics?  
(a) By seeing them  
(b) By smelling or feeling them  
(c) By touching or feeling them  
(d) By wearing them
43. What are yarns made of ?  
(a) Fabrics (b) Fibres  
(c) Rubber (d) Metals
44. Identify the correct sequence of making a cloth.  
(a) fibre → fabric  
(b) yarn → fibre → fabric  
(c) fibre → yarn → fabric  
(d) fabric → fibre → yarn
45. What are natural fibres?  
(a) Fibres from plant  
(b) Fibres from animals  
(c) Fibres from chemicals  
(d) Fibres from both plants and animals.
46. Which of the following fibres is a natural fibre?  
(a) Polyester (b) Nylon  
(c) Silk (d) Acrylic
47. Identify the odd one out.  
(a) hair of rabbit. (b) hair of horse  
(c) wool from yak (d) fleece of sheep
48. Which of the following are plant fibres?  
(a) Silk and wool (b) Jute and cotton  
(c) Rayon and nylon (d) All of these
49. Identify the synthetic fibre.  
(a) jute (b) cotton  
(c) coconut (d) acrylic
50. Which part of the cotton plant gives cotton balls?  
(a) Flower (b) Cotton  
(c) Fruit (d) Leaves
51. What conditions are needed for growing cotton?  
(a) Red soil with cold climate  
(b) Rain  
(c) Black soil with warm climate  
(d) Black soil with cold climate
52. What is ginning?  
(a) The process of picking up cotton balls.  
(b) Process of separating seeds from cotton balls.  
(c) Process of making yarns.  
(d) Process of arranging the yarns.

53. How are seeds removed from cotton bolls?  
 (a) By combing with hand.  
 (b) By machines  
 (c) Both by hand and machines.  
 (d) By charkha
54. Which part of jute plant gives the fibre?  
 (a) Leaf (b) Stem  
 (c) Flower (d) Roots
55. What is necessary for jute plants?  
 (a) Rains (b) Dry weather  
 (c) Drought (d) Cold weather
56. Which of the following are used to make carpets and gummy bags?  
 (a) Cotton (b) Silk  
 (c) Jute (d) Polyester
57. The process of making yarn from fibres is called \_\_\_\_\_.  
 (a) spinning (b) ginning  
 (c) weaning (d) carding
58. Which of the following device is used for spinning by hand?  
 (a) Charkha (b) Shuttle  
 (c) Takli (d) Both (a) and (c)
59. Who popularised hand spinning and use of homespun cloth during Independence movement  
 (a) Jawahar Lal Nehru.  
 (b) Mahatma Gandhi  
 (c) Netaji Subash Chandra Bose  
 (d) Indira Gandhi
60. Which of the following are two main processes of making fabrics?  
 (a) Ginning and weaning.  
 (b) Weaving and spinning.  
 (c) Knitting and ginning.  
 (d) Weaving and knitting.
61. Which of the following process best describes weaving?  
 (a) Process of separating seeds from bolls.  
 (b) Spinning of yarn.  
 (c) Arranging two sets of yarn together  
 (d) Immersing stems of jute plant in water.
62. Which of the following items are made by knitting?  
 (a) Socks and sweaters.  
 (b) Sarees and dupattas.  
 (c) Dhoti and turban  
 (d) Ropes and bedsheets.
63. Which of the following were used in ancient times by people to cover themselves?  
 (a) Bark of trees (b) Leaves of trees  
 (c) Furs of animals (d) All of these
64. Which of the following fibres were cultivated in ancient Egypt?  
 (a) Silk (b) Cotton  
 (c) Flax (d) Both (b) and (c)
65. Which of the following is worn as an unstitched piece of fabric?  
 (a) Shirt (b) Trousers  
 (c) Lungi (d) Frock

### Statement Based Questions

**DIRECTIONS :** Read the following statements carefully and choose the correct option.

- (i) There are different types of fabrics available in market.

(ii) People use different fabrics to make different materials.

(iii) Sarees and shirts are made of same fabric.

(a) (i) is correct but (ii) and (iii) are false.  
 (b) (ii) is correct but (i) and (iii) are false.  
 (c) (iii) is correct but (i) and (ii) are false.  
 (d) (i) and (ii) are correct but (iii) is false.
- (i) Fibres obtained from only plants are called natural fibres.

(ii) Silk is a natural fibre obtained from mulberry tree.

(a) (i) is correct, (ii) is false.  
 (b) (ii) is correct, (i) is false.  
 (c) Both are correct.  
 (d) Both are incorrect.
- (i) Fabric is made up of yarns.

(ii) Yarn is made up of fibres.

(a) (i) is correct, (ii) is false.  
 (b) (ii) is correct, (i) is false.  
 (c) Both are correct.  
 (d) Both are incorrect.
- (i) Wool is used to make mufflers, sweaters and shawls.

(ii) Yak and camels also give wool.

(a) (i) is correct, (ii) is false.  
 (b) (ii) is correct, (i) is false.  
 (c) Both are correct.  
 (d) Both are incorrect.
- (i) Some fibres are chemically made in factories.

(ii) Nylon is a natural fibre.  
 (iii) Cotton is a synthetic plant fibre

- (a) (i) is correct but (ii) and (iii) are false.  
(b) (ii) is correct but (i) and (iii) are false.  
(c) (iii) is correct but (i) and (ii) are false.  
(d) (i) and (ii) are correct but (iii) is false.
6. (i) After harvesting, the stems of Jute plants are tied into bundles and soaked in water for few days.  
(ii) The stems rot and fibres are separated by hand.  
(a) Both (i) and (ii) are correct and (iii) is correct explanation of (i).  
(b) Both (i) and (ii) are correct but (ii) is not correct explanation of (i).  
(c) (i) is true and (ii) is false.  
(d) Both are false.
7. (i) When the cotton bolls mature, they burst open and seeds covered with cotton fibres can be seen.  
(ii) Seeds are removed by hand or combing.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
8. (i) To make a piece of cloth, all the fibres have to be converted into fabrics.  
(ii) The process of making a fabric from yarn is called spinning.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
9. (i) Takli is a hand device used to weave yarns together.  
(ii) Handloom is a hand device used to spin a yarn.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
10. (i) Mahatma Gandhi promoted the use of spinning 'Charkha'.  
(ii) Charkha is a kind of loom used to make cloth.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
11. (i) Coir is a fibre obtained from husk of coconut.  
(ii) Coir is used as a stuffing in pillows and mattresses.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.
- (c) Both are correct.  
(d) Both are incorrect.
12. (i) Knitting can be done by hand only.  
(ii) Socks are made by a single yarn knitted together.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
13. (i) Primitive men used animal skins to cover their bodies.  
(ii) In the later age, early men curved hair, vines, twigs etc to make baskets.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
14. (i) In ancient India, cotton grew in regions near the river Kaveri.  
(ii) In ancient Egypt cotton was not grown.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
15. (i) To make fabrics, fibres are first converted into yarn.  
(ii) Fibres made from chemical substances are called synthetic fibres.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
16. (i) Artificial silk is a natural fibre.  
(ii) The process of arranging two sets of yarn together to make a fabric is called knitting.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
17. (i) Jute is the outer covering of coconut.  
(ii) Jute is the cheapest natural fibre.  
(a) (i) is correct, (ii) is false.  
(b) (ii) is correct, (i) is false.  
(c) Both are correct.  
(d) Both are incorrect.
18. (i) To make fabrics, fibres are first converted into yarn.  
(ii) Fibres made from chemical substances are called synthetic fibres.  
(iii) All plant have fibres in their body.

- (a) (i) is correct but (ii) and (iii) are false.  
 (b) (ii) is correct but (i) and (iii) are false.  
 (c) (iii) is correct but (i) and (ii) are false.  
 (d) (i) and (ii) are correct but (iii) is false.
19. (i) All artificial fibres can be used for making cloth.  
 (ii) Polyester absorbs more water than cotton.  
 (iii) Silk and wool both are obtained from animals.  
 (a) (i) is correct but (ii) and (iii) are false.  
 (b) (ii) is correct but (i) and (iii) are false.  
 (c) (iii) is correct but (i) and (ii) are false.  
 (d) (i) and (ii) are correct but (iii) is false.
20. (i) Nylon is not used for the manufacture of tyre cords, fabrics and ropes.  
 (ii) Cotton was not known to the ancient Indians and Egyptians.  
 (iii) Silk fibres are long, even, straight and fine.  
 (a) (i) is correct but (ii) and (iii) are false.  
 (b) (ii) is correct but (i) and (iii) are false.  
 (c) (iii) is correct but (i) and (ii) are false.  
 (d) (i) and (ii) are correct but (iii) is false.
21. (i) In India Madhya Pradesh is the leading cotton producing state.  
 (ii) Cotton is grown in such places that have black soil  
 (iii) Cotton is sown between January and March.  
 (a) (i) is correct but (ii) and (iii) are false.  
 (b) (ii) is correct but (i) and (iii) are false.  
 (c) (iii) is correct but (i) and (ii) are false.  
 (d) (i) and (ii) are correct but (iii) is false.
22. (i) The process of making yarn from fibre is called weaving.  
 (ii) Fruit of cotton plant is about the size of lemon.  
 (iii) Silk fibre is obtained from adult of silk moth.  
 (a) (i) is correct but (ii) and (iii) are false.  
 (b) (ii) is correct but (i) and (iii) are false.  
 (c) (iii) is correct but (i) and (ii) are false.  
 (d) (i) and (ii) are correct but (iii) is false.
23. (i) Synthetic fibres can not absorb sweat easily.  
 (ii) Synthetic fibres are suitable for hot and humid weather.  
 (iii) Nylon is a Animal fibre.

- (a) (i) is correct but (ii) and (iii) are false.  
 (b) (ii) is correct but (i) and (iii) are false.  
 (c) (iii) is correct but (i) and (ii) are false.  
 (d) (i) and (ii) are correct but (iii) is false.

### Figure/Based Questions

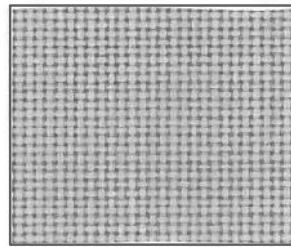
**DIRECTIONS :** Carefully observe the following pictures/figures and answer the questions.



1.

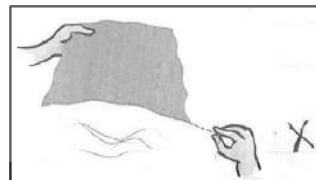
There are \_\_\_\_\_ types of clothes worn by people in \_\_\_\_\_ regions of the world.

- (a) similar, different  
 (b) different, different  
 (c) different, all  
 (d) similar, all
2. Look at the enlarged view of a piece of fabric. What is it made of?



- (a) Lines  
 (b) Checks  
 (c) Yarns  
 (d) Fibres

3.



Identify X.

- (a) fabric  
 (b) yarn  
 (c) fibre  
 (d) boll

4. Warriors often wore such clothes. These protected them against injury from daggers. Can you suggest what was used to make such clothes.

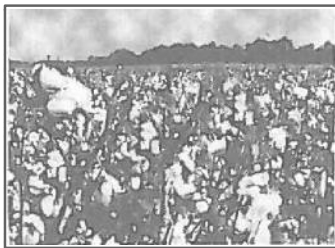


- (a) metals (b) cotton  
(c) jute (d) polyester

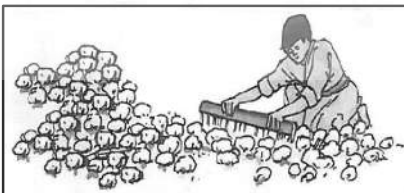
Match the following columns

5. **Column I** **Column II**
- (A) fabric (p)   
(B) fibre (q)   
(C) yarn (r) 
- (a) A → r, B → q, C → p  
(b) A → q, B → r, C → p  
(c) A → r, B → p, C → q  
(d) A → p, B → q, C → r

6. Identify this crop growing in Gujarat.

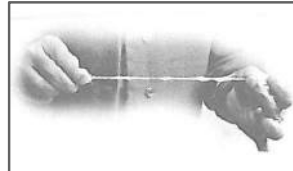


- (a) jute (b) flax  
(c) cotton (d) acrylic
7. Observe this process carefully. It is a very important event in the making of a cotton fabric. What is the purpose of this method?



- (a) To make cotton bolls fluffy.  
(b) To separate the seeds from cotton bolls.  
(c) To collect cotton bolls in the field.  
(d) To sow cotton seeds.

8. Identify the process shown in the figure below.



- (a) Making fibres (b) Making yarn  
(c) Making bales (d) All of these

9. Match the following images to the process.

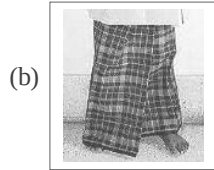
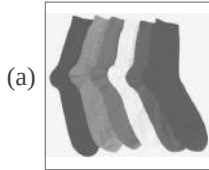
- Column I** **Column II**
- (A)  (p) weaving  
(B)  (q) knitting  
(C)  (r) spinning
- (a) A → r, B → p, C → q  
(b) A → q, B → r, C → p  
(c) A → p, B → q, C → r  
(d) A → q, B → p, C → p

10. Match the following devices use to spin cotton yarn to their names.

- Column I** **Column II**
- (A) Takli (p)   
(B) Charkha (q)   
(C) Hand spin (r) 



- (a)  $A \rightarrow r, B \rightarrow p, C \rightarrow q$   
 (b)  $A \rightarrow q, B \rightarrow r, C \rightarrow p$   
 (c)  $A \rightarrow p, B \rightarrow q, C \rightarrow r$   
 (d)  $A \rightarrow q, B \rightarrow p, C \rightarrow p$
11. Look at the following pictures and select the one that is made by knitting.



12. Observe the following figure and tell what is the woman doing in the figure?

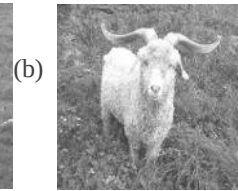


- (a) Knitting (b) Weaving  
 (c) Spinning (d) Retting
13. Fabric can be made from yarn in various ways. The figure below is showing one of the ways of making fabric from yarn. Which one of the following method is shown in the figure?



- (a) Weaving

- (b) Knitting  
 (c) Spinning  
 (d) Both weaving and knitting
14. Some animals are shown in picture below. From which of these animals we get wool?



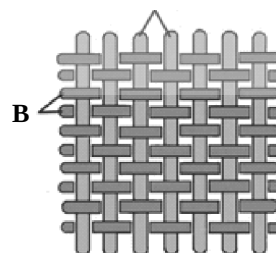
- (d) All of these

15. Select the one that can be used unstitched



- (a) (i) and (ii)  
 (b) (i) (ii) and (iii)  
 (c) (i), (ii) and (iv)  
 (d) (i), (iii) and (iv)

A





16. What 'A' is representing in the given figure?  
 (a) Weft (b) Warp  
 (c) Thread (d) Yarn
17. What 'B' is representing in the given figure?  
 (a) Cotton boll (b) Rope  
 (c) Warp (d) Weft
18. 'A' and 'B' in the given figure are related to which of the following process?  
 (a) Spinning (b) Weaving  
 (c) Ginning (d) Retting

### Matching Based Questions

**DIRECTIONS :** Match column I with column II and select correct answer using the code below.

1. **Column I** **Column II**  
 (A) Cotton (p) cocoon  
 (B) Jute (q) sheep  
 (C) Silk (r) stem  
 (D) Wool (s) fruit  
 (a)  $A \rightarrow r, B \rightarrow s, C \rightarrow q, D \rightarrow p$   
 (b)  $A \rightarrow s, B \rightarrow r, C \rightarrow p, D \rightarrow q$   
 (c)  $A \rightarrow s, B \rightarrow r, C \rightarrow q, D \rightarrow p$   
 (d)  $A \rightarrow r, B \rightarrow s, C \rightarrow p, D \rightarrow q$
2. **Column I** **Column II**  
 (A) Ginning (p) making yarn  
 (B) Weaving (q) remaining seeds  
 (C) Spinning (r) arranging yarns together  
 (D) knitting (s) single yarn woven to make fabric  
 (a)  $A \rightarrow p, B \rightarrow q, C \rightarrow r, D \rightarrow s$   
 (b)  $A \rightarrow q, B \rightarrow r, C \rightarrow s, D \rightarrow p$   
 (c)  $A \rightarrow q, B \rightarrow r, C \rightarrow p, D \rightarrow s$   
 (d)  $A \rightarrow s, B \rightarrow r, C \rightarrow q, D \rightarrow p$
3. **Column I** **Column II**  
 (A) Polyester (p) natural  
 (B) Flax (q) coir  
 (C) Coconut (r) synthetic  
 (a)  $A \rightarrow q, B \rightarrow r, C \rightarrow p$   
 (b)  $A \rightarrow r, B \rightarrow p, C \rightarrow q$   
 (c)  $A \rightarrow p, B \rightarrow r, C \rightarrow q$
4. **Column I** **Column II**  
 (A) Cotton (p) Assam  
 (B) Silk (q) Gujarat  
 (C) Jute (r) China  
 (a)  $A \rightarrow q, B \rightarrow r, C \rightarrow p$

- (b)  $A \rightarrow r, B \rightarrow p, C \rightarrow q$   
 (c)  $A \rightarrow p, B \rightarrow r, C \rightarrow q$
5. **Column I** **Column II**  
 (A) Charkha (p) knitting  
 (B) Needles (q) weaving  
 (C) Handloom (r) spinning  
 (D) Comb (s) ginning  
 (a)  $A \rightarrow r, B \rightarrow p, C \rightarrow q, D \rightarrow s$   
 (b)  $A \rightarrow q, B \rightarrow r, C \rightarrow s, D \rightarrow p$   
 (c)  $A \rightarrow p, B \rightarrow s, C \rightarrow r, D \rightarrow q$   
 (d)  $A \rightarrow s, B \rightarrow q, C \rightarrow p, D \rightarrow r$
6. **Column I** **Column II**  
 (A) Synthetic fibres (p) fur, silk  
 (B) Plant Fibres (q) rayon, nylon  
 (C) Animal Fibres (r) flax, jute  
 (a)  $A \rightarrow q, B \rightarrow p, C \rightarrow r$   
 (b)  $A \rightarrow r, B \rightarrow p, C \rightarrow q$   
 (c)  $A \rightarrow p, B \rightarrow q, C \rightarrow r$   
 (d)  $A \rightarrow q, B \rightarrow r, C \rightarrow p$
7. **Column I** **Column II**  
 (A) Sweater (p) silk  
 (B) Door mat (q) polyester  
 (C) Umbrella (r) coir  
 (D) Saree (s) wool  
 (a)  $A \rightarrow s, B \rightarrow p, C \rightarrow q, D \rightarrow r$   
 (b)  $A \rightarrow q, B \rightarrow s, C \rightarrow p, D \rightarrow r$   
 (c)  $A \rightarrow s, B \rightarrow r, C \rightarrow q, D \rightarrow p$   
 (d)  $A \rightarrow p, B \rightarrow r, C \rightarrow s, D \rightarrow q$
8. **Column I** **Column II**  
 (A) Wool (p) hot weather  
 (B) Cotton (q) gunny bags  
 (C) Jute (r) cold weather  
 (a)  $A \rightarrow q, B \rightarrow r, C \rightarrow p$   
 (b)  $A \rightarrow r, B \rightarrow q, C \rightarrow p$   
 (c)  $A \rightarrow p, B \rightarrow q, C \rightarrow r$   
 (d)  $A \rightarrow r, B \rightarrow p, C \rightarrow q$

### Passage Based Questions

**DIRECTIONS :** Read the passage (s) given below and answer the questions that follows.

#### Passage I

For thousands of years natural fibres were the only ones available for making fabrics. Now we have some fibres which are made from chemical substances. Such fibres which are made from chemical substances are called synthetic fibres.

1. Natural fibres are

- (a) plant fibres
  - (b) animal fibres
  - (c) Both (a) and (b)
  - (d) Neither (a) nor (b)
2. Which of the following is not a natural fibre?
    - (a) Yarn
    - (b) Cotton
    - (c) Silk
    - (d) Nylon
  3. In ancient times the types of fibres not available was/were
    - (a) plant fibres
    - (b) animal fibres
    - (c) synthetic fibres
    - (d) All of these

#### Passage II

4. Spinning process used to make yarn from fibres involves which of the following steps?
  - (a) Drawing out fibres from a mass of cotton wool
  - (b) Twisting of fibres
  - (c) Both the above
  - (d) None of the above
5. Which of the following is a hand operated device that is used for spinning and whose use is popularized by Mahatma Gandhi as a part of independence movement?
  - (a) Takli
  - (b) Charkha
  - (c) Both Takli and charkha
  - (d) Handlooms
6. To make fabric, we have to first convert the cotton fibres into yarns by which of the following process?
  - (a) Ginning
  - (b) Spinning
  - (c) Weaving
  - (d) Knitting

#### Passage III

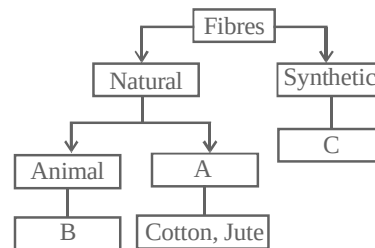
Material used for making clothes that we wear during different seasons is obtained from natural as well as man-made sources. Cotton, jute, silk, wool, etc., are obtained from natural sources, i.e., animals or plants. Polyester, nylon, rayon, etc., are man-made materials that are used for making clothes.

7. Which of the following is a man made material?
  - (a) Cotton
  - (b) Silk
  - (c) Jute
  - (d) Rayon
8. Which of the following is an animal fibre?
  - (a) Cotton
  - (b) Jute
  - (c) Wool
  - (d) Nylon

9. Which of the following is a plant fibre?
  - (a) Jute
  - (b) Flax
  - (c) Silk
  - (d) Both (a) and (b)

#### Passage IV

Look at the following flow chart and answer the given questions:



10. Which of the following is correct option for 'A'?
  - (a) Yarn
  - (b) Fabric
  - (c) Plant
  - (d) Weaving
11. Which of the following is correct option for 'B'?
  - (a) Silk
  - (b) Flax
  - (c) Cotton
  - (d) Nylon
12. Which of the following stands for 'C'?
  - (a) Wool
  - (b) Decron
  - (c) Flax
  - (d) both (b) and (c)

#### Passage V

The two main processes by which fabrics are made from yarn are weaving and knitting. The process of arranging two sets of yarns together to make fabric is called weaving. In knitting a single yarn is used to make a piece of fabric.

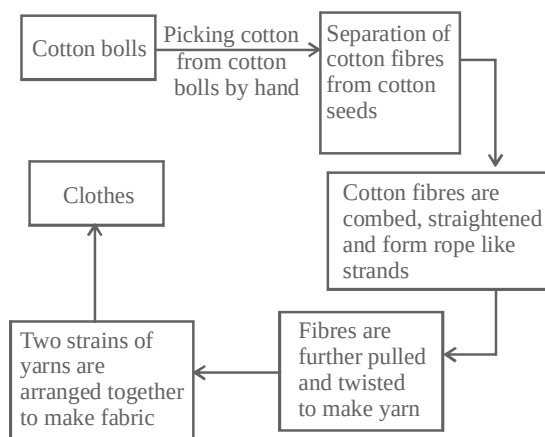
13. Which of the following devices is /are used for weaving of fabric ?
  - (a) Loom
  - (b) Charkha
  - (c) Takli
  - (d) None of these
14. Knitting
  - (a) is done by hand and also by machines
  - (b) makes use of two sets of yarns to make a fabric
  - (c) is done on hand looms
  - (d) All the above are correct
15. Select the correct statement?
  - (a) Weaving and knitting are used for making different kinds of fabric
  - (b) Socks and many other clothing items are made of knitted fabrics
  - (c) Weaving of fabric is done on looms
  - (d) All the above are correct.

**Passage VI**

Manisha has to do a project on 'Fibres to Fabrics'. In this project she has to make a list of items from her home that are made up of different fibres and she has to classify them into plant, animal or synthetic fibres on the basis of the fabric from which these items are made up of. She made following list of items.

Bed-sheets, Sweater, Jeans, School bag, Table Cloth, Blanket, Curtains.

16. Which of the following plant fibre is used for Bed-Sheets?  
 (a) Jute (b) Hemp  
 (c) Cotton (d) Ramie
17. Which of the following items are made up of animal fibre?  
 (a) Sweater, Blanket, Jeans  
 (b) Sweater and Blanket  
 (c) Jeans and Sweater  
 (d) Blanket, Table cloth and school bag
18. Fabric of school bag, curtains and table cloth is classified into which category?  
 (a) Plant fibre (b) Animal fibre  
 (c) Synthetic fibre (d) None of these

**Passage VII**

19. The cotton is separated from the seeds in machines called  
 (a) gins (b) spindle  
 (c) looms (d) charkha
20. The process in which cotton fibres are combed, straightened to form rope like strands is called  
 (a) weaving (b) retting  
 (c) ginning (d) knitting

21. What is the name of the process in which fibres are pulled and twisted to make yarn?

- (a) spinning (b) ginning  
 (c) knitting (d) weaving

**Assertion/Reason**

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "assertion A" and the other labelled as "reason R". You are to examine these two statements carefully and decide if the assertion A and reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.  
 (b) Both A and R are true but R is not the correct explanation of A.  
 (c) A is true but R is false.  
 (d) A is false but R is true.

1. **Assertion (A) :** Jute fibre is obtained from the flower of a jute plant.

**Reason (R) :** Jute fibre is a natural fibre.

2. **Assertion (A) :** The fruits of the cotton plant are about the size of a lemon.

**Reason (R) :** Cotton plants are generally grown at places having black soil and warm climate.

3. **Assertion (A) :** Wool is used for making winter clothing.

**Reason (R) :** Wool fibre is highly porous.

4. **Assertion (A) :** Cotton is comfortable to wear in hot, humid weather.

**Reason (R) :** Cotton absorbs sweat.

5. **Assertion (A) :** In India jute is mainly grown in West Bengal, Bihar and Assam.

**Reason (R) :** The jute plant is normally harvested when it is at flowering stage.

6. **Assertion (A) :** Jute can be effective substitute of plastic bags.

**Reason (R) :** Jute is 100% bio-degradable and recyclable.

7. **Assertion (A) :** Cotton on burning gives paper burning smell.

**Reason (R) :** Paper is made from cotton

# SOLUTIONS

## 1 EXERCISE

### Fill in the Blanks

1. Black soil
2. Bales
3. Coastal area
4. Cotton
5. Weaving or knitting
6. Cotton and Jute
7. Spinning
8. Weaving and knitting
9. Looms
10. Ginning of cotton

### True/False

- |           |           |
|-----------|-----------|
| 1. False  | 2. True   |
| 3. False  | 4. True   |
| 5. False  | 6. True   |
| 7. True   | 8. False  |
| 9. True   | 10. False |
| 11. True  | 12. False |
| 13. True  | 14. True  |
| 15. True  | 16. True  |
| 17. False | 18. True  |
| 19. False | 20. False |

### Match the Column

1.  $A \rightarrow (q), B \rightarrow (t), C \rightarrow (p), D \rightarrow (r), E \rightarrow (s)$
2.  $A \rightarrow (q), B \rightarrow (s), C \rightarrow (p), D \rightarrow (r), E \rightarrow (t)$
3.  $A \rightarrow (s), B \rightarrow (v), C \rightarrow (x), D \rightarrow (p), E \rightarrow (y), F \rightarrow (q), G \rightarrow (w), H \rightarrow (t), I \rightarrow (r), J \rightarrow (z).$

### Very Short Answer Type Questions

1. Patsun.
2. Rayon and polyester.
3. Wool and silk.
4. Synthetic.
5. China.
6. (i) They are stronger.  
(ii) They are cheaper.
7. A single yarn is used for knitting.
8. Cotton is a cellulose fibre.
9. Saree is used as an un-stitched piece of fabric.

### Short Answer Type Questions

1. Jute stems are immersed in water for rotting, as jute fibres can be extracted from the rotten stems easily. This process is called retting.
2. We use jute or cotton fabric for flooring as they are strong, cheap and good absorbent.
3. Flowering stage is the best season for cultivation of jute plant. It is grown in Bihar, Assam and West Bengal.
4. Cotton is a good absorbent of liquid, thus it is widely used to apply medicines, during cleaning of wounds, operation, etc.
5. Banana leaves and stem both have fibres.
6. In ancient time people used bark and big leaves of trees or animal skins and fur to cover themselves. Later on they began weaving twigs, grasses, etc. They twisted vines, animal fleece or hairs together into long strands. They were woven into fabrics.
7. Cotton is also used in hospitals as absorbent and preparing bandages.
8. Coastal regions with high rainfall and salt rich soil is best suited to these plants. In India, Kerala, Coastal Tamil Nadu, Coastal Orissa, delta area of West Bengal, Coastal area of Karnataka, A.P. and Maharashtra are the regions where coconut is grown.
9. (i) Coconut fibres are rough and very hard. Thus, can be used for making ropes.  
(ii) Coconut fibres are used for making mattresses.
10. (i) The process of arranging two sets of yarns together to make a fabric is known as weaving.  
(ii) Weaving is done on looms which are either hand operated or power operated.
11. Man-made fibres are called synthetic fibres, e.g., Nylon, Rayon, Polyester, etc.
12. Two hand operated devices are :  
(1) Hand spindle (takli)  
(2) Charkha  
Charkha was made popular by Mahatma Gandhi.

13. The process of making yarn from fibres is called spinning. In this process, fibres from a mass of cotton or wool are drawn out and twisted. This brings the fibres together to form a yarn. Devices which are used for spinning are spindle (takli) and charkha.
14. Fibres obtained from plants and animals are known as natural fibres. Cotton, jute and coconut are examples of plant fibers. Silk and wool are examples of animal fibres.
15. (i) Cotton bolls are the fruit of cotton plant.  
(ii) The soil best suited for the growth of cotton plant is black soil.  
(iii) Ginning is the process in which seeds are separated by combing.
16. 1. Cotton is used for making various textile products.  
2. The cotton seed (obtained after the cotton is ginned) is used to produce cotton seed oil, which is like any other vegetable oil. Jute is used for making gunny bags and ropes.
17. Synthetic fibres are cheap, hence economical. They have other advantages also over natural fibres as they are crease and moth resistant, easy to wash and handle. They dry up quickly.
18. Wool is obtained from fur of sheep, goat or camel.
19. Synthetic fabric get better crease as compared to cotton fabric.
20. Cocoon of silk worm is the source of silk.
21. The seeds are removed from cotton bolls by hand combing. This process is known as ginning.
22. Stem of jute plant is used to get its fibre.
23. Spinning is the process of getting yarn from fibres.
24. Two hand instruments used for spinning are :  
(a) Takli (b) Charkha
25. Weaving and knitting are two processes of getting fabric from yarns.
26. In weaving, two yarns are used at a time.
27. If we have to use any one yarn for making fabric, we will have to adopt knitting.
28. Looms are used in textile industry for making fabric from two yarns, using weaving techniques.
29. Saree, lungi, turban are three Indian dresses which do not need stitching.
30. Cotton and flax plants were used in ancient Egypt to get natural fibre.
31. Rayon and polyester are two synthetic fibres.
32. Wool and silk are two animal fabrics.

### Long Answer Type Questions

1. The quality of cotton fabrics can be improved by :  
(i) improving the quality of soil.  
(ii) protecting the crop from pests.  
(iii) discarding infected or tarnished fibres.  
(iv) twisting the fibres properly to make yarn.  
(v) ensuring minimum or no gaps while weaving.
2. (i) Weaving and knitting (ii) Spinning  
(iii) Cotton and jute
3. (i) **Natural fibres** : Wool and Jute. Wool is an animal fibre which is obtained from sheep and jute is a plant fibre obtained from plant.  
(ii) **Synthetic fibres** : Acrylic, Polyester and Rayon. These are man-made fibres and are prepared from different chemical substances.

## 2 EXERCISE

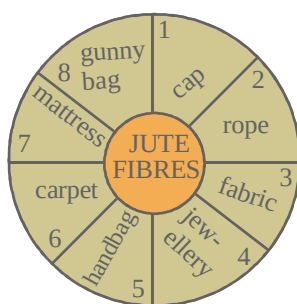
### Text Book Questions

1. **Natural fibre**: Wool, cotton, silk, Jute.  
**Synthetic fibre**: Nylon, polyester.
2. (a) True  
(b) False. Spinning is a process of making yarn.  
(c) False. Husk is the outer covering of coconut.  
(d) True  
(e) True  
(f) False. Jute fibre is obtained from the stem of a plant.  
(g) True
3. (a) Cotton, Jute  
(b) Wool, Silk
4. From the fruit of cotton plant cotton is obtained. Jute is obtained from the stem of jute plant.
5. Coir mats, baskets.

6. The process by which yarn is made from fibres is called spinning. In this process, fibres from a mass of cotton wool are drawn out and twisted. This brings the fibres together to form a yarn. A simple device used for spinning is a hand spindle, also called takli. Another hand-operated device used for spinning is charkha. On a large scale yarn spinning is done with the help of spinning machines. After spinning, yarns are used for making fabrics.

### NCERT Exemplar Questions

- Yarn, fibres.
- (a) False. Silk is an animal fibre.  
(b) False. Jute is obtained from the stem of a plant.  
(c) True  
(d) True
- Cotton fabric does not shrink but silk fabric shrinks on burning.
- Knitting
- (i) The possible reason for this can be following the end of the thread was separated into a few thin strands  
(ii) The thread was quite thick to pass through the eye of the needle.
- Saree, dhoti, lungi, turban, dupatta, towel, etc.
- (a) – (ii); (b) – (iii); (c) – (i); (d) – (iv)
- (a) – (v); (b) – (i); (c) – (vi); (d) – (ii); (e) – (iii); (f) – (iv)



- 9.
10. After maturing the fruits of the cotton plant (cotton bolls), burst open and the seeds covered with cotton fibres can be seen. Cotton is usually picked by hand from these bolls. Fibres are then separated from the seeds by combing. Fibres from a mass of cotton wool are drawn out and

twisted. This brings the fibres together to form a yarn. By arranging two sets of yarns together a fabric is made. This fabric is then used to make the cotton shirt.

11. The two main processes of making fabric from yarn are weaving and knitting.
- Weaving:** The process by which two sets of yarn are arranged together to make a fabric is called weaving. Weaving of fabric is done on looms. The looms are either hand-operated or power-operated.
  - Knitting:** Knitting is used to make a piece of fabric. It is done by hand and also by machines with single yarn is used.

### HOTS Questions

- When people settled in agricultural communities they learned to weave twigs, grass into mats and baskets for carrying. Vines and animal fleece, hair were twisted to long strands and made as curtains. These strands were woven into fabrics for their daily use.
- The product of the wool comes from fleece/hair of sheep, goat etc. That is reason for which burning of wool smells like burnt hair.
- Synthetic fibres are made from chemicals. On burning these nylon chemicals in them will not produce the smell of the burning paper as paper is a natural substance.
- Yarn construction: Yarns are made up of cotton fibres: fibres twisted together or lay side by side. These fibres may be natural, manufactured, or both. Fabrics will vary greatly in design, texture, and performance.
  - Staple fibres are made from short fibres, e.g. cotton, linen, wool or cut synthetic fibres.
  - Filament fibres are made from the long continuous form of fibres, e.g. silk and synthetics.
  - Monofilament yarns consist of a single long continuous filament.
  - Multifilament yarns consist of two or more filament fibres which may or may not be twisted together.
  - Micro fibres are made from very fine synthetic fibres, less than one denier in thickness.



5. We observe many cuttings of fabrics left over after stitching in a tailoring shop. We also see some cut pieces of cotton, silk or wool and some synthetic fibres.

### 3 EXERCISE

#### Multiple Choice Questions

1. (c) Fibres are thin strands that make up yarn. Yarn in turn is used to make fabrics.
2. (c)
3. (c)
4. (c) Natural fibres are obtained both from plant and animal sources.
5. (d) Wool is a natural fibres obtained from fleece of sheep or goat (animal source).
6. (d) Synthetic fibres are made from chemical substances.
7. (d)
8. (c) Cotton plant is grown in places that have black soil and warm climate.
9. (c)
10. (b)
11. (d)
12. (d) In India Jute is cultivated majorly in West Bengal, Bihar and Assam.
13. (d) Both Takli and charkha are hand devices used for spinning of yarn.
14. (b) Flax is a plant fibre obtained from flax plant.
15. (b)
16. (c) Lint is the fibrous material that is left after removing seed from cotton bolls.
17. (a) Spindle is called Takli. It is a simple device used for spinning of cotton.
18. (c) Both weaving and knitting are used for making fabric from yarn.
19. (a) Loom is a hand operated or power operated device used for weaving of fabrics.
20. (b)
21. (c)
22. (d) In ancient times people used bark and big leaves of trees or animal skins and furs to cover themselves.
23. (b) In early India cotton was grown in the regions near river Ganga.
24. (b) Flax (a plant) was cultivated in Egypt near river Nile.
25. (d) Saree, Dhoti, Lungi and Turban are used unstitched even today.
26. (b) The first wholly synthetic fibre is Nylon.
27. (c) Jute is mainly grown in north-east India.
28. (d)
29. (d)
30. (b) Silk is a natural fibres obtained from cocoon of silk worm.
31. (b) Knitting is used to make fabrics from yarn.
32. (b) The process of making yarn from fibres is called spinning.
33. (c) Synthetic fibres are made from chemical compounds.
34. (d) Llama and Angora rabbits provide wool.
35. (d) Wooly dog do not yield wool.
36. (b) Cotton and jute are obtained from plants therefore these are plant fibres.
37. (a) Fruit of cotton plant called cotton boll is used for obtaining cotton fibre. Cotton boll on maturing open and give cotton.
38. (c) Retting is the process of separation of jute fibre from jute plant.
39. (c)
40. (b)
41. (d) The other three are fabrics.
42. (c)
43. (b) Yarns are made of thin strands of thread called fibres.
44. (c)
45. (d) Fibres that are either obtained from plants or animals are called natural fibres.
46. (c) Other three are made from chemical. Silk comes from the cocoon of silkworm.
47. (b) The other three yields wool.
48. (b) Rayon and nylon are synthetic fibres, silk and wool are animal fibres.
49. (d) Other three are plant fibres.
50. (c)
51. (c)
52. (b)
53. (c) Traditionally it was done by combing with hand but now machines are used.
54. (b)

55. (a) Jute is cultivated in rainy season.
56. (c)
57. (a) In this process, fibres from cotton mass are drawn out and twisted.
58. (d) Takli is hand spindle, and charkha is also used for spinning.
59. (b) Gandhiji encouraged people to avoid imported clothes and wear homespun clothes.
60. (d)
61. (c) Two sets of yarn are woven to make a fabric.
62. (a) In knitting a single yarn is used to make a piece of fabric.
63. (d)
64. (d) Cotton and Flax were cultivated by people near river Nile.
65. (c) Lungi is wrapped around the waist by men in India.
18. (c)
19. (b)
20. (c)
21. (b) Maharashtra is the leading cotton producing state.  
Cotton is sown between May and September.
22. (a)
23. (a)

#### Statement Based Questions

1. (d)
2. (d) Fibres obtained from both plants and animals are natural fibres. Silk is obtained from cocoon of silkworm, which feeds on mulberry leaves.
3. (c)
4. (c)
5. (a) Nylon is a synthetic fibre and cotton is a natural fibre.
6. (a) Because of soaking in water, the stems become soft and fibres can be easily separated.
7. (c)
8. (d) To make a fabric, fibres have to be spun into yarns.
9. (d) Takli is a hand spindle, whereas handloom is used to weave cloth.
10. (a) Charkha is used for spinning.
11. (c)
12. (b)
13. (c)
14. (d) In India cotton grew near Ganga and cotton was grown in Egypt.
15. (c)
16. (d) The process of arranging two sets of yarns together to make a fabric is called weaving.
17. (b) Coir is the outer covering of the coconut.
1. (b) People wear a variety of clothes in different parts of the world.
2. (c) A fabric is made up of yarns arranged together in pattern.
3. (b)
4. (a)
5. (c)
6. (c)
7. (b) This process is called ginning.
8. (b) This is hand spinning of cotton to make yarn.
9. (b)
10. (b)
11. (a) Socks are made by process of knitting.
12. (b) The woman is weaving fabrics on looms by hand
13. (a) It is the process of weaving.
14. (d) We get wool from all the animals shown.
15. (d) Except shirt, all others can be used unstitched.
16. (a) Horizontal yarn in a loom is called weft.
17. (c) Longitudinal yarn in a loom is called warp.
18. (b)

#### Matching Based Questions

- |        |        |
|--------|--------|
| 1. (b) | 2. (c) |
| 3. (b) | 4. (a) |
| 5. (a) | 6. (d) |
| 7. (c) | 8. (d) |

#### Passage Based Questions

1. (c) Plant and animal fibres are natural fibres.
2. (d) Nylon is a synthetic fibre.
3. (c) Synthetic fibres were not available in ancient times.

4. (c) It involves drawing out fibres from a mass of cotton wool and twisting of fibres.
5. (b) **Charkha**, its use was popularised by Mahatma Gandhi as part of independence movement. Charkha is a hand operated device used for spinning.
6. (b) To make fabrics, we first convert cotton fibres into yarns by a process called spinning.
7. (d) Rayon is a man made material.
8. (c) Wool is obtained from sheep.
9. (d) Jute and flax are plant fibres.
10. (c) 'A' is for 'Plant' because natural fibres is further divided into animal and plant fibres.
11. (a) Silk is an animal fibre.
12. (b) Decron is a example of synthetic fibre.
13. (a) Loom; it is a device used for weaving of fabric. It is either hand operated or power operated.
14. (a) Knitting is done by hand as also an machines. It makes use of only a single yarn.
15. (d) All the statements given are correct
16. (c) Cotton fibre is used for bed-sheets.
17. (b) Sweater and blanket are made up of animal fibre i.e. wool.
18. (c) School bag, curtains and table cloth are made up of synthetic fibres.
19. (a) Cotton gin machines separates cotton seed and fibres easily.
20. (c)
21. (a) Spinning is the process of converting Fibres into yarn.

**Assertion/Reason**

1. (d) Assertion is false because jute fibre is obtained from stem of jute plant.
2. (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
3. (a) The air in the pores act as an insulator, and does not allow the body heat to go out.
4. (a) Sweat absorbed by cotton evaporates and results in cooling down of the body.
5. (b) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
6. (a) Jute is 100% bio-degradable and recyclable and thus environment friendly due to which reason it can be an effective substitute of plastic bags.
7. (c) Assertion is true but reason is false. Cotton and paper both are obtained from plant.

## Chapter

# 4

# SORTING MATERIALS INTO GROUPS

## INTRODUCTION

We have a number of objects around us like trees ,toys ,paper ,table ,chair etc. Some of these objects are living and some are non living. Non living objects can be man-made or natural. Objects around us may have different size,shapes, colours and uses. All objects around us are made up of one or more type of materials such as paper, glass, plastic, cloth,wood, metal, mud, soil, cotton, etc.

An object can be made from different materials. For example, chair can be made from wood or plastic.

Different objects can be made from the same material. For example window panes and fish bowl are made from same material, glass.

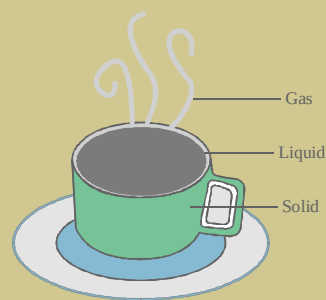
Several objects are made up of combination of several materials .For example mango shake is made up of mango, milk, sugar etc.

Different materials have different properties.Many objects differing in usage can be made from the same material. There are so many ways to group objects. *Placing similar things together is called grouping.* For example in supermarket grouping is done by keeping similar items on same shelf, which make it easier for us to find the item we need.



## SORTING MATERIALS INTO GROUPS

- All things are made of one or more materials.
- Same things can be made from different types of materials.
- It may be man-made or naturally occurring.
- Materials occupy space.
- Materials have mass.
- Materials can be classified on the basis of many criteria.
- Materials can be classified on the basis of physical state, as solid, liquid and gas.



## STATES OF MATTER

**Solid:** Solid has definite shape and definite volume. Examples: Stones, Wood, Plastic, Common Salt, Steel, Ice, Glass, etc.

**Liquid:** Liquid has indefinite shape but definite volume. Examples: Water, Milk, Oil, etc.

**Gas:** Gas has indefinite shape and indefinite volume. Examples: Oxygen, Nitrogen, Carbon dioxide, etc.

## CLASSIFICATION

The process of sorting and grouping objects/things according to some basis is called **Classification**. It makes study of large number of objects of different type easier, simple, systematic and convenient.

## PROPERTIES OF MATERIALS

Different types of materials have different properties. Some of the important properties of materials are given as following:

### Appearance

In appearance materials usually look very different from each other. The appearance of wood is different from iron. Similarly appearance of iron is different from copper or aluminum. Some materials when freshly cut appear shiny whereas others have no shine. Metals shine in their pure state. This shining property of metal is called **metallic lustre**.

Some materials having lustre are iron, copper, aluminum, gold, silver, etc.

Materials can be classified on the basis of their luster as lustrous materials, for example gold, silver etc and non lustrous materials for example wood, plastic, stone etc.

Shining property of gold, copper and silver is used for making jewellery. Some metals often lose their shine when exposed to air and moisture for some time.



Jewellery

### Hardness

**Hardness:** On the basis of hardness materials can be classified as **soft** or **hard**.

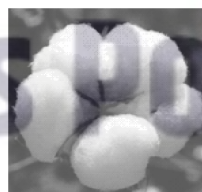
**Soft materials** are those which can be easily compressed or scratched e.g. cotton, sponge

**Hard materials** are those which are difficult to compress e.g. iron, stone, wood, diamond, etc.

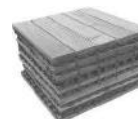
We can identify soft or hard materials by pressing different materials with our hand. Hard materials cannot be compressed easily while soft materials can be easily compressed.

Talc, that is used for making talcum powder is a very soft substance.

Wood and diamond are examples of hard substance.



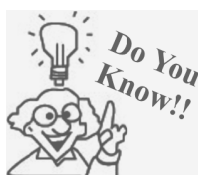
Cotton and soft toys



Wood



Diamond



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*Diamond is the hardest natural substance.*

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### Roughness

Materials can be rough or smooth. If a material has bumps or ridges on its surface which can be felt by touching them, such materials are said to be rough. For example rocks, bark of a tree, brick etc are rough materials.

**Smooth** materials do not have bumps. For example window pane, cup, plates, mirror etc.



Rough



Smooth

### Solubility

An important property of water is its ability to dissolve many substances in it. Many of the solid, liquid and gases dissolve in water.

**Solubility of solids in water:** Some of the solid substances dissolve when placed in a container containing water and stirred whereas some remain undissolved.

The solid substances that dissolve in water are called **soluble substances** e.g. salt, sugar etc.

The solid substances that remain undissolved are called **insoluble substances** e.g. sand, saw dust etc.

**Solubility of liquids in water :** When liquids are mixed with water, Some get completely mixed and are known as miscible e.g. vinegar, lemon juice.



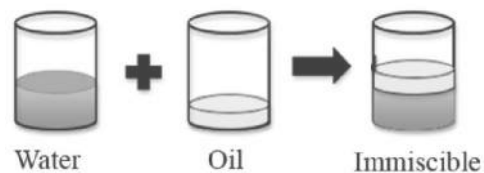
Dissolving salt in water

**NOTE:** Water can dissolve a large number of substances and plays an important role in functioning of our body.

Some do not mix and form a separate layer and are known as immiscible substances e.g. mustard oil, coconut oil, kerosene etc.

**Solubility of gases in water:** Some gases are soluble in water e.g. hydrogen chloride gas, carbon dioxide gas, ammonia gas etc. Some gases are insoluble in water e.g. nitrogen, hydrogen etc. Water, usually, has small quantities of some gases dissolved in it e.g. oxygen dissolved in water is very important for the survival of animals and plants that live in water.

Lemonade and other carbonated drinks are examples of gas dissolving in water as these drinks contain carbon dioxide gas dissolved in water.



Water

Oil

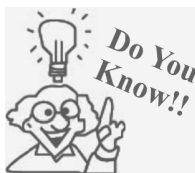
Immiscible



Carbonated drinks



Sea



*Animals living in water breathe the oxygen dissolved in water. Water plants use the carbon dioxide dissolved in water for photosynthesis.*

## Flotation

Some materials when dropped in water float on its surface e.g. dried leaves, dry wood, feather etc.

Some materials when dropped in water sink in water e.g. stone, iron nail etc. The concept of flotation following or sink can be understood by taking following example.



*Archimedes, a Greek physicist of the third century BC, discovered the principle of flotation known as Archimedes principle. According to the principle, when a body is wholly or partially immersed in a fluid there is an up thrust which is equal to the weight of fluid displaced.*

When a stone is placed in water, the water level rises. In this case, water is said to be displaced (moved somewhere else) by the stone. If the weight of this displaced water is greater than the weight of the stone, the stone will float, otherwise it will sink.

The shape of an object also affects the amount of liquid it would displace. Certain heavy objects are also able to float because of their shape. For example, the shape of a ship allows it to float on water, despite the fact that it is very heavy.



Ship



### Transparency

On the basis of transparency the objects can be divided as follows :

**Transparent objects** are those objects through which things can be seen (i.e. they allow the light to pass through them) e.g. glass, water, air, some plastics etc.

Shopkeeper mostly keep sweets ,biscuits etc. in transparent container so that customer can select item of his choice.

Air is transparent that is why we are able to see things around us ,even though air is all around us .Clean water is also transparent.

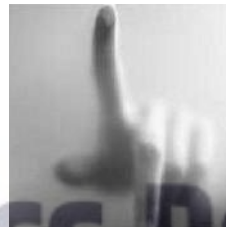
**Opaque objects** are those objects through which you are not able to see (i.e. they do not allow the light to pass through them) e.g. metals, cardboard, wood etc.



Transparent



Opaque



Translucent

**Translucent materials** are those materials through which objects can be seen but not clearly e.g. oiled paper.

### SOME OTHER PROPERTIES OF MATERIALS

#### Magnetic Properties

Materials that are attracted to a magnet are called magnetic materials. For example iron and steel are magnetic material. Nickel and cobalt are also attracted towards magnet. Aluminum, gold ,wood,plastic etc. are not attracted towards magnet these are called non magnetic materials.

Magnetic property of iron is used in doors of almirahs and refrigerators and various electronic devices.



Magnet

#### Conduction of Heat

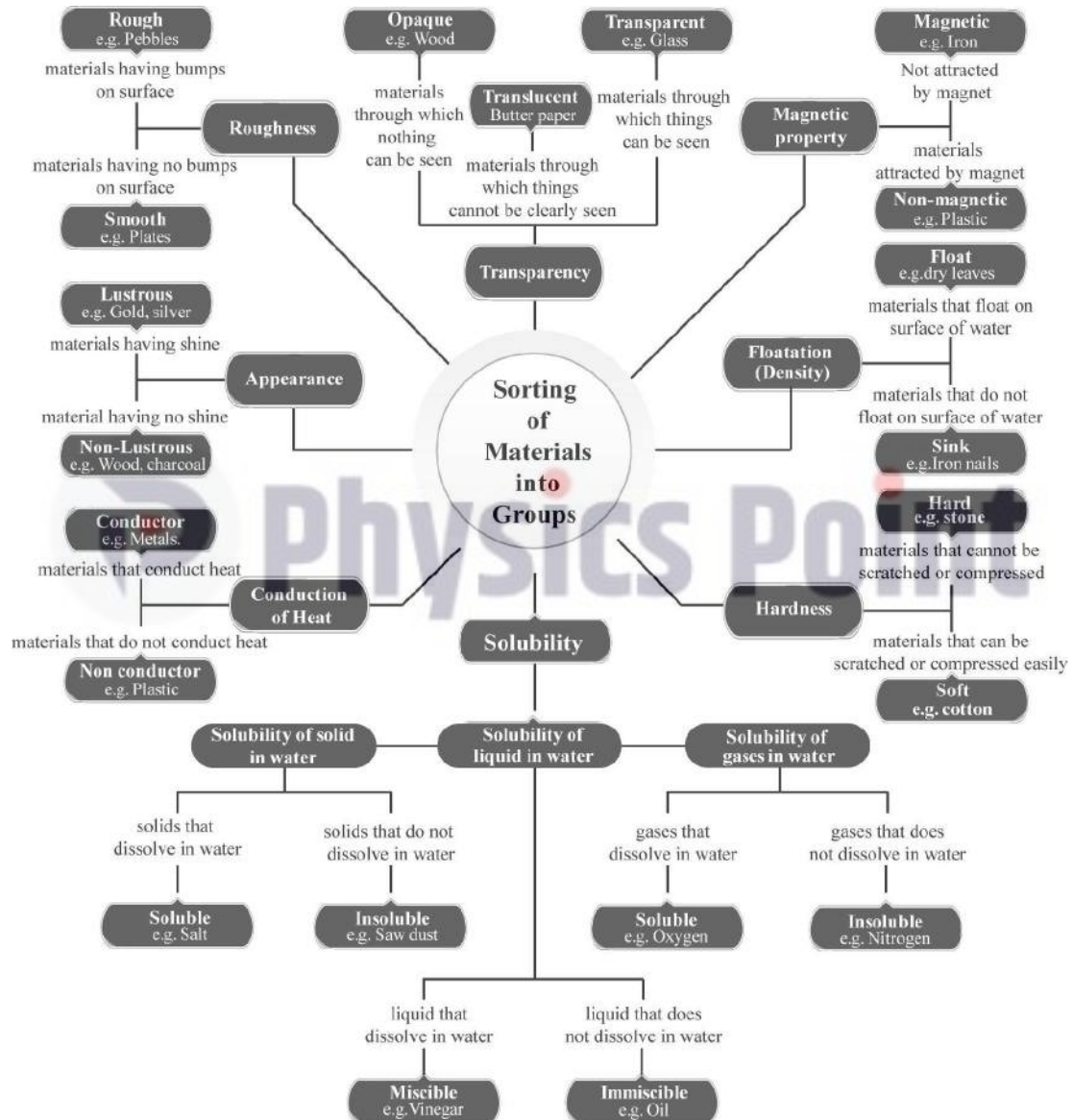
Utensil kept in kitchen are usually made up of metals and their handles are made up of plastic or wood. This is because metals get heated whereas materials such as wood and plastic do not.

Materials that allow heat to flow through them are called good conductors of heat, for example metals whereas those that do not allow heat to flow through them are bad conductors of heat. For example paper, wood, plastic and glass are bad conductor of heat.



Cooker

## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

1. Metals such as iron, silver are good ..... of heat.
2. The property which can be identified with nose is .....
3. Water is ..... while mustard oil is not.
4. Oil and water are ..... solution.
5. Ice is ..... than water.
6. Ice is ..... whereas water is .....
7. Objects which are lighter than a liquid ..... in the liquid.
8. A substance that does not allow heat to pass through is known as .....
9. Butter paper is the example of .....
10. Petrol and spirit are ..... substances.

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

1. All items are made of single material.
2. Milk is soluble in water.
3. Glass is opaque.
4. Any item can be made only of single material.
5. Metals are good conductors of heat but bad conductors of electricity.
6. Due to ductile behaviour, a long wire can be drawn of a metal.
7. Gold is the most malleable metal, among gold, aluminium and iron.
8. Iron is the soft metal.
9. Plastic is a bad conductor of heat.
10. Sand is highly soluble in water.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched. Statement (A, B, C, D, E) in column I have to be matched with statements (p, q, r, s, t) in column II.

- |    |                 |                        |
|----|-----------------|------------------------|
| 1. | <b>Column I</b> | <b>Column II</b>       |
|    | (A) Book        | (p) Wood               |
|    | (B) Table       | (q) Paper              |
|    | (C) Belt        | (r) Brick              |
|    | (D) Wall        | (s) Glass              |
|    | (E) Cup         | (t) Leather            |
| 2. | <b>Column I</b> | <b>Column II</b>       |
|    | (A) Air         | (p) Soluble in water   |
|    | (B) Oiled paper | (q) Translucent        |
|    | (C) Wood        | (r) Insoluble in water |
|    | (D) Salt        | (s) Transparent        |
|    | (E) Sand        | (t) Opaque             |

## Very Short Answers Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

1. Is grouping necessary? Give one reason.
2. If you have to select a handle out of steel, wood and rubber for your screw driver, which will you prefer?
3. Name two hard materials.
4. Wood is ductile or not?
5. Wood is used as a fuel. Which property makes it suitable for this purpose?
6. Name two substances that are not lustrous?
7. We need to group materials. Why?
8. What are the basis of grouping materials?
9. Why wood floats on water?
10. How are the gases dissolved in water are important for living organisms?

## Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. Water is called as universal solvent. Why?
2. Why we don't use steel handles in utensils?

3. Give two examples of translucent objects.
4. Mustard oil and grease both are insoluble in water, but mustard oil floats whereas grease settles down, why?
5. Why we don't use papers to prepare tables and chairs?
6. Give two examples of materials that can float on water and two which sink in water.
7. Give two-two examples of soluble and insoluble materials.
8. Describe translucent materials. Give an example.
9. Which type of materials can float on the surface of water? Give two examples.
10. How we can convert an opaque white paper into a translucent paper?
11. Write three advantages of grouping of materials.
12. What do you understand by the hardness of materials? Explain with an example.
13. How can you classify the materials on the basis of physical state?
14. Define lustrous materials? Give two examples.
15. Write the main properties on which the following objects can be sorted into groups :
  - (i) Books
  - (ii) Clothes
  - (iii) Utensils.

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. (a) Write the difference between transparent and opaque materials. Give two examples for each.  
 (b) How can we correct a normal paper into translucent.  
 (c) Shopkeepers keep eatables like biscuits, sweets in transparent containers. Why?
2. Elaborate the materials under the following headings with an example for each:
  - (i) Appearance
  - (ii) Hardness
  - (iii) Solubility
  - (iv) Transparency
  - (v) Floating property

## 2 EXERCISE

### Text Book Questions

1. Name five objects which can be made from wood.
2. Select those objects from the following which shine: Glass bowl, plastic toy, steel spoon, cotton shirt.
3. Match the objects given below with the materials from which they could be made. Remember, an object could be made from more than one material and a given material could be used for making many objects.

| Objects | Materials |
|---------|-----------|
| Book    | Glass     |
| Tumbler | Wood      |
| Chair   | Paper     |
| Toy     | Leather   |
| Shoes   | Plastic   |

4. State whether the statements given below are 'true' or 'false'.
  - (i) Stone is transparent, while glass is opaque.

- (ii) A notebook has lustre while eraser does not
- (iii) Chalk dissolves in water.
- (iv) A piece of wood floats on water.
- (v) Sugar does not dissolve in water.
- (vi) Oil mixes with water.
- (vii) Sand settles down in water.
- (viii) Vinegar dissolves in water.

5. Given below are the names of some objects and materials:  
 Water, basket ball, orange, sugar, globe, apple and earthen pitcher Group them as:
  - (a) Round shaped and other shapes
  - (b) Eatables and non-eatables
6. List all the items known to you that float on water. Check and see if they will float on an oil or kerosene.
7. Find the odd one out from the following:
  - (a) Chair, Bed, Table, Baby, Cupboard
  - (b) Rose, Jasmine, Boat, Marigold, Lotus
  - (c) Aluminium, Iron, Copper, Silver, Sand
  - (d) Sugar, Salt, Sand, Copper sulphate

**NCERT Exemplar Questions**

1. An iron nail is kept in each of the following liquids. In which case would it lose its shine and appear dull?  
(a) Mustard oil (b) Soft drink  
(c) Coconut oil (d) Kerosene
2. Pick one material from the following which is completely soluble in water.  
(a) Chalk powder (b) Tea leaves  
(c) Glucose (d) Saw dust
3. You are provided with the following materials.  
(i) Magnifying glass  
(ii) Mirror  
(iii) Stainless steel plate  
(iv) Glass tumbler  
Which of the above materials will you identify as transparent?  
(a) (i) and (ii) (b) (i) and (iii)  
(c) (i) and (iv) (d) (iii) and (iv)
4. Boojho found a bag containing the following materials.  
(i) Mirror  
(ii) Paper stained with oil  
(iii) Magnet  
(iv) Glass spectacles  
Help Boojho in finding out the material(s) which is/are opaque.  
(a) (i) only (b) (iv) only  
(c) (i) and (iii) (d) (ii) and (iv)
5. While doing an activity in class, the teacher asked Paheli to handover a translucent material. Which among the following materials will Paheli pick and give her teacher?  
(a) Glass tumbler (b) Mirror  
(c) Muslin cloth (d) Aluminium foil
6. Which pair of substances among the following would float in a tumbler half filled with water?  
(a) Cotton thread, thermocol  
(b) Feather, plastic ball  
(c) Pin, oil drops  
(d) Rubber band, coin
7. Which among the following are commonly used for making a safety pin?  
(a) Wood and glass  
(b) Plastic and glass  
(c) Leather and plastic  
(d) Steel and plastic
8. Which of the following materials is not lustrous?  
(a) Gold (b) Silver  
(c) Wood (d) Diamond
9. Which of the following statements is not true?  
(a) Materials are grouped for convenience.  
(b) Materials are grouped to study their properties.  
(c) Materials are grouped for fun.  
(d) Materials are grouped according to their uses.
10. Find the odd one out from the following.  
(a) Tawa (b) Spade  
(c) Pressure cooker (d) Eraser
11. Which type of the following materials is used for making the front glass (wind screen) of a car?  
(a) Transparent (b) Translucent  
(c) Opaque (d) All the above
12. Which of the following is not a pure substance?  
(a) Water (b) Air  
(c) Carbon dioxide (d) Paper
13. It was Paheli's birthday. Her grandmother gave her two gifts made of metals, one old dull silver spoon and a pair of lustrous gold earrings. She was surprised to see the difference in the appearance of the two metals. Can you explain the reason for this difference?
14. Mixtures of red chilli powder in water, butter in water, petrol in water, and honey in water were given to Radha, Sudha, Sofia and Raveena, respectively. Whose mixture is in solution form?
15. On a bright sunny day, Shikha was playing hide and seek with her brother. She hid herself behind a glass door. Do you think her brother will be able to locate her. If yes, why? If no, why not?
16. Take a small cotton ball and place it in a tumbler/ bowl filled with water. Observe it for at least 10 minutes. Will it float or sink in water and why?
17. Which among the following materials would you identify as soft materials and why?  
*Ice, rubber band, leaf, eraser, pencil, pearl, a piece of wooden board, cooked rice, pulses and fresh chapati*
18. You are provided with the following materials-turmeric, honey, mustard oil, water, glucose, rice flour, groundnut oil.

Make any three pairs of substances where one substance is soluble in the other and any three pairs of substances where one substance remains insoluble in the other substances.

19. Sugar, salt, mustard oil, sand, sawdust, honey, chalk powder, petals of flower, soil, copper sulphate crystals, glucose, wheat flour are some substances given to Paheli. She wants to know whether these substances are soluble in water or not. Help her in identifying soluble and insoluble substances in water.
20. Why do you think oxygen dissolved in water is important for the survival of aquatic animals and plants?
21. Chalk, iron nail, wood, aluminium, candle, cotton usually look different from each other. Give some properties by which we can prove that these materials are different.
22. Differentiate among opaque, translucent and

transparent materials, giving one example of each.

23. Match the objects given in Column I with the materials given in Column II.

| Column I                 | Column II          |
|--------------------------|--------------------|
| (A) Surgical instruments | (p) Plastic        |
| (B) Newspaper            | (q) Animal product |
| (C) Electrical switches  | (r) Steel          |
| (D) Wool                 | (s) Plant product  |

### HOTS Questions

1. A solid is put in a bucket of water. It floats just below the surface of the water. What do you think is the density of the object with relation to the density of water?
2. Water and starch are mixed in a container. What kind of solution will be got?

## 3 EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choice (a), (b), (c) and (d) out of which ONLY ONE is correct.

1. Select the one used as a basis for grouping of objects
  - (a) shape of the objects
  - (b) materials of which they are made
  - (c) Both the above
  - (d) None of the above
2. Which of the following cannot be grouped in the same group as others on the basis of their shape?
  - (a) Football
  - (b) Cricket ball
  - (c) Glass marble
  - (d) Tripod stand
3. Which of the following does not belong to the same group as others?
  - (a) Orange
  - (b) Apple
  - (c) Glass
  - (d) Banana
4. Which of the following does not have lustre?
  - (a) Iron
  - (b) Wood
  - (c) Platinum
  - (d) Gold
5. Which of the following does not belong to the group of shiny materials?
  - (a) Paper
  - (b) Cardboard
  - (c) Chalk
  - (d) All of these
6. Which of the following is a soft material?
  - (a) Iron
  - (b) Sponge
  - (c) Plastic
  - (d) None of these
7. Which of the following is not a solid substances?
  - (a) Wooden block
  - (b) Iron nail
  - (c) Glass tumbler
  - (d) Honey
8. Which of the following is insoluble in water?
  - (a) Sugar
  - (b) Salt
  - (c) Tea-leaves
  - (d) None of these
9. Which of the following substances dissolve in water?
  - (a) Vinegar
  - (b) Kerosene oil
  - (c) Petrol
  - (d) All of these
10. On the basis of transparency we can group objects in which of the following groups?
  - (a) Transparent substances
  - (b) Opaque substances
  - (c) Translucent substances
  - (d) All the above



11. Air is grouped as
  - (a) transparent (b) translucent
  - (c) opaque (d) None of the above
12. Which of the following is not a transparent substance?
  - (a) Wood (b) Glass
  - (c) Water (d) Air
13. A transparent substance is one that
  - (a) allows the light to pass through it
  - (b) does not allow the light to pass through it
  - (c) allows light partly to pass through it
  - (d) None of the above
14. Translucent materials are
  - (a) those through which objects can be seen clearly
  - (b) those through which objects can be seen, but not clearly
  - (c) those through which objects cannot be seen
  - (d) None of the above
15. Dividing materials in groups is done
  - (a) for convenience
  - (b) for easily observing any pattern in their properties
  - (c) for both the above
  - (d) neither for (a) nor for (b)
16. Which one of the following is classified as transparent substance?
  - (a) Stone (b) Mirror
  - (c) Glass (d) Card-board
17. Select the one that is not made up of the same materials as others
  - (a) Book
  - (b) Note books
  - (c) Table
  - (d) All are made of the same material
18. Which one of the following is different from others ?
  - (a) Aluminium (b) Iron
  - (c) Silver (d) Sand
19. Which one of the following is different from others?
  - (a) Sugar (b) Salt
  - (c) Sand (d) Copper sulphate
20. Which of the following is a water soluble material?
  - (a) Sand (b) Blue Vitriol
  - (c) Kerosene (d) Saffron
21. Pliers used by electrician usually have plastic cover on the handle. Why?
  - (a) Plastic is a bad conductor of heat
  - (b) Plastic is water resistant
  - (c) Plastic is bad conductor of electricity
  - (d) All of these
22. Soluble substances are those .....?
  - (a) that get completely dissolved in water at room temperature
  - (b) that floats on the surface of water
  - (c) that remains undissolved in water
  - (d) None of these is correct
23. An opaque material is one .....?
  - (a) through which you are not able to see
  - (b) through which you can see clearly
  - (c) through which you can see but not clearly
  - (d) None of these
24. Water is said to play an important role in the functioning of our body. Why?
  - (a) It is an elixir liquid for life
  - (b) It quenches our thirst
  - (c) It can dissolve a large number of substances
  - (d) Both (a) and (c)
25. We group the materials for our convenience and also for some other reasons. Materials are grouped together on the basis of .....?
  - (a) similarities in their properties
  - (b) differences in their properties
  - (c) both on similarities and difference in their properties
  - (d) None of the above is correct
26. Which of the following is correct for the term 'Lustre'?
  - (a) Hardness (b) Softness
  - (c) Dull appearance (d) Shiny appearance
27. It is a material that floats on the surface of water and is opaque. It is used to make chair, table etc.
  - (a) Paper (b) Wood
  - (c) Aluminium (d) None of these
28. Which of the following is the characteristic of materials with lustre
  - (a) Their lustre can be seen when it is freshly cut
  - (b) Their lustre can be seen when it is rubbed with sand paper
  - (c) Both (a) and (b)
  - (d) None of the above
29. Which of the following help us to choose a material for making an object?
  - (a) Some properties of the material
  - (b) Purpose for which we want to use the object
  - (c) Both the properties of the material and the purpose for which the object is to be used
  - (d) None of these

30. Find the odd one out from the following.

- (a) Chair (b) Bed  
(c) Table (d) Cat

### More than One option Correct

**DIRECTIONS :** This section contain multiple choice question. Each question has 4 choices (a), (b), (c) and (d) out of which ONE or MORE may be correct.

- Which of the following are non-living things?  
(a) Frog (b) Lion  
(c) Table (d) Plastic
- Which of the following belongs to the same group?  
(a) Oxygen (b) Water  
(c) Carbondioxide (d) Nitrogen
- We divide materials in groups according to .....?  
(a) To their visibility  
(b) To their usage  
(c) To their pattern/specification/property  
(d) None of these
- Which of the following is/are categorise as transparent objects?  
(a) Wood (b) Metals  
(c) Air (d) Glass
- Which of the following related to opaque group?  
(a) Water (b) Cardboard  
(c) Metal Containers (d) Carton
- Categorise lustrous materials from the given items?  
(a) Stone (b) Iron  
(c) Silver (d) Copper
- Properties of soluble substances are:  
(a) It can dissolve in water easily.  
(b) These substance stirred in water likes salt, sugar  
(c) Soluble substance do not dissolve in water.  
(d) Soluble substance floats on the surface of water.
- Segregate the material according to their floatation property?  
(a) Feather (b) Stone  
(c) Dry wood (d) Dried leaves
- Which of the following are immiscible in water?  
(a) Paper (b) Mustard Oil  
(c) Talcum Powder (d) Honey
- Transparent objects can be divided as:  
(a) Those objects through which things can be seen  
(b) They allow the light to pass through them  
(c) They are lustrous  
(d) Those objects through which things can not be seen clearly.
- Which of the following statement about opaque object is/are correct?  
(a) Object through which you are not able to see.  
(b) Objects through which you can see but not clearly.  
(c) Objects through which you can see clearly and they allow the light pass through them  
(d) They do not allow the light to pass through them
- Which of the following material(s) are soft but insoluble in water?  
(a) Wood (b) Cotton  
(c) Sponge (d) Talcum Powder
- Which among of the following materials would you identify as hard as well as rough materials?  
(a) Rock (b) Window pane  
(c) Bricks (d) Diamond
- Which of the following two pairs are soluble in water?  
(a) Honey in water (b) Rice flour in water  
(c) Glucose in water (d) Mustard oil in water
- Which among the following material(s) are hard but will float in salt water?  
(a) Egg (b) Metal tins  
(c) Bottle caps (d) All of these
- Which of the following organic substance(s) are soluble in water?  
(a) Urea (b) Glucose  
(c) Lemonade (d) All of these
- Which of the following statement(s) is/are true about the mettalic material(s)?  
(a) These materials cannot be pressed easily.  
(b) These material can compressed easily.  
(c) These material have shine on them.  
(d) These material floats on the surface of water.
- Which of the following statement(s) is/are correct about the translucent objects?  
(a) These objects allow light to pass through them.  
(b) These objects allow only same light to pass through them.  
(c) They cast a light or "fuzzy" shadows.  
(d) These objects do not allow light to pass through them.
- Which of the following materials are good conductor of heat and electricity.  
(a) Gold (b) Copper  
(c) Iron (d) Chalk

20. Which of the following statement(s) are true?
- Chalk is a soluble substance
  - A piece of wood floats in water
  - Vinegar dissolves in water
  - Stone is opaque, while glass is transparent

### Passage Based Questions

**DIRECTIONS :** Read the passage(s) given below and answer the questions that follow.

#### Passage I

If we look around ourselves we find that objects around us are made of different materials. Some objects are made of a single materials. An object some times is made of many materials. We also find that sometimes the same material is used to make many different objects.

- Utensil are made up of
  - metal only
  - plastic only
  - glass only
  - either metal, plastic or glass
- Wood is the material that is used to make
  - chair
  - table
  - bullock cart
  - All of these
- Which of the following materials is used to make handle of utensil?
  - Metal
  - Plastic
  - Glass
  - All of these

#### Passage II

We know that materials differ in some of their properties and they may also be similar in some of their properties. Materials can be grouped on the basis of similarities or differences in their properties.

- Why we group materials in every day life?
  - We consider it essential
  - We group them for our convenience
  - We group them as it is interesting
  - None of the above is correct
- Which of the following materials can be placed into same group?
  - Books, shirt, table, newspaper
  - Books, note books, newspaper, calendar
  - Shirt, shoes, hankerchief, plate
  - All of these
- Which of the following items, can be grouped as edible?
  - Refined oils
  - Kerosene oil
  - Beauty soaps
  - None of these

#### Passage III

A list of objects is given as following :

On the basis of this list of objects answer the following questions.

A chair, a bullock cart, a cycle, a shirt, a rubber ball, a football, a glass marble, an apple, and orange.

- The number of round objects in the list are
  - 2
  - 3
  - 5
  - 7
- The number of articles made of wood are
  - 1
  - 2
  - 3
  - 5
- The number of eatable articles are
  - 1
  - 2
  - 3
  - 4

#### Passage IV

Manish has a box in which he has following objects plastic bottle, tin cans, iron nails, paper boats, dry leaves, teddy bear, aluminium cans, cushion, pillow.

Manish wants to group these things on the basis of their properties. Help him in grouping these things by answering these questions.

- Name of things that can be grouped on the basis of their magnetic property are:
  - Tin cans, iron nails
  - Tin cans, iron nails, Aluminium can
  - Aluminium cans, iron nails, plastic bottle
  - Aluminium cans, iron nails.
- Name of the things that can be grouped on the basis of softness are:
  - Teddy bear, plastic bottle, pillow, cushion
  - Pillow, paper boat, dry leaves, teddy bear
  - Dry leaves, plastic bottle, cushion, teddy bear
  - Teddy bear, pillow, cushion
- Plastic bottle, paper boat and dry leaves are grouped together due to \_\_\_\_\_.
  - Hardness
  - Solubility
  - Floatation
  - Conduction of heat

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.  
 (b) Both A and R are true but R is not the correct explanation of A.  
 (c) A is true but R is false.  
 (d) A is false but R is true.

1. **Assertion (A)** : If we add some ammonium chloride (a solid) to a glass of water and stir it for sometime, we find that solid disappears.  
**Reason (R)** : Ammonium chloride is soluble in water.  
 2. **Assertion (A)** : The materials which can be compressed or scratched easily are called soft.  
**Reason (R)** : Iron is a hard material.  
 3. **Assertion (A)** : Wood is a good conductor of heat.  
**Reason (R)** : Substances which do not allow heat to pass through them are called poor conductors of heat.

### Multiple Matching Questions

**DIRECTION** : Match Column-I with Column-II.

- |    |                               |                                  |
|----|-------------------------------|----------------------------------|
| 1. | <b>Column I<br/>(Objects)</b> | <b>Column II<br/>(Materials)</b> |
|    | (A) Shoes                     | (p) Paper                        |
|    | (B) Chair                     | (q) Glass                        |
|    | (C) Tumbler                   | (r) Plastic                      |
|    | (D) Book                      | (s) Wood                         |
|    |                               | (t) Leather                      |
|    |                               | (u) Raxine                       |
| 2. | <b>Column I<br/>(Objects)</b> | <b>Column II<br/>(Property)</b>  |
|    | (A) Coconut oil               | (p) Soluble in water             |
|    | (B) Chalk powder              | (q) Insoluble substance          |
|    | (C) Sugar                     | (r) Soft                         |
|    | (D) Iron                      | (s) Hard                         |
|    |                               | (t) Lustorous                    |
|    |                               | (u) Immiscible in water          |

### Integer Type Questions

**DIRECTIONS** : Following are integer based/ Numeric based questions. Each question, when worked out will result in one integer or numeric value.

1. From the given material(s) identify. How many are immiscible substances? Oil, Honey, Sand, Talcum powder, Salt, Lemonade, Vinegar, Chalk

powder, Sugar, Wine etc. Your answer will be between 0 to 9.

2. Rohan have a bucket that is filled with hard and smooth objects. Following are the materials in the bucket, identify how many are the hard objects.

Rock, Piece of silk, Cotton, Screw, Talc, piece of Aluminium foil, Hammer, Wood log, Pillow, Iron rod, Egg, Tyres etc. Your answer will be between 0 to 9.

3. From the given mixtures, identify how many are mixture(s) of liquid and gas. Your answer will be between 0 to 9.

Fog, Soda, Sugar, Alcohol, lemonade, Honey, Groundnut oil.

4. Radha has collected some objects from surroundings. Some objects are hard, some are rough, some are smooth, some dissolves in water but some are not, identify how many objects are soluble in water. Your answer will be between 0 to 9.

Pebbles, Salt, Feather, Dry leaves, Piece of Brick, Piece of aluminium foil, Lemon juice, Cotton, Talc, Chalk powder.

5. Heena has taken some objects to do the experiment whether the objects floats on water or they sink. Given are the objects, identify how many will float on the water. Your answer will be between 0 to 9.

Feather, Small pieces of pebbles, Iron nails, Dry leaves, Wooden block, Piece of silk, Cotton balls, Glass, Plastic toys, Spoon.

6. Given are some materials, identify how many are soft but insoluble?

Rubber, Talc, Wood, Vinegar, Sand, Chalk powder, Charcoal powder, Thread, Ink, Lemonade, Salt, Sugar, Cream, Bleaching powder. Your answer will be between 0 to 9.

7. Given are some drinks, identify how many are carbonated drinks?

Melon soda, Nestea lemon, green tea, brisk fruit punch, Minute maid lemonade, Lemonade, Grape soda, Raspberrysoda, Cola, Cherrysoda, Vitamin water. Your answer will be between 0 to 9.

8. While doing an activity, the teacher asked Meghna to handover the transparent material from the given objects. How many objects will Meghna give to her teacher? Your answer will be between 0 to 9?

Butter Paper, Wooden Plank, Glass, Rubber, Windows pane, Water, Magnifying glass, Plastic bottles, Cellophane.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- |                |                  |
|----------------|------------------|
| 1. conductor   | 2. odour         |
| 3. transparent | 4. immiscible    |
| 5. lighter     | 6. solid, liquid |
| 7. floats      | 8. insulator     |
| 9. translucent | 10. combustible  |

### True/False

- |          |           |
|----------|-----------|
| 1. False | 2. True   |
| 3. False | 4. False  |
| 5. False | 6. True   |
| 7. True  | 8. False  |
| 9. True  | 10. False |

### Match the Column

- |    |                 |                        |
|----|-----------------|------------------------|
| 1. | <b>Column I</b> | <b>Column II</b>       |
|    | (A) Book        | (q) Paper              |
|    | (B) Table       | (p) Wood               |
|    | (C) Belt        | (t) Leather            |
|    | (D) Wall        | (r) Brick              |
|    | (E) Cup         | (s) Glass              |
| 2. | <b>Column I</b> | <b>Column II</b>       |
|    | (A) Air         | (s) Transparent        |
|    | (B) Oiled paper | (q) Translucent        |
|    | (C) Wood        | (t) Opaque             |
|    | (D) Salt        | (p) Soluble in water   |
|    | (E) Sand        | (r) Insoluble in water |

### Very Short Answer Type Questions

- Yes, grouping is necessary : By grouping, we can find required item and can also compare with similar items.
- I will prefer wood, as it is insulator of electricity as well as easily workable.
- Metals and stones.
- No, it is not ductile.
- Wood is a combustible substance/object, it is used as fuel.
- Wood and paper.

- We need to group materials for convenience and to gain systematic knowledge.
- Materials are grouped together on the basis of similarities and differences in their properties.
- Wood is lighter than water. Therefore, it floats on water.
- The oxygen gas dissolved in water is essential for the survival of aquatic animals and plants because they respire with its help.

### Short Answer Type Questions

- Water is called universal solvent as it can dissolve maximum materials.
- Steel is a good conductor of heat so it cannot be used as handle in utensils.
- Butter paper and Oiled paper are two examples of translucent objects.
- Mustard oil is lighter than water hence it floats, while grease is heavier thus it sinks.
- Paper is not hard and can be easily wet with water, moreover it is highly combustible and hence not used to make furniture.
- The objects which can float on water are : dried leaves and wood.  
The objects which sink in water are: a piece of iron and stone.
- Soluble materials – Salt and sugar.  
Insoluble materials – Sand and chalk.
- The materials through which objects are only partially visible, are known as translucent materials, e.g., butter paper.
- Materials which are lighter than water, float on water. Wood and oil are lighter than water and float on it.
- An opaque white paper can be converted into a translucent paper by dropping some oil on it.
- It helps in gaining systematic knowledge of things.
  - It gives a general idea about all the members of a group and the differences between the members of different groups.
  - It is convenient to work with all members of a group after knowing their properties.



12. Hardness is the property of materials that can be found out by pressing the material. A material may be soft or hard.  
**Soft materials** – The materials which can be compressed easily are known as soft materials. *e.g.*, – cotton, sponge, etc.  
**Hard materials** – The materials that are difficult to compress are known as hard materials. *e.g.*, – iron, wood, etc.
13. Materials can be classified into three groups on the basis of physical states :  
**Solids** – They have definite shape and volume, *e.g.*, iron, ice, etc.  
**Liquids** – They have definite volume but do not have definite shape, *e.g.*, water.  
**Gases** – They do not have definite shape and volume, *e.g.*, air.
14. The materials which have shining surface are called lustrous materials. Gold and silver are examples of lustrous material.
15. (i) **Books** can be sorted into groups on the basis of class and subject.  
(ii) **Clothes** can be sorted into groups on the basis of size and colour.  
(iii) **Utensils** can be sorted into groups on the basis of utility and material used in making them.

### Long Answer Type Questions

1. (a) **Transparent materials**  
Those materials or substances through which things can be seen. *e.g.*, glass, water.  
**Opaque materials**  
Those materials or substances through which things cannot be seen. *e.g.*, wood, cardboard.
- (b) We can make normal paper translucent by putting few drops of oil on it.
- (c) Shopkeepers keep eatables like biscuits, sweets, etc. in transparent containers so that buyers can easily see these items.
2. (i) **Appearance** : Appearance of a material is compared in terms of colour, lustre, texture or physical state. A metal spoon shines whereas a wooden spoon does not shine. Materials that have lustre are called metals, *e.g.*, copper, aluminium, gold, etc.  
(ii) **Hardness** :  
**Soft materials** : The materials that can be compressed or scratched easily are called soft. *e.g.*, cotton, sponge.

**Hard materials** : The materials that cannot be compressed or scratched easily are called hard. *e.g.*, iron.

(iii) **Solubility** : Substances that disappear or dissolve completely in water, are called soluble substances. *e.g.*, salt, sugar, etc.

The substances that do not dissolve completely in water, even after stirring for a long time are called insoluble substances. *e.g.*, chalk powder, saw dust, etc.

(iv) **Transparency** :

**Transparent Materials** : Substances through which things can be seen are transparent materials. *e.g.*, glass, water, etc.

**Opaque Materials** : Substances through which things cannot be seen are opaque materials. *e.g.*, wood, iron, etc.

**Translucent Materials** : The materials through which objects can be seen, but not clearly are known as translucent materials. *e.g.*, butter paper.

(v) **Floating property** : An object will float or sink in water, depending on whether it is lighter or heavier than water. Materials lighter than water floats, *e.g.*, plastic, pencil, etc. Materials heavier than water sinks. *e.g.*, iron nail, steel, etc.

## 2 EXERCISE

### Text Book Questions

1. (i) Table (ii) Chair  
(iii) Doors (iv) Boat  
(v) Bed
2. Glass bowl and steel spoon are shining objects.

| Objects | Materials         |
|---------|-------------------|
| Book    | Paper             |
| Tumbler | Glass and plastic |
| Chair   | Wood and plastic  |
| Toy     | Plastic and wood  |
| Shoes   | Leather           |

3. (i) False (ii) False  
(iii) False (iv) True  
(v) False (vi) False  
(vii) True (viii) True



5. (a) (i) **Round shaped:** Basket ball, apple, orange, globe, earthen pitcher.  
(ii) **Other shapes:** Water, sugar.
- (b) (i) **Eatables:** Water, orange, sugar and apple.  
(ii) **Non-eatables:** Basket ball, globe and earthen pitcher.
6. (A) **List of some items that float on water:**  
(i) Paper (ii) Wood  
(iii) Thin plastic sheets (iv) Wax  
(v) Ice (vi) Thermocol  
(vii) Oil  
(B) **List of items that float on an oil:**  
(i) Paper (ii) Plastic sheet  
(iii) Wax (iv) Thermocol  
(v) Wood  
(C) **List of items that float on kerosene:**  
(i) Paper (ii) Thermocol  
(iii) Thin plastic sheets
7. (a) Baby (all others are non-living)  
(b) Boat (all others are flowers)  
(c) Sand (all others are metals)  
(d) Sand (all others are soluble in water)
10. (d) Eraser
11. (a) Transparent
12. (b) Air
13. The silver spoon on long exposure to moist air has lost its shine and appears dull whereas gold does not tarnish.
14. Raveena has got a solution because honey will dissolve in water.
15. Yes, door glass is transparent, so Shikha can be located.
16. Cotton ball initially floats and then sinks as it absorbs water.
17. Rubber band, leaf, eraser, cooked rice and fresh chapati are soft materials because they can be compressed or scratched easily.
18. **Soluble:**  
(i) Honey in water  
(ii) Glucose in water  
(iii) Groundnut oil in mustard oil  
**Insoluble:**  
(i) Turmeric in water  
(ii) Rice flour in water  
(iii) Mustard oil in water
19. **Soluble in water** – Sugar, Salt, Honey, Copper sulphate crystals, Glucose.  
**Insoluble in water** – Mustard oil, Sand, Sawdust, Chalk powder, Soil, Petals of flower, Wheat flour.
20. Dissolved oxygen is available for animals and plants for respiration and survival.
21. The given materials can be differentiated on the basis of lustre, hardness, softness, roughness or smoothness.

### NCERT Exemplar Questions

1. (b) Soft drink
2. (c) Glucose
3. (c) (i) and (iv)
4. (c) (i) and (iii)
5. (c) Muslin cloth
6. (b) Feather, plastic ball
7. (d) Steel and plastic
8. (c) Wood
9. (c) Materials are grouped for fun.

|           | Lustre | Hardness | Softness | Roughness | Smoothness |
|-----------|--------|----------|----------|-----------|------------|
| Chalk     |        |          | √        | √         |            |
| Iron nail | √      | √        |          | √         |            |
| Wood      |        | √        |          | √         |            |
| Aluminium | √      | √        |          |           | √          |
| Candle    | √      |          | √        |           | √          |
| Cotton    |        |          | √        |           | √          |

22.

| S.No. | Opaque materials                     | Translucent materials                        | Transparent materials                     |
|-------|--------------------------------------|----------------------------------------------|-------------------------------------------|
| (i)   | Objects cannot be seen through them. | Objects cannot be seen clearly through them. | Objects can be seen clearly through them. |
| (ii)  | Example: Cardboard.                  | Example: Oiled paper.                        | Example: Hand lens.                       |

23. (A) → (r); (B) → (s); (C) → (p); (D) → (q)

### HOTS Questions

- The density of the solid and water is same because solid neither sinks nor floats on water.
- When little amount of starch is added it will dissolve in water. But as the amount of starch increases, the solution starts thickening and forms a suspension.

## 3 EXERCISE

### Multiple Choice Questions

- (c) Objects can be grouped on the basis of their shape and also on the basis of the material of which they are made.
- (d) The shape of tripod stand is not round whereas all others have a round shape.
- (c) Orange, banana and apple are fruits (plant product) whereas glass is not.
- (b) Wood is not a shining substance.
- (d) All the given materials are not shiny.
- (b) Sponge is a soft material as it can be compressed easily.
- (d)
- (c) Tea leaves remain undissolved in water.
- (a)
- (d) Substances can be grouped as transparent, opaque or translucent on the basis of their transparency.
- (a) Air is grouped as a transparent substance.
- (a)
- (a) A transparent substance is one that allows the light to pass through it.
- (b) Translucent substances are those through which objects can be seen, but not clearly.
- (c)
- (c)
- (c) Table is not made of paper, whereas books and note books are made of paper.

- (d) Sand has no lustre, others have a metallic lustre.
- (c) Sand is insoluble whereas all others are soluble in water.
- (b)
- (d) Plastic is water resistant and bad conductor of heat and electricity.
- (a) A substance that completely dissolves in water is known as soluble substance.
- (a) We cannot see through an opaque object.
- (d) Water plays an important role in the functioning of our body, because it can dissolve a large number of substances.
- (c) Materials are grouped together on the basis of similarities and differences in their properties.
- (d)
- (b) Wood floats on water, is opaque and is used to make table, chair etc.
- (c)
- (c) We choose a material depending on its properties, and the purpose for which the object is to be used.
- (d) Cat is a living object while others are non-living objects.

### More than One option Correct

- (c) and (d)
- (a), (c) and (d)
- (a), (b) and (c)
- (c) and (d)
- (b), (c) and (d)
- (b), (c) and (d)
- (a) and (b)
- (a), (c) and (d)
- (a), (b) and (c)
- (a) and (b)
- (a) and (d)
- (b), (c) and (d)

13. (a) and (c)
14. (a) and (c)
15. (b) and (c)
16. (d)
17. (a) and (c)
18. (b) and (c)
19. (a) and (b)
20. (b), (c) and (d)

**Passage Based Questions**

1. (d) **Utensil** may be made up of either a metal, plastic or glass.
2. (d) Wood is used to make all of these.
3. (d) This is because plastic is a bad conductor of heat.
4. (b)
5. (b) All of these are made up of paper
6. (a) Refined oils are edible in nature
7. (c) **The round shaped objects** are rubber ball, **football**, glass marble, apple and orange.
8. (b) Chair and bullock cart
9. (b) The eatables are apple and orange
10. (a) Tin cans contain iron and therefore show magnetic property.
11. (d) Teddy bear, pillow, cushion are soft as these can be compressed easily.
12. (c) 'Plastic bottle, paper boat and dry leaves can be grouped together on the basis of floatation.

**Assertion/Reason**

1. (a) Soluble substances dissolve in water.
2. (b)
3. (d) Wood is a poor conductor of heat.

**Multiple Matching Questions**

1. A → (t), (u); B → (r), (s); C → (q); D → (p)
2. A → (u); B → (q), (r); C → (p); D → (s), (t)

**Integer Type Questions**

1. (4) Oil, Sand, Talcum powder and Chalk powder.
2. (6) Rock, Screw, Hammer, Wood log, Iron rod and Tyres
3. (4) Fog, Soda, Alcohol and Lemonade.
4. (2) Pebbles and Piece of brick.
5. (5) Feather, Dry leaves, Wooden block, Piece of silk and Plastic toys.
6. (5) Rubber, Talc, Sand, Chalk powder and Charcoal powder.
7. (7) Melon Soda, Minute maid lemonade, Lemonade, Grape soda, Raspberryade, Cola and Cherry soda
8. (5) Glass, Windows Pane, Water, Magnifying glass and Cellophane

# Chapter 5

## SEPARATION OF SUBSTANCES

### INTRODUCTION

#### SEPARATION OF SUBSTANCES

In the day to day life, there are times when one needs to separate a useful substance from a mixture. This is done by using various methods of separation of substance.

**Mixture:** A substance which is composed of two or more substances, in which each component retains its unique property, is called mixture. Air is a mixture of gases. Water which we drink is a mixture of pure water and many other substances.

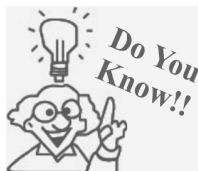
**Pure Substance:** A substance is called pure when each particle of the substance has the same unique property. For example, distilled water is pure water as each drop of it contains nothing but water.

**Need for separation of substances:** Taking out useful substances from a mixture is usually the main reason for separation of substances. Sometimes, we also need to separate substances when we need to use different components in different ways.

#### Types of Mixtures

Depending upon the nature of the components that form the mixture we can have different types of mixtures.

- (i) **Homogeneous mixture :** It is a mixture that has the same composition throughout. e.g. a solution of sugar is a mixture of two or more components.



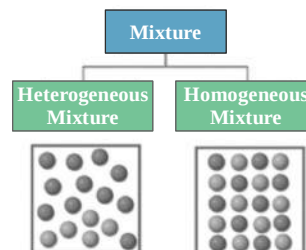
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*Most homogeneous mixtures are also known as solutions and examples of these include air, coffees, and even metal alloys.*

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- (ii) **Heterogeneous mixture :** In such a mixture the particles of each component of the mixture remain separate and can be observed as individual grains under a microscope. e.g. mixture of grains and sand. This type of mixtures contain physically distinct particles and have a non-uniform composition.

| DIFFERENT KIND OF MIXTURES WITH EXAMPLES |                                                                                        |
|------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Solid-solid mixtures</b>              | Soil is a mixture of clay & sand                                                       |
| <b>Solid-liquid mixture</b>              | Tiny particles of clay suspended in water                                              |
| <b>Liquid-liquid mixture</b>             | Milk is a mixture of tiny droplets of fatty oil in water                               |
| <b>Liquid-gas mixture</b>                | When you press the knob of an aerosol can, a mist of liquid droplets in a gas are seen |
| <b>Gas-gas mixture</b>                   | Air                                                                                    |
| <b>Solid-gas mixture</b>                 | Sponge                                                                                 |



## REQUIREMENT OF SEPARATION OF A MIXTURES

In everyday life, there are many situations in which people want to separate the particles of a mixture. For example, water that contains algae or fish, or dissolved chemicals from factories is not healthy for drinking purpose. Thus it is preferred to remove it from the water to make it suitable for drinking. Depending on the mixture involved, separating the component particles can be easy or difficult.

Separating mixtures is a scientific process in which two or more substances are separated which were once together. Separating mixtures is useful in many different ways. Which are :

1. **To remove undesirable components :** For example removal of small stones from rice and pulses before cooking
2. **To obtain useful components :** For example petrol, diesel etc are obtained from crude oil.
3. **To obtain pure substance from mixture :** For example distilled water can be obtained from any water sample by simple distillation.

## METHODS OF SEPARATION

Separation methods depends upon the nature of the constituents of the mixture. To separate a mixture we have to use some property that one constituent of the mixture has and other do not.

### Separation of Solid-Solid Mixture

**Hand picking :** It is the simplest method of separation of substances. This method is used only when unwanted material is in small quantity. Moreover, shape, size, or colour of the unwanted material is different from that of the useful materials. For example, pebbles, broken grains and insects are separated from rice, wheat and pulses by handpicking.



Hand picking



Threshing

**Threshing :** It is the process that is used to separate grains from stalks. In this process stalks are beaten to free the grain seeds. Sometimes this process is carried out with bullocks. In case of large quantities of grains, machines are used for



*Threshing machine (or simply thresher), was a machine first invented by Scottish mechanical engineer Andrew Meikle for use in agriculture. It was invented (c.1784) for the separation of grain from stalks and husks. This invention is regarded as one of the key development of british agricultural revolution in eighteenth century.*

**Winnowing :** This process is used to separate heavier and lighter components of a mixture by wind or by blowing air. This is commonly used method to separate lighter husk particles from heavy seeds of grains. It is also used to remove pests from stored grain.



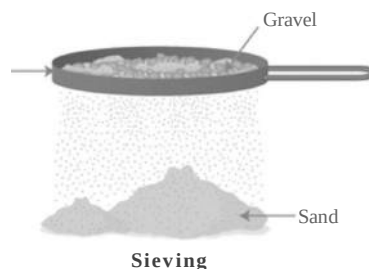
Winnowing



*In Ancient China the method of winnowing was improved by mechanisation with the development of the rotary winnowing fan, which used a cranked fan to produce the airstream.*

**Sieving :** It is carried out with the help of a sieve. The fine particles pass through the holes of sieve while bigger particles of impurities remain on sieve. It is used at home to separate impurities and bran present in flour.

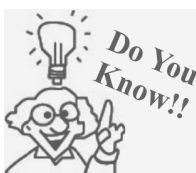
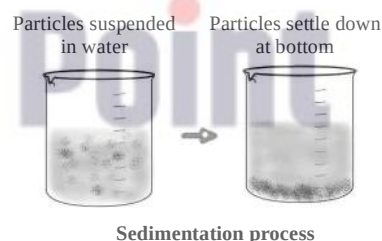
In flour mills this process is used to remove the pieces of stones, stalk and husk from wheat and other grains. In this process the difference in size of particles in a mixture is used to separate them. At construction sites, this process is used to separate pebbles and stones from sand.



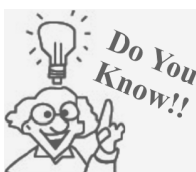
*Sieving of wheat flour is not considered a healthy practice because wheat bran which is removed during sieving is a rich source of fibre.*

### Separation of Solid- Liquid Mixture

**Sedimentation :** When a heavier component in a mixture settles after water is added to it, the process is called sedimentation. The substance settle down is called sediment. This method depends upon the difference in densities of the two component of the mixture. For example on keeping the tea with the tea leaves, aside for some time the tea leaves begin to settle down.



- Doctors often instruct us to shake the bottle containing liquid medicines before use it is because some solid particles in these medicines settle down at the bottom of the bottle.
- Sedimentation process is used in wastewater treatment, it removes solids that cannot be broken down or treated along with the liquid waste.



*The principle of sedimentation and decantation is used for separating a mixture of two liquids that do not mix with each other. For example, oil and water from their mixture can be separated by this process. If a mixture of such liquids is allowed to stand for some time, they form two separate layers. The component that forms the top layer can then be separated by decantation.*

**Decantation :** When the liquid layer above the sediment is removed and the sediment is left behind the process is called decantation. For example when tealeaves settle down, the clear tea (liquor) from the top can be poured into a cup .

Sedimentation can be speeded up by Loading. Alum is used for this purpose. For example: The dissolved particles of alum load the fine clay particles in water. They become heavier and settle down quickly.

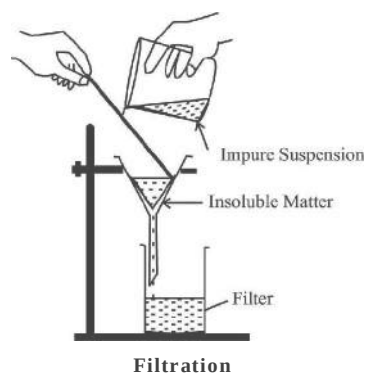




**NOTE :** If the solid dissolve in the liquid, decantation cannot be used to separate them.

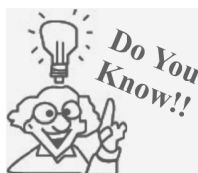
**Filtration :** This is a method of separation of an insoluble lighter solid and a liquid. The mixture is poured into a filter paper placed in a filter funnel. The liquid or solution passes through the filter paper and is collected in another container placed below the filter funnel. The liquid so collected is called filtrate. The insoluble solid is left behind at the filter paper is called residue. This process is called filtration. Difference in size of particles in a mixture is used to separate them.

For example while making cottage cheese(paneer) at home solid paneer is separated from the liquid by filtration through muslin cloth ,a coffee filter separates solid coffee grounds from liquid coffee. Our water supply is filtered through a bed of gravel, sand and charcoal.



Every time a vacuum cleaner runs, it passes a stream of dust-filled air through a filtering bag inside the machine. Solid particles are trapped within the bag, while clean air passes out through the machine.

Special water filters are used in our homes, colleges and offices for providing safe drinking water. A simple home filter contains a porous candle made up of ceramic or china clay .The water passes through the candle. Candle retains solid impurities but allows the clear water to pass through it. In these filters a special type of light called ultraviolet light is used to kill germs in water.



A method of cleaning water for drinking, which is gaining popularity today, is reverse osmosis (RO). Water is passed through special membranes. It has very fine pores through which water passes but not the impurities. Water purifiers using this technique are available in the market these days.

## Separation of Liquid-Liquid Mixture

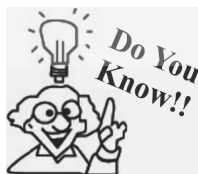
**Evaporation :** The process of conversion of water into its vapours is called evaporation. The process of evaporation takes place at all temperatures. It can be speeded up by increase in the temperature. This process is used to obtain common salt (i.e, table salt) from sea water (sea water contains dissolved common salt).

Sea water is collected in shallow ponds and allowed to evaporate in sun. Solid salt is left behind. Salt obtained from this process is not pure and it is purified by crystallisation process.

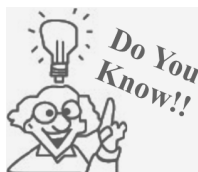
Crystallisation is used to purify solid substances. In this method pure substance is separated in form of crystal from its hot saturated solution by cooling .



Evaporation



Evaporation is a method of separating a soluble solid from the solvent in which it is dissolved. Lemon juice, which is a solution of citric acid in water, separates by evaporation. Water evaporates off from boiling lemon juice. Eventually, only solid crystals of citric acid are left behind.

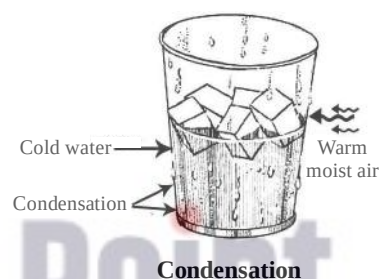


- In a clothes dryer, hot air is blown through the clothes, allowing water to evaporate very rapidly.
- The Matki/Matka, a traditional Indian porous clay container used for storing and cooling water. Water gets cooled in this due to evaporation.

**Condensation :** It is the process in which the vapours of water (or any other liquid) are allowed to cool and change to liquid state. It is the opposite of evaporation. For example : water vapour condenses into a liquid after making contact with the surface of cold bottle. The process of condensation is also present in air conditioners.



- Water from the Earth enters the atmosphere due to evaporation from the oceans and transpiration from plants. As the water vapor moves higher in the atmosphere, it begins to cool down and condenses into liquid form and clouds are formed. That causes rain or snowfall, depending on the temperature.
- Condensation can often be used to generate water in large quantities for human use. Many structures are made solely for the purpose of collecting water from condensation, such as Air wells and fog fences.



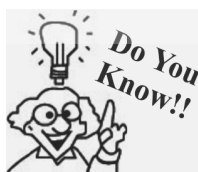
**Distillation :** Distillation is a method of obtaining pure liquid from a solution by using a special apparatus. In this process on heating a solution, liquid with low boiling point evaporates first. On cooling vapour condenses to give pure liquid. Distilled water used in lab is obtained by this method.

## SOLUTION

A homogeneous mixture of two substances is known as a solution. e.g., mixture of sugar and water. When a substance dissolves in a liquid, it breaks up into its individual molecules. These molecules spread out in between the molecules of the liquid. That is why the sugar-water solution tastes sweet.

**Solute :** The substance present in smaller quantity in a solution is called a solute. e.g. in sugar solution, sugar, which is present in smaller quantity is a solute.

**Solvent :** The substance present in larger quantity in a solution is called a solvent. e.g. in sugar solution, water, which is present in larger quantity is a solvent.



Water can dissolve a large number of substances in it. It therefore is called a Universal solvent.

**Examples of different types of solution :**

| Solute | Solvent | Solution | Example                         |
|--------|---------|----------|---------------------------------|
| solid  | solid   | solid    | certain alloys                  |
| liquid | solid   | solid    | Hg in Ag                        |
| gas    | solid   | solid    | Hydrogen gas in palladium metal |
| solid  | liquid  | liquid   | sugar in water                  |
| liquid | liquid  | liquid   | Petrol in kerosine              |
| gas    | liquid  | liquid   | soft drinks                     |
| solid  | gas     | gas      | carbon in air (smoke)           |
| liquid | gas     | gas      | Fog                             |
| gas    | gas     | gas      | Air                             |

Substances that dissolve readily in water are said to be soluble in water .  
 Substance such as sand do not dissolve in water are said to be insoluble in water.

Some gases such as carbon dioxide and oxygen are soluble in water. Solubility of oxygen in water allows the animals living in water such as fishes to survive.

**Solubility**

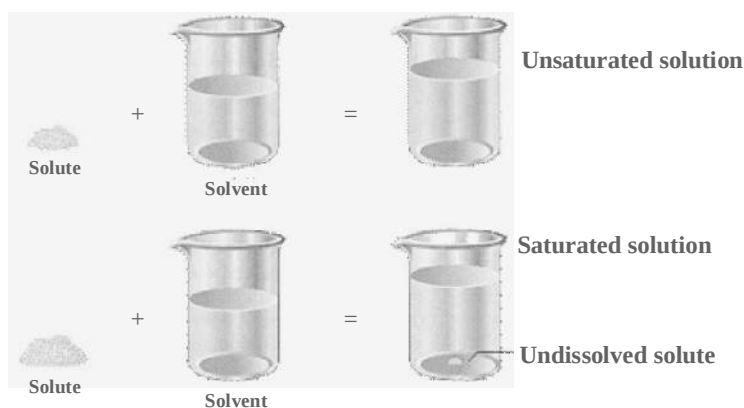
Maximum amount of solute that can be dissolved in 100 ml of a solvent is called its solubility. It is expressed in gram/100 ml. Solution is an example of homogenous mixture.

On the basis of solubility solution can be further divided as:

**Unsaturated :** A solution that is capable of dissolving more amount of solute at the given temperature is known as unsaturated solution.

**Saturated :** A solution which is not capable of dissolving any more amount of solute at a given temperature is called a saturated solution.

**NOTE:** A saturated solution becomes unsaturated if it is heated i.e. larger quantities of a salt (i.e. solute) can be dissolved on heating a solution.



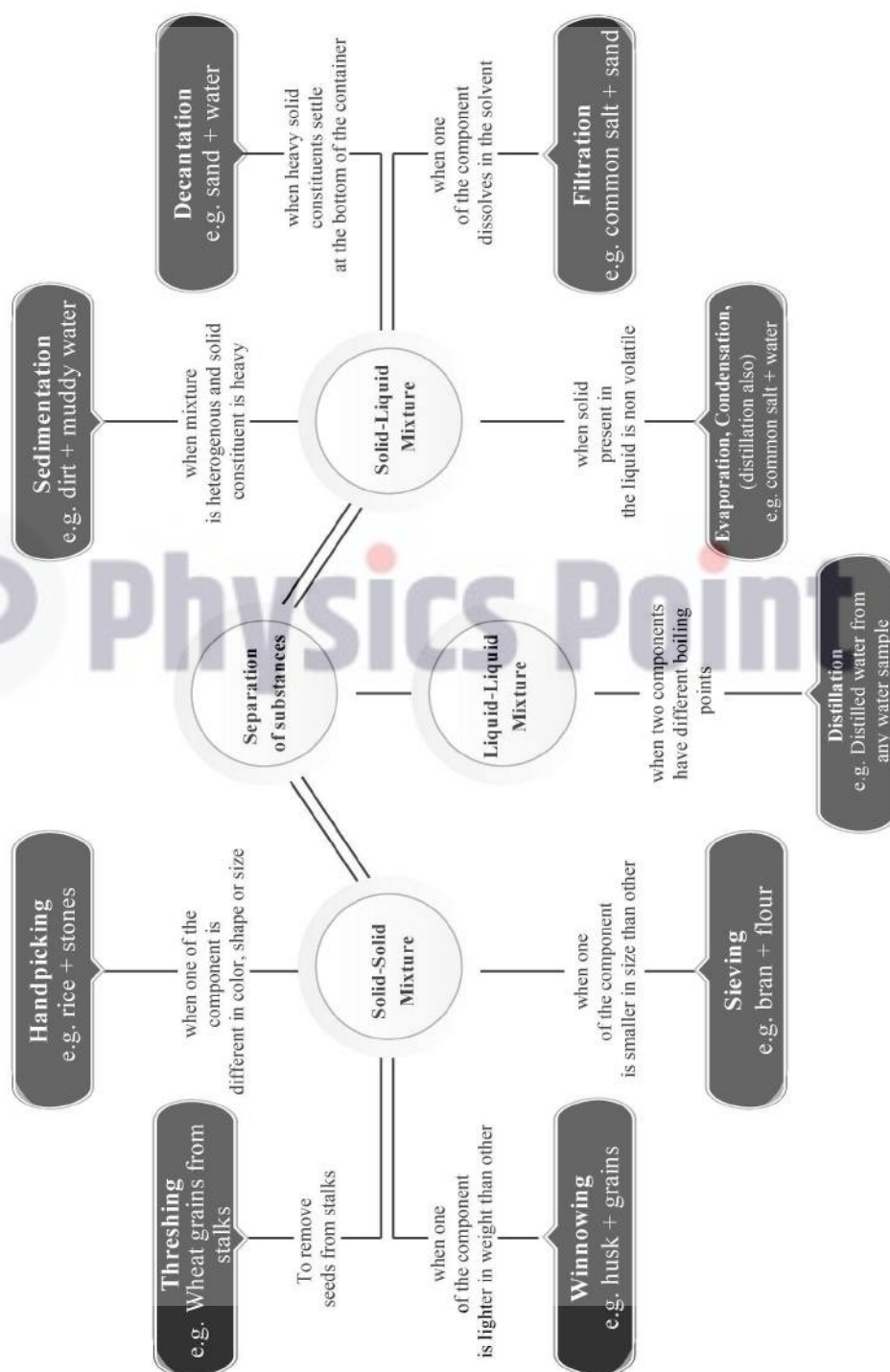
If we add any more solute to a saturated solution of the substance, it remains undissolved and settles as solid at the bottom of the container.

**Supersaturated solution :** A solution is said to be supersaturated when it contains more of the solute than could be dissolved by the solvent under normal conditions. For example carbonated water.

**Effect of Temperature on Solubility**

Solubility increases with increase in temperature. A given amount of solid solute dissolves more quickly in hot solvent than in a cold solvent. For example sugar dissolves very fast in hot water than in cold water. That is why while preparing lemonade, sugar is added before adding ice .

## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

- ..... is used to separate cream from milk.
- ..... is made by evaporation of sea water.
- Oil can be separated from water by .....
- For the separation of two miscible liquids we use .....
- ..... is added to water to kill germs.
- Shallow salt water lakes are called .....
- The process of separation of tea leaves by strainer is called .....
- Sedimentation is followed by ..... process.
- We can separate husk from rice by .....
- Components of a ..... retain their properties.

## True/False

- Salt is prepared from sea water by decantation.
- A pure sample of substance consists of only one kind of matter.
- Condensation means conversion of water into water vapour.
- Petrol can sublime.
- Various products from petroleum are obtained by the process of fractional distillation.
- Butter is removed from cream by loading.
- The process of separating an insoluble solid from a liquid is called filtration.
- Name of common sugar is sucrose.
- Winnowing is used to separate kerosene from water.
- Loading is done for faster sedimentation.

## Match the Column

- |    |                                                  |                   |
|----|--------------------------------------------------|-------------------|
| 1. | <b>Column I</b>                                  | <b>Column II</b>  |
|    | (A) Separation of husk from grains               | (p) Evaporation   |
|    | (B) Solids and liquid are allowed to settle down | (q) Threshing     |
|    | (C) Dried stalks are beaten to free grain seeds  | (r) Winnowing     |
|    | (D) Separation of insoluble                      | (s) Sedimentation |

matter from solution by passing through filter paper

- (E) Removing of solvent from a solution by heating (t) Filtration

2. **Column I****Column II**

- |                                                                      |                       |
|----------------------------------------------------------------------|-----------------------|
| (A) Separation of miscible liquids                                   | (p) Centrifugation    |
| (B) Removal of dissolved solids of different densities from liquid   | (q) Loading           |
| (C) To increase the size of impurities so that they settle down fast | (r) Separating funnel |
| (D) Separation of two immiscible liquids                             | (s) By handpicking    |
| (E) Separation of stones from rice                                   | (t) Distillation      |

## Very Short Answer Type Questions

- Explain centrifugation?
- Which property of material we used in winnowing?
- Write the name of two materials that are used as filters?
- When do we use handpicking?
- Why we use evaporation method for separation?
- Write the name of a solid, liquid and gaseous mixture, that we use daily.
- Describe condensation.
- What is a strainer?
- Explain unsaturated solution?
- What is loading?
- How can you obtain pure water?
- Define pure substance?

## Short Answer Type Questions

- Write the components of the following mixtures:  
(a) air (b) soil
- Why we separate various components of a mixture?

3. Write the principle of centrifugation?
4. How we can separate iodine from washing soda?
5. Describe the process of preparing saturated solution of sugar.
6. How we can separate sugar mixed with wheat flour?
7. Write the two processes involved in distillation.
8. What do mean by saturated solution?
9. Describe evaporation? Give an example.
10. Explain decantation?
11. What do you understand by sedimentation? Give an example?
12. Write the properties of a mixture.
13. Why we separate different components of a mixture?
14. Explain the process of sieving. Write one of its use.
15. How can we obtained common salt from sea water?
16. Describe winnowing? Name the property of the constituents of a mixture used in winnowing?
17. How we can separate a mixture of saw dust and sugar?

### Long Answer Type Questions

1. How we can separate clear water from a sample of muddy water? Explain the method with labeled diagram.
2. How will you separate sugar from a mixture of wheat flour and sugar? Explain it with the help of labeled diagram.

## 2 EXERCISE

### Text Book Questions

1. Why do we need to separate different component of mixture? Give two examples.
2. What is winnowing? Where is it used?
3. How will you separate husk or dirt particles form a given sample of pulses before cooking?
4. What is sieving? Where is it used?
5. How will you separate sand and water from their mixture?
6. Is it possible to separate sugar mixed with wheat flour? If yes, how will you do it?
7. How would you obtain clear water from a sample of muddy water?
8. **Fill up the blanks:**
  - (a) The method of separating seeds of paddy from its stalks is called .....
  - (b) When milk, cooled after boiling, is poured on to a piece of cloth the cream is left behind on it. This process of separating cream from milk is an example of .....
  - (c) Salt is obtained from seawater by process of .....
  - (d) Impurities settled at the bottom when muddy water was kept overnight in a bucket. The clear water was then poured off from the top. The process of separation used in this example is called .....
9. **True/False.**
  - (a) A mixture of milk and water can be separated by filtration. (T/F)
  - (b) A mixture of powdered salt and sugar can be separated by the process of winnowing (T/F)
  - (c) Separation of sugar from tea can be done with filtration. (T/F)
  - (d) Grain and husk can be separated with the process of decantation. (T/F)
10. Lemonade is prepared by mixing lemon juice and sugar in water. You wish to add ice to cool it. Should you add ice to the lemonade before or after dissolving sugar? In which case would be possible to dissolve more sugar?

### NCERT Exemplar Questions

1. Paheli bought some vegetables such as French beans, lady's finger, green chillies, brinjals and potatoes all mixed in a bag. Which of the following methods of separation would be most appropriate for her to separate them?
  - (a) Winnowing                      (b) Sieving
  - (c) Threshing                      (d) Hand-picking
2. Boojho's grandmother is suffering from diabetes. Her doctor advised her to take 'Lassi' with less fat content. Which of the following methods would be most appropriate for Boojho to prepare it?



- (a) Filtration (b) Decantation  
(c) Churning (d) Winnowing
3. Which of the following mixtures would you be able to separate using the method of filtration?  
(a) Oil in water (b) Cornflakes in milk  
(c) Salt in water (d) Sugar in milk
  4. Which among the following methods would be most appropriate to separate grains from bundles of stalks?  
(a) Hand-picking (b) Winnowing  
(c) Sieving (d) Threshing
  5. Four mixtures are given below  
(i) Kidney beans and chick peas  
(ii) Pulses and rice  
(iii) Rice flakes and corn  
(iv) Potato wafers and biscuits  
Which of these can be separated by the method of winnowing?  
(a) (i) and (ii) (b) (ii) and (iii)  
(c) (i) and (iii) (d) (iii) and (iv)
  6. While preparing chapatis, Paheli found that the flour to be used was mixed with wheat grains. Which out of the following is the most suitable method to separate the grains from the flour?  
(a) Threshing (b) Sieving  
(c) Winnowing (d) Filtration
  7. You might have observed the preparation of ghee from butter and cream at home. Some methods of separation are given below:  
(i) Evaporation (ii) Decantation  
(iii) Filtration (iv) Churning  
Which of the following combinations is the correct answer?  
(a) (i) and (ii) (b) (ii) and (iii)  
(c) (ii) and (iv) (d) (iv) only
  8. In an activity, a teacher dissolved a small amount of solid copper sulphate in a tumbler half filled with water. Which method would you use to get back solid copper sulphate from the solution?  
(a) Decantation (b) Evaporation  
(c) Sedimentation (d) Condensation
  9. During summer, Boojho carries water in a transparent plastic bottle to his school. One day he left his bottle in the school. The bottle still had some water left in it. The following day, he observed some water droplets on the inner surface of the empty portion of the bottle. These droplets of water were formed due to  
(a) boiling and condensation.  
(b) evaporation and saturation.  
(c) evaporation and condensation.  
(d) condensation and saturation.
  10. Paheli asked for a glass of water from Boojho. He gave her a glass of ice cold water. Paheli observed some water droplets on the outer surface of the glass and asked Boojho how these droplets of water were formed? Which of the following should be Boojho's answer?  
(a) Evaporation of water from the glass.  
(b) Water that seeped out from the glass.  
(c) Evaporation of atmospheric water vapour.  
(d) Condensation of atmospheric water vapour.
  11. Name and describe briefly a method which can be helpful in separating a mixture of husk from grains. What is the principle of this method?
  12. Both Sarika and Mohan were asked to make salt solution. Sarika was given a teaspoonful of salt and half a glass of water, whereas Mohan was given twenty teaspoonful of salt and half a glass of water.  
(i) How would they make salt solutions?  
(ii) Who would be able to prepare saturated solution?
  13. Paheli was feeling thirsty but there was only a pot of water at home which was muddy and unfit for drinking. How do you think Paheli would have made this water fit for drinking if the following materials were available to her.  
*Alum, tub, muslin cloth, gas stove, thread, pan and lid*
  14. Read the story titles "WISE FARMER" and tick the correct options to complete the story.  
A farmer was (i) *sad/happy* to see his healthy wheat crop ready for harvest. He harvested the crops and left in under the (ii) *sun/rain* to dry the stalks. To separate the seeds from the bundles of the stalk he (iii) *handpicked/threshed* them. After gathering the seed grains he wanted to separate the stones and husk from it. His wife (iv) *winnowed/threshed* them to separate the husk and later (v) *sieved/handpicked* to remove stones from it. She ground the wheat grains and (vi) *sieved/filtered* the flour. The wise farmer and his wife got a good price for the flour.
  15. You are provided with a mixture of salt, sand, oil and water. Write the steps involved for the separation of salt, sand and oil from the mixture by giving an activity along with the diagram.
  16. A mixture of iron nails, salt, oil and water is provided to you. Give stepwise methods to separate each component from this mixture?
  17. State whether the following statements are True or False.

- (a) A mixture of milk and water can be separated by filtration.
- (b) A mixture of powdered salt and sugar can be separated by the process of winnowing.
- (c) Separation of sugar from tea can be done with filtration.
- (d) Grain and husk can be separated with the process of decantation.
- (e) A mixture of oil and water can be separated by filtration.
- (f) Water can be separated from salt by evaporation.
- (g) A mixture of wheat grains and wheat flour can be separated by sieving.
- (h) A mixture of iron filings and rice flour can be separated by magnet.
- (i) A mixture of wheat grains and rice flakes can be separated by winnowing.
- (j) A mixture of tea leaves and milk can be separated by decantation.

18. Match the mixtures in Column I with their methods of separation in Column II

| Column I                                 | Column II         |
|------------------------------------------|-------------------|
| (a) Oil mixed in water                   | (i) Sieving       |
| (b) Iron powder mixed with flour         | (ii) Hand-picking |
| (c) Salt with water                      | (iii) Decantation |
| (d) Lady's finger mixed with french bean | (iv) Magnet       |
| (e) Rice flour mixed with Kidney beans   | (v) Evaporation   |

### HOTS Questions

1. Why does visibility increase after rain?
2. Raghav is given a glass bottle with some white substances in it that is either chalk or sugar. How can he find out which of the two is sugar or chalk, without tasting it?

## 3 EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choice (a), (b), (c) and (d) out of which ONLY ONE is correct.

1. Which of the following processes is used to remove stone from wheat?
  - (a) Threshing
  - (b) Winnowing
  - (c) Hand picking
  - (d) None of these
2. Which method will be used to remove tea leaves from brew?
  - (a) Hand picking
  - (b) Filtration
  - (c) Threshing
  - (d) Any of these
3. Which method is used to separate heavier and lighter components in a mixture by wind?
  - (a) Hand picking
  - (b) Threshing
  - (c) Winnowing
  - (d) Sieving
4. The process that we use to separate grain from stalks is—
  - (a) hand picking
  - (b) threshing
  - (c) winnowing
  - (d) None of these
5. The machine used for carrying out the process of threshing is called
  - (a) strainer
  - (b) ladle
  - (c) thresher
  - (d) None of these
6. In winnowing the components of a mixture are separated by
  - (a) blowing air
  - (b) water
  - (c) Both the above
  - (d) None of the above
7. Winnowing is the commonly used method to separate lighter husk particles from heavier seeds of grains. When farmers use this method the heap near the platform for winnowing will be of
  - (a) husk
  - (b) seeds of grain
  - (c) mixture of husk particles and seeds of grains
  - (d) can't predict
8. Which of the following is commonly used to separate bran present in flour ?
  - (a) Hand picking
  - (b) Winnowing
  - (c) Sieving
  - (d) Any of these
9. Which one is used to separate a mixture of oil and water?

- (a) Sieving (b) Decantation  
(c) Filtration (d) Evaporation
10. Which method would you use to separate soil from muddy water (i.e. soil suspended in water)  
(a) Sedimentation  
(b) Decantation  
(c) Evaporation  
(d) Both sedimentation and decantation
11. Which of the following is not used in filtration?  
(a) Filter paper  
(b) Filter funnel  
(c) Thresher  
(d) None of these
12. Which process is used to remove pulp from juice before drinking?  
(a) Hand picking (b) Sedimentation  
(c) Decantation (d) Filtration
13. To get *paneer*, we add lemon drops to boiling milk. We can see solid *paneer* particles being formed. *Paneer* is then separated by using  
(a) strainer  
(b) alum  
(c) stirrer  
(d) None of these
14. Which method would you use to separate the components of salt solution.  
(a) Decantation (b) Filtration  
(c) Evaporation (d) Sublimation
15. Which process is used for separation of cream from milk  
(a) Filtration (b) Threshing  
(c) Hand-picking (d) Churning
16. Salt is obtained from sea water by which process?  
(a) Evaporation (b) Filtration  
(c) Decantation (d) Condensation
17. If boiled milk is allowed to cool for sometime and is then poured on a piece of cloth, we find that cream (malai) is left behind on cloth. This process of separating cream from milk is  
(a) filtration (b) decantation  
(c) sedimentation (d) churning
18. Generally the dirt particles are separated from pulses before cooking. For this the pulse is generally washed with water. Allowed to stand for some time and then the water is removed. It is an example of which process?  
(a) Condensation (b) Filtration  
(c) Threshing (d) Decantation
19. If muddy water taken from a pond is allowed to stand undisturbed for some time we find that the dirt particles present in muddy water get settled at the bottom of container. This process will be called  
(a) sedimentation (b) decantation  
(c) filtration (d) evaporation
20. Saturated solution is  
(a) a solution which can dissolve more of a solute at a given temperature  
(b) a solution which cannot dissolve more of solute at a given temperature  
(c) a solution which can dissolve solute at a lower temperature  
(d) None of these
21. A covered glass jar containing a wet piece of cotton is placed in sunlight for an hour. Tiny droplets of water are noticed sticking to the upper inner surface of glass jar. This is due to  
(a) evaporation (b) condensation  
(c) transpiration (d) both (a) and (b)
22. A process in which the impure sample is first heated in order to vapourise the liquid and then these vapours of liquid are made to cool to give pure liquid. The complete process is called  
(a) condensation (b) distillation  
(c) sublimation (d) None of these
23. Which of the following process can be considered as reverse of condensation?  
(a) Evaporation (b) Vaporisation  
(c) Boiling (d) None of these
24. Find the odd one out  
(a) Ploughing (b) Hand picking  
(c) Winnowing (d) Threshing
25. Choose correct alternative to complete the given analogy.  
Muddy water : sedimentation : Butter from milk:  
(a) Filtration (b) Churning  
(c) Sublimation (d) Evaporation
26. Which method is used to get pure solvent from a solution?  
(a) Distillation

- (b) Centrifugation  
(c) Filtration  
(d) Using alum crystals
27. Why alum is used to purify muddy water?  
(a) Mud gets dissolved due to alum  
(b) Mud floats due to alum  
(c) Mud settles down due to alum  
(d) Alum kills germs from muddy water
28. Which method will you use to obtain pure alum from its solution?  
(a) Evaporation (b) Filtration  
(c) Sublimation (d) Distillation
29. Decantation refers to  
(a) the process of mechanically transferring a clear liquid without disturbing the settled solid particles.  
(b) the process of allowing the solid particles to settle at the bottom.  
(c) a combination of both the above  
(d) None of these
30. The process of condensation is one in which  
(a) the vapours of water are allowed to cool and change into liquid water  
(b) the vapours of a liquid are allowed to cool and change into liquid state  
(c) the vapours of a substance are changed directly to solid state  
(d) a liquid is heated to get its vapours.
5. Which of the following is/are homogeneous mixture?  
(a) Tap water (b) Brass  
(c) Concrete (d) Black Tea
6. Which of the following is/are method(s) of separating solid from solids.  
(a) Threshing (b) Winnowing  
(c) Sedimentation (d) Sieving
7. Which of the following is/are the process to separate solid-liquid mixture?  
(a) Decantation (b) Gravel  
(c) Filtration (d) Sedimentation
8. Which of the following are solute substances?  
(a) Salt (b) Sugar  
(c) Water (d) Milk
9. Which of the following is/are solvent(s) from the given items?  
(a) Petroleum (b) Alcohol  
(c) Glycerine (d) None of these
10. Which of the following is/are the method of separating liquid-liquid mixture?  
(a) Distillation (b) Condensation  
(c) Filtration (d) Evaporation

### More than One option Correct

1. Which of the following are Homogeneous mixture?  
(a) Water (b) Coffee  
(c) Mouth wash (d) None of these
2. Which of following is/are Heterogeneous mixture(s) as well as homogeneous mixture too?  
(a) Smoke (b) Alcohol  
(c) Sea water (d) Salt water
3. Which of following is/are the example(s) of liquid gas mixture?  
(a) Fog (b) Fizzy drinks  
(c) Sea water (d) All of these
4. Which of the following is/are the example(s) of solid-liquid mixture and also known as heterogeneous?  
(a) Stew (b) Cereal with milk  
(c) Salt and water (d) None of these

### Passage Based Questions

**DIRECTIONS :** Read the passage(s) given below and answer the questions that follow.

#### Passage I

You are provided with a thoroughly grinded mixture consisting of dry sand and powdered dry leaves. You are asked to separate the components of this mixture either by using the process of winnowing or by any other process.

1. Which other process would you use to separate the components of this mixture?  
(a) Threshing (b) Hand picking  
(c) Filtration (d) None of these
2. Winnowing is based on which property of component of a mixture?  
(a) Difference in size  
(b) Difference in weight  
(c) Difference in shape  
(d) Difference in colour

3. Which component of the mixture will fall near the platform used for winnowing?  
 (a) Sand (b) Dried leaves  
 (c) Both of these (d) None of these

### Passage II

You are asked to add two spoons of solid salt to some liquid water taken in a beaker. On stirring it you find that whole of the salt has disappeared and only liquid can be seen in beaker.

4. After stirring the salt completely disappears and you can see only liquid in the beaker. The liquid in beaker is  
 (a) water (b) solution  
 (c) solute (d) solvent
5. Which of the following processes will be useful to get salt from this solution?  
 (a) Condensation (b) Evaporation  
 (c) Filtration (d) Sedimentation
6. Which process can you use to get liquid water from the water vapours if you collect them in another container?  
 (a) Sedimentation (b) Condensation  
 (c) Evaporation (d) Filtration

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select one of the current options (a), (b), (c) and (d) given below in each questions.

- (a) Both A and R are true and R is the correct explanation of A.  
 (b) Both A and R are true but R is not the correct explanation of A.  
 (c) A is true but R is false.  
 (d) A is false but R is true.

1. **Assertion (A) :** The process of settling of heavier insoluble particles from a suspension of a substance in water known as decantation.

**Reason (R) :** This process along with sedimentation is used to get clear water from muddy water.

2. **Assertion (A) :** The process of conversion of liquid water to its vapours by heating the liquid is called evaporation.

**Reason (R) :** The process of conversion of water vapours to liquid by cooling the vapours is called condensation.

### Multiple Matching Questions

**DIRECTIONS :** Match Column I with Column II and select the correct answer using the codes given below the columns.

| 1.  | Column I                             | Column II        |
|-----|--------------------------------------|------------------|
| (A) | Hetrogeneous                         | (p) Brass        |
| (B) | Homogeneous                          | (q) Salt Water   |
| (C) | Seperation of liquid -liquid mixture | (r) Soda         |
| (D) | Sugar dissolves quickly              | (s) Candy Bar    |
|     |                                      | (t) Hot water    |
|     |                                      | (u) Condensation |

### Integer Type Questions

**DIRECTIONS :** Following are integer based/Numeric based questions. Each question, when worked out will result in one integer or numeric value.

1. Rohan is collecting the information and data about Homogeneous mixtures. Given are some items, identify how many are Homogeneous? Soapy water, Blood, Sandy water, Orange juice with pulp in it, Brewed tea or coffee, Hard Alcohol, Soil sample. Your answer will between 0-9?
2. Radha want to separate sugar from sugar solution. Her friend Charul told her many methods to separate the mixtures. Given are some methods to separate the different type of mixtures. Identify how many methods Radha can use to separate sugar from the sugar solution. Winnowing, Threshing, Hand picking, Filtration, Decantation, Sedimentation, Evaporation, Condensation. Your answer will between 0-9?



# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- |                     |                 |
|---------------------|-----------------|
| 1. Centrifugation   | 2. Common salt  |
| 3. separating flask | 4. distillation |
| 5. Chlorine         | 6. lagoon       |
| 7. Filtration       | 8. Decantation  |
| 9. winnowing        | 10. mixture     |

### True/False

- |          |          |
|----------|----------|
| 1. False | 2. True  |
| 3. False | 4. False |
| 5. True  | 6. False |
| 7. True  | 8. True  |
| 9. False | 10. True |

### Match the Column

- |              |           |
|--------------|-----------|
| 1. (a) (iii) | (b) (iv)  |
| (c) (ii)     | (d) (v)   |
| (e) (i)      |           |
| 2. (a) (v)   | (b) (i)   |
| (c) (ii)     | (d) (iii) |
| (e) (iv)     |           |

### Very Short Answer Type Question

- It is process of removing of solid from a solution by using centrifugal force.
- Different density material will go to different distance when subject to cross wind.
- Paper and cloth.
- When two sizes are easily be picked and their number is also less.
- To separate two miscible liquids, we use evaporation.
- Solid — Flour  
Liquid — Tea  
Gaseous — Air
- The process of conversion of water vapour into its liquid form is called condensation.
- Strainer is a kind of sieve.

- If a solution can further dissolve more solute it is known as unsaturated solution.
- The process of settling down of solid particles quickly by addition of alum is known as loading.
- By distillation process. It is the process of simultaneous vapourisation and condensation.
- A pure substance is a single substance of a definite composition. It contains particles of only one type, e.g., pure copper and pure water.

### Short Answer Type Questions

- (a) Components of air are  $\text{CO}_2$ , nitrogen, oxygen and other gases.  
(b) Components of soil are sand, silt and clay.
- We need pure components for the use and this requires the separation from mixture.
- If we churn a liquid solution, heavier particle will move towards periphery and then get separated.
- By sublimation process, we can separate iodine from washing soda.
- Keep on adding sugar slowly to water and keep stirring till no further sugar is mixed. This is how we can prepare a saturated solution of sugar.
- By sieving, we can separate sugar from flour.
- Heating and condensation are two processes involved in distillation.
- A saturated solution of a substance is the one in which no more of that substance can be dissolved.
- The process of conversion of water into its vapour is called evaporation. It takes place at all temperatures. For examples, when sea water is allowed to stand in shallow pits, water slowly turns into water vapours by absorbing the heat of the sun, leaving behind the solid salts.
- Decantation is method of separation, when two components do not mix with each other. When the insoluble solute particles settle down, the liquid is poured into another container.
- When a mixture is allowed to stand for some time, the heavier component in a mixture settle at the bottom and the process is called

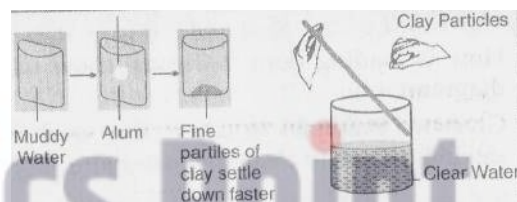


sedimentation. For example, when mixture of sand and water is allowed to stand for some time, the particles of sand settle down at the bottom of vessel. The setting down of sand particles is called sedimentation.

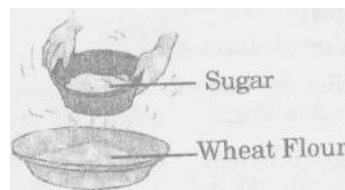
12. (a) The constituents of a mixture may be in any ratio.  
(b) The constituents can be separated by simple methods.
13. We need to separate different components of a mixture for the following reasons :  
(a) To remove useless components, e.g., removing tea leaves after making tea.  
(b) To separate two different but useful components, e.g., Churning milk to obtain butter.  
(c) To remove impurities. e.g., obtaining salt from seawater.
14. Sieving is a method used for separating solid components of mixtures varying in size. Sieving allows the fine particles to pass through the holes of the sieve while the bigger particles remain on the sieve. It is used to separate pebbles and stones from the sand.
15. Sea water is allowed to stand in shallow pits. Due to solar heat, water in the pits gets heated and it slowly converts into vapours by evaporation. After some days, the water evaporation salt) remain in the pits. The salts of the pits are further purified to get pure common salts.
16. (i) Winnowing is a method of separation which is used to separate heavier and lighter components of mixture by wind or by blowing air.  
(ii) Difference in weights of the constituents lead to their separation by winnowing.
17. To separate the mixture of saw dust and sugar, we will follow following steps :  
(i) Add water to the mixture.  
(ii) Sugar present in the mixture dissolves in water but saw dust does not.  
(iii) The solution is then filtered through filter paper.  
(iv) We will get sugar solution as filtrate and saw dust will remain on the filter paper.  
(v) Then the solution is heated and when water evaporates completely, sugar is left behind.  
(vi) In this way, we will separate the mixture of sugar and saw dust.

### Long Answer Type Questions

1. We can separate clear water from muddy water by loading and decantation processes. The muddy water is taken in a beaker. An alum piece is tied with a thread and is suspended in the muddy water. The alum piece is moved slowly in circular path in the muddy water for some time. The alum is removed and the beaker is kept undisturbed for some time. Alum dissolves in water easily. The fine dust particles, which are responsible for making the water muddy, settle down readily as they get loaded with the alum particles and form larger aggregates. The process is called loading. The clear water is decanted in another beaker.



2. Sugar can be separated from the mixture of wheat flour and sugar by sieving process. The mixture is poured on a sieve. The fine particles of wheat flour pass through the holes of the sieve and the sugar particles being bigger in size remain on the sieve. In this manner, sugar can be separated from the mixture of wheat flour and sugar.



## 2 EXERCISE

### Text Book Questions

1. When two or more substances are mixed together we call it a mixture. Sometimes, different components of mixture are not useful or may even harmful. So, we need to separate different components of the mixture.
2. Winnowing is used to separate heavier and lighter components of mixture by wind or by blowing air.

This method is commonly used by farmers to separate lighter husk particles from heavier seeds grain.

3. Husk or dirt particles from pulses are separated by handpicking.

The method of handpicking is normally used for separating slightly larger size impurities like piece of dirt, stone, husk from wheat, rice or pulses.

4. Sieving allows fine particles to pass through the holes of the sieve.

In flour mills, impurities like husk and stones are removed from wheat by sieving.

5. Steps of separating sand from water:

- (i) Allow mixture to stand in a glass.
- (ii) Sand settles at the bottom.
- (iii) Clear water forms at upper layer.
- (iv) Gently pour this water in another glass.

6. Yes, it is possible to separate sugar with wheat flour.

Yes. It is possible to separate mixture of sugar and wheat flour by the method of sieving. Sugar being bigger in size than wheat flour will stay on the sieve and wheat flour will pass through the sieve pores.

7. Method of obtaining clear water from a muddy water:

- (i) Allow muddy water to stand.
- (ii) Mud settles at the bottom.
- (iii) Upper layer is clear water.
- (iv) Decant it.
- (v) Then filter this water again to remove traces of mud particles.

8. (a) The method of separating seeds of paddy from its stalks is called threshing.

(b) When milk, cooled after boiling, is poured on to a piece of cloth the cream is left behind on it. This process of separating cream from milk is an example of filtration.

(c) Salt is obtained from seawater by process of evaporation.

(d) Impurities settled at the bottom when muddy water was kept overnight in a bucket. The clear water was then poured off from the top. The process of separation used in this example is called decantation.

9. (a) F, (b) F, (c) T, (d) F

10. We should add ice to the lemonade after dissolving sugar.

It will be possible to add more sugar before adding ice.

### NCERT Exemplar Questions

1. (d) Hand-picking
2. (c) Churning
3. (b) Cornflakes in milk
4. (d) Threshing
5. (d) (iii) and (iv)
6. (b) Sieving
7. (b) (ii) and (iii)
8. (b) Evaporation
9. (c) Evaporation and condensation.
10. (d) Condensation of atmospheric water vapour.
11. Winnowing. This method is based on the principle that the lighter husk particles are carried away by the wind leaving behind the grains.
12. (i) They would mix salt with water to make salt solution.  
(ii) Mohan's solution would be saturated because in Mohan's case some salt would remain undissolved and settle at the bottom of the glass.
13. (i) Filtration using muslin cloth.  
(ii) Swirl with alum and leave water undisturbed for some time.  
(iii) Decantation.  
(iv) Boil for 10 minutes in covered pan.  
(v) Cool, filter and now it is fit for drinking.
14. (i) happy (ii) Sun  
(iii) threshed (iv) winnowed  
(v) handpicked (vi) sieved  
They got a good price as they used appropriate methods of separation to get good quality of flour.
15. (i) Oil being insoluble in water forms a separate layer. The top layer of oil is decanted to separate it from the mixture.  
(ii) The mixture is then filtered with the help of a filter paper and funnel. The mixture is poured on the filter paper. Sand particles being bigger in size do not pass through the filter paper, they remain on the filter and the liquid is collected in the beaker placed under the funnel.  
(iii) Heat the beaker and allow it to boil. Water evaporate leaving behind the salt.
16. (i) Iron nails are separated from the mixture by handpicking.  
(ii) The mixture is allowed to stand for some time. Two separate layers will be formed.

The top layer of oil is decanted to separate it from the mixture.

- (iii) Pour this liquid into a kettle, close its lid and heat it. Now take a metal plate with some ice on it and hold this plate just above the spout of the kettle. The steam coming out condenses when comes in contact with the metal plate and forms water and salt is left behind.
17. (a) False (b) False  
(c) False (d) False  
(e) False (f) True  
(g) True (h) True  
(i) True (j) True
18. (a) – (iii); (b) – (iv); (c) – (v); (d) – (ii); (e) – (i)

### HOTS Questions

1. Rain dissolves all the dust particles in atmosphere and brings them down to earth, thus increasing visibility.
2. This can be done by dissolving both of them in water. Sugar is soluble in water but chalk is not.

## 3

### EXERCISE

### Multiple Choice Questions

1. (c) Hand picking can be used for separation of slightly larger sized impurities.
2. (b) Filtration method is used for the removal of tea leaves from brew.
3. (c) Winnowing is used to separate heavier and lighter components of a mixture by wind.
4. (b) The process that is used to separate grains from stalks is threshing.
5. (c) Threshing machine is called thresher.
6. (a) In winnowing, the components of a mixture are separated by wind or blowing air.
7. (b) The seeds of grain being heavier will form a heap near the platform of winnowing.
8. (c) Sieving allows the fine flour particles to pass through the holes and bran remains on sieve.
9. (b) Oil and water form different layers on standing and they can be separated by decantation (Oil being lighter forms upper layer).
10. (b) We allow the suspended soil particles to settle down (sedimentation) and then remove clear water using the process of decantation.
11. (c) Thresher; it is used in threshing.
12. (d) Pulp from juice is separated by filtration method.
13. (a) *Paneer* is separated by filtering using a *strainer* or fine cloth.
14. (c) To separate salt from salt solution (salt and water mixture) we use the process of evaporation.
15. (d) Cream can be separated from milk by filtration process. Churning is used for separation of butter from milk.
16. (a)
17. (a) It is the process of filtration. In it cloth acts as a filter.
18. (d) In decantation process, water (along with dirt) is removed.
19. (a) When the heavier insoluble component of substance settles at the bottom the process is called sedimentation.
20. (b) A saturated solution can dissolve more solute at a higher temperature it cannot dissolve more solute at given temperature.
21. (d) It is both due to evaporation and condensation.
22. (b) It is the distillation process.
23. (a) Condensation and evaporation are reverse of each other. For example water on heating evaporates as water vapour which on cooling condenses into liquid water.
24. (a) Except ploughing, all others are methods of separation of substance.
25. (b) Butter from milk can be separated by churning.
26. (a) Distillation is the process of obtaining pure liquid from a solution.
27. (c) The dissolved particles of alum load the fine mud particles due to which mud settles down and pure water can be decanted.
28. (a) Since alum dissolves in a solution, it can be separated by evaporation.
29. (a) The process of mechanically transferring the clear liquid without disturbing the settled solid particles is called decantation.

30. (b) In condensation process liquid vapours are allowed to cool and these vapours change into liquid state.

**More than One option Correct**

1. (a), (b) and (c)
2. (b), (c) and (d)
3. (d)
4. (a), (b)
5. (a), (b), and (d)
6. (a), (b) and (d)
7. (a), (c) and (d)
8. (a) and (b)
9. (a), (b) and (c)
10. (a), (b) and (d)

**Passage Based Questions**

1. (d) If we dissolve the mixture, sand will settle at bottom and dry leaves will float at the surface but they cannot be separated by filtration as both will remain on the filter paper. Thus none of the given processes can be used.
2. (b) Winnowing is based on the difference in weight of the component of a mixture.

Lighter component can be separated from heavier one by winnowing.

3. (a) Sand being heavier will fall near the platform used for winnowing.
4. (b) The liquid is solution of salt in water.
5. (b) On heating water will get evaporated as water vapour leaving salt behind.
6. (b) On cooling water vapours will change to liquid water. This process is called condensation.

**Assertion/Reason**

1. (c) Assertion-A is incorrect. The process is called sedimentation. Reason-R is correct.
2. (b)

**Multiple Matching Questions**

1.  $A \rightarrow (r), (s); B \rightarrow (p), (q); C \rightarrow (u); D \rightarrow (t)$

**Integer Type Questions**

1. (4) Blood, Orange juice, Brewed tea or coffee, Hard Alcohol
2. (1) Evaporation

## Chapter

# 6

# CHANGES AROUND US

## INTRODUCTION

Many changes are taking place around us on their own. We can bring about a change in a substance by doing one or more of the following:

- Heating
- Applying force
- Mixing it with something else.

**Changes caused by heating:** When an object is heated, it gets affected in one or many possible ways, like:

- Some objects get hot but do not change in any other way.
- Some objects get hot and also expand in size.
- Some objects get hot and begin to burn.
- Some objects get hot and change their state.

**Changes by applying pressure:** When we apply force to an object,

- We can change its shape and size.
- Air can be compressed.
- Metals can be hammered into thin sheets.
- Elastic can be stretched.
- Cotton can be spun into thin threads.

**Changes by mixing a substance with other:** We can bring about a change in a substance by mixing it with another, e.g., Making solution by mixing water soluble substances in water.

**Expansion:** Metals expand on heating and contract on cooling.

**Chemical changes:** These are the changes in which chemical properties of a substance changes, and a new substance is formed. For example: cooking of food.

**Physical changes:** These are the changes in which only physical property of a substance changes and no new substance is formed.

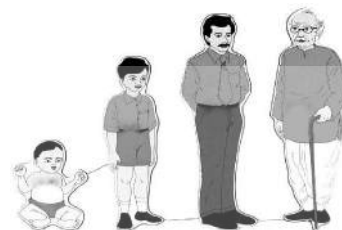
## CLASSIFICATION OF CHANGES

### 1. Based on Speed

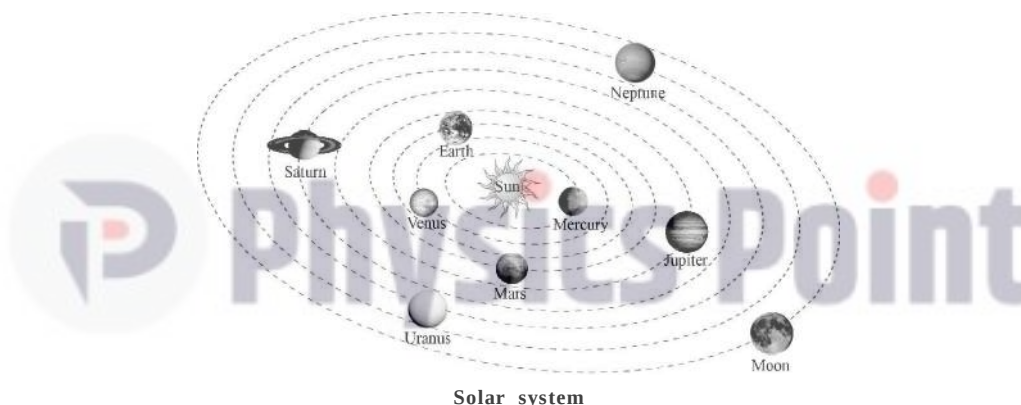
**Slow changes :** A change that occurs very slowly and takes a very long time for completion is called a slow change.

For example :

1. Growth of a child into an adult and then into an old men takes years to occur.
2. Curdling of milk takes few hours to occur
3. Germination of seed to form a plant takes 2 -4 days
4. Ripening of fruits is also a slow change
5. Conversion of night into day occurs slowly
6. Cooking food also takes some time.
7. One complete rotation of the earth around sun takes 24 hours.



Growth of a child



Solar system

**Fast changes :** A change that occurs spontaneously or occurs at a very fast speed is called a fast change.

For example :

1. Burning of a paper
2. Bursting of crackers
3. Dropping an object from height
4. Opening of a drawer
5. Blinking of eyes
6. Sneezing
7. Burning of a match stick etc are examples of fast changes.



Burning match stick

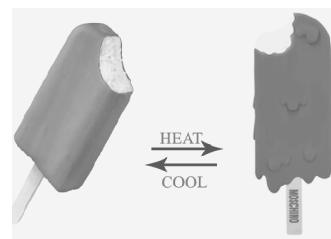
### 2. Based on Reversibility

**Reversible changes :** Some of the changes can be reversed to get back the original shape, size etc. of the material, e.g. If we deflate the inflated balloon it takes its original shape and size. Such changes are called **reversible changes**.

A reversible change can take place in both the directions. For example ice changes to water on heating and water changes to ice on cooling. Melting of ice cream is an reversible change.

**Some other examples of reversible changes:**

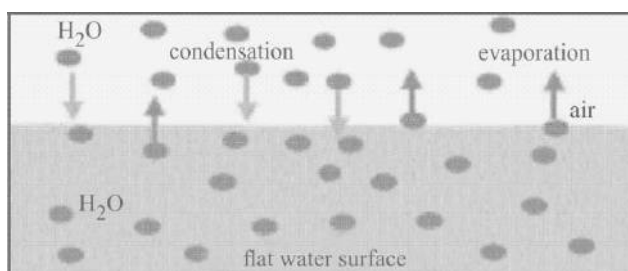
1. All the steam that is made when water in a kettle boils, turn back into water by cooling it.
2. An electric bulb can be made to give light by passing electric current through it. The bulb returns to its original state and does not give light when the electric current is switched off.



Melting of icecream



3. A blacksmith changes a piece of iron into different tools. For that, a piece of iron is heated to red hot. This also softens it. It is then beaten into the desired shape. It is a reversible change
4. When leaves of touch me not plant is touched they close and after some time open out again as before.
5. Evaporation and Condensation process are reverse of each other .  
Evaporation is a change in which a liquid gets converted into vapour.  
Condensation is the process in which the vapour changes into a liquid when it is cooled.



**NOTE:** Most of the reversible changes are physical changes, since the individual properties of the matter are still present.

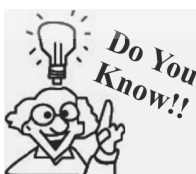
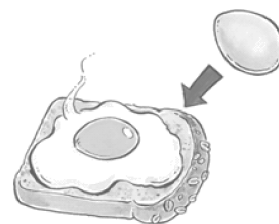
6. **Melting** and **boiling** are reversible processes.  
**Melting :** This change in state occurs when a solid is heated to a particular temperature called the melting point of solid. In it the *state of matter changes* from solid to liquid.  
**Boiling :** This brings about a change in state of a liquid. A liquid when heated to a particular temperature called boiling point changes to vapour (gaseous) state. In it the *state of matter changes*.
7. Our heart beat increases on doing vigorous physical exercise but it becomes normal after some time.  
**Irreversible changes :** Some of the changes cannot be reversed back. e.g. If an inflated balloon is tightly closed at its mouth and then pricked, it burst and then it cannot regain its original shape and size. This type of change is called an **irreversible change**.

Irreversible change can take place only in one direction. For example formation of omlette from egg is an irreversible process as omlette cannot be converted back into raw egg.

#### Another examples of irreversible changes

1. Cake batter is made from eggs, flour, sugar and butter. Once the cake has been baked, we cannot get the ingredients back.
2. Rippening of fruits is an irreversible process as we cannot get unripe fruit from riped one.
3. Cooking of food is another example we cannot get back the substances that we originally started with.
4. Blooming of flowers is an irreversible process as flowers cannot change back into buds.
5. When a paper is burnt, it changes to ash and smoke. From ash and smoke, we cannot get back paper. Thus, the change is irreversible.

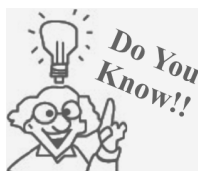
Based on reversibility changes can also be classified as temporary and permanent changes.



Artificial ripening of fruits and vegetable is an irreversible process. This method is used to accelerate the ripening of fruits and vegetables under controlled conditions. This forced change result in fruits and vegetables becoming tasteless and toxic

**Temporary change :** A change that can be easily reversed to get back the original substance is a temporary change e.g. any physical change such as evaporation, melting etc.

**Permanent change :** A change that can not be easily reversed to get back the original substance is called a permanent change e.g. any chemical change.



*Burning of a candle is an example in which both reversible and irreversible process are involved. This is because a candle, on burning, forms carbon dioxide gas and water vapour. These products cannot be converted back into a candle hence represent irreversible change but melting of wax of candle is reversible change as melted wax can be solidified again.*

### 3. Based on Time Interval

The cyclic repetition of changes after fixed interval of time decides whether a change is periodic or non periodic.

**Periodic changes :** These changes occur in a periodic manner i.e., get repeated after a certain definite interval. For example : change in position of a simple pendulum when it is vibrating. They are also called cyclic changes. Seasons repeat themselves each year hence are example of periodic changes.

**Another examples of periodic changes**

1. Day and night are periodic changes as they repeat after every twenty four hours.
2. Beating of heart is an example of periodic change.
3. Certain species of flowers open at sun rise and close at sun set.
4. Even changes in period in a school is an example of periodic change.
5. Change in phases of moon.

**Non-periodic changes :** These are the changes that may occur at any time and show no periodicity.

Example of non periodic changes:

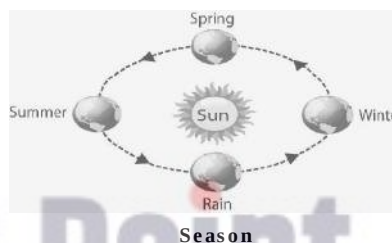
1. Freezing of water to form ice.
2. Natural disasters like cyclons, volcanic eruption, tsunamis are non periodic changes.
3. Burning of fossil fuels.
4. Melting of glaciers.

### 4. Based on composition

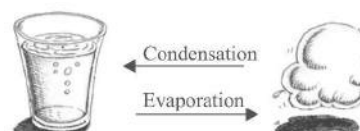
**Physical change:** It is a temporary change and in it no new substance is formed. It can be reversed. It may be a change in shape, size etc. It may be a change involving a change in state e.g. liquid water on evaporation changes to steam which when cooled again (condensation) changes to liquid water.

**Characteristics of a physical change:**

Any change in the physical properties of a substance will result in a physical change. To bring about a physical change some external force or energy has to be applied. The molecules of the substance remain same after and before the change. For example:

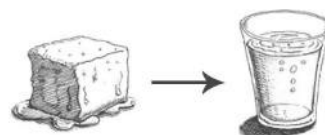


Changes in seasons and phases of moon

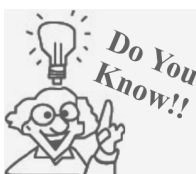


1. On kicking a football it changes its position but no new substance is formed. The molecule that make up football remains the same.
2. On tearing a paper it changes its shape and size but it remains paper. No new substance is formed.
3. If we crush sugar cubes into small particles, these small particles still remain sweet as there is no change in its molecules.

Physical changes result in change in molecular arrangement of a substance which leads to change in state of the matter. For example melting of ice.



**Chemical change:** It is a permanent change and it can not be reversed easily (i.e. it is irreversible change). In it a new substance is formed and the original substance can not be easily formed from the new substances.



*Some chemical changes require the presence of another substance which itself does not undergo any change. Such a substance is called a catalyst. Chlorophyll in plants is a catalyst. It changes water and carbon dioxide to food but itself does not change.*

#### Characteristics of chemical changes

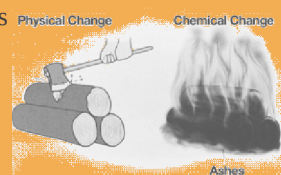
In chemical changes the molecules of original substance undergo changes to form molecules of new substance. A chemical change occurs when there is chemical reaction between the substances. Original substance is called reactant and new substance formed is called product.

Chemical changes are always accompanied by some external indications such as production of heat or light, precipitation, change in colour or appearance, etc.

#### Some examples of chemical changes are:

1. Burning of paper gives smoke and gases like water vapour and carbon dioxide. The ash left behind is different from paper in its properties.
2. The decomposition process of dead organic and inorganic matter is an example of chemical change. The organic waste or dead animals undergo gradual degradation and they finally mix with the soil. The chemical reactions that assist the process result in producing sharp odour, which is an evidence of the chemical change.
3. One of the best example of day-to-day chemical change is the process of photosynthesis. This is a process by which plants synthesize food and release oxygen as the by-product.

**NOTE:** Cutting of wood is an physical change as in this no new substance is formed, molecules of the wood remain the same. While burning of wood results in the formation of certain gases and ash is formed that has different properties than wood hence it is a chemical change.



4. The process of rusting is also an example of chemical change. When iron is exposed to water and oxygen, it gets coated with a brown layer, called rust.
5. The most common example of chemical change is cooking. When we boil egg, it becomes hard and taste very different. The molecules of egg changes to give new substance. Cooking of rice, vegetables etc are chemical changes.



Rusting of iron nails



Cooking food

## 5. Based on Energy

Energy initiates a change, when any change takes place energy is either evolved or absorbed.

**Exothermic change :** A change that is accompanied by *release of heat energy* is called an exothermic change e.g. burning of magnesium ribbon.

**Another examples of exothermic reactions:**

1. During making of ice cubes heat is released
2. Formation of snow in cloud is exothermic
3. When water vapours condenses into liquid water energy is released. Hence condensation is exothermic.
4. Flame of candle or burner is example of exothermic change
5. During mixing of water and strong acid heat is released.
6. When a bomb explodes, large amount of heat is released so explosion of bomb is exothermic.



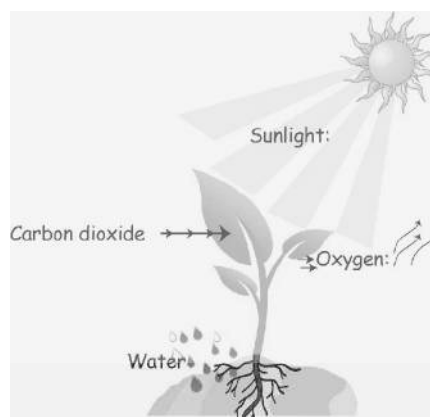
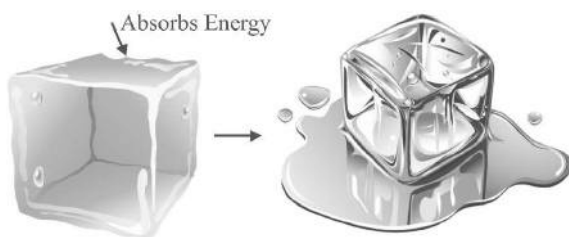
*Respiration is also an example of exothermic change. During respiration glucose molecules breakdown and energy is released which can be utilized for our day to day actions. Similarly digestion of food is also exothermic change.*

**Endothermic changes :** A change that is accompanied by *absorption of heat energy* is called an endothermic change. e.g. change of state from solid to liquid.

**NOTE:** While energy is involved in all types of changes, it is not always easy to see these changes happening. For example we cannot see the energy involved in case of weather changes or drying of clothes.

### Examples of endothermic changes

1. In evaporation process heat is absorbed by the water molecules at the surface of the water. Hence evaporation is endothermic.
2. Heat is absorbed during melting of ice.
3. Heat is adsorbed in baking bread and cooking food.
4. Photosynthesis is an endothermic process because it will not happen without an external source of energy, which in this case is sunlight.



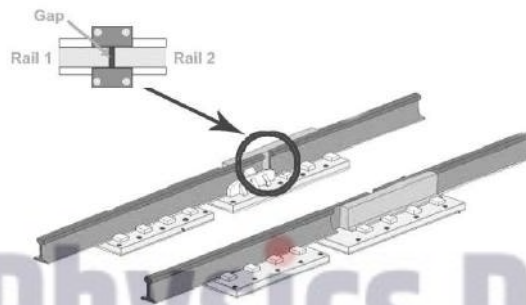
**Photosynthesis**

**EXPANSION AND CONTRACTION OF MATERIALS**

Heating and cooling of materials can make them change. This change occurs in all materials, from water to metals to air. But the effect of heating is opposite to that of cooling.

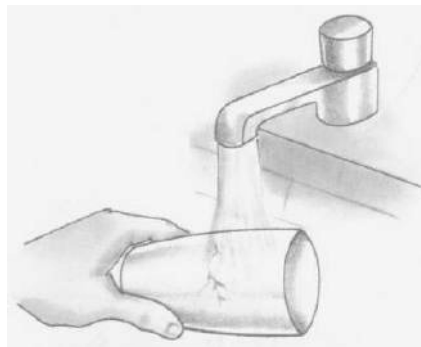
Heating a substance can make it expand, but the degree of expansion differs in solids, liquids, and gases. Gases expand the most while solids expand the least.

For example metals expand on heating. Railway track consist of two parallel metal rails joined together. Small gap is left between the rails as there is an expansion of the rails in hot weather.



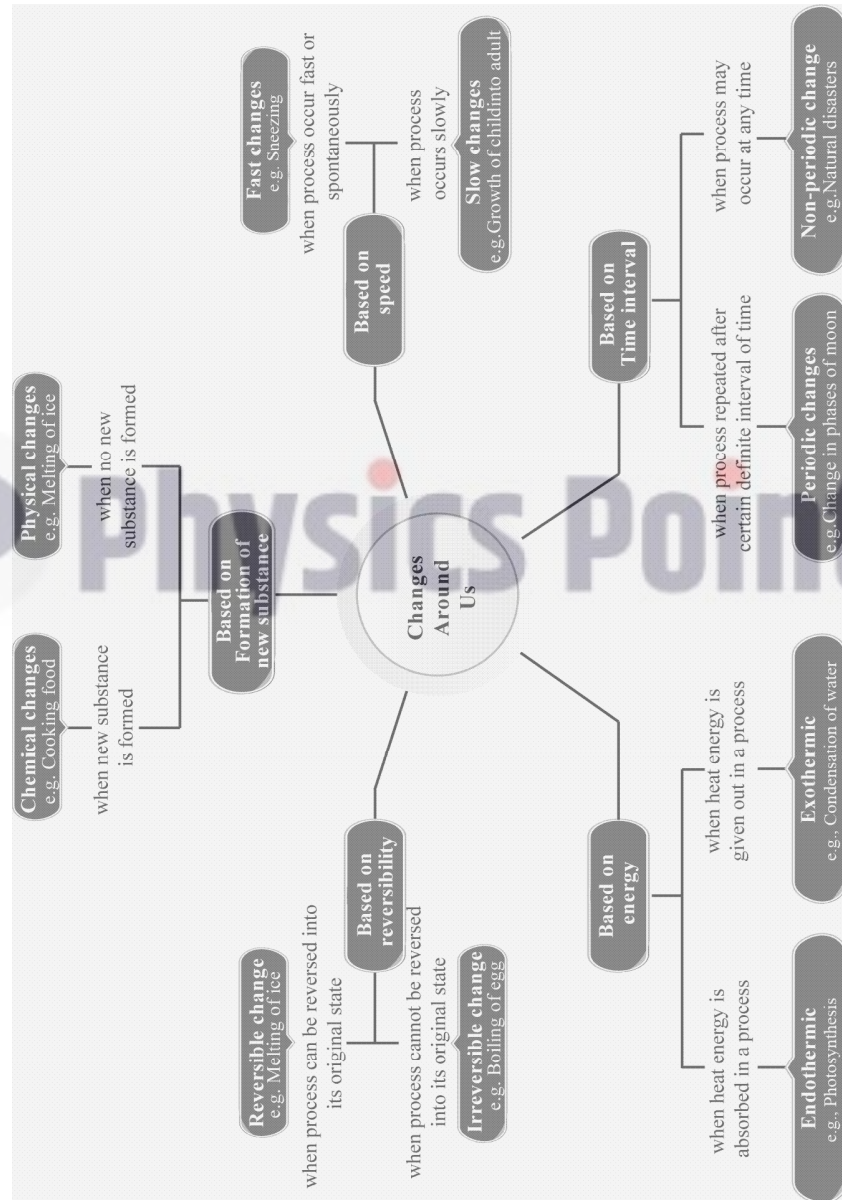
**Expansion joint in railway track**

Cooling of a substances result in contraction .Solids contract the least while gases contract the most.For example a very hot glass cracks on putting it under cold water. This is because the outer surface of the glass when it comes in direct contact with the cold water contracts more compared to the inner surface of glass that is not in direct contact with cold water and hence takes time to cool down and contract.



**Contract of glass**

## Concept Map





## 1

## EXERCISE

## Fill in the Blank

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

1. Liquids becomes ..... on freezing.
2. Flow of electric current is ..... process.
3. Melting of chocolate is ..... process.
4. Colouring of paper is ..... change.
5. In chemical change, constituents lead to the formation of new .....
6. Change that leads to the formation of a new substance is known as .....
7. Grinding of grain is .....
8. .... kind of change is the rising of sun.
9. .... change occurs in the eruption of a volcano.
10. Breaking of a toy is a ..... change.

## True/False

**DIRECTIONS :** Read the following statement and write your answer as true or false.

1. Making China Wall is a chemical change, as it is permanent.
2. Eruption of volcano is a physical change.
3. Making ghee from milk is a chemical change.
4. Making chapatti and baking it is a permanent change. It is also chemical change.
5. If we mix sodium with water, it is a physical change.
6. Plucking a leaf from tree is a reversible change.
7. Liquid water is evaporated by heating. This is a reversible change.
8. Rusting of iron is an irreversible chemical change.
9. Formation of curd from milk is a periodic change.
10. Stretching of rubber band is a reversible change.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two column which have to be matched statements (A, B, C, D, E) in column I have to be matched with statements (p, q, r, s, t) in column II.

| Column I                 | Column II             |
|--------------------------|-----------------------|
| (A) Cutting of paper     | (p) Physical change   |
| (B) Folding of paper     | (q) Reversible change |
| (C) Melting of ice-cream | (r) Permanent change  |
| (D) Making dosa          | (s) Periodic change   |
| (E) Change of season     | (t) Chemical change   |

## Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

1. When a cement bag left open it gets hard after some time, what type of change it is?
2. A making of an omlette reversible or irreversible?
3. Boiling of an egg is a physical or a chemical change?
4. Write two changes in yourself that you face every day.
5. How pickling of lemon is a desirable change?
6. Describe periodic change.
7. Which change is permanent – physical change or chemical change?
8. Define solution?
9. When you make an aeroplane from paper. The shape of a paper sheet changes. Can you reverse this change?

## Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. Write four examples of each physical and chemical changes.
2. Some changes occur themselves. What are they called? Give two examples.
3. Give two examples for slow and fast changes.

4. Categorise into physical/chemical changes :  
(a) Burning of tree (b) Cutting of tree
5. Classify into reversible/irreversible changes.  
(a) Growth of plant.  
(b) Falling of rain.
6. Suppose you have dropped your favorite toy and broken it. Can this change be reversed?
7. Can we count explosion of a cracker as a chemical change. Explain.
8. How we can change a piece of iron into different tools?
9. We keep vegetables or fruits in refrigerator. Why?
10. Describe reversible changes? Give two examples.
11. Explain periodic and non-periodic changes? Give examples.
12. Some bags of cement are lying on the floor get wet due to the leakage of tap water in the room. The next day, they are kept in the sunshine. Do you think the changes, that have occurred in the cement could be reversed?
13. Write examples of three quick natural changes.
14. Differentiate between physical and chemical changes. Give two examples.

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. How is the iron blade in tools fixed to the wooden handle?
2. When we burn the candle. What kind of changes occurs? Give reasons.

## 2 EXERCISE

### Text Book Questions

1. To walk through a waterlogged area, you usually shorten the length of your dress by folding it. Can this change be reversed?
2. You accidentally dropped your favorite toy and broke it. This is a change you did not want. Can this change be reversed?
3. Some changes are listed in the following table. For each change, write in the blank column, whether the change can be reversed or not.

| S. No. | Change                        | Can be reversed (Yes/No) |
|--------|-------------------------------|--------------------------|
| (i)    | The sawing of a piece of wood |                          |
| (ii)   | The melting of ice candy      |                          |
| (iii)  | Dissolving sugar in water     |                          |
| (iv)   | The cooking of food           |                          |
| (v)    | The ripening of a mango       |                          |
| (vi)   | Souring of milk               |                          |

4. A drawing sheet changes when you draw a picture on it. Can you reverse this change?
5. Give examples to explain the difference between changes that can or cannot be reversed.
6. A thick coating of a paste of Plaster of Paris (POP) is applied over the bandage on a fractured

bone. It becomes hard on drying to keep the fractured bone immobilised. Can the change in POP be reversed?

7. A bag of cement lying in the open gets wet due to rain during the night. The next day the sun shines brightly. Do you think the changes, which have occurred in the cement, could be reversed?

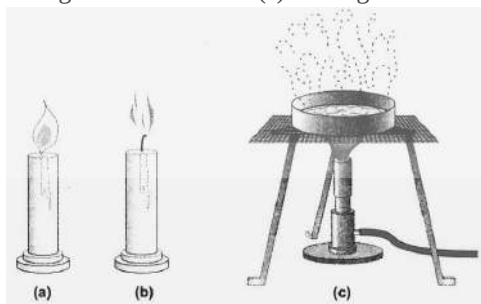
### NCERT Exemplar Questions

1. Pick the change that can be reversed from the following.  
(a) Cutting of trees (b) Melting of ghee  
(c) Burning of candle (d) Blooming of flower
2. Which of the following changes cannot be reversed?  
(a) Hardening of cement  
(b) Freezing of ice cream  
(c) Opening a door  
(d) Melting of chocolate
3. An iron ring is heated. Which of the following statements about it is incorrect?  
(a) The ring expands.  
(b) The ring almost comes to the same size on cooling.  
(c) The change in this case is reversed.  
(d) The ring changes its shape and the change cannot be reversed.

4. While lighting a candle, Paheli observed the following changes
- (i) Wax was melting.
  - (ii) Candle was burning.
  - (iii) Size of the candle was reducing.
  - (iv) Melted wax was getting solidified.

Of the above the changes that can be reversed are

- (a) (i) and (ii)
  - (b) (ii) and (iii)
  - (c) (iii) and (iv)
  - (d) (i) and (iv)
5. Salt can be separated from its solution (salt dissolved in water), because
- (a) Mixing of salt in water is a change that can be reversed by heating and melting of salt.
  - (b) Mixing of salt in water is a change that cannot be reversed.
  - (c) Mixing of salt in water is a permanent change.
  - (d) Mixing of salt in water is a change that can be reversed by evaporation.
6. Rolling of chapati and baking of chapati are the changes that
- (a) can be reversed.
  - (b) cannot be reversed.
  - (c) can be reversed and cannot be reversed, respectively.
  - (d) cannot be reversed and can be reversed, respectively.
7. Iron rim is made slightly smaller than the wooden wheel. The rim is usually heated before fixing into the wooden wheel, because on heating the iron rim
- (a) expands and fits onto the wooden wheel.
  - (b) contracts and fits onto the wooden wheel.
  - (c) no change in the size takes place.
  - (d) expands first, then on cooling contracts and fits onto the wooden wheel.
8. Look at the figure below which shows three situations, (a) a burning candle, (b) an extinguished candle and (c) melting wax.



Which of these shows a reversible change and why?

9. A piece of iron is heated till it becomes red-hot. It then becomes soft and is beaten to a desired shape. What kind of changes are observed in this process— reversible or irreversible?
10. Paheli had bought a new bottle of pickle from the market. She tried to open the metal cap to taste it but could not do so. She then took a bowl of hot water and immersed the upper end of the bottle in it for five minutes. She could easily open the bottle now. Can you give the reason for this?
11. Can we reverse the following changes? If yes, suggest the name of the method.
- (i) Water into water vapour
  - (ii) Water vapour into water
  - (iii) Ice into water
  - (iv) Curd into milk
12. Which of the following changes cannot be reversed?
- (i) Blowing of a balloon
  - (ii) Folding a paper to make a toy aeroplane
  - (iii) Rolling a ball of dough to make roti
  - (iv) Baking cake in an oven
  - (v) Drying a wet cloth
  - (vi) Making biogas from cow dung
  - (vii) Burning of a candle
13. Boojho's sister broke a white dove, a symbol of peace, made of Plaster of Paris (POP). Boojho tried to reconstruct the toy by making a powder of the broken pieces and then making a paste by mixing water. Will he be successful in his effort? Justify your answer.
14. Tearing of paper is said to be a change that cannot be reversed. What about paper recycling?
15. Give one example in each case.
- (i) Change which occurs on heating but can be reversed.
  - (ii) Change which occurs on heating but cannot be reversed.
  - (iii) Change which occurs on cooling but can be reversed.
  - (iv) Change which occurs on mixing two substances, but can be reversed.
  - (v) Change which occurs on mixing two substances, but cannot be reversed.

16. A potter working on his wheel shaped a lump of clay into a pot. He then baked the pot in an oven. Do these two acts lead to the same kind of changes or different? Give your opinion and justify your answer.
17. Conversion of ice into water and water into ice is an example of change which can be reversed. Give four more examples where you can say that the changes can be reversed.
18. Change of a bud into a flower is a change which cannot be reversed. Give four more such examples.
19. Paheli mixed flour and water and
- made a dough,
  - rolled the dough to make a chapati,
  - baked the chapati on a pan,
  - dried the chapati and ground it in a grinder to make powder.
- Identify the changes (i) to (iv) as the changes that can be reversed or that cannot be reversed.

**HOTS Questions**

1. Rahul puts a few drops of alcohol on the back of his hand, the alcohol disappears and his hand feels cool. Why does this happen?

**3****E X E R C I S E****Multiple Choice Questions**

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choice (a), (b), (c) and (d) out of which ONLY ONE is correct.

- Which of the following is a reversible change?
  - Change of raw egg to boiled egg
  - Change of stretched rubber band to its normal size.
  - Change of bud to flower
  - None of these
- Any change in which the original substance can be obtained by reversing conditions is known as a
  - reversible change
  - periodic change
  - physical change
  - Both (a) and (c)
- The melting of wax is an example of
  - physical change
  - chemical change
  - reversible change
  - Both (a) and (c)
- Burning of candle is a
  - physical change
  - chemical change
  - periodic change
  - Both (a) and (b)
- When a woollen yarn is knitted to get a sweater, the change can be classified as
  - physical change
  - chemical change
  - exothermic change
  - endothermic change
- The change of milk to curd, when we add a small quantity of curd to milk, can be classified as
  - Fast change
  - slow change
  - periodic change
  - None of these
- Which of the following are endothermic change?
  - Condensation and melting
  - Condensation and freezing
  - Evaporation and melting
  - Evaporation and freezing
- The change of bud to flower is a/an
  - physical change
  - reversible change
  - irreversible change
  - None of these
- Which of the following is a periodic change?
  - Change of season
  - Phases of moon
  - Beating of human heart
  - All of these

10. A chemical change is one which occurs with  
(a) the formation of new substances  
(b) the evolution or absorption of energy  
(c) Both the above  
(d) None of these
11. A change is called physical change because in it  
(a) only change in physical properties takes place  
(b) transfer of energy takes place  
(c) can be easily reversed  
(d) All of the above
12. Select the one that is a chemical change.  
(a) rusting of iron  
(b) tearing of paper  
(c) Both of these  
(d) None of these
13. Select a reversible change.  
(a) milk to paneer  
(b) growth of a tree  
(c) cow-dung to biogas  
(d) ice-cream to molten ice cream
14. Which one is a periodic change?  
(a) Earth-quake  
(b) Formation of rainbow in sky  
(c) Occurrence of tides in seas  
(d) None of these
15. Select the one that represents a periodic change.  
(a) Occurrence of tides  
(b) Opening of a morning glory flower  
(c) Both the above  
(d) None of these
16. The change of a ball of dough to a rolled out *roti* is a  
(a) physical change  
(b) chemical change  
(c) periodic change  
(d) None of these
17. An aeroplane was cut out from a rectangular sheet of paper. The change involved is a  
(a) physical change  
(b) temporary change  
(c) irreversible change  
(d) None of these
18. Which type of change takes place when a rolled *roti* is baked on *tawa* ?  
(a) physical change  
(b) permanent change  
(c) periodic change  
(d) None of these
19. What type of change is used for fixing a metal rim on a wooden wheel of a cart?  
(a) physical change  
(b) chemical change  
(c) Both the above  
(d) None of these
20. Heating of wax in a pan is a  
(a) reversible change  
(b) irreversible change  
(c) permanent change  
(d) None of these
21. The dissolution of salt in water is a  
(a) reversible change  
(b) irreversible change  
(c) chemical change  
(d) periodic change
22. Select the one that is *not* a chemical change.  
(a) dissolution of ammonia in water  
(b) dissolution of carbon dioxide in water  
(c) dissolution of oxygen in water  
(d) None of these
23. Which one is reversible change?  
(a) melting of ice candy  
(b) cooking of food  
(c) ripening of mango  
(d) None of these
24. Cooking of an egg in boiling water containing salt is a  
(a) permanent change  
(b) temporary change  
(c) irreversible change  
(d) Both (a) and (c).
25. Condensation is a physical change. why?  
(a) Vapour turns into liquid  
(b) No heat is required  
(c) It happens automatically  
(d) No new substance is formed
26. Which of the following is a natural change?  
(a) Cutting hair      (b) graying hair  
(c) Oiling hair      (d) colouring hair
27. Choose the correct alternative to complete the given analogy. Physical change : Boiling : : Chemical change: \_\_\_\_\_  
(a) Melting      (b) Burning  
(c) Condensing      (d) Evaporating

28. Which of the following is a reversible change?  
(a) Ripening of the fruit  
(b) Melting of ice  
(c) Burning of paper  
(d) Converting wood into saw dust
29. What is difference between making of furniture from wood and burning of wood?  
(a) First is irreversible and second is reversible change  
(b) First is physical and second is chemical change  
(c) First is fast and second is slow change  
(d) First is periodic and second is non-periodic change
30. A change that results in formation of new substances and can't be reversed easily is known as a  
(a) physical changes  
(b) chemical changes  
(c) reversible changes  
(d) None of these
5. Which of the following is/are examples of physical change?  
(a) Melting an Ice cube  
(b) Boiling water  
(c) Rusting of Iron  
(d) Crumpling a sheet of aluminum foil
6. By which of the following characteristic(s) we came to know that the changes is/are physical?  
(a) To bring out a change same external force or energy has to be applied.  
(b) If we crush sugar cubes into small particles, there small particles still remain sweet as there is no change in its molecules.  
(c) The molecules of the substance remain same after and before the change.  
(d) The molecules of the original substance undergo changes to form molecules of new substance
7. Which of the following statement(s) is/are correct for reversible conditions or change?  
(a) This change can take place in both the directions.  
(b) Some of the changes can be reversed to get back in the original shape, size etc. of the material.  
(c) These changes cannot be reversed back.  
(d) It cannot regain its original shape.

**More than One option Correct**

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choice (a), (b), (c) and (d) out of which ONE or MORE is correct.

1. Which of the following is/are the basis of change(s) happen around us?  
(a) Based on Speed  
(b) Based on Reversibility  
(c) Based on Time Interval  
(d) Based on Composition
2. Energy also initiates changes, which of the following is/are the part of this change?  
(a) Periodic change  
(b) Non-periodic changes  
(c) Exothermic change  
(d) Endothermic change
3. Which of the following changes is/are takes place in case of baking a dough into bread.  
(a) Reversible change  
(b) Periodic change  
(c) Irreversible change  
(d) Non-Periodic change
4. Which of the following is/are related to chemical change?  
(a) Burning of wood (b) Cooking an egg  
(c) Baking a cake (d) Breaking a bottle
8. Which of the following is/are slow changes?  
(a) One complete rotation of earth around the sun  
(b) Burning of paper  
(c) Germination of seed to form a plant  
(d) Conversion of night into day
9. Some of the changes are given below. Which of the following is/are periodic changes?  
(a) Season repeat themselves each year  
(b) Change in phases of moon  
(c) Melting of glaciers  
(d) Certain species of flowers open at sunrise and close at sunset
10. Which of the following examples is/are related to endothermic changes?  
(a) During making of ice cubes heat is released  
(b) Heat is absorbed during melting of ice  
(c) When a bomb explodes, large amount of heat is released  
(d) Flame of candle or burner



### Passage Based Questions

**DIRECTIONS :** Read the passage(s) given below and answer the questions that follow.

#### Passage I

For changing milk into curd we add a small quantity of curd into milk. The milk is stirred and is set aside for a few hours at a warm place. In a few hours the milk changes into curd.

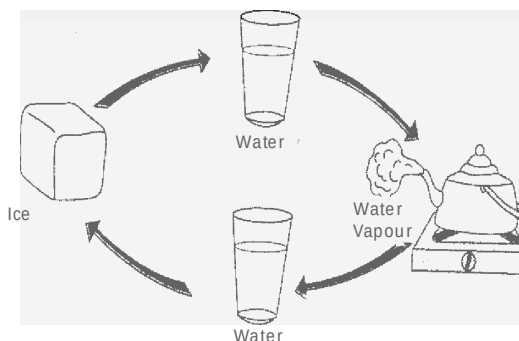
- The change of milk into curd is a
  - physical change
  - chemical change
  - periodic change
  - None of the above
- The change of milk into curd is a
  - slow change
  - fast change
  - exothermic change
  - endothermic change
- Chemical changes are generally
  - reversible change
  - irreversible change
  - periodic change
  - None of these

#### Passage II

Sheetal once preparing evening tea. In the mean while telephone bell rings and she rushed upto attend telephone call. She got busy on phone and suddenly heard a sound from kitchen. When she enter back into kitchen. She saw that tea water was boiling with steam over it and cover of tea container is flew a side with water droplets over it.

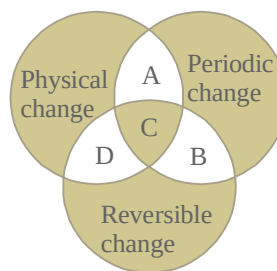
- Why cover of tea kettle flew away?
  - Not properly tight
  - Tea is explosive in nature
  - Pressure of steam
  - None of these
- Water droplets on cover of tea container represents
  - condensation
  - evaporation
  - melting
  - freezing
- Steam over tea represents phenomena of
  - condensation
  - Boiling
  - Fusion
  - None of these

#### Passage III



- What is the term used to describe the phase change of a liquid to a gas?
  - Boiling
  - Condensation
  - Melting
  - None of the above
- What term is used to describe the phase change of a solid to a liquid?
  - Freezing
  - Melting
  - Boiling
  - None of the above
- What is the term used to describe the phase change as a liquid becomes a solid?
  - Evaporation
  - Condensation
  - Freezing
  - None of the above

#### Passage IV



- Which of the following represents 'A'?
  - Solar eclipse
  - Formation of rainbow
  - Occurence of season
  - both (a) and (c)
- Which of the following represents 'D'?
  - Making tea
  - Burning of sulphur
  - Dissolving salt in water
  - Burning of coal

12. Which of the following represent 'C'?

- (a) Solar eclipse
- (b) Raining
- (c) Formation of rainbow
- (d) Growth of a plant

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

1. **Assertion (A) :** The explosion of a fire crackers is a physical changes.

**Reason (R) :** A physical change is a reversible change.

2. **Assertion (A) :** The process of conversion of liquid water to its vapours by heating the liquid is called boiling.

**Reason (R) :** The process of conversion of water vapours to liquid by cooling the vapours is called condensation.

3. **Assertion (A) :** Burning of paper is a physical change.

**Reason (R) :** The products formed on burning of paper cannot be easily converted back to paper.

4. **Assertion (A) :** The formation of rust is a chemical change.

**Reason (R) :** For the formation of rust iron must be exposed to air and water.

5. **Assertion (A) :** Respiration is an exothermic process.

**Reason (R) :** In an exothermic process heat is evolved.

6. **Assertion (A) :** The change of water from liquid to steam on heating is a physical change.

**Reason (R) :** Conversion of liquid into steam is called evaporation.

7. **Assertion (A) :** Explosion of a bomb is an exothermic change.

**Reason (R) :** Large amount of heat energy is released during explosion of bomb.

8. **Assertion (A) :** Small gap is left between the rails of a railway track.

**Reason (R) :** Cooling of substances result in contraction.

### Multiple Matching Questions

**DIRECTIONS :** Following questions has four statements (A, B, C, D) given in Column I and four statements (p, q, r, s) in column II, Any given statement in Column I can have correct matching with one or more statement(s) given in column II. Match the entries in column I with entries in column II.

| 1. | Column I           | Column II              |
|----|--------------------|------------------------|
|    | (A) Melting of Ice | (p) Exothermic change  |
|    | (B) Baking Bread   | (q) Endothermic change |
|    | (C) Bomb Explosion | (r) Reversible change  |
|    | (D) Day and Night  | (s) Periodic change    |

### Integer type Questions

**DIRECTIONS :** Following are integer based/Numeric based questions. Each question, when worked out will result in one integer or numeric value.

- Given are the example(s) of changes happened around us. Identify how many are chemical changes? Your answer will between 0 to 9?  
Photosynthesis in plants, Baking of bread, Boiling water, Hot molten iron, combustion of wood, Rusty iron, Gushing a car
- Megha making a chart of non-periodic changes happen around us. Given are some example of periodic and non-periodic changes. Identify how many are non-periodic? Your answer will between 0 to 9?  
Change of season, Sneezing, Day and Night formation, Heart Beat, Volcano, Change in phases of moon, Melting of glaciers, Burning of fossil fuels.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blank

- |                    |                     |
|--------------------|---------------------|
| 1. solidify        | 2. irreversible     |
| 3. reversible      | 4. irreversible     |
| 5. product         | 6. chemical change  |
| 7. physical change | 8. periodic change  |
| 9. chemical change | 10. physical change |

### True/False

- |          |          |
|----------|----------|
| 1. False | 2. False |
| 3. True  | 4. True  |
| 5. False | 6. False |
| 7. True  | 8. True  |
| 9. False | 10. True |

### Match the Column

A → (r); B → (p); C → (q); D → (t); E → (s)

### Very Short Answer Type Questions

- Chemical change.
- Irreversible change.
- Chemical change.
- (a) Daily hair growth.  
(b) Daily nails growth.
- Pickle adds taste to our food. Hence, pickling of lemon is a desirable change.
- A change which repeats after a regular interval of time is known as periodic change.
- Chemical change is permanent because in this change, an entirely new substance is formed with different properties.
- When a solid is dissolved in a liquid, a solution is formed.
- Yes, this change can be reversed by unfolding the paper aeroplane.

### Short Answer Type Questions

- Physical change — (a) Drawing a line from light pencil on a paper. (b) Arranging building blocks. (c) Iron clothes. (d) Taking bath.  
Chemical change — (a) Preparation of ghee. (b) Preparation of Dosa. (c) Extraction of juice from fruits. (d) Making coffee.

- Natural changes, e.g., a tree full of leaves becomes leafless, fixing of curd.
- Slow change — ripening of fruit, fixing of curd  
Fast change — tearing a paper, grinding.
- (a) Burning of tree — Chemical changes.  
(b) Cutting of tree — Physical change.
- (a) Growth of plant — Irreversible process.  
(b) Falling of rain — Irreversible changes.
- No, this change cannot be reversed because the toy cannot be repaired to its previous form.
- When we burn a cracker, it explodes. Heat, light and smoke come out after explosion. Many new products are formed. Hence, it is a chemical change.
- A piece of iron is heated till it becomes red-hot. Then this red-hot iron, which is quite soft, is beaten into desired shapes.
- Vegetables or fruits are spoiled by bacteria and other microbes. To prevent them from spoilage, they are stored at low temperature in refrigerator where microbes are unable to survive.
- The changes, which can be reversed by reversing the conditions, are called reversible changes.  
For example — (i) Conversion of ice into water by heating. (ii) Stretching a rubber band.
- Periodic change** — A change that occurs during a definite time interval is known as periodic change, e.g., phases of moon, heart-beat, etc.  
**Non - periodic change** — A change that does not repeat again and again after a regular interval of time is known as non-periodic change, e.g., earthquake, flood and so on.
- Cement bags are converted in to a hard mass due to the chemical reaction with water. A new product is formed, which has entirely different properties. So, this chemical change cannot be reversed.
- Example of three quick natural changes are :  
(a) Collapsing of building during an earthquake.  
(b) Uprooting of trees during a tempest.  
(c) Tsunami

14.

| S. No. | Physical change                                                                                         | Chemical change                                                                                                |
|--------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| (a)    | Only physical properties like colour, volume, etc. change.                                              | The chemical composition and chemical properties of the reacting substances undergo a changes.                 |
| (b)    | No new substance is formed.<br>Example :<br>(i) Conversion of water into ice,<br>(ii) Tearing of paper. | One or more new substances are formed.<br>Example :<br>(i) Burning of cooking gas,<br>(ii) Ripening of fruits. |

### Long Answer Type Questions

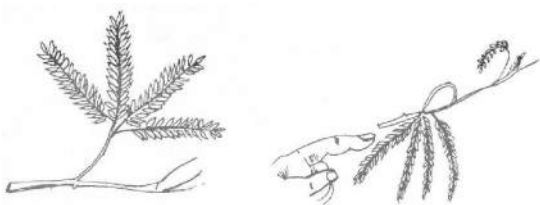
- The iron blade of the tools has a ring in which the wooden handle is fixed. The ring is slightly smaller in size than the wooden handle. To fix the handle, the ring should be heated so that it will become larger in size, as iron expands on heating. Now, the handle easily fits into the ring and on cooling, it fits tightly due to contracting in the ring.
- When a candle burns, both physical and chemical changes take place. On burning a candle, the wax melts and is solidified again on cooling. So, melting of wax is a physical change. But the burning of candle also produces light and some gases like carbon dioxide. Hence, the burning of wick of a candle is a chemical change.

## 2 EXERCISE

### Text Book Questions

- Yes, by unfolding the dress this change can be reversed.
- No, it cannot be reversed, so it is an irreversible change.
- (i) No (ii) Yes (iii) Yes (iv) No (v) No (vi) No
- No, we cannot get fresh drawing sheet once a picture is drawn on it with paint/oil or water. However, we can reverse the change, if soft pencil is used to draw the picture.
- Examples of reversible and irreversible changes

|       | Reversible changes                                                                                                                                                                                                                                 |      | Irreversible changes                                                                       |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------|
| (i)   | Glowing of electric bulb. (It glows when switched on and becomes dark when switched off.)                                                                                                                                                          | (i)  | Burning of paper or wood. (It gives smoke and ash, which cannot form paper or wood again). |
| (ii)  | Distillation of liquid:<br><div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <math display="block">\text{Liquid} \xrightleftharpoons[\text{condensation}]{\text{evaporation}} \text{Vapour}</math> </div> | (ii) | Rusting of iron. (Rust cannot be changed into iron again.)                                 |
| (iii) | Sublimation<br><div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <math display="block">\text{Solid} \xrightleftharpoons[\text{cool}]{\text{heat}} \text{Vapour}</math> </div>                             | (ii) | Making of curd from milk.                                                                  |
| (iv)  | Collapsing of mimosa (touch me not) leaves on touching and opening up on removing the finger.                                                                                                                                                      | (iv) | Growth of plants and animals.                                                              |



Collapsing and opening up of Mimosa leaves represent a reversible change.

6. No, the change in POP cannot be reversed since it is a chemical change.
7. No, these are irreversible chemical changes.

### NCERT Exemplar Questions

1. (b) Melting of ghee
2. (a) Hardening of cement
3. (d) The ring changes its shape and the change cannot be reversed.
4. (d) (i) and (iv)
5. (d) Mixing of salt in water is a change that can be reversed by evaporation.
6. (c) can be reversed and cannot be reversed, respectively.
7. (d) expands first, then on cooling contracts and fits onto the wooden wheel.
8. Melting of wax in (c), which on cooling changes back to solid wax.
9. The changes that can be reversed (reversible).
10. Expansion of metal cap on heating.
11. (i) Yes, condensation  
(ii) Yes, evaporation  
(iii) Yes, freezing  
(iv) Not possible
12. (iv), (vi) and (vii) cannot be reversed.
13. Boojho will not be successful, because making of toy from plaster of paris (PoP) is a change that cannot be reversed.
14. Paper recycling is also an irreversible process. This is because we do get paper on paper recycling but it is not the same original paper was used. The colour and texture of the paper changes.
15. (i) Heating of an iron rod.  
(ii) Baking of chapati.  
(iii) Formation of ice from water.  
(iv) Formation of salt solution.  
(v) Mixing of cement and water.
16. These two acts lead to the different kinds of changes. Former can be reversed while the latter cannot be reversed. The pot can be broken down into lumps of clay but after baking the pot in an oven, it cannot be reversed back into its original form.
17. (i) Melting of wax  
(ii) Folding of a paper  
(iii) Knitting of a sweater  
(iv) Inflating of a tyre
18. (i) Milk into curd (ii) Burning of wood  
(iii) Ripening of fruits (iv) Digestion of food
19. Changes (i), (iii) and (iv) cannot be reversed, change (ii) can be reversed.

### HOTS Questions

1. This happens because the heat energy required for the change which is provided by the body.

## 3 EXERCISE

### Multiple Choice Questions

1. (b) The rubber band can be stretched again by applying force. It is a reversible change.
2. (d) In both types of changes (i.e. reversible change and physical change) we can get back the original substance by reversing the conditions.
3. (d)
4. (b) During burning of candle carbon dioxide gas and water vapours are formed therefore it is a chemical change. Also burning of candle result in melting of wax is a physical change.
5. (a) It is a physical change. Yarn can be obtained back from sweater.
6. (b) The change of milk to curd takes a long time so it can be classified as a slow change.
7. (c) In both evaporation and melting heat is absorbed so both of them are endothermic changes.
8. (c) The change of bud to flower is an irreversible change as blooming flower cannot be changed into buds.
9. (d) All these changes are periodic as they occur after regular intervals of time.
10. (c) A chemical change is accompanied by the formation of new substance and generally occurs with the evolution/absorption of energy.
11. (a) We call it a physical change because of change of physical properties in it.
12. (a) In it rust that is formed is a new substance (i.e. different from iron, the original substance) so it is a chemical change.
13. (d) Molten ice cream when cooled gives ice-cream again.

14. (c) Low and high tides appear periodically, so it is a periodic change.
15. (c) Both occurrence of tides and opening of a morning glory flower are periodic changes.
16. (a) It is a physical change because we can get back the ball of dough from a rolled out *roti*.
17. (c) It is an irreversible change.
18. (b) It is permanent change as rolled out *roti* cannot be obtained from baked one.
19. (a) Iron expands on heating and contracts on cooling. This is a physical change.
20. (a) It is a reversible change. The melted wax again gives solid wax on cooling.
21. (a) It is a reversible change as we can get back salt from its solution by evaporating off water.
22. (c) Dissolution of oxygen in water is *not* a chemical change as no new substance is formed in it.  
[In case of dissolution of ammonia in water ammonium hydroxide is formed. In case of dissolution of carbon dioxide in water a new substance, carbonic acid, is formed]
23. (a) Melting of ice candy is reversible because we can get back ice-candy from melted ice candy.
24. (d) It is an irreversible change and also a permanent change.
25. (d) 26. (b)
27. (b) Burning is a chemical change while melting, condensing and evaporation are physical change.
28. (b)
29. (b) Wood undergoes a physical change in making furniture, while the chemical structure changes when you burn wood.
30. (b)
2. (a) It is a slow change. The change occurs in few hours.
3. (b) Chemical changes are generally irreversible as we cannot get back the starting substances from new product formed.
4. (c) On boiling tea, steam is formed. So, due to pressure of steam the cover of tea kettle flew away.
5. (a) 6. (b)
7. (a)
8. (b) Melting involve phase change of solid to liquid.
9. (c) Conversion of liquid to solid for example water to ice is called freezing
10. (d) Occurrence of season is a physical and periodic change. As seasons repeat themselves every year.
11. (c) It is a physical change and salt can be obtained from salt water solution by evaporation and hence it is a reversible change
12. (a) Solar eclipse is a physical change that is periodic as well as reversible.

### Assertion/Reason

1. (d) In it Assertion is false because the explosion of fire cracker is a chemical change. When a fire cracker explodes, new chemical substances are formed. Reason is true.
2. (b)
3. (d) Burning of paper is a chemical change.
4. (b) Since the properties of rust are different from the iron therefore rusting is a chemical change.
5. (b) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
6. (b)
7. (a) Both assertion and reason are true and reason is the correct explanation of assertion.
7. (b) Small gap is left between the rails of a railway track because there is expansion of the rails in hot weather.

### Multiple Matching Questions

1. (a)  $A \rightarrow (q), (r)$   $B \rightarrow (q), C \rightarrow (p), D \rightarrow (s)$

### Integer Type Questions

1. 3
2. 5 = Change of season, Sneezing, Volcano, Melting of glaciers, Burning of fossil fuels

### More than One option Correct

1. (a), (b), (c) and (d)
2. (c) and (d)
3. (c)
4. (a), (b) and (c)
5. (a), (b), and (d)
6. (a), (b) and (c)
7. (a) and (b)
8. (a), (c) and (d)
9. (a), (b) and (d)
10. (b)

### Passage Based Questions

1. (b) It is a chemical change because a new substance has been formed.



## Chapter

# 7

# GETTING TO KNOW PLANTS

## INTRODUCTION

Plants can be classified on the basis of their height, stem and branches. On these parameters, plants can be of three types, viz. herbs, shrubs and trees.

### CLASSIFICATION OF PLANTS

#### I. Classification based on the size and nature of stem :

**Herbs :** Herbs are small plants which have soft stem. Examples: Wheat, paddy, cabbage, grass, coriander, etc.

**Shrubs :** These are bushy and medium- sized plants and they are somewhat bigger than herbs. Their branches start from just above the ground. Examples: Lemon, Coriander, Henna, Rose, etc.

**Tree :** These are tall and large plants with hard and woody stem. A single main-stem arises from the ground. The main-stem is called trunk. The trunk gives out many branches at certain height. The branches carry leaves, flowers and fruits. Examples: Mango, banyan, acacia, coconut, poplar, willow, etc.



Herb



Shrub



Tree

### SOME OTHER TYPES OF PLANTS

**Creepers:** Plants with weak stem that cannot stand upright and spread on the ground are called creepers. Examples: Pumpkin, Watermelon, sweet potato, etc.

**Climber :** Plants with weak stem that needs support is called climber. Examples: Grapevine, money-plant, cucumber, bean, etc.

## STRUCTURE OF A TYPICAL PLANT

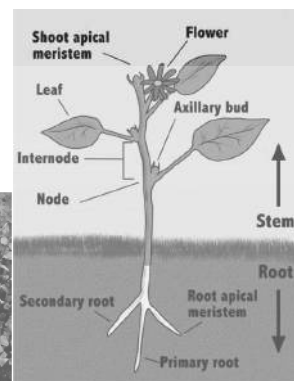
A typical plant contains two main parts, viz. roots and stem. The stem bears leaves, flowers and fruits.

II. Plants were divided into two broad groups – **flowering plants** and **non-flowering plants**. Flowering plants are rose, mango, sunflower and jasmine, etc. Ferns & mosses are non-flowering plants.

III. **Based on their life span** : Depending on the duration of their life cycle, there are three types of plants:



Ferns



Structure of plant



Sunflower



Bean



Pea

Annual plants

(ii) **Biennials** : These plants complete their life cycle in two years. These plants are usually herbs.

(iii) **Perennials** : These remain alive for many years. These are mostly shrubs and trees. They keep producing flowers, fruits and seeds year after year. *E.g.* neem, mango, *Hibiscus*, etc.



Carrot is a Biennial plant

Big plants



Peepal



Banyan

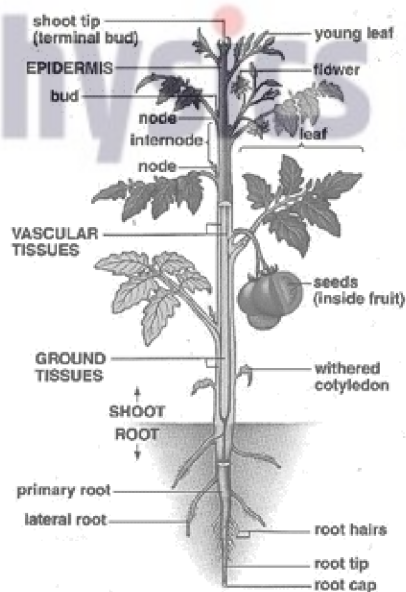


Coconut

Perennial trees

| Parameters     | Herbs                                                                             | Shrubs                                                                            | Trees                                                                             | Climbers                                                                            | Creepers                                                                            |
|----------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Size           | Very small, less than 1 m high                                                    | medium size<br>1 - 3 m high                                                       | tall more than<br>3 m high                                                        | can be very<br>tall                                                                 | can be very<br>long                                                                 |
| Nature of stem | green, tender stem, few branches                                                  | hard, but not very thick<br>branches near the base of stem                        | hard, woody thick stem, branches on upper part of stem                            | soft stem, needs support to stand                                                   | soft stem that cannot stand erect, creep on soil surface                            |
| Example        | tomato, mint                                                                      | lemon, rose, <i>Hibiscus</i>                                                      | neem, mango, peepal                                                               | grapevine, gourd, pea, money plant                                                  | strawberry, mint, <i>Oxalis</i>                                                     |
|                |  |  |  |  |  |

## PLANT SYSTEMS



A flowering plant

Various parts of a plant perform different functions to keep it alive.

### Parts of a plant

- Root system :** The part of the plant that grows below the surface of the soil is called the root. The root is a very important part of a plant. It has three main functions:
  - It helps in holding the plant firmly in the soil.
  - They absorb water and dissolved minerals from the soil.
  - Some roots, like carrot and radish, store food for the plant.
 Plants need water and minerals to stay alive-suck these from the soil and send them up to the rest of the

plant. Roots generally grow in the direction where they find the correct amount of air, water and minerals needed for the plant.

## Root Systems

### Tap roots

A typical root consists of the following parts:-

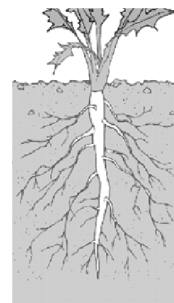
- (a) Primary root
- (b) Secondary root
- (c) Root cap and root hair (temporary)

Tap roots are true roots. They generally grow vertically downwards and give off lateral branches from main root. They develop from radicle of embryo (germinating seed).

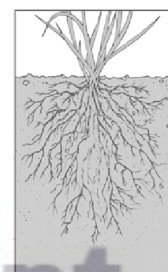
**Secondary root :** These are lateral branches of the primary root which hold on to the soil and give mechanical support to the plant.

**Root cap :** It covers the tip of the main root. It protects the growing root tip.

Plants with tap roots bear leaves that are generally broad and have a criss cross network



**Tap root**



**Fibrous root**

### Fibrous root:

**Fibrous root of grass :** The fibrous roots generally grow in clusters of slender roots from the base of stem. These do not develop from radicle of embryo. They develop from any other part of plant. They do not have any secondary or primary root system. These do not have root caps. Plant with fibrous root bear leaves which are long and tapering and have parallel venation.

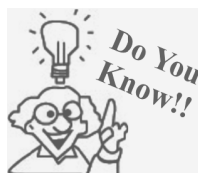
E.g. – wheat, rice, corn, grass and barley etc.

### Modifications of Roots:

1. **Storage :** Roots of carrot, radish, sweet potato and beet root store food prepared by plant. Lets eat these roots. Plants use this food when conditions are unfavorable.



**Sweet potato**

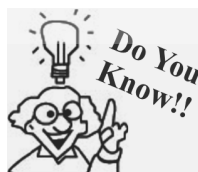


The high energy roots of baobab tree are much sought after when nothing else grows during famine. In Rajasthan roots of khejri trees are eaten when crops fail.

2. **Aerial roots :** The banyan tree has roots that grow down from its branches. They, provide support to the spreading branches of the huge tree. Such roots are called prop roots.

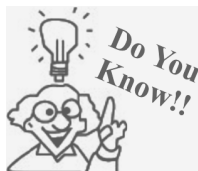


**Modifications of roots for support**



The big banyan tree in the Indian Botanical Garden near Kolkata have more than 900 prop roots.

3. The roots in sugar cane and maize provide extra support to the thin stem. These are called stilt roots.



*Pneumatophores are breathing roots seen in mangroves and other plants growing in swampy environment. They grow vertically upward, against gravity and help the plant get oxygen.*



Stilt roots of sugarcane

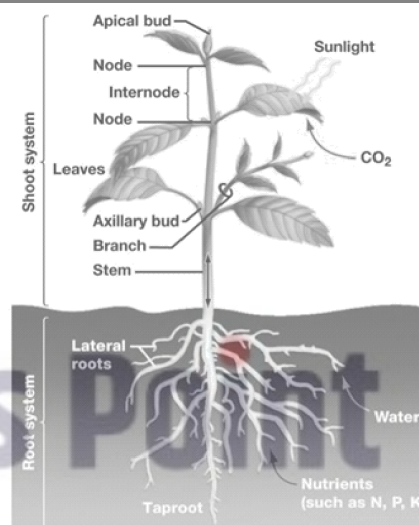
### The Shoot System

The aerial part of the plant is called the shoot system. It consists of two regions.

1. The vegetative organs comprising the stem and leaf.
2. The reproductive organs, namely the flower.

**The stem :** It forms the main axis on which leaves, buds, flowers, branches and fruits arise.

Stem develops from plumule of the embryo of the seed. Unlike roots, the stem has distinct regions called *nodes* from which the leaf arises. Region between two successive nodes is called *internode*. Angle between the stem and leaf is known as *axil*. Axil has a bud called *axillary* bud. Bud grow into a branch or a flower. At the tip of the stem is the terminal bud which is responsible for elongation of the plant.



Shoot system

### Main differences between Root and stems

|   | Root                                                                                                  | Stem                                                                                              |
|---|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1 | It is descending non green part of the plant grows towards the soil and water and away from sunlight. | It is ascending portion of axis of plant. It grows away from soil and water but towards sunlight. |
| 2 | It is not differentiated into nodes and internodes.                                                   | It is differentiated into nodes and internodes.                                                   |
| 3 | Root has rootlets and root hair and does not bear leaves, buds and flowers.                           | Stem bears leaves, buds and flowers.                                                              |

### Functions of stems

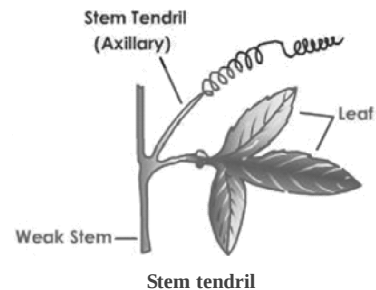
1. It holds leaves in position and keep the plant upright.
2. It bears flowers, fruits, buds, leaves, etc., leaves are arranged in such a way that they are exposed to sunlight.
3. Green stem has chlorophyll and can carry out food manufacturing by photosynthesis.
4. It conducts water and minerals from roots to leaves. It also carries food made by leaves to other parts of the plant. Xylem tissue carries water and minerals and phloem tissue carries prepared food.



Cactus

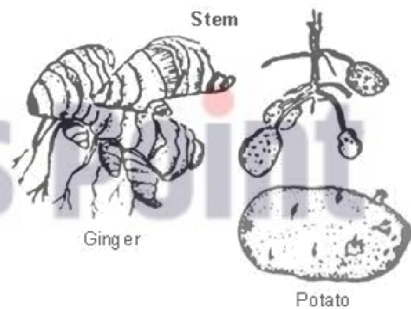
## Stem Modifications

1. **Storage of water** : Stems of plants like cactus swell up to store water in them. They also have a waxy layer for protection from the sun.
2. **To manufacture food** : Stems of cactus become leaf like and flattened to perform photosynthesis.
3. **For protection** : Stems may be modified as thorns (as in *Bougainvillea*), prickles (as in rose), to protect the plant from being eaten by animals.
4. **For support** : Stems of some climbers like grapes are modified to form special structures called tendrils. These help the climber plant to coil round the support.



*Cacti can gather and hold a lot of water in their stems. The water is not pure and clear but is thick viscous liquid. It is drinkable and has been known to save many lives in the desert.*

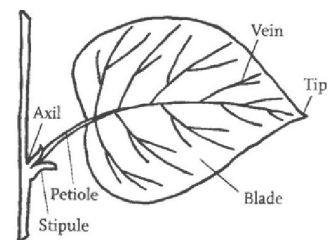
5. **For storage of food** : Potato, onion and ginger are modified stems that store food. There are three kinds of underground stems:- Bulbs of onions & garlic, tuber of potato and rhizome of ginger.
6. **For multiplication of the plant** : Rhizomes, bulbs and tubers also help in multiplication of plant. Some plants like rose multiply by stem cutting.



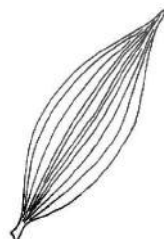
Modification of root for storage of food

## The leaf :

The leaf is a flat, green lateral outgrowth of the stem, arising from the node. The flat portion of the leaf is called leaf blade or lamina. The lamina is attached to the stem by a stalk called petiole. Such leaves are called petiolate leaves and if the petiole is not distinct, the leaf is called sessile. At the tip of the leaf, lateral outgrowths called stipules are present. Petiole continues into parts of a leaf the leaf as midrib. Midrib branches out into venation of veins which may be **criss cross in reticulate venation** and **parallel to each other in parallel venation**. Midrib supports the leaf and the veins distribute water and nutrients throughout the leaf. **Reticulate venation is seen in plants with tap roots** and **parallel venation is seen in plants with fibrous roots**.



Parts of a leaf



Parallel venation



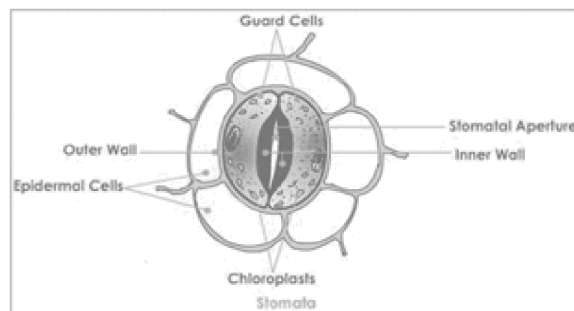
Reticulated venation

Types of leaf venation



The green colour of the leaves is due to presence of a pigment called chlorophyll. They may sometimes have yellow, red or violet spots besides green colour. Such leaves are called variegated leaves.

Leaf surface also has small pores or openings called stomata which allow exchange of gases for photosynthesis, transpiration and respiration.



### Functions of the Leaf

1. **Photosynthesis** : Leaves make food in the presence of sunlight with the help of water from soil and carbon dioxide from air. Chlorophyll traps sunlight and provides energy to the plant for making food by the leaves is called photosynthesis.

The sugar that is prepared by leaves is glucose. This change to starch and is stored in plant fruits, roots and stems.

**Test for starch** : When iodine solution is added to a leaf which has been boiled in water and spirit, show blue-black colouration. This confirms presence of starch.

#### Experiments :

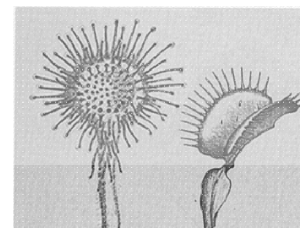
1. If a leafy branch is enclosed in a polythene bag and its mouth tied, and kept in the sun, droplets of water are seen in the bag. This water comes from the leaves due to a process called transpiration.
2. Put a leaf in a test tube and cover it with spirit. Keep the test tube in a beaker half filled with water and then heat the beaker till all the green colour from leaf disappears. Now remove the leaf and test the leaf for starch by putting some iodine solution on the leaf. Blue black colouration confirms the presence of starch.
2. **Transpiration** : The pores present on the leaf surface allow excess of water from the plant to escape in the form of water vapour. This is called transpiration .It helps in cooling down the plant. Transpiration also exerts a pull on the roots which absorbs more nutrients from the soil. It also plays an important role in water cycle.
3. **Protection** : In cactus plants the leaves are modified into spines. They protect the plant from being eaten by grazing animals.
4. **Respiration** : There are many small pores called stomata on the leaves. Through these holes, oxygen enters the leaves and carbon dioxide is released.

### Modifications of leaf

1. **Leaf tendrils** : Some of the upper portion of leaves are modified into tendrils. These tendrils coil around support.
2. **Spines** : In cactus, leaves are modified to form spines. This reduces loss of water from the leaves. Spines also protect the plant.
3. **Insectivorous plant** : Some plants cannot get enough nitrogen from the soil. So they become carnivorous.

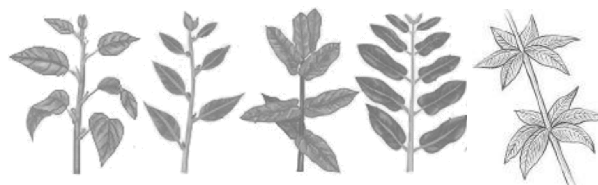
They trap the insects and digest them to derive proteins.

E.g. *Nepenthes* and Venus fly trap.



*Drosera and Dionaea*  
Insectivorous plants

**Arrangement of leaves** on the stem is called **phyllotaxy**. There are three types of phyllotaxy such as, alternate, spiral, opposite and whorled.



Alternate

Spiral

Opposite

Whorled

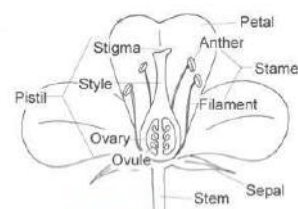
Types of phyllotaxy

## Flower

The most attractive part of a plant is its flower. Many flowers have sweet smell and some have emplacement smell. Flower is the main reproductive organ of flowering plant.

**Pedicel** : It is the axis in bearing the flower and joins it to the stem.

**Thalamus** : The upper part of pedicel is wide and slightly swollen. It is called receptacle or thalamus.



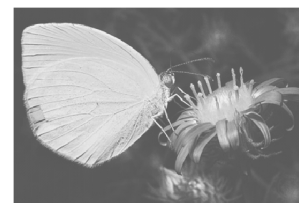
Parts of a flower

**NOTE:** The female reproductive part of a flower; Pistil consists of three parts the stigma, the style and the ovary.

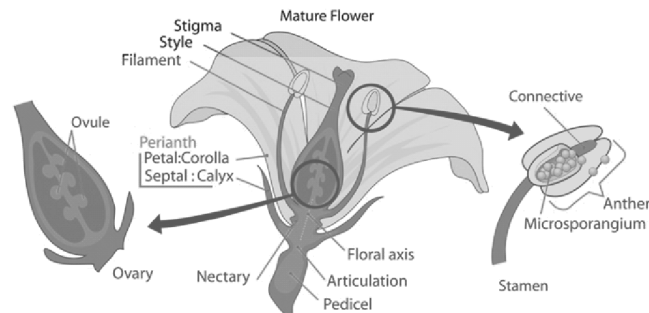
- The upper end of the pistil is called the stigma, where pollen grains get deposited and enter the pistil.
- The narrow tubular part is called the style, which connects with stigma, where pollen grains get deposited and enter the pistil.
- The lower bugly part of the pistil is called the ovary. It contains ovules.

In an angiosperm flower, four whorls of leaf like structures arise from the thalamus. These are called floral leaves.

1. **Calyx** : The outermost whorl of green, leaf like structures is called calyx. A single unit is called sepal. These protect the flower in the bud stage.
2. **Corolla** : Next to calyx in the whorl of brightly coloured leaf like structures. A single unit is called petal. Calyx and corolla together protect the inner whorls in the bud stage but later the petals secure to attract the insects for pollination.
3. **Androecium** : This is the third whorl from outside. The single units are called stamens. Stamens form the male reproductive part of the flower.
  - Each stamen consist of a stalk called filament and at the tip of the filament is a sac like structure called anther. The anthers produce pollen grains which consist of male gametes.
  - **Gynoecium** : This is the innermost whorl of the flower. It forms the female part of the flower. A single unit is called carpel.
  - Each carpel consists of a swollen base called ovary, a short tube like part called style and a discoid tip called stigma.
  - Stigma is usually sticky and forms the landing place for pollen grains. Ovary contains small swells which contains the female gametes.



A butterfly pollinating the flower



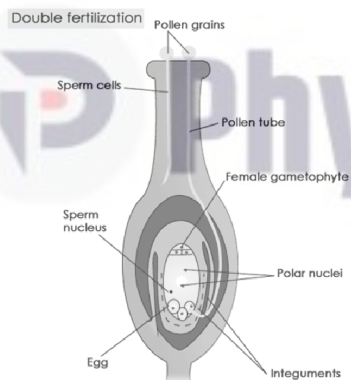
Parts of gynoecium

Parts of androecium

- **Pollination** : The transfer of pollen grains from the anther of a flower to the stigma of a flower is called pollination. It can occur by wind, water or insects.

### Fertilization

- From the stigma, the male gametes travel downward through the style into the ovary and fuse with the female gamete. This results in formation of zygote. The process of fusion of male and female gametes is called fertilization.



Fertilization



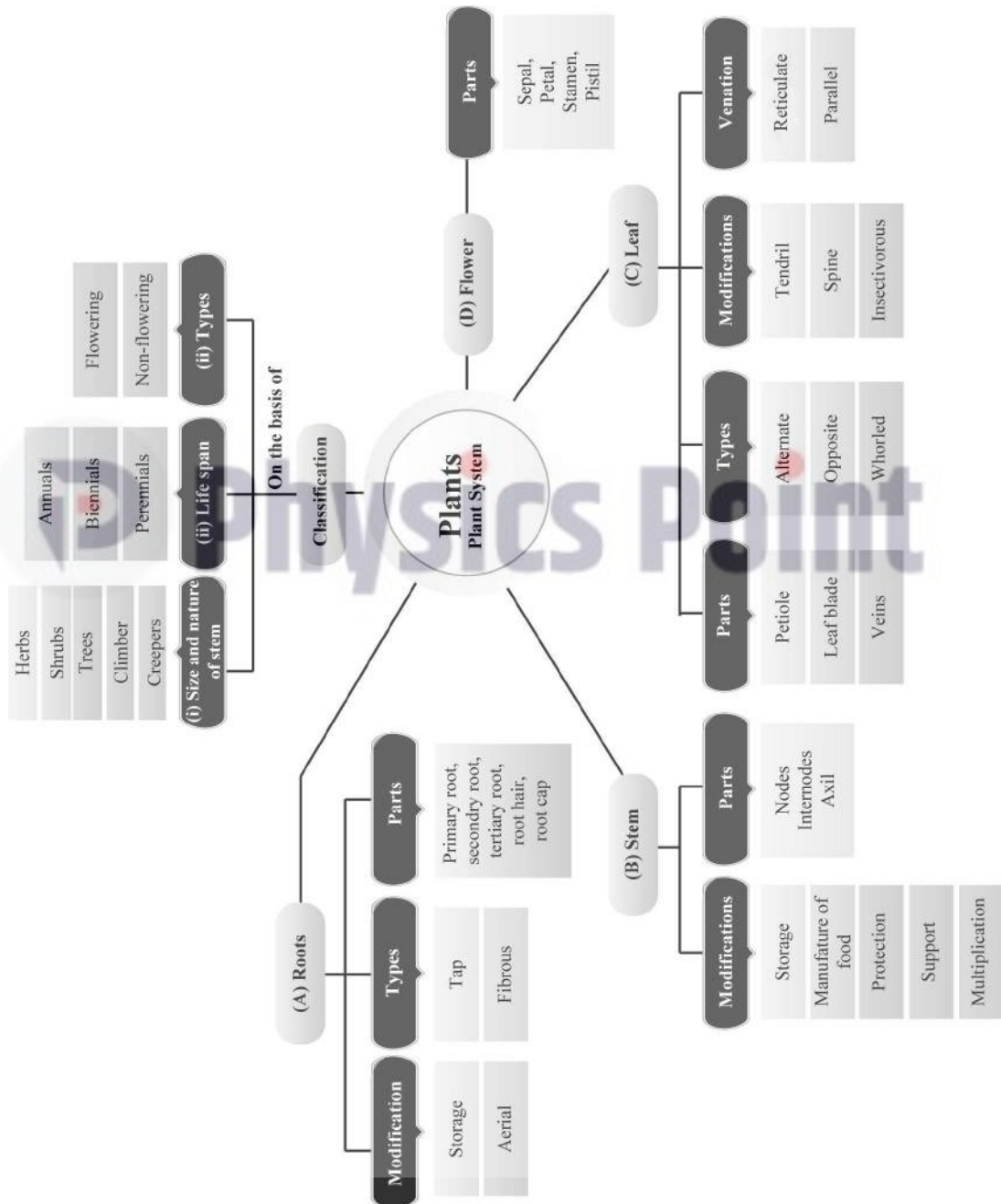
Fruits with seeds

- After fertilization, the sepals and petals wither and fall off. The ovary develops into a fruit and the ovules form seeds. The seeds contain the embryonic plant which under suitable conditions germinate into a new plant.

### KEY WORDS

- **Venation** : arrangement of veins on a leaf
- **Lamina** : the flat green portion of leaf
- **Taproot** : root which develops from radicle
- **Flower** : reproductive part of a plant
- **Photosynthesis** : process by which green plants manufacture food

## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- The part of the leaf by which it is attached to the stem is called .....
- The flower with all whorls i.e., sepals, petals, stamens and carpel is called ..... flower.
- Petals are ..... to attract insects for pollination.
- Female part of a flower is called .....
- Male part of a flower is called .....
- ..... is a shrub.
- Transpiration takes place through .....
- ..... is the male organ part of the flower.
- A leaf usually has a ..... and .....
- The patterns of veins in the leaf is known .....

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- Ginger is a root.
- Potato is a stem.
- Stem's major work is to keep the leaves away from the ground.
- In Cabbage, the edible portion is flower.
- Transpiration occurs through chlorophyll.
- Transpiration is process of intake of water by the plant.
- Venation is the arrangement of veins in a leaf.
- Food in plants is manufactured by chlorophyll.
- Pumpkin and bitter gourd are creepers.
- Climbers take the support of neighbouring structures and move up.
- Green colour of the leaf is due to chlorophyll.
- Photosynthesis takes place in stem.
- Flowers transport food to various parts of a plant.
- Bud is a non bloomed flower.
- Fruit is a matured ovary.
- Pollen grains are stored in anthers.

- Roots are necessary only in small plants and they are not necessary in old trees.
- The hanging parts in banyan tree are aerial roots.
- Sweet potato is a modified stem.
- Carrot is a modified stem.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched. Statement (A, B, C, D, E, F, G, H, I, J) in column I have to be matched with statements (p, q, r, s, t, u, v, w, x, y) in column II.

| 1.  | Column I        | Column II                |
|-----|-----------------|--------------------------|
| (A) | Tap root        | (p) Wheat & maize plant  |
| (B) | Fibrous root    | (q) Datura and gourd     |
| (C) | Joined sepals   | (r) Gram and mustard     |
| (D) | Separate sepals | (s) Petals               |
| (E) | Corolla         | (t) Aerial roots         |
| (F) | Stamens         | (u) Mustard & China rose |
| (G) | Banyan tree     | (v) Sepals               |
| (H) | Transpiration   | (w) Anthers              |
| (I) | Pistil          | (x) Stomata              |
| (J) | Calyx           | (y) Ovary                |

## Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

- Define pistil?
- Where is pistil located?
- Write the function of sepals?
- Does stem prepare food in any plant? Give an example.
- Write two plants that have tap root system?
- What type of root system do gram and mustard have?
- Write two plants that have reticulate venation.
- Name two plants that have parallel venation.
- Name the process of releasing of water by plants.
- Define lamina?

11. 'Kitchen of the plant' reminds you of which part of the plant?
12. Which gas is released by the plants during photosynthesis?
13. A plant has leaves with parallel venation. What kind of root is it likely to have?
8. On the basis of height, name the three types of plants.
9. How are plants classified?
10. What are the parts of a flower?
11. Shikha has placed rose under shrubs. Is she correct? Justify.
12. Differentiate between creepers and climbers.
13. Write three functions of roots.
14. Life is not possible without plants. Justify.
15. Give the basis of characterising different types of plants using any one of the salient features.

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. Is there any relationship between the type of root system and the type of venation?
2. Draw a labelled diagram of a simple leaf.
3. Is sweet potato a stem, root or a fruit? Justify your answer.
4. What is venation? What are the types of venation?
5. Mention two functions of a stem.
6. Differentiate between shrubs & herbs.
7. What is the difference between petiole and lamina?

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. Draw a labelled diagram of a plant.
2. Draw a labelled diagram of a complete flower.
3. Explain about a leaf?
4. Write the characteristics of plants?

# 2

# EXERCISE

### Text Book Questions

1. Correct the following statements and rewrite them in your notebook.
  - (i) Stem absorbs water and minerals from the soil.
  - (ii) Leaves hold the plant upright.
  - (iii) Roots conduct water to the leaves.
  - (iv) The number of petals and sepals in a flower is always equal.
  - (v) If the sepals of a flower are joined together, its petals are also joined together.
  - (vi) If the petals of a flower are joined together, then the pistil is joined to the petal.
2. Draw (a) a leaf, (b) a taproot and (c) a flower, you have studied for Table.
3. Can you find a plant in your house or in your neighbourhood, which has a long but a weak stem? Write its name. In which category would you classify it?
4. What is the function of a stem in a plant?
5. Which of the following leaves have reticulate venation?  
*Wheat, tulsi, maize, grass, coriander (dhania), China rose*
6. If a plant has fibrous root, what type of venation are its leaves likely to have?
7. If a plant has leaves with reticulate venation, what kind of roots will it have?
8. Is it possible for you to recognise the leaves without seeing them? How?
9. Write the names of the parts of a flower.
10. Which of the following plants have flowers?  
*Grass, maize, wheat, chilli, tomato, tulsi, peepal, shisham, banyan, mango, jamun, guava, pomegranate, papaya, banana, lemon, sugarcane, potato, groundnut*
11. Name the part of the plant which produces its food. Name this process.
12. In which part of a flower, you are likely to find the ovary?
13. Name two flowers, each with joined and separated sepals.

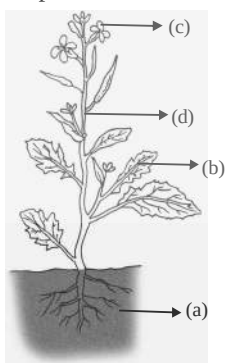


**NCERT Exemplar Questions**

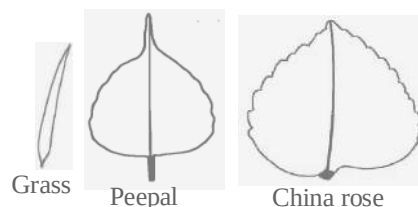
- Fill in the blanks:
  - The small green leaves at the base of flowers are known as \_\_\_\_\_.
  - The swollen basal part of the pistil is the \_\_\_\_\_ which bears the \_\_\_\_\_.
  - Stamen has two parts called \_\_\_\_\_ and \_\_\_\_\_.
  - The young unopened flower is termed as \_\_\_\_\_.
- Match the parts of plant given in Column I with their function in Column II.
 

| Column I   | Column II          |
|------------|--------------------|
| (A) Flower | (p) Photosynthesis |
| (B) Leaf   | (q) Anchorage      |
| (C) Stem   | (r) Reproduction   |
| (D) Root   | (s) Bears branches |
- Boojho wanted to test the presence of starch in leaves. He performed the following steps.
  - He took a leaf and boiled it in water.
  - He placed the leaf in a petri dish and poured some iodine over it. He did not get the expected result. Which step did he miss? Explain.
- Will a leaf taken from a potted plant kept in a dark room for a few days turn blue-black when tested for starch? Give reasons for your answer.
- Can the stem of a plant be compare with a street with two-way traffic? Give reason.
- Read the function of parts of a plant given alongside:
  - Fixes plant to the soil
  - Prepares starch
  - Takes part in reproduction
  - Supports branches and bears flowers

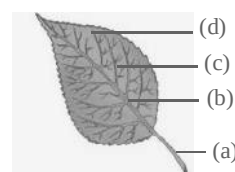
In the given diagram, write the names of the parts whose functions you have just read at the appropriate space.



- Draw the veins of leaves given in the figure below and write the type of venation.



- Observe the figure given below and attempt the questions that follow it.



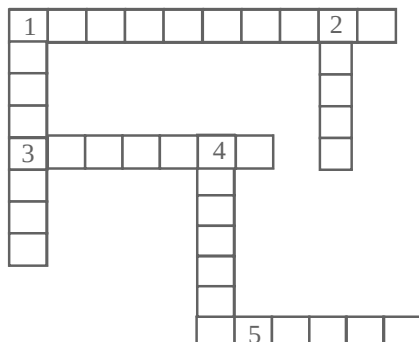
- Label the parts (a), (b), (c) and (d) in the diagram.
  - What type of venation does the leaf has?
  - What type of venation is seen in grass leaves?
- Observe the picture of an activity given below carried out with leaves of plants and polythene bag.



Now answer the following:

- Which process is demonstrated in the activity?
  - When will this activity show better results- on a bright sunny day or a cloudy day?
  - What will you observe in the polythene bag after a few hours of setting up the activity?
  - Mention any one precaution you must take while performing this activity.
- Identify the wrong statements and correct them.
    - Anther is a part of the pistil.
    - The visible parts of a bud are the petals.
    - Lateral roots are present in a tap root.
    - Leaver perform the function of transpiration only.

11. Solve the crossword as per the clues given below it.



#### Across

1. The term that describes upward movement of water in a stem.

3. The part of leaf which is attached to the stem.  
5. This part is attached to the tip of filament.

#### Down

1. Plants that are weak and spread on the ground.  
2. Ovules are present in this part of flower.  
4. Is the broad part of leaf.

#### HOTS Questions

1. Rahul tries to pull out a grass and a rose plant from the soil. Which one will he be able to pull out more easily and why?  
2. Is a mango sapling a herb (it has a green stem like herbs)? Give reasons to support your answer.

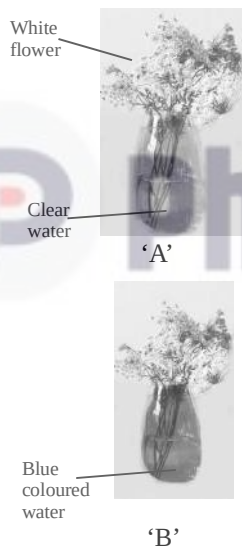
## 3 EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each questions has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

- A wheat plant belongs to the category of  
(a) herb (b) shrub  
(c) tree (d) None of these
- A brinjal plant belongs to which of the following category?  
(a) Herb (b) Shrub  
(c) Tree (d) None of these
- Classify neem in one of the categories of plants  
(a) Herb (b) Shrub  
(c) Tree (d) All of these
- A plant has weak stem and cannot stand upright. It spreads on the ground. It may be called  
(a) herb (b) shrub  
(c) creeper (d) climber
- The plants having weak stem and take support on neighbouring structures is called a  
(a) creeper (b) climber  
(c) Both of these (d) None of these
- In which of the following plants the stem is very weak and needs support?  
(a) Gourd (b) Cucurbita  
(c) Both of these (d) None of these
- In plants of gourd and cucurbita, some thread like structures arise from the stem that helps the plants to climb. These structures are called  
(a) leaf tendrils (b) thorns  
(c) spines (d) stem tendrils
- In a mango tree the branches appear  
(a) at the base of stem  
(b) higher up on the stem  
(c) no where on the stem  
(d) None of the above
- Lemon tree belongs to which category?  
(a) Herb (b) Shrub  
(c) Tree (d) Can't say
- A tomato plant has stems of which colour?  
(a) Green  
(b) Red  
(c) Sometimes green, sometimes red  
(d) Neither green nor red
- The stem of tomato plant is \_\_\_\_\_.  
(a) tender (b) thick  
(c) hard (d) thin
- Water moves up in the stem and goes to which part of plant?

- (a) Stem  
(b) Leaves  
(c) Flowers  
(d) Plant parts attached to stem
13. The part of the leaf by which it is attached to the stem is called  
(a) petiole (b) lamina  
(c) veins (d) None of these
14. The lines on the broad green part of the leaf are called  
(a) lamina (b) veins  
(c) venation (d) None of these
15. Look at the figures below and try to guess the colour of flower in fig. 'B' after few hours? The colour of flower will most likely be



- (a) white  
(b) blue  
(c) red  
(d) half blue and other half red
16. The water is released  
(a) by plants into air by process of transpiration  
(b) through leaves in the form of water vapour  
(c) Both the above  
(d) None of the above
17. The food produced in the leaves is in the form of  
(a) starch (b) proteins  
(c) chlorophyll (d) All of these
18. Which part of the plant anchors the plant firmly in the soil?

- (a) Root (b) Stem  
(c) Both of these (d) None of these
19. The plants having leaves with parallel venation have \_\_\_\_\_.  
(a) tap roots (b) lateral roots  
(c) fibrous roots (d) None of these
20. Select the plant whose roots store food for future use.  
(a) Turnip (b) Sweet potato  
(c) Tapioca (d) All of these
21. Petals are  
(a) modified leaf  
(b) usually coloured  
(c) forms part of corolla of flower  
(d) All of these
22. Pistil is the  
(a) inner most part of the flower  
(b) female structure of the flower  
(c) Both the above  
(d) None of the above
23. A pistil consists of  
(a) ovary  
(b) ovary and style  
(c) ovary and stigma  
(d) ovary, style and stigma
24. Which type of veins are present in grass?  
(a) Mid-rib  
(b) Reticulate venation  
(c) Parallel venation  
(d) None of the above
25. Which of the following is given out during the process of photosynthesis?  
(a) Water vapours (b) Carbon dioxide  
(c) Oxygen (d) None of these
26. The leaf uses water to make food. The water is supplied to the leaf by  
(a) roots (b) stem  
(c) flower (d) All of these
27. Different flowers have petals of  
(a) different colour (b) same colour  
(c) mixed colours (d) None of these
28. When the inner part of an ovary of a flower were observed with the help of a lens, some small bead like structures are observed. These are called  
(a) anther (b) stamen  
(c) ovule (d) None of these

29. Which of the following statements are incorrect?
- (a) Maize and wheat are plants with fibrous root.
  - (b) Tulsi plant has soft green stem. It is a herb.
  - (c) Money plant is climber as it has weak stem and needs support to stand.
  - (d) Potato is an underground root.
30. Ginger shows brown scale like leaves on it. The part of ginger that we use in cooking is actually a
- (a) stem
  - (b) root
  - (c) leaf
  - (d) fruit
31. A cactus plant grows in desert and its leaves are modified into spines. So, which part of cactus then performs photosynthesis?
- (a) Roots
  - (b) Stem
  - (c) Spines
  - (d) Flowers
32. Which of the following is the female reproductive part of flower?
- (a) Sepal
  - (b) Androecium
  - (c) Gynoecium
  - (d) Petal
33. Which plant has prop roots?
- (P) Bamboo
  - (q) Sugarcane
  - (r) Banyan
  - (s) p, q and r
  - (a) Only p
  - (b) (p) and (q)
  - (c) p, q and r
  - (d) All of these
34. The tendril in a pea plant is a modified
- (a) leaf
  - (b) stem
  - (c) stipules
  - (d) flower
35. The flat green portion of the leaf is called
- (a) petiole
  - (b) lamina
  - (c) leaflet
  - (d) stipule
36. Find the odd one out
- (a) Ovary, style, stigma
  - (b) Filament, anther, pollen
  - (c) Beetroot, potato, carrot
  - (d) Potato, carrot, radish
37. Why are roots said to anchor the plant in soil?
- (a) The roots absorb water from the soil.
  - (b) The roots transport water and minerals to various parts of plant.
  - (c) The roots help in holding the plant firmly in the soil.
  - (d) The roots are fibrous in nature.
38. Why do we eat roots of turnip?
- (a) Food is stored in them.
  - (b) Starch is prepared in them.
  - (c) It is a green vegetable.
  - (d) It is easily available.
39. Which of the following is used to test the presence of starch?
- (a) Copper sulphate
  - (b) Iodine
  - (c) Sugar
  - (d) Water
40. To test the presence of starch, why is leaf covered with spirit?
- (a) To kill the leaf
  - (b) To dissolve chlorophyll
  - (c) To remove starch
  - (d) None of the above
41. When the leaf is tested for starch, which colour confirms the test?
- (a) Blue
  - (b) Black
  - (c) Red
  - (d) Blue-black
42. How many whorls are there in typical flower?
- (a) 1
  - (b) 2
  - (c) 4
  - (d) 3
43. In a rose flower, we find
- (a) many sepals which are coloured
  - (b) stamen are joined to petals
  - (c) pistil is not present
  - (d) All of the above are correct
44. A modified leaf that forms one of the components of calyx of flower and made of small leaf like structures is fallown as
- (a) petals
  - (b) sepals
  - (c) stamen
  - (d) None of these
45. Which of the following statement(s) is/are correct?
- (a) Creepers are plants having weak stems that cannot stand upright and spread on ground.
  - (b) The part of the leaf by which it is attached to the stem is called lamina.
  - (c) Herbs have a hard stem.
  - (d) None of the above
46. Which of the following statement(s) is/are correct?
- (a) Leaf venation is the pattern of veins of leaf.

- (b) In the process of photosynthesis plants absorb nitrogen and carbondioxide from atmospheric air.  
 (c) Stems anchor the plants firmly in the soil.  
 (d) None of the above
47. Which of the following statement(s) is/are correct?  
 (a) Stems absorb water and minerals from the soil.  
 (b) Stems conduct water from roots to the leaves.  
 (c) Stems conduct food from roots to various parts of plant.  
 (d) None of the above
48. Which of the following statement(s) is/are correct?  
 (a) Roots conduct water to the leaves.  
 (b) The number of petals and sepals in a flower is always equal.  
 (c) Leaves produce food for the plant.  
 (d) None of the above
49. Which of the following is a herb?  
 (a) Neem (b) Tulsi  
 (c) Mango (d) Rose
50. Which characteristic is common to lemon, rose and Hibiscus?  
 (a) They are herbs (b) They are trees  
 (c) They are shrubs (d) They are climbers
51. Which of the following features characterize a tree?  
 (a) They are tall  
 (b) They have thick woody stem  
 (c) They have branches in the upper part  
 (d) All of the above
52. Which of the following is a climber?  
 (a) Many plants (b) Grapevine  
 (c) Balsum (d) Both (a) and (b)
53. Which of the following are the features of a creeper?  
 (a) They have weak stems  
 (b) They spread on the ground  
 (c) They cannot stand upright  
 (d) All of these
54. Which part of the plant conducts water and mineral salts?  
 (a) Root (b) leaves  
 (c) Stem (d) Flowers
55. What is the other name for stalk of leaf?  
 (a) Plumule (b) Stipule  
 (c) Petiole (d) Radicle
56. The flat green part of the leaf is called \_\_\_\_\_.  
 (a) Petiole (b) Stomata  
 (c) Lamina (d) Sepals
57. The thin lines on a leaf are called \_\_\_\_\_.  
 (a) Midrib (b) Veins  
 (c) Stems (d) Ribs
58. The thick vein in the middle of the leaf is called the \_\_\_\_\_ and the arrangement of veins is called \_\_\_\_\_.  
 (a) Reticulate, naiolrib  
 (b) Midrib, reticulate  
 (c) Venation, parallel  
 (d) Midrib, venation
59. Identify the kind of venation shown in Fig. A and B.  
 (a) A → parallel; B → reticulate  
 (b) A → reticulate; B → parallel  
 (c) Both parallel  
 (d) Both reticulate



A



B

60. Plants lose extra water in the form of water vapour by a process called \_\_\_\_\_.  
 (a) respiration (b) exertion  
 (c) Transpiration (d) Photosynthesis
61. Which of the following are the functions of a leaf?  
 (a) Photosynthesis and respiration  
 (b) Transpiration and photosynthesis  
 (c) Photosynthesis, transpiration and respiration  
 (d) Conduction, Photosynthesis

62. During photosynthesis ——— is taken in and ——— is given out.  
 (a) Oxygen, carbon dioxide  
 (b) Carbon dioxide, oxygen  
 (c) Water, food  
 (d) Sunlight, oxygen
63. Plants store food in the form of \_\_\_\_\_.  
 (a) Proteins (b) Starch  
 (c) Water (d) Fiber
64. Which part of the plant is responsible for anchoring the plant to the soil?  
 (a) Stem (b) Root  
 (c) Fruit (d) Tendril
65. Which of the following plant has tap root?  
 (a) Grass (b) Maize  
 (c) Wheat (d) Carrot
66. Name a plant with fibrous root.  
 (a) Mango (b) Neem  
 (c) Sugarcane (d) Turnip
67. Which of the following is a function of roots?  
 (a) Photosynthesis  
 (b) Transpiration  
 (c) Storage of food  
 (d) Protection
68. Green leaf like structures of a flower are called \_\_\_\_\_.  
 (a) Petals (b) Sepals  
 (c) Carpels (d) Stems
69. Male reproductive part of a flower is called ——— and female reproductive part is called \_\_\_\_\_.  
 (a) sepals, petals  
 (b) stems, pistil  
 (c) stamens, pistil  
 (d) pistil, petals
70. Which of the following are the parts of a stamen?  
 (a) Style, stigma (b) Anther, style  
 (c) Anther, filament (d) ovary, filament
71. The lowermost and swollen part of a pistil is called \_\_\_\_\_.  
 (a) Ovule (b) Ovary  
 (c) Stigma (d) Pollen
72. Small bead like structure inside the ovary are called \_\_\_\_\_.  
 (a) Pollens (b) Stomata  
 (c) Ovules (d) Seeds
73. Anther contains a powdery substance called \_\_\_\_\_.  
 (a) Ovules (b) Ovary  
 (c) Stigma (d) Pollen

### Statement Based Questions

**DIRECTIONS :** Read the following two statements carefully and choose the correct options.

- (i) There is a great variety of plants around us.  
 (ii) All plants have the same parts; roots, stem, leaves, branches, flowers and fruits.  
 (a) It (i) is correct but (ii) is false  
 (b) (ii) is correct but (i) is false  
 (c) Both are correct  
 (d) Both are false
- (i) Shrubs are plants that have woody stem and branches arising from the base of stem.  
 (ii) Lemon is a shrub.  
 (a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
 (b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
 (c) Both are false  
 (d) (i) is correct but (ii) is false
- (i) Weeds are unwanted plants growing in fields, gardens or pots.  
 (ii) Farmers have to remove weeds regularly from thin fields.  
 (a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
 (b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
 (c) Both are false  
 (d) (i) is correct but (ii) is false
- (i) Climbers are plants with weak stems that spread on the ground.  
 (ii) Creepers are plants that need support to stand.  
 (a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
 (b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
 (c) Both are false  
 (d) (i) is correct but (ii) is false



5. (i) Water and minerals go to the leaves and other parts of plant attached to stem through narrow tubes inside the stem.  
(ii) Stem is known as conducting tissue.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are false  
(d) (i) is correct but (ii) is false
6. (i) All leaves are green in colour.  
(ii) The flat green part of the leaf is called petiole.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are false  
(d) (i) is correct but (ii) is false
7. (i) The arrangement of veins in a leaf is called reticulate venation.  
(ii) In parallel venation, the veins run parallel to midrib.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are false  
(d) (i) is correct but (ii) is false
8. (i) Plants release a lot of water vapour into air.  
(ii) Leaves are the parts through which water comes out in the form of vapour.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are false  
(d) (i) is correct but (ii) is false
9. (i) In an experiment to test the presence of starch in leaves, the leaves have to be first decolorised.  
(ii) Boiling leaves in water will remove all the starch from leaves.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are false  
(d) (i) is correct but (ii) is false
10. (i) Green leaves need sunlight, water and carbon dioxide to make food.  
(ii) Proteins are made as the end product of photosynthesis.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are false  
(d) (i) is correct but (ii) is false
11. (i) If leaf is covered with black paper and left in sun, it will not be able to prepare food.  
(ii) Partly covered with black paper does not show blue black colour when tasted for starch.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are false  
(d) (i) is correct but (ii) is false
12. (i) Roots help in preventing soil erosion.  
(ii) Roots absorb water and minerals from the soil.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are true  
(d) (i) is correct but (ii) is false
13. (i) Plants having leaves with reticulate venation have tap roots.  
(ii) Some roots store extra food for future use.  
(a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
(b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
(c) Both are false  
(d) (i) is correct but (ii) is false

14. (i) Sunflower, Marigold and *Chrysanthemum* are not single flower but a group of flowers  
 (ii) Sepals protect the flower in bud stage.  
 (a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
 (b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
 (c) Both are true  
 (d) (i) is correct but (ii) is false
15. (i) Pistil is the female part of the flower.  
 (ii) Ovules are present inside the ovary.  
 (a) (i) and (ii) are correct but (i) is not correct explanation of (ii)  
 (b) (i) and (ii) are correct and (i) is correct explanation of (ii)  
 (c) Both are true  
 (d) (i) is correct but (ii) is false

### Figure/Diagram Based Questions

**DIRECTIONS :** Carefully observe the following pictures and answer the questions.

1. The Picture below shows a pistil. Label its parts A, B, C correctly.



- (a) A–style; B–stigma; C–ovary  
 (b) A–stigma; B–style; C–ovary  
 (c) A–ovary; B–style; C–stigma  
 (d) None of the above
2. Observe the figures given below :

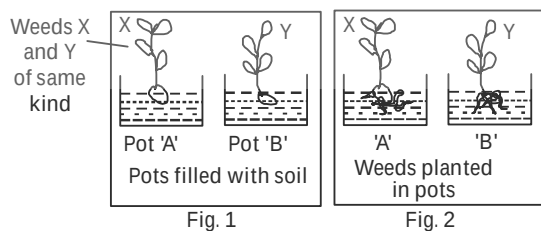


Fig. 1

Fig. 2

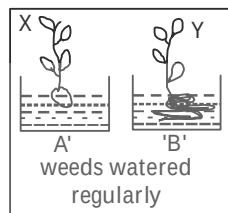


Fig. 3

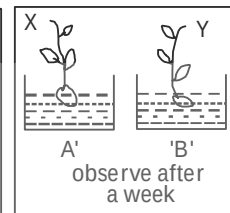


Fig. 4

After a week (Fig. 4) the weed in pot 'A' was healthy and that in pot 'B' started wilting and drying up. It shows that

- (a) starch is present in the leaves.  
 (b) for photosynthesis, the presence of sunlight is necessary.  
 (c) transpiration cannot occur in absence of water.  
 (d) water is absorbed by roots and transported to other plant parts.
3. Look at the below pictures and correctly label A, B, C.



A

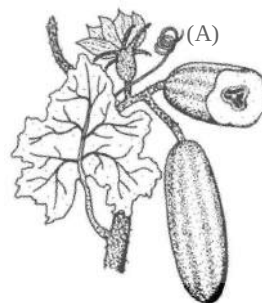


B



C

- (a) A–Herb; B–Shrub; C–Tree  
 (b) A–Shrub; B–Herb; C–Tree  
 (c) A–Tree; B–Herb; C–Shrub  
 (d) None of these
4. The part marked 'A' in the figure of cucumber plant is called



- (a) prop root (b) tendrils  
 (c) climber (d) petiole

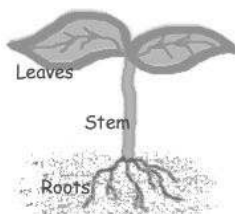
5. Look at the following pictures of plants. Can you categorize them into their group.



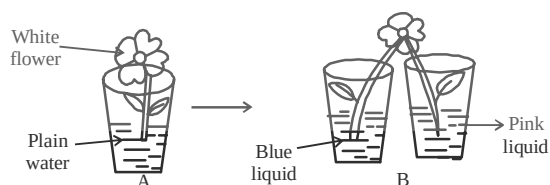
- (a) Shrub                      Tree                      Herb  
 (b) Herb                      Tree                      Shrub  
 (c) Herb                      Shrub                      Tree  
 (d) Shrub                      Herb                      Tree
6. Identify the plant that is similar to the one shown in picture.



- (a) Strawberry                      (b) Grapevine  
 (c) Marigold                      (d) Maize
7. Paheli conducted the following experiment. She observed thin lines in the stem and leaves. What can be concluded from this experiment?



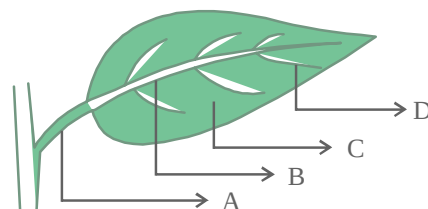
- (a) The leaves conduct water downwards.  
 (b) There is red pigment in leaves.  
 (c) There are thin tubes present in stem through which water is conducted upwards.  
 (d) The stem conducts to other parts of the plant.
8. Study the following set up done by Paheli. What will she observe?



- (a) The flower will remain white in B  
 (b) The flower will turn pink in B

- (c) The flower will remain blue in B  
 (d) The flower will remain half pink and half blue in B

9. Label the part A–D in the following figure.



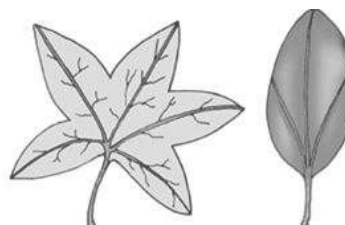
- B
- | A           | B      | C      | D       |
|-------------|--------|--------|---------|
| (a) Stalk   | Vein   | Lamina | Midrib  |
| (b) Petiole | Midrib | Lamina | Vein    |
| (c) Petal   | Vein   | Blade  | Petiole |
| (d) Petiole | Time   | Midrib | Vein    |

10. What is this technique rubbing a pencil tip sideways on a paper with a leaf below it known as.



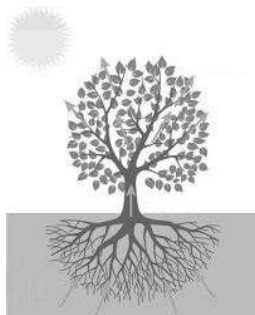
- (a) Painting                      (b) Shading  
 (c) Impression                      (d) Drawing

11. Look at the two leaves shown below. Identify the characteristic feature of both the leaves.



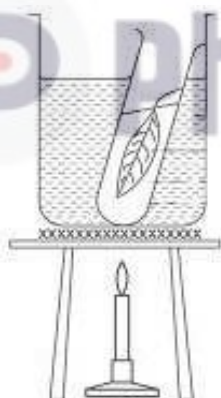
- (a) They have different edges  
 (b) They have different venation  
 (c) They have same venation  
 (d) They have same kind of roots

12. Look at the following experimental set up?



What could be the aim of this experiment?

- (a) To study respiration in plants  
 (b) To study photosynthesis in plants  
 (c) To test for the presence of starch  
 (d) To study transpiration in plants
13. Study the following experimental set-up to test the presence of starch.



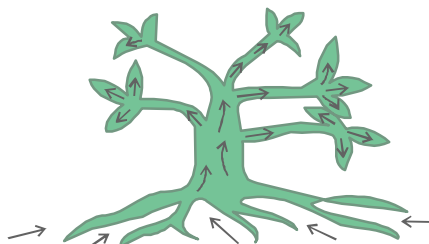
- (a) Boiling water (b) Spirit  
 (c) Iodine solution (d) Red dye
14. Look at the way Paheli and Boojho are watering their plants. Who is right and why?



- (a) Boojho because leaves need water to make food

- (b) Paheli because roots are getting water.  
 (c) Paheli because she is giving water to pot  
 (d) Boojho because he is cleaning the leaves

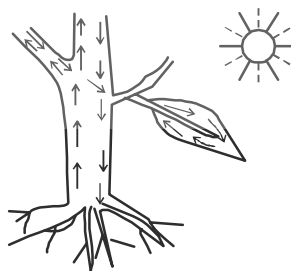
15. Which of the following substances are transported by the arrows shown in given plant?



- (i) Oxygen (ii) Minerals  
 (iii) Water (iv) Carbon dioxide  
 (v) Sugar
- (a) (i), (iii) and (iv) (b) (ii), (v)  
 (c) (ii) and (iii) (d) (i), (ii), and (v)
16. Which of the following statements are true for the root system shown in the given figure.

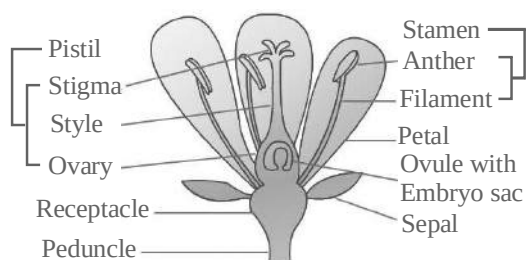


- (i) It is fibrous root system  
 (ii) It is tap root system  
 (iii) The branches that arise from main root are called lateral roots.  
 (iv) Leaves have parallel venation  
 (v) Eg. pea, carrot, tulsi.
- (a) (i), (iii), (v) (b) (ii), (iii), (v)  
 (c) (i), (iv) (d) (ii), (iii), (iv)
17. Look at the following figure and choose the correct statement.



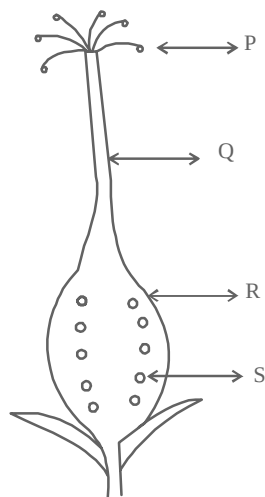
- (a) Stem is a one-way street.
- (b) Carbon dioxide moves in the plant
- (c) Water and minerals move bothways
- (d) Stem is a two-way street.

18. Which of the following represents P, Q and R in the figure.



- | X            | Y      | Z     |
|--------------|--------|-------|
| (a) Filament | Stigma | Ovule |
| (b) Style    | Stigma | Ovary |
| (c) Style    | Anther | Ovary |
| (d) Filament | Anther | Ovule |

19. Identify P, Q, R and S in following figure



- | P           | Q        | R        | S      |
|-------------|----------|----------|--------|
| (a) Anthers | Filament | Stigma   | Ovary  |
| (b) Sepal   | Style    | Thalamus | Ovules |
| (c) Style   | Stigma   | Ovules   | Ovary  |
| (d) Stigma  | Style    | Ovary    | Ovules |

### Matching Based Questions

**DIRECTIONS :** Match Columns I and II and select the correct answer using the code given below the columns.

- | 1.  | Column I            | Column II                     |
|-----|---------------------|-------------------------------|
| (A) | Herbs               | (p) Hard, thick, tall stem    |
| (B) | Shrubs              | (q) Green, short, tender stem |
| (C) | Trees               | (r) Hard, not so thick stem   |
| (a) | A → r; B → p; C → q |                               |
| (b) | A → q; B → r; C → p |                               |
| (c) | A → q; B → r; C → r |                               |
| (d) | A → p; B → q; C → r |                               |
- 
- | 2.  | Column I            | Column II      |
|-----|---------------------|----------------|
| (A) | Herbs               | (p) Strawberry |
| (B) | Climber             | (q) Mint       |
| (C) | Creeping            | (r) Gourd      |
| (a) | A → r; B → p; C → q |                |
| (b) | A → p; B → q; C → r |                |
| (c) | A → q; B → r; C → p |                |
| (d) | A → q; B → p; C → r |                |
- 
- | 3.  | Column I            | Column II |
|-----|---------------------|-----------|
| (A) | Banana              | (p) Tree  |
| (B) | Gulmohar            | (q) Shrub |
| (C) | Lemon               | (r) Herb  |
| (a) | A → q; B → r; C → p |           |
| (b) | A → p; B → q; C → r |           |
| (c) | A → q; B → p; C → r |           |
| (d) | A → r; B → p; C → q |           |
- 
- | 4.  | Column I                   | Column II                  |
|-----|----------------------------|----------------------------|
| (A) | Creeping                   | (p) Needs support          |
| (B) | Climber                    | (q) Branches near the base |
| (C) | Herb                       | (r) Ground/spread on       |
| (D) | Shrub                      | (s) Less than 1 m          |
| (a) | A → q; B → r; C → p; D → s |                            |
| (b) | A → p; B → r; C → q; D → s |                            |
| (c) | A → r; B → p; C → s; D → q |                            |
| (d) | A → s; B → q; C → p; D → r |                            |

5. **Column I** **Column II**
- |            |                                   |
|------------|-----------------------------------|
| (A) Stem   | (p) Reproduction                  |
| (B) Root   | (q) Photosynthesis                |
| (C) Leaf   | (r) Anchors plant in soil         |
| (D) Flower | (s) Conduction of water and food. |
- (a) A → r; B → s; C → q; D → p  
 (b) A → s; B → r; C → q; D → p  
 (c) A → q; B → r; C → p; D → s  
 (d) A → p; B → s; C → q; D → s
6. **Column I** **Column II**
- |                          |              |
|--------------------------|--------------|
| (A) Tap, fibrous         | (p) Flowers  |
| (B) Parallel, reticulate | (q) Root     |
| (C) Bisexual, unisexual  | (r) Venation |
- (a) A → q; B → p; C → r  
 (b) A → q; B → r; C → p  
 (c) A → r; B → p; C → q  
 (d) A → p; B → q; C → r
7. **Column I** **Column II**
- |                    |                            |
|--------------------|----------------------------|
| (A) Transpiration  | (p) Producing new plants   |
| (B) Photosynthesis | (q) Arrangement of veins   |
| (C) Venation       | (r) Prepare food for plant |
| (D) Reproduction   | (s) Loss of excess water   |
- (a) A → r; B → p; C → s; D → q  
 (b) A → p; B → s; C → r; D → q  
 (c) A → s; B → r; C → q; D → p  
 (d) A → q; B → r; C → p; D → s
8. **Column I** **Column II**
- |            |                             |
|------------|-----------------------------|
| (A) Leaf   | (p) Sepals, stamens, pistil |
| (B) Flower | (q) Tap root, lateral root  |
| (C) Root   | (r) Petiole, midrib         |
- (a) A → r; B → p; C → q  
 (b) A → q; B → p; C → r  
 (c) A → p; B → q; C → r  
 (d) A → r; B → q; C → p
9. **Column I** **Column II**
- |            |                              |
|------------|------------------------------|
| (A) Sepals | (p) Brightly coloured        |
| (B) Petal  | (q) Male reproductive part   |
| (C) Stamen | (r) Green, leaf like         |
| (D) Pistil | (s) Female reproductive part |
- (a) A → r; B → p; C → s; D → q  
 (b) A → q; B → p; C → p; D → s  
 (c) A → r; B → p; C → q; D → s  
 (d) A → q; B → r; C → s; D → p
10. **Column I** **Column II**
- |              |                                               |
|--------------|-----------------------------------------------|
| (A) Ovary    | (p) Knob like structures on stamen            |
| (B) Style    | (q) Small, bead like structure                |
| (C) Filament | (r) Connecting stalk between ovary and stigma |
| (D) Anther   | (s) Slender stalk of stamen                   |
| (E) Ovule    | (t) Swollen part of pistil                    |
- (a) A → q; B → s; C → r; D → q; E → t  
 (b) A → t; B → r; C → s; D → p; E → q  
 (c) A → t; B → s; C → r; D → q; E → p  
 (d) A → q; B → r; C → s; D → p; E → t
11. **Column I** **Column II**
- |            |                                                                  |
|------------|------------------------------------------------------------------|
| (A) Ovary  | (p) The slender, elongated portion of pistil                     |
| (B) Ovule  | (q) The upper two lobed part of a plant stamen                   |
| (C) Anther | (r) Enlarged basal portion of pistil                             |
| (D) Style  | (s) An oval body in ovary of a flower which develops into a seed |
- (a) A → (p); B → (q); C → (r); D → (s)  
 (b) A → (r); B → (s); C → (p); D → (q)  
 (c) A → (r); B → (s); C → (q); D → (p)  
 (d) A → (p); B → (s); C → (r); D → (q)



**12. Column I**

(A) Stamens

(B) Filament

(C) Pistil

(D) Stigma

**Column II**

(p) The portion of the pistil receiving the pollen

(q) The female structure of a flower

(r) The stalk of an anther

(s) It is an inner part of a flower

(a) A→(s); B→(r); C→(q); D→(p)

(b) A→(s); B→(q); C→(r); D→(p)

(c) A→(r); B→(s); C→(p); D→(q)

(d) A→(q); B→(r); C→(s); D→(p)

**13. Column I**

(A) Tap root

(B) Fibrous roots

(C) Stem

(D) Petiole

**Column II**

(p) The part of leaf

(q) The main root of plants with reticulate venation

(r) Found in plants with parallel venation

(s) Conducts water

(a) A → (p); B → (q); C → (r); D → (s)

(b) A → (q); B → (r); C → (s); D → (p)

(c) A → (r); B → (s); C → (p); D → (q)

(d) A → (s); B → (p); C → (q); D → (r)

(c) Both of the above

(d) None of these

**3. Veins of a leaf can be seen on**

(a) lamina of leaf

(b) petiole of leaf

(c) both on petiole and lamina of leaf

(d) All of the above are correct

**Passage II**

Various parts of a plant are stem, branches, roots, leaves, flowers and fruits. Plants are classified on the basis of differences in their heights, stems and branches. Branches grow in some plants close to the ground and in some plants higher up on the stems.

**4. On the basis of height and other characteristics a Neem plant is classified as**

(a) herb

(b) shrub

(c) tree

(d) Any of these

**5. Select the one in which the branches appear higher up on the stem.**

(a) Brinjal

(b) Wheat

(c) Mango

(d) None of these

**6. A plant has green and tender stem. The plant is most likely to belong to which category?**

(a) Herb

(b) Shrub

(c) Tree

(d) Can't predict

**Passage III**

To see the inner parts of the flower clearly, you have to cut it open, if its petals are joined, *e.g.*, In *Datura* and other bell shaped flowers, the petals have to be cut lengthwise so that inner parts can be seen clearly.

**7. Which one of the following is the innermost part of a flower and also the female structure of a flower?**

(a) Anther

(b) Ovary

(c) Pistil

(d) None of these

**8. You are given a bell shaped flower and you are asked to cut the flower in such a way that its inner parts can be seen clearly. You will**

(a) cut the petals lengthwise

(b) cut the petals lengthwise and spread out

(c) cut it open if its petals are joined

(d) All of the above

**Passage Based Questions**

**DIRECTIONS :** Read the passage (s) given below and answer the questions that follow.

**Passage I**

If you look at a leaf carefully you can easily see some lines on the leaf. These lines are called veins. In some cases you can see a thick vein in the middle of the leaf. This vein is called midrib. The design made by veins is called the leaf venation.

- The pattern of veins of the leaf is called
  - leaf venation
  - reticulate venation
  - parallel venation
  - All of the above
- Parallel venation can be seen in
  - leaves of grass
  - leaves of Peepal tree

9. The flowers in a *Datura* plant
- (a) are bell shaped
  - (b) the petals of *Datura* flower are to be cut lengthwise and spread to see its inner part clearly
  - (c) Both the above are correct
  - (d) None of the above
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as “Assertion A” and the other labelled as “Reason R”. You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.
1. **Assertion (A) :** Trees are plants which are very tall. They have a hard and thick brown stem.  
**Reason (R) :** Lamina is thin, flat, broad, green part of leaf.
2. **Assertion (A) :** The minerals dissolved in water move up in stem along with water.  
**Reason (R) :** The stem bears leaves, flowers and fruits.
3. **Assertion (A) :** Plants release a lot of water into the air through the process of transpiration.  
**Reason (R) :** The water is released through the leaves in the form of water vapour.
4. **Assertion (A) :** The parts of a typical flower are sepals and petals only.  
**Reason (R) :** The parts of stamen are filament and anther.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- Petiole
- Complete
- Colourful
- Pistil
- Stamens
- Lemon
- Stomata
- Androecium
- Petiole and a Lamina
- Venation

### True/False

- |           |          |           |           |
|-----------|----------|-----------|-----------|
| 1. True   | 2. True  | 3. False  | 4. True   |
| 5. False  | 6. False | 7. True   | 8. True   |
| 9. True   | 10. True | 11. True  | 12. False |
| 13. True  | 14. True | 15. True  | 16. True  |
| 17. False | 18. True | 19. False | 20. False |

### Match the Column

- | Column I            | Column II                |
|---------------------|--------------------------|
| (A) Tap root        | (r) Gram and mustard     |
| (B) Fibrous root    | (p) Wheat & maize plant  |
| (C) Joined sepals   | (q) Datura and gourd     |
| (D) Separate sepals | (u) Mustard & China rose |
| (E) Corolla         | (s) Petals               |
| (F) Stamens         | (w) Anthers              |
| (G) Banyan tree     | (t) Aerial roots         |
| (H) Transpiration   | (x) Stomata              |
| (I) Pistil          | (y) Ovary                |
| (J) Calyx           | (v) Sepals               |

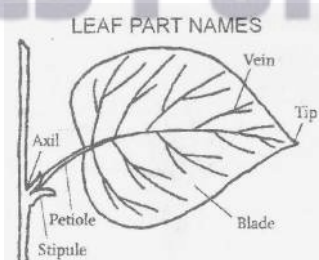
### Very Short Answer Type Questions

- Pistil is female part of a flower.
- It is central most part of flower that consists stigma, style and ovary.

- They safeguard inner parts in bud stage.
- Yes, in cactus plant.
- Carrot, radish.
- Tap root.
- Grape, Biogainvilia.
- Wheat and maize.
- Transpiration.
- Bract part of leaf is called lamina.
- Leaf.
- Oxygen.
- Fibrous root.

### Short Answer Type Questions

- A plant with tap root system has reticulate venation while a plant with fibrous roots have parallel venation.



- Reticulate venation
  - Parallel venation
- Sweet potato is a modified root, meant for the storage of food material.
- Arrangement of veins on the lamina of leaf is called venation. They are of two types :
  - The stem carries water and mineral from the roots to the different parts of the plant.
  - The stem provides support to the branches, leaves, flowers and fruits.
- Herbs are comparatively smaller plants, have green stem whereas shrubs have distinct and harder stem with branching from near the ground.
- There are two parts of leaf :  
Petiole is the part of the leaf or small stalk by which the leaf is attached to the stem.

Lamina is the flat, thin and broad part with conspicuous system of veins and veinlets.

8. Three types of plants are :  
1. Herbs. 2. Shrubs 3. Trees
9. Plants are classified into herbs, shrubs, trees, climbers, and creepers on the basis of their height, type of stems and the mode of branching.
10. The basic parts of a flower are sepals, petals, stamens and pistil.
11. Yes, she is correct. Rose is categorised as a shrub because it displays the following characteristics:
  - These are medium – sized plants with least thickness and height
  - It has woody stem
  - These are generally bushy
  - Branches are slightly above the ground
  - These of rose are generally used for ornamental purposes.

| Creepers |                                                                                                           | Climbers |                                                                        |
|----------|-----------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------|
| (i)      | Stem is thin, delicate, weak and unable to stand erect.                                                   | (i)      | Stem is long, flexible and go up entwined around the support.          |
| (ii)     | May grow prostrate on ground or may get buried in the top soil.<br><b>Examples :</b> Pumpkin, grass, etc. | (ii)     | Take support of the nearby objects to climb.<br><b>Examples :</b> Pea. |

13. Roots perform following functions in the plant:
  - (a) Roots absorb water and minerals from the soil.
  - (b) Roots hold the plants to the soil.
  - (c) Roots store food.
14. Life is not possible without plants. We should save plants. Plants give us oxygen which is essential for life. They provide us raw materials for various purposes. They are the house of many birds and animals.
15. Plants are characterised into three types on the basis of several features. One of the features is "Type of stem":
 

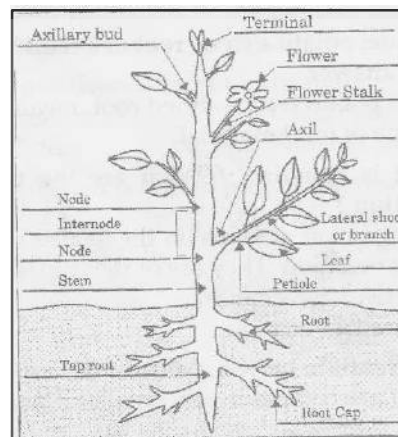
**Trees :** They are tall, have hard, thick and woody stems.

**Shrubs :** They are of medium height, have hard and woody stems.

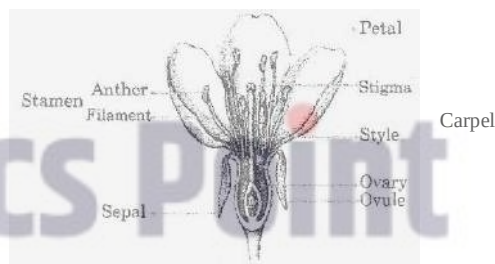
**Herbs :** They are short and have tender, green and short stems.

### Long Answer Type Questions

1.



2.



3. A leaf is a thin expanded outgrowth arising from the node of a stem. The part of a leaf by which it is attached to the stem is called a petiole. The broad green part of the leaf is called lamina. The lines on the leaf are called veins. The thick vein in the middle of the leaf is called the midrib. The design made by the veins on the leaf is called venation. If the design is net like, it is termed as reticulate venation whereas if the veins are parallel to each other, it is termed as parallel venation.
4. Characteristics of plants are :
  - (i) They cannot move from one place to another.
  - (ii) They can prepare their own food.
  - (iii) These are the living organisms on the earth which are responsible for the formation of food for all the living forms directly or indirectly.
  - (iv) All other organisms on the earth depend on the plants and their products for their survival.
  - (v) These living things grow in the soil from where they take nutrients for their growth and propagation.

## 2 EXERCISE

### Text Book Questions

- Roots absorb water and minerals from the soil.
  - Stem holds the plant upright.
  - Stem conducts water to the leaves.
  - The number of petals and sepals in a flower may be different in different plants.
  - If the sepals of a flower are joined together, its petals may or may not be joined together.
  - If the petals of a flower are joined together, then the pistil may or may not be joined to the petal.

- 

(b)



(c)

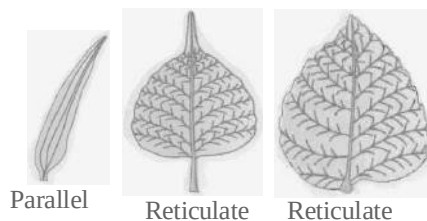


- The money plant that is categorised under the category of climbers.
- The function of a stem is as follows:
  - It conduct water and minerals to different parts of a plant from roots.
  - It provide support to the different parts of the plant.
- Tulsi, coriander (dhania) and China rose have reticulate venation.

- Parallel venation
- Tap root
- Yes. Leaves can be recognised by looking at the type of roots the plant has. If the plant roots are fibrous, then the leaves will have parallel venation and if the plant has tap root, the leaves will have reticulate venation.
- A flower contains Petals, Sepals, Stamens and Pistils.
- All the given plants bears flowers but in *tulsi*, *peepal* and *sugarcane* they are not visible.
- By the process of photosynthesis leaves produce the food.
- Pistil
- Periwinkle and Hibiscus are with joined sepals.
  - Rose and Magnolia are with separated sepals.

### NCERT Exemplar Questions

- (a) sepals (b) ovary, ovules (c) filament, anther (d) bud
- (a) – (iii); (b) – (i); (c) – (iv); (d) – (ii)
- He did not boil the leaf in spirit to remove the chlorophyll.
- No, all the starch stored in the leaf would have been used up by the plant. No starch would be synthesised due to non-availability of sunlight.
- Yes, as two-way traffic water and minerals are moving in opposite directions. Water and minerals move upwards and food moves downwards.
- |            |          |
|------------|----------|
| (a) Root   | (b) Leaf |
| (c) Flower | (d) Stem |



- (a) Petiole, (b) Midrib, (c) Lamina, (d) Vein
  - Reticulate venation
  - Parallel venation

9. (i) Transpiration  
(ii) On a bright sunny day.  
(iii) Small drops of water inside the polythene cover  
(iv) The set-up must be airtight, polythene bag must be dry and the twig must be fresh with 10-12 leaves.
10. Identify the wrong statements and correct them.  
(i) Wrong- Anther is a part of the stamen.  
(ii) Wrong- The visible parts of a bud are the sepals.  
(iii) Correct  
(iv) Wrong- Leaves also perform photosynthesis.
11. **Across**  
1. conduction                      3. petiole  
5. anther
- Down**  
1. creepers                      2. ovary  
4. lamina
11. (a) Tomato plant has a tender stem.  
12. (d) Water goes to leaves and other plant parts attached to the stem. (Leaves are attached to the stem).  
13. (a)  
14. (b) The lines on the broad green part of leaf are called veins.  
15. (b) Due to capillary action blue water rises and reaches up to flower.  
16. (c) Plants release a lot of water into the air by *transpiration*. The water is released through leaves in the form of water vapours.  
17. (a) The food produced in the leaves is in the form of starch.  
18. (a)  
19. (c) The plants having leaves with parallel venation have fibrous roots.  
20. (d) The roots of all these plants store food for future use.  
21. (d)  
22. (c) Pistil is the female structure of a flower. It is the innermost part of the flower.  
23. (d) Pistil consists of ovary, style and stigma.  
24. (c) In leaves of grass, we find parallel venation.  
25. (c)      26. (b)  
27. (a) Different flowers have petals of different colours.  
28. (c) Small beads like structures inside the ovary of a flower are called **ovules**.  
29. (d)      30. (a)      31. (b)      32. (c)  
33. (c)      34. (a)      35. (b)  
36. (c) Beetroot is an underground root whereas potato and carrot are underground stem.  
37. (c)  
38. (a) The food is prepared in leaves of plants and it travels through the stem and is stored in different parts of plant.  
39. (b)      40. (b)      41. (d)      42. (c)  
43. (a) Except (a), all others are incorrect.  
44. (b) These are characteristics of sepals.  
45. (a) It is called petiole and not lamina the part of leaf attached to stem. Herbs have green, tender stem  
46. (a) Nitrogen is not absorbed in photosynthesis. More over roots anchor the plant.

### HOTS Questions

1. Rahul will be able to pull out a grass plant more easily because it has fibrous root which does not go down much deep in soil.  
2. No, it is not a herb because sapling is a stage in growth of the plant. A mango sapling would grow into a tree.

## 3 EXERCISE

### Multiple Choice Questions

1. (a) It is a herb. It is of a short height.  
2. (a)  
3. (c) It is a tree. It is very tall.  
4. (c) It is a creeper.  
5. (b)  
6. (c) In both cases (i.e. gourd and cucurbita plants), the stem is very weak and needs support.  
7. (d) These are called stem tendrils.  
8. (b) In a mango tree branches appear, higher up on the stem.  
9. (b) It is a shrub. It is taller and has a hard stem.  
10. (a) The stem of tomato plant is green.



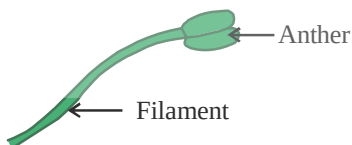
47. (b) Roots (not stem) absorb water find minerals from the soil. Stem conducts food from leaves (not roots) to other parts of plant.
48. (c)
49. (b) Tulsi plants have green, small and tender stems.
50. (c) These have hard stems with branches near the base.
51. (d)
52. (d) Both these plants cannot stand on their own and take of neighbouring structures.
53. (d) Eg. Strawberry
54. (c) Stem conducts water upwards
55. (c) Petiole is the part by which a leaf is attached to the stem.
56. (c)
57. (b)



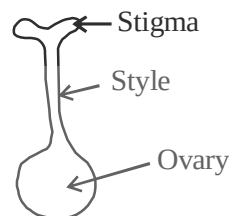
58. (d) Midrib in the middle vein



59. (d) Look at the network of veins.
60. (c)
61. (c) Leaf prepare food, get rid of extra water and take in gases.
62. (b)
63. (b)
64. (b)
65. (d) All other have fibrous root
66. (c) The roots grow from the base of stem.
67. (c) Some roots like carrot, beetroot and turnip store food.
68. (b) Sepals protect the flower in bud stage
69. (b)



70. (c)
71. (c)



72. (c)
73. (a) Pollen are powdery substances that help in reproduction in flower.

### Statement Based Questions

- (a) The parts of a plant are different in each plants. They vary in their structure and function. Some have many parts while some lack there parts.
- (b)
- (b)
- (d) Creepers spread on ground and climbers need additional support to stand.
- (b)
- (d) Some leaves are red, yellow, white and purple in colour. The flat green part of leaf is called lamina.
- (b) Arrangement of veins is called venation.
- (a) Leave release extra water in the form of water vapour.
- (a) Boiling leaf in spirit will remove green colour from the leaf.
- (d) Starch is the end product of photosynthesis.
- (b)
- (c)
- (a) Plants with reticulate venation have tap root system.
- (c)
- (c)

### Figure/Diagram Based Questions

- (b) It correctly represents various parts.
- (d) Since roots of plant 'B' were cut before planting it (Fig. 2), it failed to absorb water from soil.
- (a) It is the correct labelling.

4. (b) It is a tendril.

[**Note :** In climbing plants, it refers to slender, elongated structure which serves as an organ of attachment; may be modified stem, leaf or stipule.

5. (d) Look at their stems. P has hard woody stem with branches arising from the base. Q has green tender stem white R has thick, woody stem with branches at the top.
6. (b) Grapevine is a climber.
7. (c) The stem conducts water and minerals upwards to other parts of the plant.
8. (d) Since half stem is dipped in pink liquid and half in blue liquid, the flowers will also show both the colours.
9. (b)
10. (c) This is taking an impression of a leaf.
11. (b) 'P' has reticulate venation and 'Q' has parallel venation.
12. (d) Leaves give out extra water in the form of water vapour. This is called transpiration.
13. (c) Iodine will turn blue black in the presence of starch.
14. (b) Roots need water as they transport water upward to stem and then water reaches leaves.
15. (c) Water and minerals salts are absorbed by roots and transported upwards into stem and leaves.
16. (b)      17. (d)      18. (c)      19. (d)

### Matching Based Questions

- |         |         |         |         |
|---------|---------|---------|---------|
| 1. (b)  | 2. (c)  | 3. (d)  | 4. (c)  |
| 5. (b)  | 6. (b)  | 7. (c)  | 8. (a)  |
| 9. (c)  | 10. (b) | 11. (c) | 12. (a) |
| 13. (b) |         |         |         |

### Passage Based Questions

- (a)
- (a) Parallel venation can be seen in leaves of grass.
- (a) Veins can be seen on lamina.
- (c) It is quite tall and classified as tree.
- (c) In a mango tree the branches appear, higher up on the stem.
- (a) These are characteristics of stem of a herb.
- (c) Pistil is the female structure of the flower and is the innermost part of flower. It consists of ovary, style and stigma.
- (b) Cut the petals lengthwise and spread out so that inner parts can be seen clearly.
- (c) Both (a) and (b) are correct.

### Assertion/Reason

- (b) Both A and R correct but R is not correct explanation of A.
- (b)
- (b)
- (d) A is false, R is true.

[**Note :** The parts of a typical flower are sepals, petals, stamen and pistil.]

## Chapter

# 8

# BODY MOVEMENTS

## INTRODUCTION

Living things differ from non-living things in that living things show movements of their body parts. Even when we are at rest our body shows some movements like blinking of eyes. Animals move from one place to another. For this purpose they show various kinds of movements like walking, running, flying, creeping, slithering, crawling, etc.

**Movements:** A change in the position of any object is called movement. Many movements take place in our body and also in other organisms' body.

**Locomotion:** When movement results in change of position of the whole organism, it is called locomotion.

*Examples of Movements in the Human Body:*

- (a) Movement of eyelids.
- (b) Movement of the heart muscles.
- (c) Movement of teeth and jaw.
- (d) Movement of arms and legs.
- (e) Movements of head.
- (f) Movements of neck.

Movement of some organs happens because of the teamwork of bones and muscles. In such cases, movement is possible along a point where two or more bones meet.

**Human body movements :** Humans can move their various body parts in different ways. We can move some parts of our body in different directions and some body parts can be moved only in one direction. Our body is made up of a framework of bones called skeleton.

1. Bones are made of hard substance.
2. Cartilages are soft and elastic.
3. In the bone marrow, red blood cells are produced.
4. Bones are of many shapes and sizes. Some are flat, some are cylindrical and some are spherical.
5. The longest bone of our body is femur and the smallest bone is found in our internal ears.
6. Cartilages are found in our nose and external ears.
7. Skeleton system extends from the top of our head to the tip of the toes.



Human skeleton

**Functions of skeleton:**

1. The skeleton gives shape to our body.
2. Skeleton protects many delicate internal organs.
3. Skeleton provides numerous points for attachment of muscles.

Bones are held together by strands of tissues called ligaments. Points where two bones join are called joints. There are 206 bones in a human body.

#### DESCRIPTION OF SKELETON

- (a) **Skull :** The bony part of head is called skull. The skull is made up of 22 bones joined together. These bones are not movable except the lower jaw bone. It has two parts; the cranium or the brain box and the facial bones. The cranium covers and protects the brain. The facial bones form the upper and lower jaws and some other bones. The eye sockets are also part of skull.

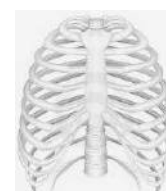


Skull

- (b) **Ribcage :** Ribs are curved bones in the body. There are 12 pairs of ribs. The ribs are curiously bent. They join the chest bone and the backbone together to form a box. This is called a ribcage.

Ribcage protects the internal organs of the body like heart, lungs. Cartilage attaches 10 of them to the breast bone at the front.

Two ribs are free and are called floating ribs. The ribs allow certain kind of movement of the chest during breathing.

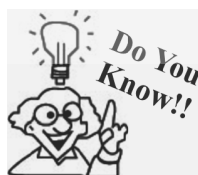


Ribcage

- (c) **Shoulder bone or Pectoral girdle :** The shoulder bone is formed by the collar bone and the shoulder blade. It is attached to the upper part of the ribcage and to the upper arm bone.



Shoulder bone

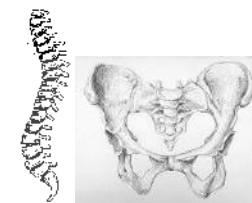



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*The longest bone is the femur or thigh bone, which forms 1/4 of the body height. The shortest bone is the stirrup in the ear.*

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- (d) **Backbone** : The backbone is a long hollow, rod like structure running from the neck to the hips. Backbone is made up of 33 small bones placed one over the other. These small bones are called vertebrae. It provides support to the body and protects spinal cord.
- (e) **Pelvic bones** : The pelvic bones form a large, basin shaped frame at the lower end of the backbone, to which legs are attached. The pelvic bones encloses the portion of our body below the stomach. It is formed by the fusion of three bones, the hip bones and the tail parts of the backbone; to form a large bony bowl. The thigh bones are attached to the hip bone.



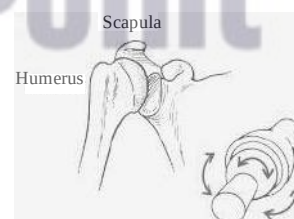
Backbone Hipbone

| Parts of Hand | Part of Leg | No. of Bones               |
|---------------|-------------|----------------------------|
| Upper arm     | Thigh       | One long bone              |
| Fore arm      | Lower leg   | Two long bones             |
| Wrist         | Ankle       | Several small bones        |
| Palm          | Foot        | Five bones                 |
| Fingers       | Toe         | Each has three small bones |

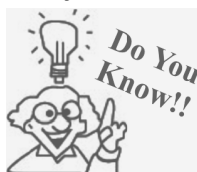
### BONE JOINTS

The places where two or more bones meet are called joints. There are various kinds of joints.

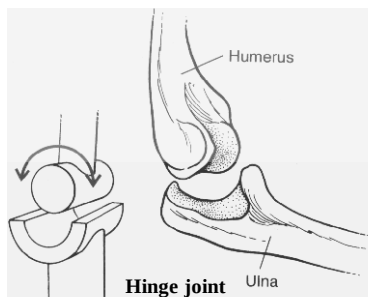
- (a) Ball and socket joint (b) Hinge joint  
(c) Pivot joint (d) Fixed joint.
- (a) **Ball and socket joint**: The rounded end of one bone fits into cavity (hollow space) of the other bone is called ball and socket joint. Such joints allow movements in all directions. Ex. shoulder joints, hip joints.
- (b) **Hinge joint**: A hinge joints allow the movements of bones only in one direction. Forwards and backwards. Ex. elbow and knee joints. The movement by this joint is not more than 180 degrees. The wrist has double hinge joint.



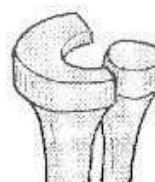
Ball and socket joint



- There are more than 350 joints in our body.
- The biggest joint is in the knee.
- The bendiest joint is in the shoulder.
- The tiniest joint is in the ear. It is smaller than letter 'a'.

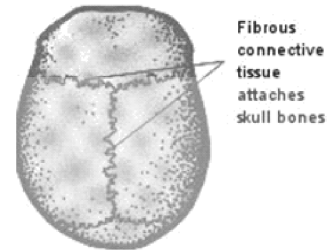


Hinge joint

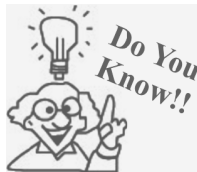


Pivot joint

- (c) **Pivot joint:** Such joints allow only rotation against one another. In it a cylindrical bone rotates in a ring. It allows us to bend our head forward and backward and turn the head to our right and left.
- (d) **Fixed joints:** In some joints, the bones are held so tightly together that they cannot move at all. Such joints are called fixed joints. E.g. joint between the skull and the upper jaw.



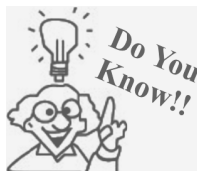
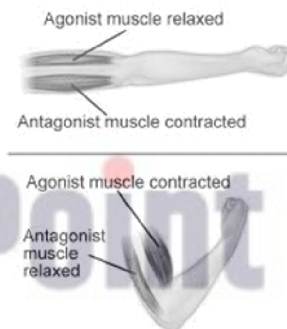
Fixed joints



*Many bones are curved like the skull bones because it makes them much stronger than if they were flat.*

## MUSCLES

Muscle is a fibrous tissue in the body which has ability to contract. When muscle contracts, it shortens and pulls the bone due to which the bone move at that joint. A muscle can only pull a bone it cannot push a bone. The muscles joined to our bones work in pairs. When one muscle of a pair contracts, then the other muscle of a pair is relaxed. A contracted muscle can come back to its original position only when the other muscle of the pair pulls it by contracting itself. Muscles are attached to the bones by fibres called tendons.



*The body's bendiest muscle is the one you use to talk, eat, drink and lick your lips. It's your tongue.*

The skeleton and muscles play an important role in the movement of animals. The skeleton is made of bones joined together by fibres called ligaments.

Before birth our skeleton is made up of cartilage and is soft.

Later these cartilages get changed to bones. Bones become hard because of deposits of calcium and phosphorus.

## LOCOMOTION

Animals differ from plants in that they show quick movements. Plants show slow movements. Most of the animals move from one place to another. However some animals like sponges, corals, sea anemones remain fixed at one place. They simply show body movements but no locomotion.

### Why animals move?

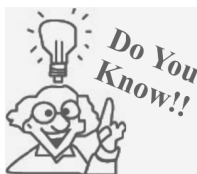
- Animals move in search of food.
- They move to escape from enemies and predators.
- To get better habitat.
- To find mate for reproduction.



**Gait of animals :** Different animals have different organs for locomotion.

**Earthworm:** The body of earthworm is made up of many rings joined end to end. It has muscles which help to extend and shorten the body. Under its body it has large number of bristles which are connected with muscles. This bristles help to get grip on the ground.

During movement, the earthworm first extends the front part of body, keeping the rear portion fixed to the ground. Then it fixes the front end and release the rear end. It then shortens the body and pull the rear end forward. This makes it forward by small distances. Repeating such muscle contraction and relaxations , the earthworm can move through soil. Its body secrete a slimy substance to help movement.



*Animals without Bones : All animals do not have bones. Bones are present in animals with backbones that is vertebrates.*

1. *Sharks have backbone but their bodies do not have any bones. Its body is made up of cartilages.*
2. *Crabs, insects and spiders also do not have bones. Their bodies are covered and protected by hard coverings.*
3. *Jelly fishes, leeches and worms have neither bones nor hard structures.*
4. *Hard coverings of crabs and insects are known as exoskeleton.*
5. *Molluscs have exoskeleton that is made up of calcium.*

**Snail :** The body of snail is covered with a hard and inflexible shell. It has an opening with a lid. The snail drags the shell while moving. The head comes out through the opening in the shell. The snail has muscular foot which helps in locomotion. The muscular foot is made up of strong muscles. The foot is attached to the belly and it produces slow wavy movements. Hence a snail moves slowly.



Snail

**Cockroach :** A cockroach has three pairs of jointed legs, which help it to walk, run and climb. It also has two pairs of wings for flying. Large and strong muscles help in the movement of legs. The body is covered by chitin, a light protective material. Chitin is shed regularly so that the body can grow.



Cockroach

**Birds :** Birds can walk on the ground and fly as well. Some birds can also swim in the water.

A bird has streamlined body. Its bones are light and strong. They are hollow and have air spaces between them. The hind limbs of birds are modified as claws, which help it to walk and to perch. The breast bones are modified to hold massive flight muscles which help in moving wings up and down.

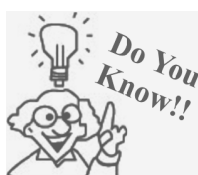
Birds have special flight muscles and the forelimbs are modified as wings. The wings and tail have long feathers, which help in flying. Birds show two types of flight; gliding and flapping.



Birds are flying

1. **Gliding :** during gliding the bird has its wings and tail spread out. In this movement the bird uses air currents for going up and down.
2. **Flapping :** this is an active flight. The bird beats the air by flapping its wings. They use flight feathers for this purpose.

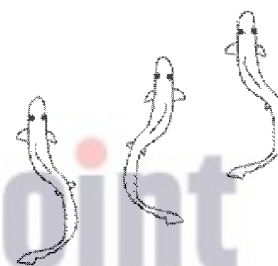
**Snake :** The body of snake consists of a large number of vertebrae. The adjoining vertebrae, ribs and skin are interconnected with slender body muscles. When the snake moves, it makes many loops on its sides. The forward push of the loops against the surface makes the snake move forward. Movement of snake is called slithering movement. Many snakes can swim in water also.



*Both the squid and octopus move via jet propulsion.*



**Fish :** Fish swims with the help of fins. They have two paired fins and an unpaired fin. The body of a fish is streamlined to reduce friction; while moving in water. They have strong muscles, which help in swimming. When a fish swims; its front part curves to one side and the tail part stays in the opposite direction. In the next move, the front part curves to the opposite side and the tail part also changes its position to another side. The tail fin helps in changing direction.



Movement of fish

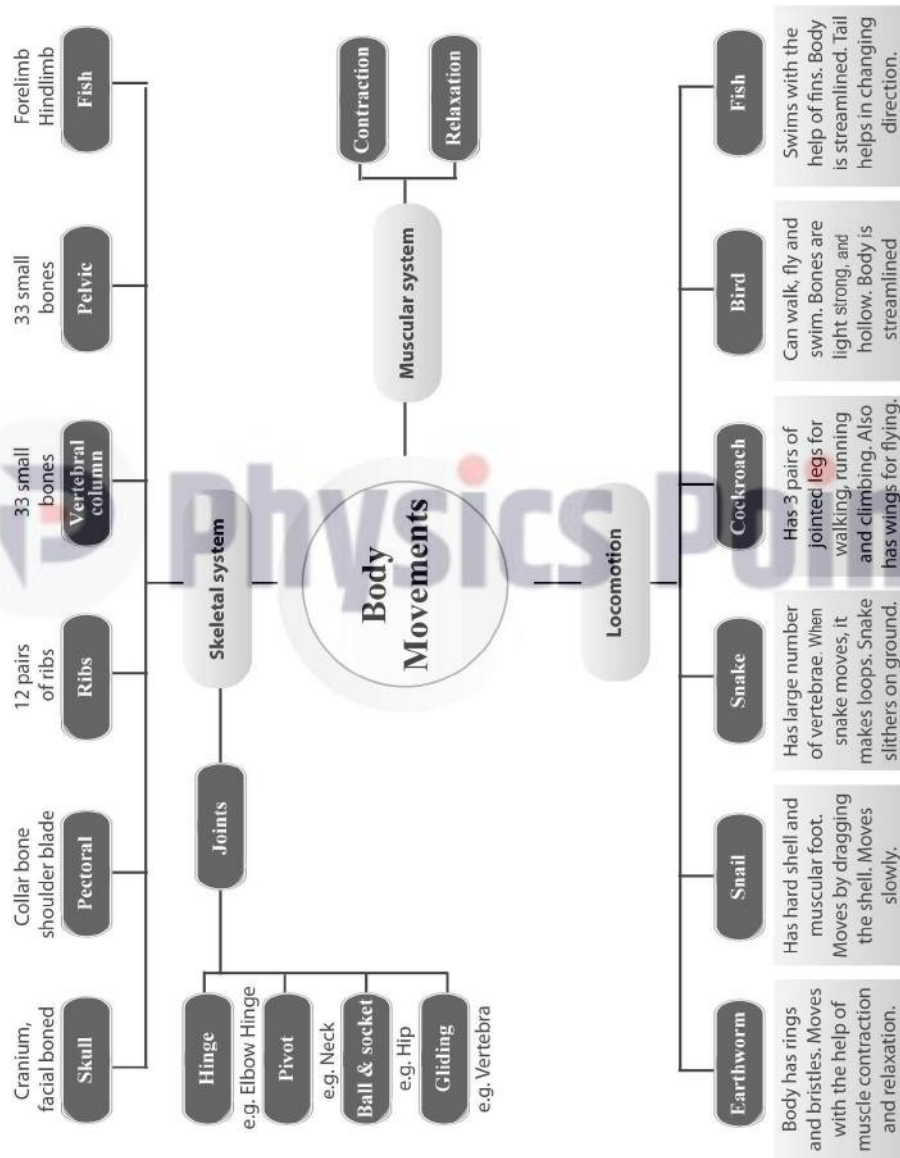


*Underwater divers wear fin like flippers on their feet to help them move easily in water.*

### KEY WORDS

- **Joint :** Place where two bones meet and articulate.
- **Skeleton :** Internal framework of bones in animals.
- **Movements :** A change in the position of any object is called movement.
- **Locomotion :** When movement results in change of position of the whole organism, it is called locomotion.
- **Cartilage :** Cartilages are soft and elastic fibres that make nose and external ears.
- **Tendon :** Muscles are attached to the bones by fibres called tendons.
- **Ligaments :** Bones are held together by strands of tissues called ligaments.

## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- ..... is a hinge joint in human body.
- ..... is a pivot joint in human body.
- ..... bones are there in a fully developed human body.
- ..... muscles are there in a human body.
- The place where two or more bones meet together is known as .....
- ..... is the part of the skeleton that is not as hard as bones.
- The part of skeleton system which is covered by soft tissue is .....
- ..... pair of ribs are there in humans rib cage.
- Alternate contraction and relaxation of muscles helps in the ..... of bones.
- ..... slithers on ground by looping sideways.

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- Nails are the parts of exoskeletons.
- In a tissue all cells do different works.
- Skeleton is also present in our nose and ear.
- Movements in the body parts are due to muscles.
- A muscle pulls and pushes the bone.
- Rib cage provides safety to heart and lungs.
- Locomotion and movement in all animals are the same.
- Finger bones do not have joints.
- Cartilage is softer than bones.
- There are 201 bones in a fully developed human body.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched.

- | 1.  | Column I  | Column II                              |
|-----|-----------|----------------------------------------|
| (A) | Fish      | (p) protects heart.                    |
| (B) | Upper jaw | (q) have fins and streamlined body.    |
| (C) | Ribs      | (r) is an immovable joint.             |
| (D) | Snail     | (s) has exoskeleton and fast movement. |
| (E) | Cockroach | (t) has exoskeleton but can move slow. |

## Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

- What type of skeleton does a snail have?
- Identify the type of joint in the figure given below :



- Which one of the following animals has a streamlined body? Cockroach, Snake, Fish or Snail?
- What do you understand by the term "Gait of animals"?
- Which bones enclose by the term "Gait of animals"?
- Name the joint where bones cannot move.
- Name the joint where our neck joins the head.
- Which part of the skull encloses the brain?
- Are scales of fish endoskeleton or exoskeleton?

10. What modifications do birds have for flying?
11. What provides rigid surface for attachment of muscles?
12. Cartilage provides the shape to our body and also lubrication in movement. Is it true?
13. Why is our back bone not fixed?

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. What is a backbone?
2. How many types of joints are there in humans? Write their names?
3. Differentiate between bones and cartilage.
4. Explain the working of muscles.
5. What do you mean by endoskeleton?
6. How does a fish swim?
7. What is cartilage? Where do we find it?
8. What is a ball and socket joint?
9. Describe the way of movement in a snail.
10. What is a fixed joint? Give an example?
11. Describe the movement of earthworm in the soil.
12. What are setae? Define their role.

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. Describe the skeleton of a cockroach.
2. Describe the skeletal system. Write any two functions of it.
3. One day Arun and Raj were playing cricket in a field along with their classmates. Suddenly Raj fell down very badly while he was trying to take a catch. Seeing this Arun ran towards him and found that he was not able to lift his left hand. So Arun immediately cushioned his hand by his sweater and took him to a nearby doctor. After examining, Raj, the doctor told them that Raj has dislocated one of the bones at the joint and had a minor fracture in his left hand. But he consoled them that after proper treatment Raj will get well soon.
  - (i) Name the type of joints found in the human body?
  - (ii) What values are possessed by Arun?
  - (iii) What values are possessed by the doctor?

# 2

# EXERCISE

### Text Book Questions

1. Fill in the blanks.
  - (a) Joints of the bones help in the \_\_\_\_\_ of the body.
  - (b) A combination of bones and cartilages forms the \_\_\_\_\_ of the body.
  - (c) The bones at the elbow are joined by \_\_\_\_\_ joint.
  - (d) The contraction of the \_\_\_\_\_ pulls the bones during movement.
2. Indicate True (T) and False (F) among the following sentences.
  - (a) The movement and locomotion of all animals is exactly the same.
  - (b) The cartilages are harder than bones.
  - (c) The finger bones do not have joints.
  - (d) The fore arm has two bones.
  - (e) Cockroaches have an outer skeleton.
3. Match the items in Column I with one or more items of Column II.
 

| Column I      | Column II                    |
|---------------|------------------------------|
| (A) Upper jaw | (p) have fins on the body    |
| (B) Fish      | (q) has an outer skeleton    |
| (C) Ribs      | (r) can fly in the air       |
| (D) Snail     | (s) is an immovable joint    |
| (E) Cockroach | (t) protect the heart        |
|               | (u) shows very slow movement |
|               | (v) have a streamlined body  |
4. What is a ball and socket joint?

5. Which of the skull bones are movable?  
 6. Why can our elbow not move backwards?

### NCERT Exemplar Questions

- Name the type of joint of your hand which helps you to grasp a badminton racquet.
- What would have happened if our backbone was made of one single bone?
- Provide one word answers to the statements given below.
  - Joint which allows movement in all directions.
  - Hard structure that forms the skeleton.
  - Part of the body with a fixed joint.
  - Help in the movement of body by contraction and relaxation.
  - Bones that join with chest bone at one end and to the backbone at the other end.
  - Framework of bones which gives shape to our body.
  - Bones which enclose the organs of our body that lie below the abdomen.
  - Joint where our neck joins the head.
  - Part of the skeleton that forms the earlobe.
- Write the type of joint which is used for each of the following movements:
  - A cricket bowler bowls the ball.
  - A girl moves her head in right and left direction.
  - A person lifts weights to build up his biceps.
- Match the name of the animals given in Column I with its body parts used for movement given in Column II.

#### Column I

- (A) Human being  
 (B) Cow  
 (C) Snake  
 (D) Eagle

#### Column II

- (p) Fins  
 (q) Wings  
 (r) Legs  
 (s) Whole body

- (E) Fish (t) Limbs

- Given below is a list of different types of movements in animals. Write the types of movements seen in each animal.
 

|                   |                  |
|-------------------|------------------|
| (i) Duck          | (ii) Horse       |
| (iii) Kangaroo    | (iv) Snail       |
| (v) Snake         | (vi) Fish        |
| (vii) Human being | (viii) Cockroach |
- Boojho fell off a tree and hurt his ankle. On examination the doctor confirmed that the ankle was fractured. How was it detected?
- Bones are hard structures and cannot be bent. But, we can still bend our elbow, knee, etc. How is this possible?
- Which type of movement would have been possible if
  - our elbow had a fixed joint.
  - we were to have a ball and socket joint between our neck and head?
- How is the skeleton of a bird well suited for flying?
- In the given figure, there are two snakes of the same size slithering on sand. Can you identify which of them would move faster and why?



### HOTS Questions

- Why does an earthworm find it difficult to move on a glass?
- Why is the upper part of the human ear not soft as the lower part or the earlobe?

# 3

# EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which one is correct.

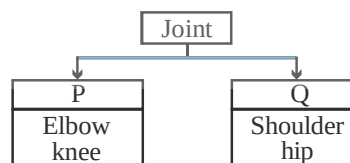
- Human skeleton is formed by
  - bones
  - cartilages
  - bones and cartilages
  - bones, cartilages and muscles



2. Joints are the
- (a) places where two parts of our body seem to be joined
  - (b) the points of contact between two (or more) bones together with tissues that surround it
  - (c) the points of contact between two (or more) bones
  - (d) Both (a) and (b)
3. Shoulder joint
- (i) is a ball and socket type of joint
  - (ii) is a joint in which the rounded end of one bone fits into cavity of other bone
  - (iii) allows movement in all directions
  - (iv) exists between limbs and hip
- (a) (i), (ii) only                      (b) (i), (iii) only  
(c) (i), (ii), (iii) only              (d) All of these
4. Which one of the following has a different type of joint than others?
- (a) Finger                              (b) Elbow  
(c) Knee                                (d) Shoulder
5. The type of joint in which a cylindrical bone rotates in a ring is which of the following types of joint?
- (a) Ball and socket joint
  - (b) Pivot joint
  - (c) Hinge joint
  - (d) Fixed joint
6. The rib cage protects which of the following body parts?
- (a) Lungs                              (b) Wind pipe  
(c) Heart                                (d) All of these
7. Select the function performed by our skeletal system.
- (a) It gives shape and form to our body.
  - (b) It helps body in performing different body movements.
  - (c) It protects our delicate internal organs.
  - (d) It performs all the functions given in (a), (b) and (c).
8. Select the one that is incorrect about cartilage.
- (a) It is a firm but flexible skeletal material.
  - (b) It is as hard as bones.
  - (c) It can be bent.
  - (d) It is found in the joints of our body.
9. Which of the following statements is incorrect?
- (a) The body of earthworm is made up of many rings joined end to end.
  - (b) Outer skeleton of snail is called shell.
  - (c) Pivot joint allow us to bend our head forward and backward.
  - (d) None of these
10. Corals are/is
- (a) the tiny animals that live in shells in the sea
  - (b) a special variety of fish that live in shells
  - (c) a particular type of shell found near some of the sea coasts
  - (d) the remains of tiny sea animals resembling shells
11. The joint between the upper jaw and rest of the head is
- (a) a pivotal joint
  - (b) fixed joint
  - (c) a ball and socket joint
  - (d) a hinge joint
12. Ribs refers to
- (a) chestbones
  - (b) backbone
  - (c) chestbones and backbone
  - (d) the bones that join the chestbone and backbone
13. Backbone
- (i) is made up of many small bones
  - (ii) encloses and supports the spinal cord
  - (iii) extends from skull to tip of tail
  - (iv) forms the main supporting axis
- (a) (i), (ii), (iii) are correct  
(b) (ii), (iii) are correct  
(c) (i), (iv) are correct  
(d) (i), (ii), (iii) and (iv) are correct
14. Skull
- (a) is made up of many bones joined together
  - (b) encloses brain and sense organs
  - (c) consists of cranium and facial bones
  - (d) All of the above
15. Which of the following is correct for earthworm?
- (a) Its body is made of many rings joined end to end.
  - (b) Its body has only very small bones.
  - (c) It cannot extend or shorten its body using its muscles.
  - (d) All of the above

16. Shell  
(a) refers to skeleton of a snail  
(b) is a single unit  
(c) is made up of only one bone  
(d) Both (a) and (b)
17. Snakes  
(a) move with the help of ribs and scales  
(b) slither on the ground by looping side ways  
(c) Both the above  
(d) None of these
18. In birds  
(a) the breast bones are modified to hold muscles of flight  
(b) the bony parts of fore limbs are modified as wings  
(c) the bones of hind limbs are typical for walking and perching  
(d) All of the above
19. A streamlined body is one  
(a) in which middle portion of body is large as compared to head or tail portion  
(b) in which middle portion is smaller as compared to head or tail portion  
(c) Both the above  
(d) None of these
20. The bones are moved  
(a) by simultaneous contraction and relaxation of two sets of muscles  
(b) by alternate contraction and relaxation of two sets of muscles  
(c) by alternate contraction and relaxation of one set of muscles  
(d) None of these
21. The body joints are classified in various types on the basis of  
(a) nature of joints  
(b) direction of movement allowed by them  
(c) part of body where they are found  
(d) Both (a) and (b)
22. The forward and backward movement of our head is possible because of presence of  
(a) ball and socket joint where our neck joins the head  
(b) pivot joint where our neck joins the head  
(c) hinge joint where our neck joins the head  
(d) None of these
23. The elbow joint  
(a) is a hinge joint  
(b) allows only a back and forth movement  
(c) allows movement in one direction only  
(d) All of the above
24. During swimming, fish uses its muscles and they  
(a) make the front part of its body curve to one side and tail part to the same side  
(b) make the front part of its body curve to one side and tail part to the opposite site  
(c) make the whole body straight  
(d) All of the above
25. Select the one that forms supporting frame work of nasal and buccal cavities and consists of cranium and facial bones.  
(a) Backbone (b) Skeleton  
(c) Skull (d) None of these
26. A specialised organ of our body whose function is contraction by means of which change of shape or movement of body part is undertaken  
(a) cartilage (b) muscle  
(c) Both of these (d) None of these
27. Which of the following statement(s) is correct?  
(a) The movement and locomotion of all animals is exactly the same.  
(b) The cartilages are harder than bones.  
(c) There are no joints in finger bones.  
(d) Cockroaches have an outer skeleton.
28. Which of the following statement(s) is correct?  
(a) The shoulder joint is a hinge joint.  
(b) In a pivot joint a cylindrical bone rotates in a ring.  
(c) The shoulder joint is a pivotal joint.  
(d) None of these
29. Which of the following statement(s) is correct?  
(a) Backbone forms main supporting axis of body.  
(b) Backbone is a single strong bone.  
(c) Backbone is not hollow  
(d) All of the above
30. Which of the following statement(s) is/are correct?  
(a) Outer skeleton of snail is called shell.  
(b) Cartilages are not found in joints in body.  
(c) The bones of earthworm are quite delicate.  
(d) The earthworm moves by alternate extension and contraction of body using bristles.

31. Which of the following statement(s) is/are correct?
- A contracted muscle becomes shorter, stiffer and thicker.
  - A contracted muscle pushes the bone.
  - The fins of tail help the fish to keep its body balance.
  - The snakes move very fast in a straight line.
32. Which of the following statements is true ?
- Bone has a soft substance called bone marrow inside it.
  - The only movable bone in skull is the upper jaw bone.
  - Longest bone in human body is humerus.
  - Floating ribs are joined to the breastbone.
33. We need a pair of muscles to move a bone, because a muscle
- can only pull
  - can only push
  - can push and pull
  - All of these
34. The earthworm makes the soil useful for plants because
- the earthworm does not have any bones
  - the body of earthworm is made up of many rings joined end to end
  - the earthworm move by alternate extension and contraction of body using muscles
  - None of these
35. Birds can fly, because
- of their strong muscles and light bones
  - their bones are hollow and light
  - Both the above
  - None of these
36. How do fishes move in water?
- Their streamlined bodies facilitates their movement in water.
  - Fins or flippers help fish to gain speed.
  - Tail which acts as a rudder helps fish to change its direction during the movement.
  - The streamlined body, fins and tail help a fish to move in water.
37. In shark the skeleton is made up of
- bones
  - cartilage
  - ligaments
  - tendons
38. The \_\_\_\_\_ in earthworms help to get a good grip on the ground.
- muscular foot
  - legs
  - rings
  - bristles
39. The joint in between the adjacent vertebrae in the backbone is
- Hinge joint
  - Pivotal joint
  - Fixed joint
  - Gliding joint
40. The body and legs of cockroaches have hard coverings forming an outer \_\_\_\_\_.
- skeleton
  - skin
  - Both (a) & (b)
  - None of these
41. Number of bones in human body is
- 106
  - 306
  - 206
  - 406
42. How many types of skeleton are present in a snail?
- 1
  - 2
  - 3
  - None of these
43. Which part of our body helps us to move?
- cartilage
  - bones
  - joints
  - muscles
44. Which feature helps human beings to walk upright?
- Head bones are light
  - Two legs
  - No tail
  - Backbone holds the body upright
45. Which of the following joint enables a bowler to bowl a ball in a cricket match?
- Hinge joint of elbow
  - Hinge joint at shoulder
  - Ball and socket joint at shoulder
  - Ball and socket joint at elbow
46. Study the following flow chart and identify P and Q in the given chart.



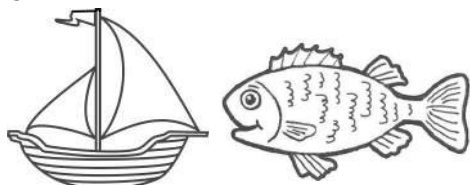
- (a) P — Pivot, Q — Hinge  
(b) P — Hinge, Q — Ball and Socket  
(c) P — Ball and Socket, Q — Hinge  
(d) P — Fixed, Q — Ball and Socket
47. Which type of movement is possible for the joint at forearm and knee?  
(a) Circular movement  
(b) Gliding movement  
(c) Side to side movement  
(d) Stretching and folding movement
48. Which of the following is not a function of skeletal system?  
(a) Protects internal organs  
(b) Gives shape to our bodies  
(c) Helps in movement of some parts  
(d) Helps in digestion of food
49. Kunal met with an accident and broke his leg. What will the doctor first advise him to get done?  
(a) Blood test (b) MRI  
(c) X ray (d) Urine culture
50. What would have happened if our palms were made of a single large bone?  
(a) Did not matter  
(b) We could not hold or lift anything  
(c) We could not write  
(d) Both (b) and (c)
51. What would have happened if backbone was made up of one long bone?  
(a) We could not stand  
(b) We could not sit  
(c) We could not walk  
(d) We could not bend
52. Which part of human skeleton retain cartilage even in an adult?  
(a) Upper and lower jaw  
(b) Nose and ear  
(c) Eye and nose  
(d) Jaws and ear
53. Which of the following is the correct difference between a cartilage and a bone?  
(a) Cartilage is flexible and stronger than bone  
(b) Bone is more primitive tissue than cartilage  
(c) Bone is hard and cannot bend while cartilage is soft and can be bent  
(d) Bone is inside the body and cartilage is outside the body.
54. Muscles and bones work together to enable the body to move. What is the main function of skeletal system in relation to muscular system?  
(a) To help muscles in growth and repair  
(b) To produce muscle cells inside bones  
(c) To produce enzymes  
(d) To attach muscles for movement
55. An organism 'P' moves by contraction and relaxation of the body. It has many bristles on the underside which help to get a grip on surface which organism is 'P'?  
(a) Cockroach (b) Snail  
(c) Earthworm (d) Snake
56. I am an organism that has to carry his house from place to place. I do not have any bones but I have a thick muscular foot. Who am I?  
(a) Snake (b) Earthworm  
(c) Fish (d) Snail
57. An organism 'X' can climb on a wall, can walk and can also fly in the air. Which organism is 'X'?  
(a) Snail (b) Bat  
(c) Cockroach (d) Butterfly
58. Study the following statements and identify the incorrect ones.  
(i) Birds have hollow bones  
(ii) The forelimbs are made for walking  
(iii) The hindlimbs are modified for flying  
(iv) The breastbone help in moving the bones up and down  
(a) (i) and (iv) (b) (ii) and (iii)  
(c) (i) and (iii) (d) (ii) and (iv)
59. Underwater divers wear one of the following things to move easily in water. Which one is it?  
(a) Helmet (b) Water  
(c) A torch (d) Flippers
60. Which of the following statements is correct?  
(i) Snakes do not have backbone  
(ii) Snakes move in a straight line  
(iii) They have many thin muscles connected to each other

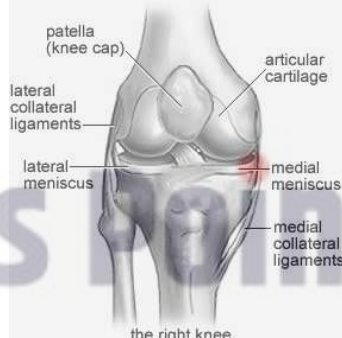
- (iv) Snake moves very fast because of the many loops formed by its body
- (a) (i) and (ii)                      (b) (ii) and (iii)  
(c) (iii) and (iv)                    (d) (i) and (iv)
61. Which of the following animals is called a former's friend and why?
- (a) Snake because it can eat rats  
(b) Snails because they can eat insects  
(c) Birds because they help in seed dispersal  
(d) Earthworm because it eats its way through the soil thereby making the soil porous
62. Which organism has a streamlined body?
- (a) Fish                                      (b) Snail  
(c) Bird                                      (d) Both (a) & (c)

### Statement Based Questions

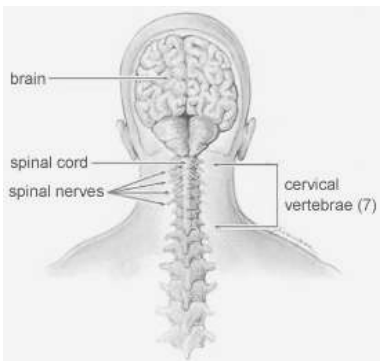
**DIRECTIONS :** Read the following two statements carefully and choose the correct options.

1. Read the following statements and answer the correct option.
- (i) Animals show different kind of movements  
(ii) There is no movement inside a plant
- (a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
2. (i) We move different parts of our body in different ways  
(ii) The movement of an elbow is different from that of a neck
- (a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
3. (i) We can move all parts of our body  
(ii) There are some parts which do not rotate while some rotate completely.
- (a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
4. (i) Joints are places where two muscles meet.  
(ii) Bones can bend at joints.  
(iii) We can bend or move our body only at joints.
- (a) (i) and (iii) are correct but (ii) is false  
(b) (ii) and (iii) are correct but (i) is false  
(c) (i) and (ii) are false but (iii) is correct  
(d) All are false
5. (i) The joint between a shoulder and upper arm allows movement in all directions.  
(ii) The joint between hip and thigh allows only side movement.
- (a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
6. (i) Joint at knee and elbow is hinge joint  
(ii) Hinge joint allows back and forth movement
- (a) Both are correct but (ii) is not correct explanation of (i)  
(b) Both are correct and (ii) is correct explanation of (i)  
(c) Both are incorrect  
(d) (i) is correct but (ii) is incorrect
7. (i) Neck can move in all directions, so it has ball and socket joint.  
(ii) The bones of skull have fixed joints as they cannot move.
- (a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
8. (i) Human body has 206 bones.  
(ii) X rays cannot show shapes of bones.
- (a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
9. (i) We cannot bend every joint of our fingers.  
(ii) Our hand is made up of a single bone.
- (a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
10. (i) The ribs join the backbone and are free in the front.  
(ii) The ribs are curved bones.
- (a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false

11. (i) The pelvic bones protect our stomach.  
(ii) The pelvic bones help us to sit.  
(a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
  12. (i) Cartilage is as hard as a bone.  
(ii) Cartilage is found in the joints of our body.  
(a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
  13. (i) When we bend our arm, the muscle of the upper arm contracts.  
(ii) When a muscle contracts, it becomes short, stiff and thick.  
(a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
  14. (i) Snails and earthworms lack an internal skeleton.  
(ii) Birds have both an external and an internal skeleton.  
(iii) Cockroach has hard outer skeleton  
(a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
  15. (i) The breastbones of a bird are modified to hold muscles of flight.  
(ii) Fish have fins to help them keep balance of their body and to maintain direction.  
(a) (i) is correct but (ii) is false  
(b) (ii) is correct but (i) is false  
(c) Both are correct  
(d) Both are false
2. The common feature in both the things below is  


(a) both can be classified as sea animals.  
(b) both can move in water using some fuel.  
(c) both have streamlined body.  
(d) Nothing is common in them.
  3. The joint shown in pictures below A, B, C, D are respectively.  


(A)



(B)

### Figure/Diagram Based Questions

**DIRECTIONS :** Carefully observe the following pictures and answer the questions.

1. Which part of the ear lobe shown in picture has cartilage?  


(a) Lower part of ear  
(b) Upper part of ear  
(c) Middle part of ear  
(d) Not present in any part of ear



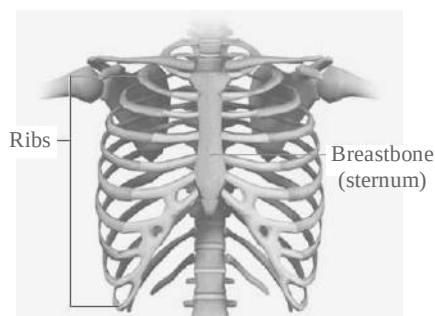
(C)



(D)



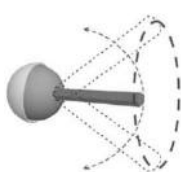
- (a) Ball and socket, fixed, hinge, pivot  
 (b) Hinge, pivot, fixed, ball and socket  
 (c) Hinge, pivot, ball and socket, fixed  
 (d) Pivot, hinge, fixed, ball and socket
4. The part of the human skeleton shown in picture protects which of the following :



- (a) Heart (b) Lungs  
 (c) Wind pipe (d) All of these
5. Identify the following joint in our body.



- (a) Ankle and knee joint  
 (b) Shoulder and knee joint  
 (c) Neck and wrist joint  
 (d) Hip and shoulder joint
6. Which joints are represented by the follow models?



A



B

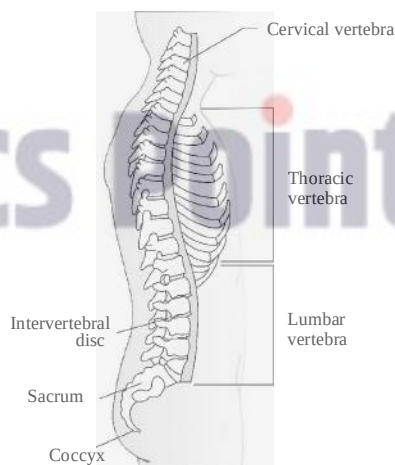
- (a) Hinge pivot  
 (b) Ball and socket hinge  
 (c) Hinge ball and socket  
 (d) Fixed gliding
7. Look at the joint shown alongside. where in our body can we find such a joint?
- (a) Knee (b) Neck  
 (c) Back (d) Elbow



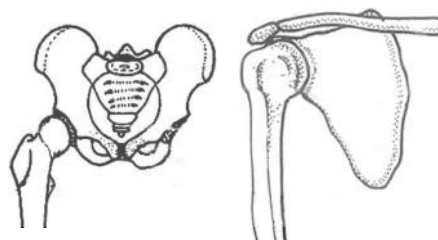
8. Kiran met with an accident and had a fracture. The doctor took the following image which clearly showed the bone details. What is this test called?



- (a) Urine report (b) Blood report  
 (c) X-ray report (d) Muscle test
9. In which part of the body this structure present?

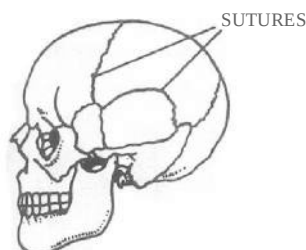


- (a) Legs (b) Hands  
 (c) Back (d) Ribs
10. Study the above two part identify their location in our body.



- (a) Knee and face (b) Hip and hand  
 (c) Shoulder and hip (d) Ribs and spine

11. This is skull. Which of the following statements regarding it is true?



- (a) It is made up of a single large bone  
 (b) All joints are movable  
 (c) Lower jaw is the only movable joint  
 (d) It protects the heart
12. Which of the following animal make by repeated expansion and contraction of their body.



P



Q



R



S

- (a) P and Q                      (b) R and S  
 (c) R only                      (d) S only

### Matching Based Questions

**DIRECTIONS :** Match Columns I and II and select the correct answer using the code given below the columns.

1. **Column I**                      **Column II**  
 (A) Upper jaw                      (p) has an outer skeleton

- (B) Ribs                      (q) has a streamlined body  
 (C) Fish                      (r) is an immovable joint  
 (D) Cockroach                      (s) protect the heart  
 (a)  $A \rightarrow (p)$ ;  $B \rightarrow (q)$ ;  $C \rightarrow (r)$ ;  $D \rightarrow (s)$   
 (b)  $A \rightarrow (r)$ ;  $B \rightarrow (s)$ ;  $C \rightarrow (q)$ ;  $D \rightarrow (p)$   
 (c)  $A \rightarrow (q)$ ;  $B \rightarrow (s)$ ;  $C \rightarrow (r)$ ;  $D \rightarrow (p)$   
 (d)  $A \rightarrow (s)$ ;  $B \rightarrow (r)$ ;  $C \rightarrow (q)$ ;  $D \rightarrow (p)$

2. **Column I**                      **Column II**  
 (A) Neck                      (p) Slither  
 (B) Shoulder                      (q) Pivot joint  
 (C) Birds                      (r) Ball and socket joint  
 (D) Snake                      (s) Have hollow bones  
 (a)  $A \rightarrow (p)$ ;  $B \rightarrow (q)$ ;  $C \rightarrow (r)$ ;  $D \rightarrow (s)$   
 (b)  $A \rightarrow (s)$ ;  $B \rightarrow (q)$ ;  $C \rightarrow (r)$ ;  $D \rightarrow (p)$   
 (c)  $A \rightarrow (r)$ ;  $B \rightarrow (s)$ ;  $C \rightarrow (q)$ ;  $D \rightarrow (p)$   
 (d)  $A \rightarrow (q)$ ;  $B \rightarrow (r)$ ;  $C \rightarrow (s)$ ;  $D \rightarrow (p)$

3. **Column I**                      **Column II**  
 (A) Ball and socket joint                      (p) Between upper jaw and head  
 (B) Pivot joint                      (q) Neck and head  
 (C) Hinge joint                      (r) Allows movement in one plane only  
 (D) Fixed joint                      (s) The rounded end of one bone fits into cavity of other bone  
 (a)  $A \rightarrow (s)$ ;  $B \rightarrow (r)$ ;  $C \rightarrow (q)$ ;  $D \rightarrow (p)$   
 (b)  $A \rightarrow (r)$ ;  $B \rightarrow (s)$ ;  $C \rightarrow (q)$ ;  $D \rightarrow (p)$   
 (c)  $A \rightarrow (s)$ ;  $B \rightarrow (q)$ ;  $C \rightarrow (r)$ ;  $D \rightarrow (p)$   
 (d)  $A \rightarrow (s)$ ;  $B \rightarrow (q)$ ;  $C \rightarrow (p)$ ;  $D \rightarrow (r)$

4. **Column-I**                      **Column-II**  
 (A) Hinge joint                      (p) Neck joint  
 (B) Gliding joint                      (q) Hip joint  
 (C) Pivot joint                      (r) Knee joint  
 (D) Ball & Socket joint                      (s) Wrist joint

- (a)  $A \rightarrow (r), B \rightarrow (s), C \rightarrow (p), D \rightarrow (q)$   
 (b)  $A \rightarrow (p), B \rightarrow (q), C \rightarrow (s), D \rightarrow (r)$   
 (c)  $A \rightarrow (s), B \rightarrow (p), C \rightarrow (r), D \rightarrow (q)$   
 (d)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (p), D \rightarrow (s)$
5. **Column-I** **Column-II**  
 (A) Bird (p) Swim  
 (B) Snake (q) Fly  
 (C) Humans (r) Slithers  
 (D) Fish (s) Walk  
 (a)  $A \rightarrow (p), B \rightarrow (s), C \rightarrow (q), D \rightarrow (r)$   
 (b)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (p), D \rightarrow (s)$   
 (c)  $A \rightarrow (s), B \rightarrow (p), C \rightarrow (r), D \rightarrow (q)$   
 (d)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (s), D \rightarrow (p)$
6. **Column-I** **Column-II**  
 (A) Arm (p) does not move at all  
 (B) Neck (q) Rotates completely  
 (C) Upper jaw (r) Rotates partly  
 (a)  $A \rightarrow (q), B \rightarrow (p), C \rightarrow (r)$   
 (b)  $A \rightarrow (r), B \rightarrow (q), C \rightarrow (p)$   
 (c)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (p)$   
 (d)  $A \rightarrow (p), B \rightarrow (q), C \rightarrow (r)$
7. **Column I** **Column II**  
 (A) Ball and Socket (p) knee  
 (B) Pivot (q) shoulder  
 (C) Hinge (r) neck  
 (D) Fixed (s) upper jaw  
 (a)  $A \rightarrow (s), B \rightarrow (q), C \rightarrow (p), D \rightarrow (r)$   
 (b)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (s), D \rightarrow (p)$   
 (c)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (p), D \rightarrow (s)$   
 (d)  $A \rightarrow (r), B \rightarrow (q), C \rightarrow (s), D \rightarrow (p)$
8. **Column I** **Column II**  
 (A) Hinge (p) all directions  
 (B) Ball and Socket (q) sideways movement  
 (C) Pivot (r) back and forth move  
 (a)  $A \rightarrow (p), B \rightarrow (r), C \rightarrow (q)$   
 (b)  $A \rightarrow (q), B \rightarrow (p), C \rightarrow (r)$   
 (c)  $A \rightarrow (r), B \rightarrow (q), C \rightarrow (p)$   
 (d)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (q)$
9. **Column I** **Column II**  
 (A) Rib cage (p) Vertebral column  
 (B) Pelvic bones (q) chest bones  
 (C) Backbone (r) hip bones  
 (a)  $A \rightarrow (q), B \rightarrow (p), C \rightarrow (r)$   
 (b)  $A \rightarrow (p), B \rightarrow (q), C \rightarrow (r)$   
 (c)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (p)$   
 (d)  $A \rightarrow (r), B \rightarrow (q), C \rightarrow (p)$
10. **Column I** **Column II**  
 (A) Rib cage (p) brain  
 (B) skull (q) spinal cord  
 (C) Backbone (r) heart and lungs  
 (a)  $A \rightarrow (p), B \rightarrow (r), C \rightarrow (q)$   
 (b)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (q)$   
 (c)  $A \rightarrow (p), B \rightarrow (q), C \rightarrow (r)$   
 (d)  $A \rightarrow (r), B \rightarrow (q), C \rightarrow (p)$
11. **Column I** **Column II**  
 (A) X ray bones (p) framework of  
 (B) Skeleton (q) immovable joints  
 (C) Wrist (r) images of bones  
 (D) Skull (s) many small bones  
 (a)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (s), D \rightarrow (q)$   
 (b)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (q), D \rightarrow (s)$   
 (c)  $A \rightarrow (p), B \rightarrow (r), C \rightarrow (s), D \rightarrow (q)$   
 (d)  $A \rightarrow (s), B \rightarrow (q), C \rightarrow (p), D \rightarrow (r)$
12. **Column I** **Column II**  
 (A) Bones (p) ear lobe  
 (B) Cartilage (q) contract  
 (C) Muscles (r) made of calcium  
 (a)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (p)$   
 (b)  $A \rightarrow (q), B \rightarrow (p), C \rightarrow (r)$   
 (c)  $A \rightarrow (p), B \rightarrow (r), C \rightarrow (q)$   
 (d)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (q)$
13. **Column I** **Column II**  
 (A) Earthworm (p) jointed legs  
 (B) Snail (q) Scales  
 (C) Snake (r) Bristles  
 (D) Cockroach (s) Muscular foot  
 (a)  $A \rightarrow (r), B \rightarrow (r), C \rightarrow (p), D \rightarrow (q)$   
 (b)  $A \rightarrow (p), B \rightarrow (q), C \rightarrow (r), D \rightarrow (s)$   
 (c)  $A \rightarrow (r), B \rightarrow (s), C \rightarrow (q), D \rightarrow (p)$   
 (d)  $A \rightarrow (q), B \rightarrow (p), C \rightarrow (s), D \rightarrow (r)$

14. **Column I** **Column II**
- |            |                   |
|------------|-------------------|
| (A) Bird   | (p) Fins          |
| (B) Fish   | (q) Wings         |
| (C) Humans | (r) Long backbone |
| (D) Snake  | (s) Legs          |
- (a)  $A \rightarrow (p), B \rightarrow (r), C \rightarrow (q), D \rightarrow (s)$   
 (b)  $A \rightarrow (q), B \rightarrow (p), C \rightarrow (s), D \rightarrow (r)$   
 (c)  $A \rightarrow (p), B \rightarrow (q), C \rightarrow (r), D \rightarrow (s)$   
 (d)  $A \rightarrow (s), B \rightarrow (r), C \rightarrow (q), D \rightarrow (p)$

- (b) We can also feel chest bones.  
 (c) We can also feel our backbone.  
 (d) All of the above
6. Pelvic bones  
 (a) are present at all joints  
 (b) are present only at shoulders  
 (c) enclose the portion of our body that is below the stomach  
 (d) enclose the portion of our body that is above the stomach.

### Passage Based Questions

**DIRECTIONS :** Read the passage (s) given below and answer the questions that follow.

#### Passage I

The places in our body where two parts of our body seem to be joined is called a joint. e.g., in the elbow different bones are joined together. We can bend or move our body only at those points where bones meet. There are many different types of joints in our body to help in carrying out different movements and activities.

- A joint that allows movements in all directions is called
  - pivotal joint
  - hinge joint
  - ball and socket joint
  - None of these
- The joint that allows only a back and forth movement is called a
  - hinge joint
  - pivotal joint
  - Fixed joint
  - movable joint
- The joint where our head joins the neck is a
  - hinge joint
  - pivot joint
  - joint that allows movement in all directions
  - ball and socket joint

#### Passage II

The X-rays show the shape of bones of our body. We can also have some idea about the number and shape of bones in some parts of our body by feeling them.

- In which parts of our body can we feel the bones?
  - Knee
  - Ankle
  - Fingers
  - All of these
- Choose the correct statements :
  - We can feel a number of bones at the back of our palm.

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

1. **Assertion (A) :** The elbow joint is a hinge joint.  
**Reason (R) :** Hinge joint allows movement in one plane only.

2. **Assertion (A) :** Shoulder is the region where fore limb or arm joins the body.  
**Reason (R) :** The two bones at the shoulder are called shoulder bones.

3. **Assertion (A) :** Earthworm has muscles that help to extend or shorten body.  
**Reason (R) :** Muscles can only pull and not push.

4. **Assertion (A) :** Snails move with the help of muscular foot.  
**Reason (R) :** The outer skeleton of a snail is called the shell.

5. **Assertion (A) :** Entire skeleton of shark is made of cartilage.  
**Reason (R) :** Cartilage is also found in joints in body.

6. **Assertion (A) :** Cartilage covers the ends of bones.  
**Reason (R) :** Cartilage acts as a shock absorber and reduces friction between bones.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

1. Elbow joints.
2. Head joint
3. 206.
4. 600 skeletal muscles.
5. joint.
6. Cartilage
7. Endoskeleton
8. 12
9. movement.
10. Snake

### True/False

- |          |            |          |          |
|----------|------------|----------|----------|
| 1. True  | 2. False   | 3. True  | 4. True  |
| 5. False | 6. True    | 7. False | 8. False |
| 9. True  | 10. False. |          |          |

### Match the Column

- | Column I      | Column II                              |
|---------------|----------------------------------------|
| (A) Fish      | (q) have fins and streamlined body.    |
| (B) Upper jaw | (r) is an immovable joint.             |
| (C) Ribs      | (p) protects heart.                    |
| (D) Snail     | (t) has exoskeleton but can move slow. |
| (E) Cockroach | (s) has exoskeleton and fast movement. |

### Very Short Answer Type Questions

1. Snail has exoskeleton.
2. Ball and Socket joint.
3. Fish.

4. "Gait of animals" refers to the way of movement in animals. Different animals have different body parts that help them to move. Aristotle, ancient Greek philosopher, wrote the book "Gait of Animals".
5. Pelvic bones enclose the portion of our body below the stomach.
6. The bones cannot move at fixed joints.
7. The joint where our neck joins the head is a pivot joint.
8. Cranium enclose brain.
9. Scales of fish are exoskeleton.
10. Fore limbs of birds are modified to wings which help them in flying.
11. Skeleton provides rigid surface for attachment of muscle.
12. Yes, it is true.
13. Backbone is not fixed so that we can bend it.

### Short Answer Type Questions

1. The backbone extends from the neck to the hip. It consists of many small bones called vertebrae joined end to end. The ribs are joined to these bones.
2. Five types of joints are there in human :  
(a) Fixed joints (b) Ball and socket joints  
(c) Pivot joints (d) Hinge joints  
(e) Gliding joints
3. Bones are rigid and non flexible whereas cartilage is semi rigid but flexible. Bones form frame work of whole body whereas cartilage form frame work only for a little part of body.
4. Muscle always works in pairs. When one of them contracts, the bone is pulled in that direction. The other muscle of the pair relaxes. To move the bone in the opposite direction, the relaxed muscle contracts to pull the bone to its original position. A muscle can only pull. It cannot push.
5. The part of skeleton system that is inside the body and covered by soft tissues is endoskeleton. It cannot be seen from outside.

One can feel or see it thorough X-ray photograph only.

6. Fish has a spindle-shaped streamlined body. This shape of the body helps it to move in water. Fish use their muscular tail and fins for swimming.
7. Cartilage is the part of the skeleton that is not as hard as the bones. It can be bent easily. We can find the cartilage in the upper part of ear.
8. In ball and socket joint, the round end of one bone fits into the cavity of the other bone, e.g., thigh and hip joint. This type of joint allows movements in all directions.
9. Body of the snail is covered with a hard shell. This shell does not help the snail in movement. Head of the snail may come out of an opening in the shell. The snail has a thick and strong muscular foot. Foot moves slowly with a wavy motion.
10. Fixed joint is the one where there is no relative movement of the bones. The joint between the head and the upper jaw is an example of fixed joint.
11. During movement, the earthworm first extends the front part of the body, keeping the rear portion fixed to the ground. Then it fixes the front end and releases the rear end. It then shortens the body and pulls the rear end forward. This makes it move forward by a small distance. Repeating such muscle expansions and contractions, the earthworm can move through soil.
12. Setae are bristle-like projections on the lower side of the bodies of earthworms and leeches. As earthworm does not have bones, muscles help it to extend and contract the body to help in its movement. The bristles are connected with muscles. The bristles help to get a good grip on the ground.

### Long Answer Type Questions

1. Cockroaches walk and climb as well as fly in the air. They have three pairs of legs which help them in walking. The body is covered with a hard outer skeleton. This outer skeleton is made of different units joined together which permit

movement. There are two pairs of wings attached to the thorax. The cockroaches have distinct muscles — those near the legs move the legs for walking. The thoracic muscles move the wings when the cockroach flies.

2. The framework of bones and cartilage which supports the body of an animal is called its skeletal system.

Human skeletal system is made-up of 206 bones and cartilage.

The human skeletal system consists of the skull, backbone, ribs, breastbone, bones in arms and legs, shoulder and hip bones.

#### Functions of the skeletal system :

- (i) It forms framework of the body.
  - (ii) It helps to protect the delicate organs of the body in their proper position.
3. (i)

| Structural                                                                                                                                                            | Functional                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Fibrous Joints (fixed) :</b><br>Bones held together by fibrous connective tissue incl. many collagen fibres<br>No synovial cavity/fluid.                           | <b>Immovable Joint :</b><br>Synarthrosis (singular),<br>Synarthroses (plural)                         |
| <b>Cartilaginous Joints :</b><br>Bones held together by cartilage. No synovial cavity/fluid.                                                                          | <b>Slightly movable joint :</b> Amphiarthrosis (singular),<br>Amphiarthroses (plural)                 |
| <b>Synovial joints :</b> Joint includes a synovial cavity containing fluid secreted by synovial membrane. Bones forming the joint surrounded by an articular capsule. | <b>Movable Joint, or 'Freely movable joint' :</b><br>Diarthrosis (singular),<br>Diarthroses (plural). |

- (ii) **Value :** Caring and loyal towards his friends.
- (iii) **Value :** Good predictor of fracture.

## 2 EXERCISE

### Text Book Questions

1. (a) movement. (b) skeleton  
(c) hinge (d) muscle



2. (a) False (b) False  
(c) False (d) True  
(e) True
3. (A)  $\rightarrow$  (s); (B)  $\rightarrow$  (r); (C)  $\rightarrow$  (t); (D)  $\rightarrow$  (u);  
(E)  $\rightarrow$  (q), (r)
4. A ball and socket joint is a movable joint. It comprises of a round head which fits into socket-like depression in another bone.
5. Mandible
6. Elbow is a hinge joint that allows movement only in one plane.
9. (i) We would not have been able to bend/fold our arms.  
(ii) We would have been able to rotate our head  $360^\circ$ .
10. (i) Bones are light and hollow.  
(ii) Bones of hindlimbs are for perching and walking  
(iii) Bones of forelimbs are modified as wings.  
(iv) Shoulder bones are strong.  
(v) Breast bones hold flight muscles and are used to move the wings up and down.
11. A snake forms loops in its body while slithering. Each loop of the snake gives it a forward push by pressing against the ground. The snake with a large number of loops moves much faster than the snake with less number of loops. Thus snake "A" will move faster than snake "B".

**NCERT Exemplar Questions**

1. Hinge joint.
2. We would not have been able to bend from our waist.
3. (i) Ball and socket joint  
(ii) Bones  
(iii) Upper jaw with skull  
(iv) Muscles  
(v) Ribs  
(vi) Skeleton  
(vii) Pelvic bones  
(viii) Pivot  
(ix) Cartilage
4. (i) Ball and socket joint  
(ii) Pivot joint  
(iii) Hinge joint
5. (A) – (r); (B) – (t); (C) – (s); (D) – (q); (E) – (p)
6. (i) Duck - flying, walking, swimming  
(ii) Horse - running, walking.  
(iii) Kangaroo - jumping, walking  
(iv) Snail - creeping  
(v) Snake - slithering  
(vi) Fish - swimming  
(vii) Human being - walking  
(viii) Cockroach - walking, flying
7. The doctor must have observed a swelling and taken an X-ray of the ankle. X-ray images confirm injuries/fractures in bones.
8. Elbow and knee are made up of two or more bones which are joined to each other by hinge joint. This joint along with the muscles helps us to bend the elbow and knee.

**HOTS Questions**

1. For movement, earthworm fixes its front end and releases the rear end. On a glass, it loses its grip.
2. The upper part of the ear is made up of cartilage whereas the earlobe contains only muscles.

**3 EXERCISE****Multiple Choice Questions**

1. (c) Human skeleton is formed by bones and cartilages.
2. (d)
3. (d) All (i), (ii), (iii) and (iv) are correct.
4. (d) Shoulder joint is of ball and socket type where as others are hinge joints.
5. (b)
6. (d) Rib cage protects our lungs, heart and wind pipe.
7. (d)
8. (b) It is not as hard as bones.
9. (d) All the given statements are correct.
10. (d) 11. (b) 12. (d)
13. (d) All are correct.
14. (d)
15. (a) There are no bones in body of earthworm. The earthworm moves by alternate

- extension and contraction of body using muscles.
16. (d) Shell is not made of bones.
  17. (c)      18. (d)      19. (a)      20. (b)
  21. (d)      22. (b)      23. (d)      24. (b)
  25. (c)      26. (b)      27. (d)      28. (b)
  29. (a) Backbone is made up of many small bones and is hollow.
  30. (a) Cartilages are found in joints. There are no bones in earthworm. The earthworm moves by alternate extension and contraction of body using muscles (not bristles).
  31. (a) A contracted muscle pulls (not pushes) the bone. The fins of tail help the fish in its body movement (*not* in body balance). The snakes move very fast and *not* in straight line.
  32. (a)
  33. (a) A muscle can only pull and not push. It is because of this that we need a pair of muscles to move a bone. The bones are moved by alternate contractions and relaxation of two sets of muscles.
  34. (d) The earthworm, actually, eats its way through the soil. The body then throws the undigested part of the material that it eats. In this way, the earthworm makes the soil more useful for plants.
  35. (c)      36. (d)      37. (b)      38. (d)
  39. (d)      40. (a)      41. (c)
  42. (a) Snails have 1 skeleton, the hard outer exoskeleton *i.e.*, the shell.
  43. (c) Joints help us to bend and move our body parts.
  44. (d)
  45. (c) The joint between shoulder and upper arm enables a bowler to rotate his arm to bowl a ball. This is a ball and socket joint.
  46. (b)
  47. (d) These parts have hinge joint which allows back and forth movement.
  48. (d) All the others are functions of skeleton.
  49. (c) X-ray gives an image of the bone so the doctor can locate the fracture in the bone and treat the patient accordingly.
  50. (d) If palm was only one bone, we would not be able to move our hand to do every day task.
  51. (d) Backbone is made of many small bones which help us to bend.
  52. (b) Tip of nose and ear lobes are made of cartilage.
  53. (c)
  54. (d) Bones provide attachment points for muscles.
  55. (c)
  56. (d)
  57. (c) Cockroaches can fly, walk and climb on walls.
  58. (b) Forelimbs are meant for flying and hindlimb are meant for walking.
  59. (d) The fin like flippers help underwater divers to move freely in water.
  60. (c) Snakes do have backbone and they do not move in a straight line.
  61. (d) It eats soil as it moves and then throws the undigested part. This increases aeration of soil.
  62. (d) Both birds and fish have streamlined body so that they can move freely in air and water respectively.

### Statement Based Questions

1. (a) Plants also show movement by responding to light, water and other stimulus.
2. (c)
3. (b)
4. (c) Joints are places where two bones meet and bones cannot bend.
5. (a) Joint between hip and thigh is also ball and socket joint
6. (b)
7. (b) Neck has pivot joint.
8. (a) X-rays can tell us about the shape of bones.
9. (d) We can bend at every joint of our fingers and our hand is made up of many small bones.
10. (b) Ribs joint the chest bone in the front and backbone at the back.
11. (b) Pelvic bones are found just below the stomach.

12. (b) Cartilage is not as hard as a bone. It is soft.
13. (b)
14. (a) Birds have only internal skeleton.
15. (c)

### Figure/Diagram Based Questions

1. (b) Cartilage is present in upper parts of the ear that is not as soft as the ear lobe, not as hard as a bone.
2. (c) Both have streamlined body.
3. (c)
4. (d)
5. (d) This is a ball and socket joint.
6. (b) A allows movement in all direct while 'B' allows back and forth movement.
7. (a) This is hinge joint of knee.
8. (c) X-ray images are used by doctor to show the extent of fracture.
9. (c) This is vertebral column or backbone.
10. (c) P is shoulder joint and Q is pelvic girdle ..... in hip region.
11. (c) Skull is made up of several bones joined by fixed joints. It protects the brain.
12. (c) An earthworm moves by repeated expansion and contraction of its body.

### Matching Based Questions

1. (b)  $A \rightarrow (r); B \rightarrow (s); C \rightarrow (q); D \rightarrow (p)$
2. (d)  $A \rightarrow (q); B \rightarrow (r); C \rightarrow (s); D \rightarrow (p)$
3. (c)  $A \rightarrow (s); B \rightarrow (q); C \rightarrow (r); D \rightarrow (p)$
4. (a)  $A \rightarrow (r), B \rightarrow (s), C \rightarrow (p), D \rightarrow (q)$
5. (d)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (s), D \rightarrow (p)$
6. (b)  $A \rightarrow (r), B \rightarrow (q), C \rightarrow (p)$
7. (c)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (p), D \rightarrow (s)$
8. (d)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (q)$
9. (c)  $A \rightarrow (q), B \rightarrow (r), C \rightarrow (p)$
10. (b)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (q)$
11. (a)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (s), D \rightarrow (q)$
12. (d)  $A \rightarrow (r), B \rightarrow (p), C \rightarrow (q)$
13. (c)  $A \rightarrow (r), B \rightarrow (s), C \rightarrow (p), D \rightarrow (p)$
14. (b)  $A \rightarrow (q), B \rightarrow (p), C \rightarrow (s), D \rightarrow (r)$

### Passage Based Questions

1. (c)
2. (a) Hinge joint
3. (b) 4. (d) 5. (d) 6. (c)

### Assertion/Reason

1. (b) 2. (b) 3. (b) 4. (b)
5. (b) 6. (a)

# Chapter 9

# LIVING ORGANISMS AND THEIR SURROUNDINGS

## INTRODUCTION

Living organisms exist in most places. We come across plants and animals everyday. Living things are found practically everywhere. Some live on land, some under water, some in burrows, and some in air. Life exists even in open volcanoes. Some organisms live even in our homes.

**Habitat:** The place where organisms live most comfortably is called its habitat. It is the natural home of living things.

**Aquatic habitat:** When organisms live in water, it is known as aquatic habitat. Ponds, lakes, rivers, oceans, etc., are examples of aquatic habitat. Water is a medium in aquatic habitat.

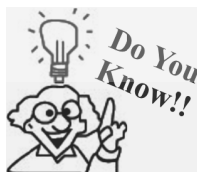
**Terrestrial habitat:** When organisms live on land, it is known as terrestrial habitat. Forests, deserts, orchards, tea gardens and mountains are the examples of terrestrial habitat. Air is the medium in terrestrial habitat.

**Mountain:** The Mountain is a special terrestrial habitat where temperature is very low and the most of the areas are covered with snow. The plants like grasses, mosses and lichens and animals like snow bear, fox, water fowl, musk deer and wolf are found commonly in this habitat.

Several kinds of plants and animals may share the same habitat.

## HABITAT

The term habitat refers to the surroundings where organisms live. Every habitat is home for a certain living creature. Habitat includes both living and non-living components. Plants and animals have different features that help them to survive in their own habitat. Habitat can be terrestrial or aquatic.



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*The word ecology is derived from Greek word 'Oikos' which means 'house' or 'place to live in'. German Biologist Ernst Haeckel was first one to use this word.*

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### Importance of habitats

A good habitat provides its inhabitants the following:

1. A suitable place for organisms to stay and rest.
2. It makes enough food available.
3. Provides protection to the inhabitants.
4. Provides place for breeding and rearing of organisms.
5. Provides space for movement.

**Terrestrial habitat** refers to the land where all plants and animals survive. It includes **deserts, forests and grasslands**, as well as coastal and mountain regions. For example, camels and cactus plants live in deserts only.

**Aquatic habitat** refers to the water where plants and animals survive. Aquatic habitat includes **rivers, ponds, lakes, ocean and swamps**. For example, fish live in water.

**Adaptation:** Plants and animals develop certain features or certain habits that help them survive in their surroundings, and this is known as adaptation. Different living creatures adapt to their habitats in different ways. For example, fish have gills that help them to live in water and use the oxygen dissolved in it. Plants that live in water have special tissues that help to take in dissolved gas from water. For example, the *Ulva* has ribbon-like leaves. It takes thousands of years for a living being to adapt to its habitat.

**Acclimatisation:** The small adjustments by the body to overcome small changes in the surrounding atmosphere for a short period of time are called acclimatisation.

The components in a habitat are broadly classified into two types. They are biotic and abiotic components.

**Biotic components** include all the living organisms in a habitat. These can be further classified into following categories:

- (a) Producers (b) Consumers (c) Scavengers (d) Decomposers

(a) **Producers** : Green plants are the only living organisms that make their own food. They are, therefore, called producers of food.

(b) **Consumers** : All animals and non-green plants directly or indirectly depend on plants for food. They consume the food prepared by the producers. All animals, including human beings are consumers.

Consumers are of three types :

(i) **Herbivorous animals** : These are plant-eaters. Since they feed on plants directly, they are called primary consumers. Examples are cow, deer, goat, buffaloes, elephants, etc.

(ii) **Carnivorous animals** : These feed on other animals and are called secondary consumers. Examples are tiger, lion, wolf, etc.

(iii) **Omnivorous animals** : Animals that feed on both plants and animals are called omnivorous animals. Examples are humans, dogs, bears, crows, etc.

(c) **Scavengers** : Living organisms that feed on dead animals are called scavengers. Examples are flies, crows, dogs, vultures and hyena.

(d) **Decomposers** : Microorganisms like bacteria and fungi are very small organisms. They cannot be seen with the naked eyes. These microorganisms feed on dead remains of plants and animals and their wastes. They decompose them into simple nutrient substances they were made up of. They help in recycling of matter in the environment.

**Abiotic components** include all the non-living things in a habitat. These include air, rocks, water, sunlight and heat. All living things depend on the abiotic components for all their needs. The abiotic components are very useful for the survival of the biotic components in a habitat.

For example, sprouting is the first step where a new plant grows from a seed. The sprouting of a seed depends on abiotic components such as air, water, light and heat.

The population of some species of turtles has declined due to the change in the earth's temperature. Some popular theories believe that dinosaurs became extinct because of the changes in the earth's temperature millions of years ago.



Fishes in Aquatic habitat

**Interaction of biotic and abiotic components:** Organisms do not live in isolation but are interdependent.

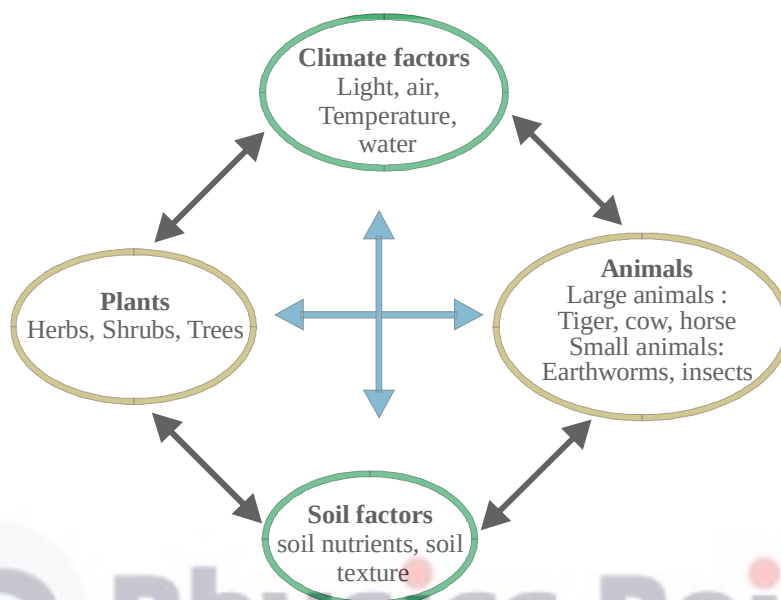


Fig. Interaction of biotic and abiotic components

### Types of habitat

**Terrestrial Habitat:** Habitat is the place that is natural for the life and growth of an organism.

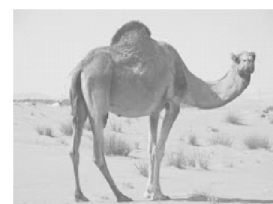
Now let us discuss how animals and plants adapt themselves for the terrestrial and aquatic habitats.

**Terrestrial habitat:** All the deserts, mountains and forests and plain lands come under terrestrial habitat.

Conditions prevailing in terrestrial habitat:

- Oxygen is available in plenty.
- Temperature varies from season to season and from place to place.
- Light is available in sufficient quantity.
- Water is variable and animals have to adapt to less water.

**Adaptations in desert animals :** Camels have long legs for adaptation. It has hump to store fat, can drink large quantities of water at one time and can stay without water for several days. It excretes very little urine and its dung is dry. It does not sweat and its feet are padded so that it can walk on sand easily.



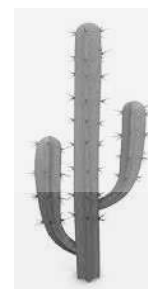
Camel can survive in a desert

Snakes and rats live in burrows and come out only during the night when it is cool.

**Adaptations in desert plants :** Xerophytes or desert plants shows some adaptations to sustain in the desert conditions.

In desert plants, the leaves are either absent or reduced to spines as in cacti. The leaf-like structure seen in cactus is its stem and it carries photosynthesis. The roots grow deep into the soil for absorbing water. The reduced leaf and the thick waxy layer of stem minimise transpiration. Many Cacti plants have fleshy stems to store water. These are called **succulents**.

**Adaptations in plants and animals found in cold regions :** The plants and animals in the mountain habitat show some adaptations.



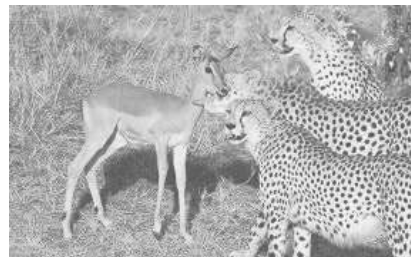
Cactus



Most of the trees in cold mountains are cone shaped. The leaves are also very thin and look like needles for the sliding of water and snow during rains and snowfall. Animals in mountain areas have long hair and thick skin to protect them from cold climate. Thick fur all over body of Yak and Snow Leopard protects them from the cold climate. The mountain goat, have strong hooves that help them run on the mountain slopes easily.

**Adaptations in animals found in grassland :** The animals living in the grasslands show some adaptations.

Lions live in forests and prey on other animals, like deer, for food. The lions brown skin colour blends easily with the colour of dry grass in grasslands and helps in catching the prey. They have strong claws to tear and eat their food. The eyes of the lion in front of its head help in identifying the prey from long distances. Deers have long ears to help them sense the presence of a predator. Deers have eyes on the side of its head to look in all directions for danger and have long legs to run away from predator.



Animals found in forest

### Aquatic Habitat

All the fresh water and marine water bodies, has come under aquatic habitat.

Conditions prevailing in terrestrial habitat:

- Except in deep oceans, uniform supply of light, temperatures, oxygen is available.
- Light and temperature vary in deep oceans at different depths.



Aquatic habitat

### Adaptations in aquatic animals

Fish have special features that help them to live in water.

They have streamlined body, which reduce friction and allow them to move freely in water.

Sea animals like the octopus and the squid do not have streamlined body as they stay deep inside the ocean on the ocean bed, but make their body streamlined when they move in the water.

Sea animals, like fish, octopus and squid have gills that help them to absorb the dissolved oxygen from the water they drink!

Dolphins and whales have blowholes to breathe in air when they swim close to the surface of the water and there by stay inside the water for a long time without breathing.

### Adaptations in aquatic plants

In general the aquatic plants have much smaller roots and helps the plant in holding on the surface. Stems are long and light. Leaves in submerged plants such as *Ulva* has narrow and ribbon-like. These allow the plants to bend themselves in the direction of the flow of water. In milfoil, leaves are highly dissected, making water to easily flow without. Frogs usually live in ponds and lakes.

### Amphibians

A frog can live both in water and on land. Frogs have strong hind legs to hop on land and webbed feet to swim in water.

Frogs also have a membrane called the nictitating membrane on their eyes. This membrane helps protect their eyes inside water.



Frog

### Aerial adaptations

**Aerial adaptations :** Birds are adapted for aerial mode of life. Some of the adaptations are :

1. Bones are hollow containing air cavities to make body light.
2. Birds have feathers and wings to fly. Their forelimbs are modified to function as wings.
3. They have sharp eye sight. E.g. Eagles can spot their prey from a great height.
4. Joints in the bones are completely fused.



Birds fly in air

On the basis of habitats, plants are divided into three categories :

1. **Hydrophytes** : These are plants which grow in water *i.e.* Lotus, *Eicchornia*, *Hydrilla*, water chestnut (singhara), etc.
2. **Mesophytes** : These are plants which like moderate temperature and sufficient water. These plants dominate other plants. Almost all herbs, shrubs, trees are placed under this category. The plants you see and those found in countryside and forests, all come under this category.
3. **Xerophytes** : These are land plants that are found in deserts or areas with very little water or moisture. Most of them have fleshy stems and leaves change into spines to avoid loss of water.

**Types of animals on the basis of habitat** : On the basis of habitats, the animals are also divided into four categories. These are :

1. **Aquatic** : These animals live in water. If taken out of water, they die. Examples are fishes, whale, molluscs, starfish, etc.
2. **Terrestrial** : These animals live on land. Horse, cow, buffalo, cat, dog, giraffe, lion, squirrel, camel along with host of other animals belong to this group.
3. **Amphibian** : These are the organisms which can live both on land as well as in water. Frog and toad are examples of this group.
4. **Arboreal** : Monkeys, squirrels, some spiders, a few snakes and a host of other animals are arboreal *i.e.*, they live on trees.



Lotus plant



Mesophytes



Xerophytes

**Characteristics of Living Things** : Human beings, animals and plants all need food to survive. Trees, creepers, birds, flowers, insects, animals and seeds are all living things. Soil, bench, water, air and dry leaves are all non-living things. The characteristics of living things are:

**Living Things Need Food** : Living things need food to survive and grow. Food makes the body grow faster, and gives energy to the body to help it perform the life activities. For example, plants produce their own food by the process of photosynthesis, and grow. Animals depend on plants and other food for their survival.

**Living Things Grow** : As living things take food, they get more and more energy and grow faster. All living things grow continuously.

**Living Things Respire** : Respiration is the process of breathing in and out. Living things take **oxygen** into the body as they breathe in and release **carbon dioxide** as they breathe out. The oxygen that enters the body during respiration helps the body to create energy from the food consumed. Some animals have special organs that help them in the process of respiration.

For example, the gills of fish help them to absorb oxygen dissolved in water. Earthworms breathe through their skin. Plants have tiny pores on the leaves that help them to breathe.

Plants respire day and night, but breathe out oxygen during the day. Plants release more oxygen while producing their food than they release during respiration.

**Living Things Respond to Stimuli** : Stimulus is a change of some kind in the environment of a living organism. Every living thing responds in some way or the other to **stimuli**. The response in plants to stimulus can be observed easily.

For example, a plant called touch-me-not closes its leaves when touched. Also, the Evening primrose blooms only during the night, while the flowers of *Mentzelia mollis* close after sunset.

**Living Things Excrete :** The process of eliminating wastes from the body is called **excretion**. Living things need food, but they only absorb some amount of it for various processes, while the remaining food needs to be eliminated from the body. For example, plants eliminate harmful waste substances in the form of secretions such as resins and gums, whereas some plants store the harmful substances without any difficulty.

**Living Things Reproduce :** All living things **reproduce**. Some animals lay **eggs**, while others reproduce by giving **birth to young ones**. Plants produce seeds that can germinate into a new plant, but there are some, such as potato and rose plants, which reproduce through other parts.

**Living Things Move :** Even though plants are living things, they cannot move as their roots are fixed in the soil. However, the substances produced and required for their growth, such as water, minerals and food, move from one part of a plant to another. Some plants show some restricted movement. Animals have various modes of locomotion.

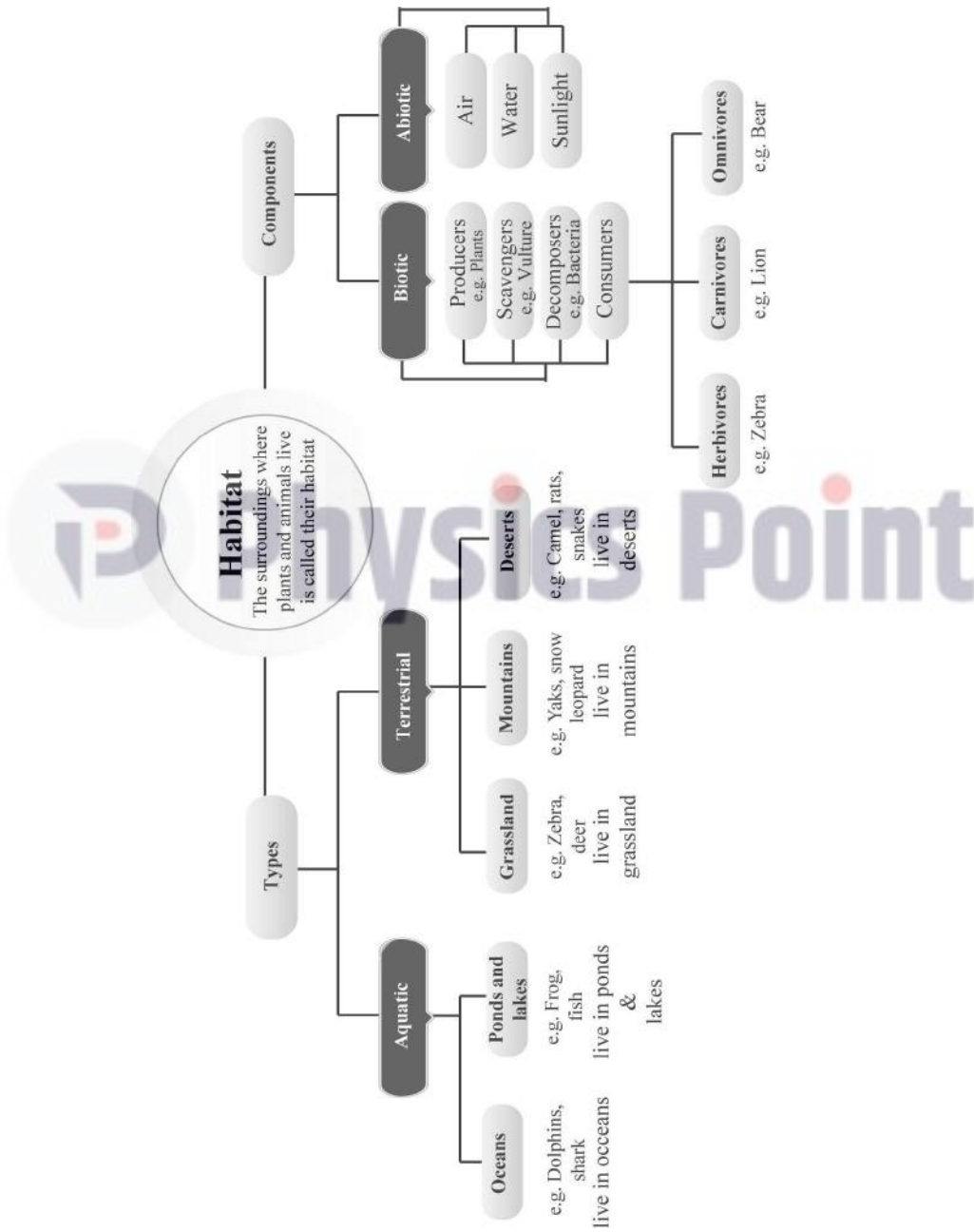
**Living Things Die :** All living things must die one day or another. Plants and animals die.

All living things possess these characteristics, whereas non-livings do not have these characteristics.

#### KEYWORDS

- **Ecology :** Study of relationship between living things and their environment.
- **Adaptation :** Feature that helps an organism survive in a place where the conditions for the existence of a living organism are present.
- **Habitat :** A place where the conditions for the existence of a living organism are present.
- **Hibernation :** A period of rest and sleep during winter months by an organism.

## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- The specific feature that enables a plant or an animal to live in a particular habitat is called .....
- Soil, water and air are the ..... factors of a habitat.
- The habitat of plants animals that live in water are called ..... habitat.
- Living things produce more of their own kind through .....
- Brown colour of Lion helps it to hide in dry grasslands while hunting, thus it is a .....

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- Fish can see in water.
- In desert trees, leaves shape them as spines and stem becomes green to produce food.
- Cactus plant live in so much heat and very less water, because of acclimatization.
- Mountains are not terrestrial habitat.
- Some plants like pitcher plant have pitcher with lid. This has grown as adaptation.
- Buffalo sweats heavily.
- Dolphins are the most wise aquatic animals that's why they are friendly with human.
- Animals adapt according to abiotic constituents whereas plants cannot adapt.
- All living things reproduce.
- Living things die in cold conditions.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched.

- |           |                                                              |                               |
|-----------|--------------------------------------------------------------|-------------------------------|
| <b>1.</b> | <b>Column I</b>                                              | <b>Column II</b>              |
|           | (A) Bird                                                     | (p) Desert adaptations        |
|           | (B) Cockroach                                                | (q) Nocturnal                 |
|           | (C) Camel                                                    | (r) Xerophyte                 |
|           | (D) Cat                                                      | (s) Volant adaptation         |
|           | (E) Cactus                                                   | (t) Terrestrial               |
| <b>2.</b> | <b>Column I</b>                                              | <b>Column II</b>              |
|           | (A) Excrete small urine                                      | (p) Snow leopard              |
|           | (B) Webbed feet                                              | (q) Predators                 |
|           | (C) Animals have thick fur on its body including feet & toes | (r) Help in swimming in water |
|           | (D) Highly divided leaves                                    | (s) Camel                     |
|           | (E) Animal which eat other animals                           | (t) Aquatic submerged plant   |

## Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

- What are predators?
- Name two plants found on mountains.
- What is the function of gills?
- Write one characteristic feature of fish that helps it to live comfortably in water.
- What is called as the ship of desert?
- What is the name of land habitat in which plants and animals live?
- Do plants also excrete?
- What is the name of water habitat in which plants and animals live?
- What is a prey?

10. Name the components of a habitat.
11. Dolphins and whales do not have gills yet they breathe in water. How?
12. What is a habitat?
13. What do you understand by excretion?
7. How much time does adaptation take to occur?
8. How do rats and snake escape from the intense heat of the desert?
9. How do yaks and snow leopard protect themselves from extreme cold?

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. What features made crocodiles so adaptable to live on earth for the longest time?
2. What are the features in fish that make it suitable to live in water?
3. (a) What type of adaptation is found in a deer, that helps it to see in all the directions?  
(b) How does exchange of gases take place in an earthworm?
4. Which components are included in biotic and abiotic components?
5. What is an adaptation?
6. What do the biotic and abiotic components include?

10. Write any three features that a deer has to protect itself from its predators.
11. How adaptations help an organism to survive?
12. How is a camel adapted for the desert environment?

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. Where is cactus mostly found? How is it adapted to survive in such habitat?
2. Define the following :  
(i) Prey (ii) Predators  
(iii) Acclimatization (iv) Adaptation  
(v) Stimuli
3. List the common characteristics of the living things.

## 2

## EXERCISE

### Text Book Questions

1. What is a habitat?
2. How is cactus adapted to survive in a desert?
3. Fill in the blanks.  
(a) The presence of specific features, which enable a plant or an animal to live in a particular habitat, is called \_\_\_\_\_.  
(b) The habitats of the plants and animals that live on land are called \_\_\_\_\_ habitat.  
(c) The habitats of plants and animals that live in water are called \_\_\_\_\_ habitat.  
(d) Soil, water and air are the \_\_\_\_\_ factors of a habitat.  
(e) Changes in our surroundings that make us respond to them, are called \_\_\_\_\_.
4. Which of the things in the following list are non-living?  
Plough, Mushroom, Sewing machine, Radio, Boat, Water hyacinth, Earthworm
5. Give an example of a non-living thing, which shows any two characteristics of living things.
6. Which of the non-living things listed below, were once part of a living thing?  
*Butter, Leather, Soil, Wool, Electric bulb, Cooking oil, Salt, Apple, Rubber*
7. List the common characteristics of the living things.
8. Explain, why speed is important for survival in the grasslands for animals that live there.

### NCERT Exemplar Questions

1. Unscramble the given words below to get the correct word using the clues given against them.  
(a) SATPADAOINT Specific features or certain habits which



- enable a living being to live in its surroundings.
- (b) RETECOXNI Waste products are removed by this process.
- (c) LUMISIT All living things respond to these. Because of this we find organisms of the same kind.
- (d) ROUCDPR-ENTOI Because of this we find organisms of the same kind.
2. Using the following words, write the habitat of each animal given in the figures (a) to (d).  
*Grassland, Mountain, Desert, Pond, River*
- 

(a)



(b)
- 

(c)



(d)
3. Classify the following habitats into terrestrial and aquatic types.  
*Grassland, Pond, Ocean, Rice field*
4. Why is reproduction important for organisms?
5. Paheli has a rose plant in her garden. How can she increase the number of rose plants in the garden?
6. Why do desert snakes burrow deep into the sand during the day?
7. Write the adaptation in aquatic plants due to which
- (i) submerged leaves can bend in the flowing water.
  - (ii) leaves can float on the surface of water.
8. Mention one adaptation present in the following animals:
- (i) In camels to keep their bodies away from the heat of sand.
  - (ii) In frogs to enable them to swim.
  - (iii) In dolphins and whales to breathe in air when they swim near the surface of water.
9. Some desert plants have very small leaves whereas some others have only spines. How does this benefit the plants?
10. Like many animals although a car also moves but it is not considered as a living organism. Give 2-3 reasons.
11. What are the adaptive features of a lion that help it in hunting?

### HOTS Questions

1. Explain, why speed is important for survival in the grasslands for animals that live there.
2. Why does a fish die when kept outside of water?

## 3

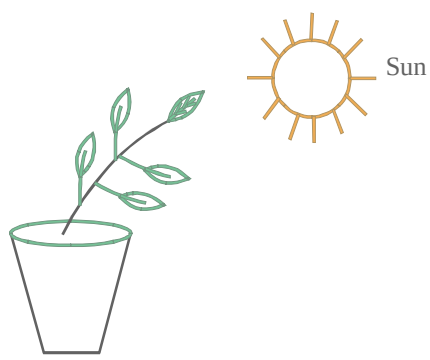
## EXERCISE

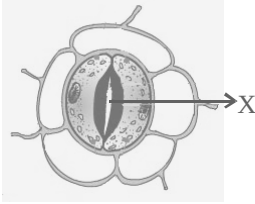
### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which only one is correct.

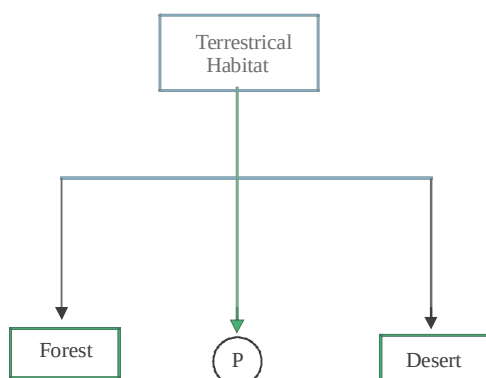
1. Select the characteristics that a plant adapt to survive in desert
  - (a) its leaves are modified into spines
  - (b) its stem is covered with thick waxy layer
  - (c) its root penetrate deep into the ground
  - (d) All of the above
2. The adaptations observed in animals living in mountain habitat are/is
  - (a) they have thick skin and fur
  - (b) they have scales on their bodies
  - (c) Both the above
  - (d) None of the above
3. Which of the following is not a long term adaptation?
  - (a) Feathers in a bird
  - (b) Tanning of skin
  - (c) Prehensile tail
  - (d) Streamlined body

4. Polar bear lives at
  - (a) north pole only
  - (b) south pole only
  - (c) both north pole and south pole
  - (d) both at north pole, south pole and also some forests
5. Select a process in which there is no increase in amount of carbon dioxide in air
  - (a) Breathing
  - (b) Respiration
  - (c) Photosynthesis
  - (d) Decay of vegetation
6. Which of the following is/are terrestrial habitats?
  - (a) Forests
  - (b) Grasslands
  - (c) Desert
  - (d) All of these
7. Which of the following are/is biotic components of a habitat?
  - (a) Lion
  - (b) Tiger
  - (c) Plants
  - (d) All of these
8. From amongst the following, select the abiotic components
  - (i) Air
  - (ii) Water
  - (iii) Heat
  - (iv) Sunlight
  - (a) (i) and (ii) only
  - (b) (ii) and (iii) only
  - (c) (iii) and (iv) only
  - (d) All of these
9. Germination means
  - (a) the beginning of growth of a seed after a period of dormancy
  - (b) the beginning of a new plant from a seed
  - (c) Both the above
  - (d) None of the above
10. The long legs of a camel
  - (a) help it to move fast
  - (b) help it to keep its body away from heat of sand
  - (c) help it to defend itself from its enemies
  - (d) All of the above
11. In desert plants, the process of photosynthesis is carried out by
  - (a) leaves
  - (b) roots
  - (c) stems
  - (d) branches
12. In trees of mountain region, we generally find that
  - (a) they are cone shaped
  - (b) they have non-sloping branch
  - (c) they have needle like leaves
  - (d) only (a) and (c) are correct
13. A snow leopard
  - (a) has thick fur on its body but not on its feet & toes
  - (b) has thick fur on its body including its feet and toes
  - (c) Both the above
  - (d) None of the above
14. Select an animal whose body is not streamlined. However when they move in water they make the body shape streamlined.
  - (a) Squids
  - (b) Octopus
  - (c) Both of these
  - (d) None of these
15. Which of the following is correct for frogs?
  - (a) They usually have ponds as their habitat.
  - (b) They have strong front legs.
  - (c) Both the above
  - (d) None of these
16. An instrument used for measuring the rate of transpiration is a
  - (a) Potometer
  - (b) Klinometer
  - (c) Hygrometer
  - (d) Osmometer
17. The sugar and starch content in leaves would be at its lowest
  - (a) at mid morning
  - (b) in early afternoon
  - (c) in early evening
  - (d) at dawn
18. The rest period which many seeds undergo before they begin to grow is called
  - (a) Viability
  - (b) Germination
  - (c) Pollination
  - (d) Dormancy
19. An example of a predator is a
  - (a) mouse
  - (b) lion
  - (c) rabbit
  - (d) deer
20. On land the frog respire mainly by means of its
  - (a) skin
  - (b) lungs
  - (c) gills
  - (d) mouth
21. If a green leaf of a land plant is immersed in water, which of the following processes do not take place?
  - (a) Respiration
  - (b) Photosynthesis
  - (c) Transpiration
  - (d) None of these
22. The adaptation that helps a polar bear to locate its prey is \_\_\_\_\_.
  - (a) its very strong sense of smell
  - (b) its long, curved and sharp claws
  - (c) its white fur that is not easily visible in the snowy white back ground
  - (d) layer of fat under its skin

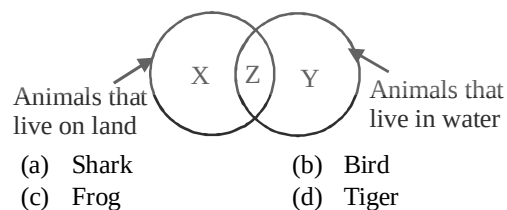
23. Which of the following adaptation is not shown by polar bear?
- Its body is streamlined.
  - It has two thick layers of fur.
  - It has long, curved and sharp claws.
  - It has a layer of fat under the skin.
24. Select the incorrect statement.  
In cactus plants,
- the process of photosynthesis is generally carried out by leaves.
  - the process of photosynthesis is generally carried out by stems.
  - the stem is covered with a thick waxy layer.
  - All of the above
25. In which of the following animals the breathing process is similar to that of human beings?
- Cows
  - Earthworm
  - Fish
  - None of these
26. In earthworm the process of breathing occurs
- through its nose
  - through its skin
  - through its mouth
  - None of these
27. Respiration in plants take place
- only during day time
  - only during night time
  - day and night
  - only in presence of sunlight
28. Frog belongs to which category?
- Terrestrial
  - Aquatic
  - Amphibious
  - Aerial
29. Frog catches its prey with the help of \_\_\_\_\_.
- teeth
  - legs
  - mouath
  - tongue
30. What type of leaves are present in submerged plants?
- Spinous
  - Narrow, long and thin
  - Thick
  - Having layer of wax like substance
31. Horse : Terrestrial :: Tortoise : \_\_\_\_\_
- Terrestrial
  - Aquatic
  - Amphibious
  - Vertebrate
32. Plants do not move from one place to another in search of food and shelter. Some plants like *Mimosa* (Touch-me-not) show leaf movements. A sunflower always faces the sun. From the above paragraph what can be concluded?
- Plants can move their body parts
  - Plants response to stimulus
  - Plants show locomotion
  - Both (a) and (b)
33. When a seed is buried in the soil, in which direction will its root and stem grow?
- | Root                | Stem            |
|---------------------|-----------------|
| (a) Towards earth   | Away from earth |
| (b) Away from earth | Towards earth   |
| (c) Towards earth   | Towards earth   |
| (d) Away from earth | Away from earth |
34. A camel is a desert animal. It shows many adaptations. Which of the following statements (P, Q, R & S) is incorrect ?  
P - It has a hump where fat is stored.  
Q - It can stay without water for long time.  
R - It sweats a lot.  
S - It excretes large amount of urine.
- P only
  - Q only
  - P & Q
  - R & S
35. A plant shows the following features
- roots are reduced in size
  - stems are long
  - stems have spaces
  - leaves are large and flat
- To which category does this plant belong to?
- Polar region
  - Desert
  - Rainforest
  - Oceans
36. 
- The plant shows
- Phototropism
  - Geotropism
  - Photosynthesis
  - Respiration
37. Small changes take place in the body of a single organism over short period to overcome small problems due to changes in environment is called
- Habitat
  - Adaptation
  - Acclimatization
  - Habit

38. Exchange of gases in plants take place through tiny pores on leaves called \_\_\_\_\_.  
 (a) holes (b) stomata  
 (c) veins (d) None of these
39. Earthworm breathes through  
 (a) gills (b) skin  
 (c) lungs (d) stomata
40. The structure marked X in the given picture is involved in
- 
- (a) Exchange of gases during respiration  
 (b) Release of water  
 (c) Exchange of gases during photosynthesis  
 (d) Both (a) and (c)
41. A plant that loses very little water through transpiration and has very small leaves is adapted to which of the following habitats?  
 (a) Mountain regions  
 (b) Grasslands  
 (c) Forests  
 (d) Deserts
42. The type of habitat that is very cold and windy and in some areas of which snowfall occurs in winters is  
 (a) mountain regions  
 (b) grasslands  
 (c) forests  
 (d) deserts
43. An animal that live in grasslands, has strong teeth for chewing hard plant stems and has long ears to hear movement of predators is  
 (a) Lion (b) Tiger  
 (c) Deer (d) All of these
44. It is an aquatic animal. It has no gills. They breathe in air through their nostrils or blow holes. It is  
 (a) Dolphins (b) Octopus  
 (c) Both of these (d) None of these
45. The stems of plant are long, hollow and light, and its root are much reduced in size. It is adapted to which one of the following habitats?  
 (a) Desert (b) Terrestrial  
 (c) Aquatic (d) None of these
46. Which of the following statement(s) is/are correct?  
 (a) Ponds, swamps and lakes are examples of aquatic habitats.  
 (b) There is no variations in the habitats located in different parts of the world.  
 (c) A biotic community consists of a single population.  
 (d) Sunlight and heat are biotic components of a habitat.
47. Which of the following statement(s) is/are correct?  
 (a) The body structure of a camel helps it to survive in a desert.  
 (b) The dung of camel is dry.  
 (c) Camels do not sweat.  
 (d) All of the above
48. Which of the following statement(s) is/are correct?  
 (a) Xerophytes refers to desert plants and animals.  
 (b) There are no roots in desert plants.  
 (c) Desert plants do not show the process of transpiration.  
 (d) In mountains regions we see different kinds of adaptations at different heights.
49. Which of the following statement(s) is/are correct?  
 (a) Lions have long claws in their back legs.  
 (b) Deer live in forests.  
 (c) Mountain goat has weak hooves.  
 (d) All of the above
50. Which of the following statement(s) is/are correct?  
 (a) Sea animals can move easily in water because they have a streamlined body.  
 (b) The body of octopus is streamlined.  
 (c) The body of squids is streamlined.  
 (d) All of the above
51. The aquatic plants are buoyant because  
 (a) their stems are soft and spongy containing air cavities  
 (b) they have hollow stalk and huge disc like leaves which help the plant to float on water  
 (c) Both the above  
 (d) None of these
52. How does burrowing habit help desert animals to survive hot and dry conditions?  
 (a) The holes and burrows are comparatively cooler and moist  
 (b) By remaining in burrows during day time  
 (c) Both the above  
 (d) None of these

53. How many parts are there in a stamen?  
(a) 1 (b) 2 (c) 3 (d) 4
54. How many parts are there in a pistil?  
(a) 1 (b) 3 (c) 4 (d) 5
55. How many mid-ribs are there in a leaf?  
(a) 1 (b) 2 (c) 3 (d) 4
56. Which term means 'Adjustment to environment'?  
(a) Habitat  
(b) Adaptation  
(c) Hibernation  
(d) Aestivation
57. The following is a list of some plants and the habitat in which they live. Which one is mismatched?  
(a) Cactus-hot and dry places  
(b) Mango-marshy areas  
(c) Coconut-rot and damp places  
(d) Pinus-cold and hilly areas
58. Which of the following things are parts of the environment?  
(a) Only biotic components  
(b) Only abiotic components  
(c) Both biotic and abiotic components  
(d) Only plants and animals
59. Which pair is incorrectly paired?  
(a) Camel-desert  
(b) Polar bear-snow  
(c) Germs-air  
(d) Whale-river
60. Which of the following is an abiotic component of habitat?  
(a) Soil (b) Bacteria  
(c) Tulsi (d) Snake
61. Study the figure given below"



- Which of the following can be represented by 'P'?
- (a) Ocean (b) Island  
(c) Grassland (d) Snowland
62. Which organisms depends on abiotic components for food?  
(a) Plants (b) Fish  
(c) Birds (d) Insects
63. Look at the following statements. Which adaptation helps the camel to survive in the hot and dry desert.  
(i) It has a layer of fat under its skin  
(ii) It stores fat in its hump  
(iii) It stores water in its long neck  
(iv) It sleeps during day and is active at night  
(v) It has long legs  
(a) (i), (iii) and (iv) (b) (ii), (iv) and (v)  
(c) (ii) and (v) (d) (iii) and (iv)
64. Identify the odd one out  
(a) Desert-dolphin  
(b) Terrestrial-giraffe  
(c) Aquatic-deer  
(d) Terrestrial-whale
65. Which adaptation helps a cactus plant to survive in hot desert?  
(a) Leaf reduced to spine  
(b) Stem flat and leaf like  
(c) Roots not dap growing  
(d) Both (a) and (b)
66. Which characteristics protect an animal against cold weather?  
(i) Thin skin  
(ii) Thick skin  
(iii) Thick layer of fat under skin  
(a) (i) and (ii) only  
(b) (ii) and (iii) only  
(c) (i) and (iii) only  
(d) (i), (ii) and (iii)
67. In which habitat can the animals move very fast?  
(a) Ocean (b) Forest  
(c) Mountains (d) Grassland
68. Which animal can be grouped in 'Z'?



69. Which of these plants have long, hollow and light stems and light broad leaves floating on water?  
 (a) Cactus (b) Oak  
 (c) Water lily (d) Fungi
70. Frog shows many adaptations to survive on land and in water. Which of these following statements (P, Q, R and S) does not hold true?  
 P. They have webbed feet  
 Q. They have strong hind legs  
 R. They have scales on their bodies  
 S. They breathe through moist skin  
 (a) P and R (b) Q and S  
 (c) P and S (d) only R
71. Read the feature of a plant as given below.  
 (i) Leaves are needle like  
 (ii) Trees are conical  
 (iii) Branches are sloping  
 To which of these habitats does this plant belong?  
 (a) Desert (b) Aquatic  
 (c) Mountain (d) Greenland
72. Suppose you accidentally touch hot kettle. You would immediately remove your hand. The instant removal of hand is called \_\_\_\_\_.  
 (a) quick reaction (b) response  
 (c) stimulus (d) pain reaction
73. Living beings are characterized by all except – \_\_\_\_\_.  
 (a) Locomotion (b) Reproduction  
 (c) Crystallization (d) Respiration
74. Which of the following is not an example of response to stimulus?  
 (a) Closing of leaves of mimosa plant when touched  
 (b) Watering in mouth at the sight of good food  
 (c) A chick hatching from an egg.  
 (d) Shutting of eyes when something is thrown suddenly in our direction
75. Which one the following in not correct about excretion?  
 (a) Excretion occurs in plants  
 (b) Excretion occurs in plants and animals  
 (c) Secretion is a method of excretion  
 (d) Excretion is a method of getting rid of excess water.
76. Choose the odd one out from below with respect to reproduction.  
 (a) seeds of potato  
 (b) Roots of peepal tree  
 (c) Buds of potato  
 (d) Eggs of snake
77. Although living things die, their kind continues to live on earth. Which characteristic makes this possible  
 (a) Respiration (b) Movement  
 (c) Reproduction (d) Excretion
78. An organism 'P' has hair on its body. It has given birth to young ones that feed on their mothers milk. Which organism is 'p'?  
 (a) Lizard (b) Frog  
 (c) Rabbit (d) Crocodile
79. A cow gives birth to calf and a chicken lays eggs. Which characteristic feature of living things is proved by the given statements?  
 (a) All living things respond to stimuli  
 (b) All living things grow  
 (c) All living things reproduce  
 (d) Some living things reproduce.
80. The earth has so many different types of plants and animals. Which word least describes the above statement?  
 (a) Division (b) Similarity  
 (c) Diversity (d) Tropical

### Statement Based Questions

**DIRECTIONS :** Read the following two statements carefully and choose the correct options.

- (i) Trees like oaks, pines and deodars are found in plains.  
 (ii) Trees found on mountains are different from those found in plains.  
 (a) (i) is correct but (ii) is false  
 (b) (ii) is correct but (i) is false  
 (c) Both are correct  
 (d) Both are false
- (i) Various kind of organisms are found in every kind of places.  
 (ii) There are no living organisms in the openings of volcanoes.  
 (a) (i) is correct but (ii) is false  
 (b) (ii) is correct but (i) is false  
 (c) Both are correct  
 (d) Both are false
- (i) A camel has long legs so that they can reach to tall trees.  
 (ii) They excrete dry dung so as to store water.  
 (a) (i) is correct but (ii) is false  
 (b) (ii) is correct but (i) is false  
 (c) Both are correct  
 (d) Both are false



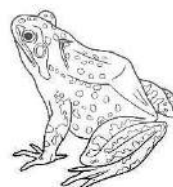
4. (i) Fish has a boat shaped body to swim in water line.  
(ii) Fish breathe through special organs called fins.  
(iii) Scales help in taking in dissolved oxygen.  
(a) (i) is correct but (ii) and (iii) are false  
(b) (ii) is correct but (i) and (iii) are false  
(c) (iii) is correct but (i) and (ii) are false  
(d) All are correct.
5. (i) A camel is suited to live in a desert.  
(ii) Different animals are adapted to their surroundings in different ways.  
(a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
(b) Both are correct and (ii) is correct explanation of (i)  
(c) Both are incorrect.  
(d) (i) is correct but (ii) is incorrect.
6. (i) Forests, grassland, deserts, mountains are terrestrial habitats.  
(ii) Plants and animals that live on land are called terrestrial animals  
(a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
(b) Both are correct and (ii) is correct explanation of (i)  
(c) Both are incorrect.  
(d) (i) is correct but (ii) is incorrect.
7. (i) The living components of a habitat are called abiotic components.  
(ii) Plants and animals are biotic components.  
(a) (i) in correct but (ii) in false  
(b) (ii) in correct but (i) in false  
(c) Both are correct  
(d) Both are false
8. (i) Seeds kept in refrigerator and dark room fail to germinate  
(ii) Water and air are necessary for seeds to germinate  
(a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
(b) Both are correct and (ii) is correct explanation of (i)  
(c) Both are incorrect.  
(d) (i) is correct but (ii) is incorrect.
9. (i) Animals adapt to different abiotic factors in similar ways.  
(ii) Animals which adapt to changes die while those which cannot adapt survive.  
(a) (i) and (ii) are correct but (ii) is not correct explanation of (i)
- (b) Both are correct and (ii) is correct explanation of (i)  
(c) Both are incorrect.  
(d) (i) is correct but (ii) is incorrect.
10. (i) A cactus has stem that functions like a leaf.  
(ii) The leaves are reduced to spines.  
(a) (i) in correct but (ii) in false  
(b) (ii) in correct but (i) in false  
(c) Both are correct  
(d) Both are false
11. (i) Trees growing on mountain have needle shaped leaves to prevent loss of water through transpiration.  
(ii) Snow animals have thick skin to keep them warm.  
(a) (i) in correct but (ii) in false  
(b) (ii) in correct but (i) in false  
(c) Both are correct  
(d) Both are false
12. (i) Trees growing on high mountains have sloping branches and are cone shaped.  
(ii) Rain water and snow can easily slide off the sloping branches.  
(a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
(b) Both are correct and (ii) is correct explanation of (i)  
(c) Both are incorrect.  
(d) (i) is correct but (ii) is incorrect.
13. (i) A mountain goat cannot run up the rocky slopes of mountains.  
(ii) A mountain goat has weak nooves.  
(a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
(b) Both are correct and (ii) is correct explanation of (i)  
(c) Both are incorrect.  
(d) (i) is correct but (ii) is incorrect.
14. (i) A deer has long ears and eyes on the side of its head.  
(ii) Speed of deer helps it to run away from danger.  
(a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
(b) Both are correct and (ii) is correct explanation of (i)  
(c) Both are incorrect.  
(d) (i) is correct but (ii) is incorrect.
15. (i) Octopus and squids do not have streamline bodies.  
(ii) Streamline bodies helps animals to move easily in water.  
(a) (i) and (ii) are correct but (ii) is not correct explanation of (i)

- (b) Both are correct and (ii) is correct explanation of (i)  
 (c) Both are incorrect.  
 (d) (i) is correct but (ii) is incorrect.
16. (i) Dolphins come out to the surface of sea water from time to time.  
 (ii) Dolphins have blowholes on their heads to breathe in air.  
 (a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
 (b) Both are correct and (ii) is correct explanation of (i)  
 (c) Both are incorrect.  
 (d) (i) is correct but (ii) is incorrect.
17. (i) Aquatic plants have roots that are deeply penetrated in soil.  
 (ii) The leaves are narrow and can float on water.  
 (a) (i) is correct but (ii) is false  
 (b) (ii) is correct but (i) is false  
 (c) Both are correct  
 (d) Both are false
18. (i) Frogs have strong front legs that help them in leaping  
 (ii) They have webbed feet that help them to walk on land.
19. (i) All living things need food to survive.  
 (ii) Food gives energy to carry out various life processes.  
 (iii) Plants prepare their own food and animals depend on plants and other animals for food.  
 (a) (i) is correct but (ii) and (iii) are false  
 (b) (ii) is correct but (i) and (iii) are false  
 (c) (iii) is correct but (i) and (ii) are false  
 (d) All are correct.
20. (i) All living things do not grow.  
 (ii) All living things respire.  
 (iii) Plants respire during daytime.  
 (a) (i) is correct but (ii) and (iii) are false  
 (b) (ii) is correct but (i) and (iii) are false  
 (c) (iii) is correct but (i) and (ii) are false  
 (d) All are correct.
21. (i) Plants do not respond to stimuli, only animals respond.  
 (ii) We shut our eyes when we move from a dark place to a bright sunlight area.  
 (a) (i) is correct but (ii) is false  
 (b) (ii) is correct but (i) is false  
 (c) Both are correct  
 (d) Both are false
22. (i) Some plants store their waste products within their parts.  
 (ii) Some plants remove waste products as secretions  
 (a) (i) is correct but (ii) is false  
 (b) (ii) is correct but (i) is false  
 (c) Both are correct  
 (d) Both are false
23. (i) All animals do not reproduce their own kind.  
 (ii) All plants reproduce through seeds.  
 (iii) Animals undergo different modes of reproduction.  
 (a) (i) is correct but (ii) and (iii) are false  
 (b) (ii) is correct but (i) and (iii) are false  
 (c) (iii) is correct but (i) and (ii) are false  
 (d) All are correct.
24. (i) Plants do not show any kind of movement.  
 (ii) Non-living things like car, bus and clouds move on their own.  
 (iii) Animals move from place to place and also show body movements.  
 (a) (i) is correct but (ii) and (iii) are false  
 (b) (ii) is correct but (i) and (iii) are false  
 (c) (iii) is correct but (i) and (ii) are false  
 (d) All are correct.
25. (i) All living things have some common characteristics.  
 (ii) Non living things may not show all these characteristics at the same time.  
 (a) (i) is correct but (ii) is false  
 (b) (ii) is correct but (i) is false  
 (c) Both are correct  
 (d) Both are false

### Figure/Diagram Based Questions

**DIRECTIONS :** Carefully observe the following pictures and answer the questions.

1. What adaptations do the organism shown in figure have?



- (a) Strong back legs      (b) Webbed feet  
 (c) Both (a) and (b)      (d) None of these

2. The plant shown in picture is a desert plant. Which of the following characteristics does it adapt to survive in deserts?



- (a) its leaves are modified into spines  
(b) its stem is covered with thick waxy layer  
(c) its root penetrate deep into the ground  
(d) All of the above
3. Look at the pictures below and tell which of the following is correct?



(i)

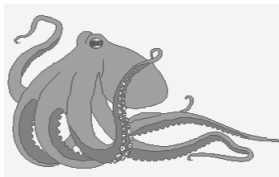


(ii)



(iii)

- (a) (i) and (ii) have deserts as their habitat  
(b) (i) lives in forest  
(c) (iii) has grassland as its habitat  
(d) (i), (ii) and (iii) have mountain range as their habitat.
4. Which of the following animals have no gills?



(i)



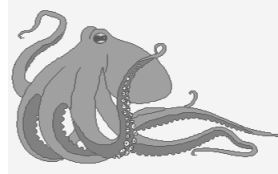
(ii)



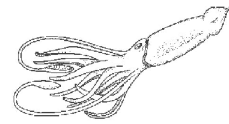
(iii)

- (a) Both (i) and (ii) (b) Both (ii) and (iii)  
(c) Both (i) and (iii) (d) All of these

5. Select the one having streamlined bodies.



(A)



(B)

- (a) Only A (b) Only B  
(c) Both A and B (d) None of these

6. Look at the following picture. Which animals can be found in the place shown in the picture?



- (a) Camel and Goat  
(b) Tiger and Leopard  
(c) Polar bear and Snow leopard  
(d) Shark and Giraffe

7. Look at this animal. It can survive without water for many days. which adaptation helps it to live without water?



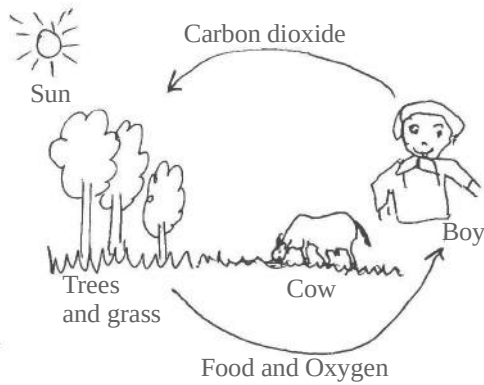
- (a) Long legs (b) Hump  
(c) Big eyes (d) dry dung

8. Observe the following fish in an aquarium. Fish have slippery scales on their bodies. What is the function of scales?



- (a) To breathe and eat  
(b) To protect their body and move easily in water  
(c) To move fast and excrete  
(d) To change directions and maintain balance

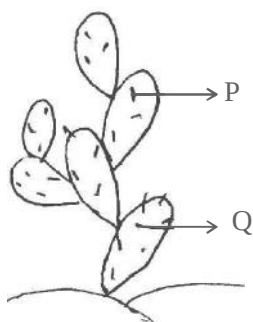
9. What does the figure given below represent?



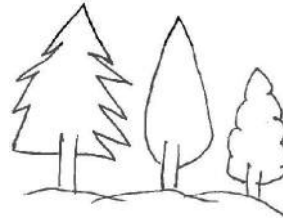
- (a) Biotic components only  
 (b) Abiotic components only  
 (c) Interdependence between animals and plants  
 (d) Interdependence between animals.
10. Look at the rats and snakes hiding in burrows. In which habitat will you see such burrows?



- (a) Ponds (b) Polar region  
 (c) Ocean (d) Desert
11. Look at this plant. Identify P and Q.



- (a) P stomata, Q leaf (b) P stem, Q leaf  
 (c) P leaf, Q stem (d) P branch, Q fruit
12. Under what climatic conditions will the following trees grow.



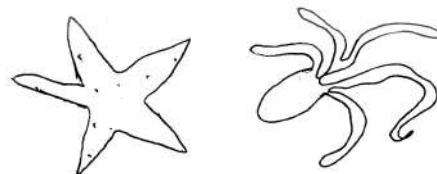
- (a) hot and humid (b) cold and snowy  
 (c) cold and dry (d) hot and dry
13. Look at these animals. Which adaption helps them to survive in their habitat?

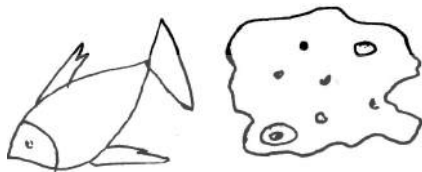


- (a) Long claws in the front legs  
 (b) Long ears  
 (c) Thick skin and long hair  
 (d) Thin skin and short hair
14. Look at the following animals. Who is the prey and the predator?

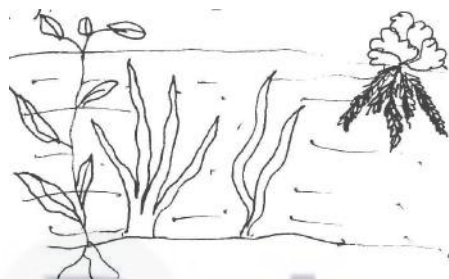


- (a) P pray, Q prey  
 (b) P prey, Q predator  
 (c) P predator, Q prey  
 (d) P predator, Q predator
15. Look at the following animals. What is the common character in these animals?





- (a) They all have streamlined body
- (b) They all have backbone
- (c) They all are aquatic
- (d) They all lay eggs.

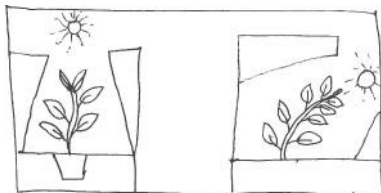


16.

There are plants living in water too. They have leaves that are adapted to different conditions. Some leaves can easily bend in flowing water. Which adaptation help them bend in water?

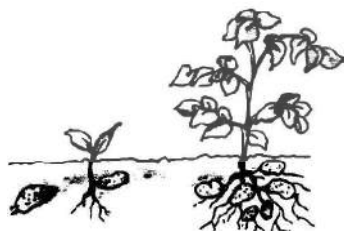
- (a) Broad big leaves
- (b) Narrow ribbon like leaves
- (c) Divided leaves
- (d) Needle like leaves

17. The plant in the given figure responds to



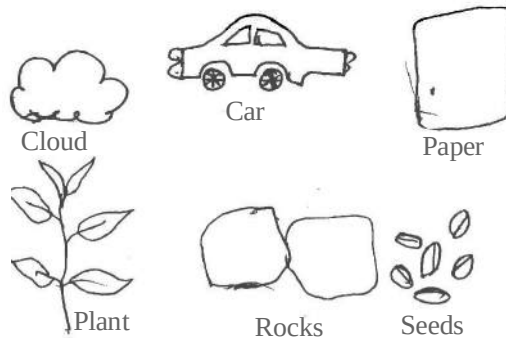
- (a) Touch
- (b) Water
- (c) Gravity
- (d) Sunlight

18. Look at the following figure, which method of reproduction is shown below.



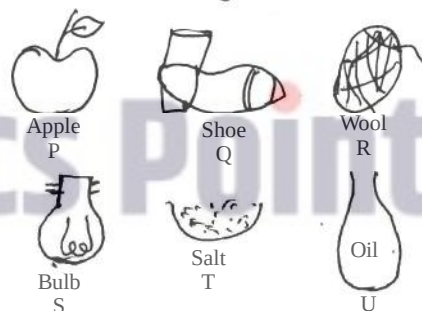
- (a) Seeds
- (b) Young ones
- (c) Bud
- (d) Cutting

19. Find the odd one from the following list.



- (a) Rocks and paper
- (b) Car and cloud
- (c) Plant and seeds
- (d) Seed and cloud

20. Which of the following things were once part of a living thing?



- (a) P, R and T
- (b) P, Q, R, T.
- (c) P, Q, R, U
- (d) S, T, R

### Matching Based Questions

**DIRECTIONS :** Match Columns I with II and select the correct answer using the code given below.

| 1. Column I                    | Column II            |
|--------------------------------|----------------------|
| (A) Casuarina                  | (p) Mountains        |
| (B) Pine                       | (q) Plains           |
| (C) Neem                       | (r) Sea beach        |
| (D) Cactus                     | (s) Desert           |
| (a) A → s; B → r; C → p; D → q |                      |
| (b) A → r; B → p; C → q; D → s |                      |
| (c) A → q; B → s; C → p; D → r |                      |
| (d) A → p; B → q; C → r; D → s |                      |
| 2. Column I                    | Column II            |
| (A) Organisms                  | (p) Surroundings     |
| (B) Habitat                    | (q) Salty            |
| (C) Saline                     | (r) Way of living    |
| (D) Habit                      | (s) Living creatures |



- (a)  $A \rightarrow q; B \rightarrow r; C \rightarrow p; D \rightarrow s$   
 (b)  $A \rightarrow s; B \rightarrow q; C \rightarrow r; D \rightarrow p$   
 (c)  $A \rightarrow s; B \rightarrow p; C \rightarrow q; D \rightarrow r$   
 (d)  $A \rightarrow p; B \rightarrow s; C \rightarrow r; D \rightarrow q$
3. **Column I** **Column II**  
 (A) Terrestrial (p) long term changes  
 (B) Aquatic (q) living on land  
 (C) Adaptation (r) short term changes  
 (D) Acclimatization (s) living in water  
 (a)  $A \rightarrow q; B \rightarrow s; C \rightarrow p; D \rightarrow r$   
 (b)  $A \rightarrow s; B \rightarrow q; C \rightarrow p; D \rightarrow r$   
 (c)  $A \rightarrow s; B \rightarrow q; C \rightarrow r; D \rightarrow p$   
 (d)  $A \rightarrow q; B \rightarrow s; C \rightarrow r; D \rightarrow p$
4. **Column I** **Column II**  
 (A) Yaks, goats (p) water  
 (B) Rats, camels (q) everywhere  
 (C) Crabs, fish (r) desert  
 (D) Ants. (s) mountains  
 (a)  $A \rightarrow s; B \rightarrow p; C \rightarrow r; D \rightarrow q$   
 (b)  $A \rightarrow q; B \rightarrow r; C \rightarrow p; D \rightarrow s$   
 (c)  $A \rightarrow r; B \rightarrow q; C \rightarrow s; D \rightarrow p$   
 (d)  $A \rightarrow s; B \rightarrow r; C \rightarrow p; D \rightarrow q$
5. **Column I** **Column II**  
 (A) Camel (p) scales  
 (B) Fish (q) streamline body  
 (r) lungs  
 (s) long legs  
 (t) gills  
 (u) dry dung  
 (a)  $A \rightarrow q, r, s, u; B \rightarrow p, t$   
 (b)  $A \rightarrow r, s, u; B \rightarrow p, q, t$   
 (c)  $A \rightarrow s, t; B \rightarrow p, q, r, u$   
 (d)  $A \rightarrow r, u; B \rightarrow p, q, s, t$
6. **Column I** **Column II**  
 (A) Biotic (p) soil, water, air  
 (B) Abiotic (q) forest, mountain, desert  
 (C) Terrestrial (r) plants, mosses, animals  
 (D) Aquatic (s) sea, rivers, ponds  
 (a)  $A \rightarrow p; B \rightarrow r; C \rightarrow A; D \rightarrow q$   
 (b)  $A \rightarrow q; B \rightarrow r; C \rightarrow p; D \rightarrow r$   
 (c)  $A \rightarrow r; B \rightarrow p; C \rightarrow q; D \rightarrow s$   
 (d)  $A \rightarrow p; B \rightarrow r; C \rightarrow q; D \rightarrow s$
7. **Column I** **Column II**  
 (A) Snow leopard (p) grassland  
 (B) Whales (q) snow mountains  
 (C) Deer (r) oceans  
 (D) Goat (s) mountains  
 (a)  $A \rightarrow q; B \rightarrow r; C \rightarrow p; D \rightarrow s$   
 (b)  $A \rightarrow s; B \rightarrow r; C \rightarrow p; D \rightarrow q$   
 (c)  $A \rightarrow q; B \rightarrow r; C \rightarrow s; D \rightarrow p$   
 (d)  $A \rightarrow s; B \rightarrow r; C \rightarrow q; D \rightarrow p$
8. **Column I** **Column II**  
 (A) Desert (p) broad leaves  
 (B) Mountains (q) spines are leaves  
 (C) Water (r) needle shaped leaves  
 (D) Tropical forests (s) narrow & ribbon shaped leaves  
 (a)  $A \rightarrow s; B \rightarrow q; C \rightarrow p; D \rightarrow r$   
 (b)  $A \rightarrow r; B \rightarrow q; C \rightarrow s; D \rightarrow p$   
 (c)  $A \rightarrow r; B \rightarrow q; C \rightarrow p; D \rightarrow s$   
 (d)  $A \rightarrow q; B \rightarrow r; C \rightarrow s; D \rightarrow p$
9. **Column I** **Column II**  
 (A) Sloping branches (p) water plants  
 (B) Aquatic (q) mountain trees  
 (C) Floating leaves (r) desert plants  
 (a)  $A \rightarrow r; B \rightarrow q; C \rightarrow p$   
 (b)  $A \rightarrow p; B \rightarrow q; C \rightarrow r$   
 (c)  $A \rightarrow q; B \rightarrow r; C \rightarrow p$   
 (d)  $A \rightarrow q; B \rightarrow p; C \rightarrow r$
10. **Column I** **Column II**  
 (A) Lion (p) long hairs  
 (B) Deer (q) strong hooves  
 (C) Yak (r) long ears  
 (D) Mountain goat (s) retracting leaves  
 (a)  $A \rightarrow r; B \rightarrow s; C \rightarrow q; D \rightarrow p$   
 (b)  $A \rightarrow s; B \rightarrow r; C \rightarrow p; D \rightarrow q$   
 (c)  $A \rightarrow s; B \rightarrow r; C \rightarrow q; D \rightarrow p$   
 (d)  $A \rightarrow p; B \rightarrow q; C \rightarrow s; D \rightarrow r$
11. **Column I** **Column II**  
 (A) Dolphin (p) Moist skin  
 (B) Frog (q) Gills  
 (C) Fish (r) Lungs  
 (D) Earthworm (s) Blowholes  
 (a)  $A \rightarrow r; B \rightarrow s; C \rightarrow p; D \rightarrow q$   
 (b)  $A \rightarrow s; B \rightarrow r; C \rightarrow p; D \rightarrow q$   
 (c)  $A \rightarrow s; B \rightarrow r; C \rightarrow q; D \rightarrow p$   
 (d)  $A \rightarrow q; B \rightarrow p; C \rightarrow s; D \rightarrow r$



### Passage Based Questions

**DIRECTIONS :** Read the passage (s) given below and answer the questions that follow.

#### Passage I

The animals and plants of deserts live on the desert soil and breathe air from surroundings. In deserts only little water is available. In deserts days are quite hot and nights are quite cold.

- Desert rats dig holes to live with in because
  - this offer a moist and cool home
  - the rats like to live in holes
  - rats have sharp teeth to dig holes
  - All of the above
- Camel
  - is a desert animal
  - lives in burrows
  - Both (a) and (b)
  - None of the above
- The desert animals that dig holes and burrows in the sand and live with in \_\_\_\_\_.
  - never come out of them
  - come out of their burrows at night but remain inactive
  - come out of their burrows during day and become active
  - come out of their burrows during night and become active

#### Passage II

A lion lives in forest. It is a strong animal. It has a light brown colour, long claws in their front leg that can be withdrawn inside the toes. It has eyes in front of its face.

- The habitat of a lion is
  - terrestrial habitat
  - forest
  - grassland
  - All of the above
- The light brown colour of lion helps it
  - to hide in green grassland when it hunts for prey
  - to hide in dry grassland when it hunts for prey
  - Both (a) and (b)
  - None of the above
- The eyes in front of the face of a lion allow it
  - to see its prey even at night
  - to have correct idea about the location of its prey
  - to keep it alert and keep on eye on its prey
  - All of the above

#### Passage III

The fish and many other sea animals are adapted to live in sea. They have streamlined bodies which help them to move easily in water. These animals have

gills which help them to use oxygen dissolved in water.

- Select the sea animal that have gills.
  - Whales
  - Dolphin
  - Fish
  - All of these
- Fish
  - have slippery scales on their bodies
  - have flat fins and tales
  - Both (a) and (b)
  - None of the above
- Dolphins and whales
  - breathe in air through nostrils or blow holes.
  - breathe in air when they swim near the surface of water.
  - nostrils or blow holes are located in the upper parts of the body of dolphins and whales.
  - All of the above

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

- Assertion (A) :** The plants and animals that live on land are said to live in terrestrial habitat.  
**Reason (R) :** Ponds, rivers, lakes, etc., are examples of terrestrial habitats.
- Assertion (A) :** Some abiotic factors like air, water, light and heat are very important for growth of plants.  
**Reason (R) :** Some of the above abiotic factors are important for all living organisms.
- Assertion (A) :** Any animal which adapts itself against heat and water scarcity is well suited for desert conditions.  
**Reason (R) :** In deserts only little water is available.
- Assertion (A) :** The leaves of desert plants are either absent, very small or they are present in shapes of spines.  
**Reason (R) :** In deserts only little water is available.
- Assertion (A) :** Deer has strong teeth and long ears.  
**Reason (R) :** The speed of deer helps them to run away from prey.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

1. Adaptation
2. Abiotic
3. Aquatic
4. reproduction
5. Adaptation

### True/False

1. True
2. True
3. False
4. False
5. True
6. False
7. True
8. False
9. True
10. False

### Match the Column

1.  $A \rightarrow s; B \rightarrow q; C \rightarrow p; D \rightarrow t; E \rightarrow r$
2.  $A \rightarrow s; B \rightarrow r; C \rightarrow p; D \rightarrow t; E \rightarrow q$

### Very Short Answer Type Questions

1. Those animals that kill other animals for food are called predators.
2. Pinus, Deodar.
3. To absorb oxygen dissolved in water.
4. Presence of gills for respiration helps a fish to live comfortably in water.
5. Camel.
6. Terrestrial habitat.
7. Yes.
8. Aquatic habitat.
9. The animals killed by predators are called prey.
10. There are two components named as, biotic and abiotic components.
11. They breathe with the help of blowholes or nostrils.
12. The surrounding where organisms live is called a habitat.
13. Removal of harmful material from body is called excretion.

### Short Answer Type Questions

1. Crocodile have very strong jaws, very hard back cover and can live on land also. It can live hungry for a quite long time. It is a social animals and does sharing with group.
2. Fish have scales all over the body and their body is streamlined also. They can see and breathe in water, thus they are adapted to live in aquatic conditions.
3. (a) Eyes of the deer are located on the side of its head. This helps it to see in all the directions.  
(b) Exchange of gases in an earthworm takes place through its moist skin.
4. The small changes which take place in the body of a single organism over short period of time to overcome small problems due to changes in the surroundings are called acclimatization.
5. The presence of specific features or certain habits, which enable a plant or an animal to live in its habitat comfortably, is called adaptation.
6. Biotic components include living things such as plants and animals.  
Abiotic components include non-living things such as air, water, soil, rock, heat and light, etc.
7. Adaptation does not take place in a short time. The abiotic factors of a region change over thousands of years. The animals and plants which cannot changes die out and those who adapt are able to survive.
8. Rats and snakes escape the intense heat of the desert by hiding themselves deep into the burrows in the sand during day. They come out during the night when it is cool outside.
9. Yaks have long hair and leopard has thick fur on its body including feet and toes to prevent them from extreme cold.
10. (i) It has long ears to hear the movements of its predators.  
(ii) Its eyes on the side of its head helps it to look in all the directions.  
(iii) It has high speed of running which helps it to run away from its predators.

11. Animals and plants are adapted to the conditions of the habitats in which they live. Animals can live in many different places in the world because they have special adaptations to the area they live in. Animals depend on their physical features to help them obtain food, keep safe, build homes, withstand weather and attract mates. These physical features are called physical adaptations. They make it possible for the animal to live in a particular place and in a particular way.
  12. A camel has following adaptations to survive in a desert environment :
    - (a) It has long legs to escape from the heat of the sand.
    - (b) It can live without water for several days.
    - (c) It excretes dry dung and small amount of urine.
- of an organism that is maintained a developed by means of natural selection. Adaptation refers to both current state of being adapted and to the dynamic evolutionary process that leads to the adaptation.
- (v) **Stimuli** : An agent, action, or condition that elicits or accelerates a physiological or psychological activity or response.
3. The characteristics of living things are as follows :
    - (i) All living things need food.
    - (ii) They all respire.
    - (iii) They exhibit growth.
    - (iv) They show response to stimuli.
    - (v) All living things can reproduce their own kinds.
    - (vi) They exhibit movement.
    - (vii) All living things excrete.

### Long Answer Type Questions

1. Cactus is mostly found in the deserts. It has the following special features to adapt itself to survive in the desert :
  - (i) Leaves are modified into the spines to reduce the rate of loss of water.
  - (ii) Stem becomes green and fleshy to take over the function of photosynthesis.
  - (iii) Stem is also covered with a thick layer of wax to retain water.
  - (iv) Its roots go deeper into the soil for better absorption of water.
2.
  - (i) **Prey** : An animals hunted or caught for food; quarry.
  - (ii) **Predator** : An organism that lives by preying on other organism is called a predator.
  - (iii) **Acclimatization** : It is the process in which an individual organism adjusts to a gradual change in its environment (such as a change in temperature, humidity, photoperiod, or pH), allowing it to maintain performance across a range of environmental conditions. Acclimatization occurs in a short period of time (days to weeks), and within the organism's lifetime (compare to adaptation).
  - (iv) **Adaptation** : In biology, adaptation, also called an adaptive trait, is a trait with a current functional role in the life history

## 2 EXERCISE

### Text Book Questions

1. The surroundings where organisms live is called its habitat.
2. Cactus roots are long and go deep into soil to absorb water, leaves are reduced to spines to reduce rate of transpiration and their stem is covered with a waxy coating to prevent water loss.
3. 

|                |                 |
|----------------|-----------------|
| (a) adaptation | (b) terrestrial |
| (c) aquatic    | (d) abiotic     |
| (e) stimuli    |                 |
4. Plough, sewing machine, radio, boat.
5. An example is car. following are the characteristics of living things:
  - (i) It exhibits movement.
  - (ii) It requires energy to do work.
6.
  - (i) Butter is obtained from milk which in turn is obtained from dairy animals.
  - (ii) Leather is obtained from skin of animals.
  - (iii) Wool is removed from skin of certain animals.
  - (iv) Cooking oil is obtained from plant seed.
  - (v) Apple is a fruit and a plant part.
  - (vi) Rubber is extracted from rubber plant.

7. Following are the common characteristics of living things:
- (i) Living things require food for survival.
  - (ii) Living things respire.
  - (iii) Living things excrete waste products.
  - (iv) Living things reproduce.
  - (v) Living things grow and die.
  - (vi) Living things exhibit movement.
8. Grassland habitats comprise few trees. A large number of predators are found, along with other animals which become their prey. For both the predators and prey. Since there are less number of places to hide. Animals adapt themselves by increasing their speed.
11. (i) Brown body colour helps it to hide in dry land avoiding detection by its prey.  
 (ii) Eyes placed in front allow it to know the exact location and movements of its prey.  
 (iii) Powerful paws and long claws help it to catch and kill the prey.

### NCERT Exemplar Questions

- (a) ADAPTATIONS  
(b) EXCRETION  
(c) STIMULI  
(d) REPRODUCTION
- (a) Grassland (b) Pond  
(c) Mountain (d) Desert
- Terrestrial habitats - grassland, rice field  
Aquatic habitats - pond, ocean
- Reproduction leads to the production of more individuals of an organism.
- By planting stem-cutting of the rose plant which grows into a new rose plant. She can increase the number of rose plants in the garden.
- To stay away from heat of the desert during day time. As the deeper layers of sand are cooler, they burrow deep into the sand.
- (i) Leaves are narrow and ribbon-like.  
(ii) Stems/stalks of leaves are long, hollow and light.
- (i) Long legs  
(ii) Webbed feet  
(iii) Blowholes
- These modifications are adaptation to dry conditions. As a result of these modifications the surface of lamina is reduced thereby reducing water loss by transpiration.
- (i) Living organisms move on their own while car moves by the burning of fuels like diesel and petrol.

### HOTS Questions

- Grassland habitats comprise few trees. A large number of predators are found, along with other animals which become their prey. For both the predators and prey. Since there are less number of places to hide animals adapt themselves by increasing their speed.
- Fishes breathe through gills which take up oxygen dissolved in water. When kept out of the water, they are not able to respire due to difference in pressure.

## 3

## EXERCISE

### Multiple Choice Questions

- (d)
- (a)
- (b)
- (a) It lives at north pole only.
- (c) In photosynthesis carbon dioxide is absorbed from air and oxygen is given out.
- (d)
- (d)
- (d)
- (c)
- (b)
- (c)
- (d) They have sloping branches.
- (b)
- (c)
- (a) They have strong back legs.
- (a) It is a potometer.
- (d)
- (d) It is called dormancy.
- (b)
- (d)
- (d) None of these process can occur as the conditions required for their occurrence are not fulfilled.
- (a) its very strong sense of smell helps it to locate its prey.
- (a) The body of polar bear is not streamlined.
- (a) In desert plants photosynthesis is generally carried out by stems and not leaves.

[NOTE : The leaf-like structure seen in cactus (a desert plant) is, in fact, its stem.]

25. (a) The process of breathing in cows is similar to that in human beings.
26. (b) Earthworm breathes through its skin.
27. (c) Respiration in plants take place day and night.
28. (c) 29. (d) 30. (b)
31. (c) Horse lives on land. Tortoise can live on land and water. So tortoise is amphibious.
32. (d) 33. (a) 34. (d) 35. (d)
36. (a) 37. (c) 38. (b) 39. (b)
40. (d) 41. (d) 42. (a)
43. (c) Lion and tiger are predators.
44. (a) 45. (c)
46. (a) There are large variations in aquatic habitats located in different parts of the world. A biotic community consists of a number of populations. Sunlight and heat are abiotic components.
47. (d)
48. (d) Xerophytes are desert plants. Desert plants have long roots. Desert plants lose very little water through transpiration.
49. (b) Lions have long claws in their front legs. Mountain goats has strong hooves.
50. (a) Squids and octopus do not have streamlined bodies. However when they move in water their body shapes streamlined.
51. (c) 52. (c)
53. (b) These are anther and filament.
54. (b) The three parts of a pistil are style, stigma and ovary.
55. (a) A leaf has 1 mid-rib.
56. (b)
57. (b) Mango grow in plains
58. (c) Both biotic (living) and abiotic(non-living) components constitute an environment.
59. (d) Whales live in oceans
60. (a) Soil is a non-living component
61. (c) Grassland is a land habitat.
62. (a) Plants depend on air, water, soil, light etc. to prepare food.
63. (c)
64. (b) This is paired correctly, others are in incorrect pairs.
65. (d)
66. (b)
67. (d) Animals like lion, deer move very fast in open grasslands.
68. (c)
69. (c) Aquatic plants have these features.
70. (d)
71. (c) These are features of plant growing on mountains
72. (b) This is an example of response to a hot kettle (stimulus).
73. (c) Non-living things like salts get crystallised.
74. (c) A chick hatching is not response to stimulus.
75. (d) Excretion is a method of getting rid of all unwanted waste including water.
76. (b) Roots of peepal tree cannot grow into new plants.
77. (c) The process of giving birth to new organisms is called reproduction.
78. (c) Rabbits give birth to young ones.
79. (c)
80. (c) There is a great diversity (variety) of plants and animals living on earth.

### Statement Based Questions

1. (b) Oaks, pines and deodars are found in hills and mountains.
2. (a) There are organisms in volcanoes too!
3. (b)
4. (a) Fish breathe through gills and scales protect their bodies and also help in easy movement in water.
5. (b)
6. (b)
7. (b) Living components are called biotic components.
8. (a) Heat and light are also needed for germination.
9. (c)
10. (c)
11. (b)
12. (b)
13. (c) Mountain goats have strong hooves to run up the rocky slopes.
14. (a) Long ears helps deer to hear movements of lions and eyes allow them to look in all directions.
15. (a) When octopus and squids move in water they make their bodies streamlined.

16. (b)
17. (d) Roots are reduced in size and leaves are ribbon shaped/narrow but they are submerged in water.
18. (d) Frogs have strong hindlegs and webbed feet that helps them to swim in water.
19. (d)
20. (b) All living things show some growth in their lifetime and plants undergo respiration day and night.
21. (b) Plants also respond to external stimulus such as sunlight, water, gravity etc.
22. (c)
23. (c) All animals reproduce their own kind and plants have different modes of reproduction, seed is one such method.
24. (c) Plants show movement in the form of stem bending towards light, substances moving from one part to another part of plant etc. Non living things do not move on their own. They need fuel or energy to move.
25. (c)
13. (c) These animals live on mountains under extreme cold conditions, so they have thick skin and long hair/fur to survive in cold conditions.
14. (c) Predator is the animal who attacks and prey is the victim. Here lion is the predator and deer is the prey.
15. (c) All these live in water.
16. (b) Narrow ribbon shaped leaves can easily bend in flowing water.
17. (d) Plants bend towards sunlight.
18. (c) This is a new plant growing from the bud of a potato.
19. (c) Plant and seeds are living whereas their things are non-living.
20. (c) Apple comes from a tree, Shoe made of leather which comes from animal, wool comes from sheep, oil comes from plants.

### Matching Based Questions

1. (b)  $A \rightarrow r$ ;  $B \rightarrow p$ ;  $C \rightarrow q$ ;  $D \rightarrow s$
2. (c)  $A \rightarrow s$ ;  $B \rightarrow p$ ;  $C \rightarrow q$ ;  $D \rightarrow r$
3. (a)  $A \rightarrow q$ ;  $B \rightarrow s$ ;  $C \rightarrow p$ ;  $D \rightarrow r$
4. (d)  $A \rightarrow s$ ;  $B \rightarrow r$ ;  $C \rightarrow p$ ;  $D \rightarrow q$
5. (b)  $A \rightarrow r, s, u$ ;  $B \rightarrow p, q, t$
6. (c)  $A \rightarrow r$ ,  $B \rightarrow p$ ;  $C \rightarrow q$ ;  $D \rightarrow s$
7. (a)  $A \rightarrow q$ ;  $B \rightarrow r$ ;  $C \rightarrow p$ ;  $D \rightarrow s$
8. (d)  $A \rightarrow q$ ,  $B \rightarrow r$ ,  $C \rightarrow s$ ,  $D \rightarrow p$
9. (c)  $A \rightarrow q$ ,  $B \rightarrow r$ ,  $C \rightarrow p$
10. (b)  $A \rightarrow s$ ,  $B \rightarrow r$ ,  $C \rightarrow p$ ,  $D \rightarrow q$
11. (c)  $A \rightarrow s$ ,  $B \rightarrow r$ ,  $C \rightarrow q$ ,  $D \rightarrow p$

### Passage Based Questions

1. (a)      2. (a)      3. (d)      4. (d)
5. (b)      6. (b)
7. (c) Whales and dolphins do not have gills.
8. (c)      9. (d)

### Assertion/Reason

1. (c) Ponds, rivers, lakes are aquatic habitats.
2. (b)      3. (a)      4. (b)
5. (c) The speed of deer helps them to run away from its predator not prey.

### Figure/Diagram Based Questions

1. (c)      2. (d)      3. (d)
4. (b) Dolphin and whale have no gills.
5. (d)
6. (c) Polar bears and Snow leopard live on snow.
7. (d) Since camels excrete very little urine and their dung is dry, they lose very little water from their bodies.
8. (b) Scales protect their bodies and help them to move easily through water.
9. (c) It shows how plants and animals are dependent on each other for food and other resources.
10. (d) In deserts, rats and snakes hide in burrows to stay away from intense heat of the day.
11. (c) P is spine which is actually a leaf and Q is stem functioning as a leaf.
12. (b) These conical trees grow on mountains which are cold, windy and experience lot of rain and snow.



# Chapter 10

# MOTION AND MEASUREMENT

## INTRODUCTION

We observe in our daily life various moving objects like cars, buses, water flowing down etc. We also often talk of how fast or slow, an object is moving by comparing the distances travelled by the objects in a given time interval. In this chapter we shall learn to describe moving objects and measure various physical quantities.

### Rest and Motion

*If the position of an object does not change with time with respect to its surroundings, it is said to be at rest.* For e.g., a box lying on the table, a baby lying in his cot, a PC lying on the table etc.

*If the position of an object changes with time relative to its surroundings, it is said to be in motion.* A bird flying in the air, and a ball rolling on the ground are a few examples of objects in motion.

### Rest and Motion are Relative Terms

The same object can be at rest or in motion at a time. A person sitting in a moving train is at rest with respect to the other passengers in the train but he is in motion w.r.t. a man standing on the ground.

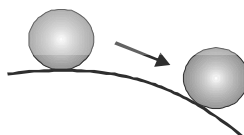
### Types of Motion

- (1) **Rectilinear Motion:** When the motion is in a straight line, it is called linear motion, e.g., a car moving on a straight road.



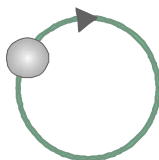
Rectilinear Motion

- (2) **Curvilinear Motion:** When the motion is on a curved path, it is called curvilinear motion, e.g., a car moving on a bend.



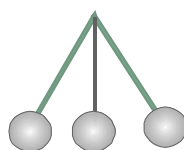
Curvilinear Motion

- (3) **Circular Motion:** When the motion is on a circular path, it is called circular motion, e.g., the motion of the earth in its orbit.



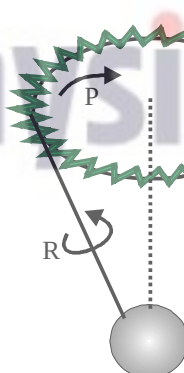
Circular Motion

- (4) **Periodic Motion:** When the motion is repetitive after a fixed interval, it is called periodic motion, e.g., motion of a clock.



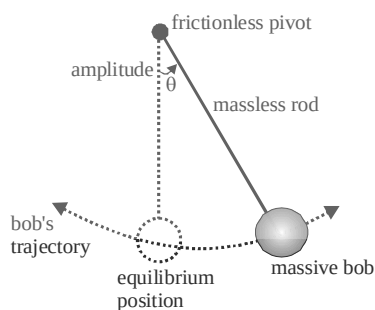
Periodic Motion

- (5) **Rotational Motion:** When an object moved around an axis, it is called rotational motion, e.g. rotation of the earth on its axis.

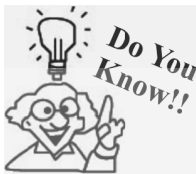


Rotational Motion

- (6) **Oscillatory / Vibratory Motion:** The to and fro motion of an object about a mean position is known as oscillatory or vibratory motion. Motion of a swing, movement of a pendulum of a clock are examples of oscillatory motion.



Oscillation or Vibration in Pendulum



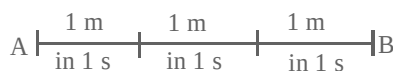
*Every oscillatory motion is periodic but every periodic motion is not oscillatory.*

### OBJECTS HAVING MORE THAN ONE TYPE OF MOTION

1. A wheel rolling on the surface has a rotatory as well as translatory motion.
2. The swinging pendulum of a wall clock performs both oscillatory and periodic motion.
3. The earth going around the sun has a circular as well as rotatory motion.

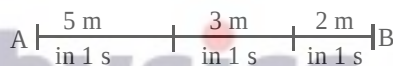
### UNIFORM AND NON-UNIFORM MOTION

**Uniform motion** : An object is said to have uniform motion if it travels equal distances in equal intervals of time.



Example: The motion of the earth about its axis, the motion of watch hands etc.

**Non-uniform motion**: An object is said to have non-uniform motion, if it travels unequal distances in equal intervals of time.



Example: Motion of a train, when it approaches towards a station.



*Uniform and non-uniform motion can be rectilinear or circular*

### IMPORTANT PARAMETERS OF MOTION

#### Distance

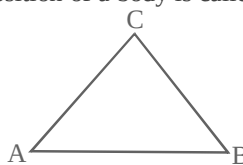
The actual length of the path covered by an object is called distance. Its S.I unit is metre (m).

#### Displacement

The shortest distance between the initial and final position of a body is called displacement. Its S.I. unit is metre (m)

If a body reaches from position A to B via C then the distance travelled by the object = AC + CB

And displacement = AB



**NOTE:** Distance covered by a moving body can never be zero or negative but displacement of a moving body can be zero or negative. For e.g., a person goes to the market which is 1 km away from his home (assume path is straight line) then the distance and displacement both are 1 km but when he reaches back to home the distance covered by him is 1 km + 1 km = 2 km while the displacement is 1 km – 1 km = zero as he comes back to his initial point.

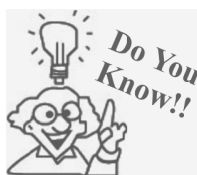
Another example can be consider, a body moving in a circle of radius  $r$ . Then the distance covered by the body after completing one revolution is  $2\pi r$  which is the length of a complete circular path while displacement is zero.

## Speed

Distance covered by a body per unit time is called speed.

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\therefore \text{S.I unit} = \frac{\text{m}}{\text{s}}$$




---

Speed of sound in air is 332 m/s and speed of light in air is  $3 \times 10^8$  m/s.

---

## Velocity

It is the displacement per unit time

$$\text{Velocity} = \frac{\text{displacement}}{\text{time}}$$

$$\therefore \text{S.I unit} = \text{m/s}$$

## Acceleration

The rate of change of velocity of a body is called acceleration.

If 'u' is the initial velocity of a body and after a time interval 't', it acquires a final velocity 'v', then

$$\text{Acceleration, (a)} = \frac{\text{change in velocity}}{\text{time}} = \frac{v - u}{t}$$

$$\begin{aligned} \therefore \text{S.I. unit} &= \frac{\text{m/s}}{\text{s}} \\ &= \text{m/s}^2 \end{aligned}$$

**Acceleration due to gravity:** When a body falls freely under the effect of gravity of earth, then its acceleration is called acceleration due to gravity.

It is denoted by 'g'. The value of g on earth is taken to be  $9.8 \text{ m/s}^2$ .




---

In a good vacuum where air friction is negligible the paper and coin truly fall with the same acceleration, regardless of the shape or weight of the paper.

---

$g = 9.8 \text{ m/s}^2$  for a body falling vertically downwards.

$g = -9.8 \text{ m/s}^2$  for a body rising vertically upward.

## MEASUREMENT AND ITS NEED

To buy a piece of cloth, to buy vegetables, to know the amount of sugar to be added to a cup of coffee, we need measurements. A quantity which can be measured is known as **Physical quantity**.

**Measurement** is the comparison of unknown physical quantity with a known standard quantity of same kind. The result of measurement is expressed as the numerical value 'n' and the unit 'u'.

i.e.,  $Q = nu$

For e.g., length of a cloth is expressed as  $L = 2\text{m}$ . The numerical value tells that how many times a standard quantity is contained in a given physical quantity.

**STANDARD UNIT OF MEASUREMENT**

A standard unit is a standard measure of some definite and suitable quantity which remains the same at all times and all places.

The system of units which is internationally accepted for measurement is abbreviated as SI (International system) units. The SI system was developed by General conference on weight and measures in 1960 for international usage.

| Physical Quantity | S.I. unit | Symbol    |
|-------------------|-----------|-----------|
| Length            | metre     | <i>m</i>  |
| Mass              | kilogram  | <i>kg</i> |
| Time              | second    | <i>s</i>  |
| Temperature       | Kelvin    | <i>K</i>  |
| Electric current  | Ampere    | <i>A</i>  |

**NOTE:** Mass, length, time, temperature and electric current are known as fundamental quantities as they are independent and need not be derived from other quantities. And their units are known as fundamental units.

**MULTIPLES AND SUBMULTIPLES OF UNITS**

- Length:** (Distance between two points)

1 decametre (dam) = 10 m

1 kilometre (km) = 1000 m

1 centimetre (cm) =  $10^{-2}$  m

1 micrometre ( $\mu\text{m}$ ) =  $10^{-6}$  m

1 hectometre (hm) = 100 m

1 decimetre (dm) =  $10^{-1}$  m

1 millimetre (mm) =  $10^{-3}$  m

1 Angstrom ( $\text{\AA}$ ) =  $10^{-10}$  m



*In A.D. 1120 king Henry I of England declared that the standard of length in his country would be the yard and that the yard would be precisely equal to the distance from his nose to the tip of his outstretched arm.*

- Mass:** (Total matter present in a body)

1 Quintal (qt) = 100 kg

1 Decagram (dag) =  $10^{-2}$  kg

1 milligram (mg) =  $10^{-6}$  kg

1 Tonne (t) = 1000 kg

1 gram (g) =  $10^{-3}$  kg

- Time:** (Interval between two events)

1 minute = 60 seconds

1 hour = 60 minutes

1 day = 24 hours

1 year =  $365 \frac{1}{4}$  days

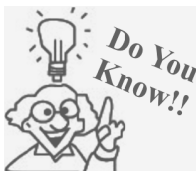
1 century = 100 years

1 millennium = 1000 years

1 mean solar day = 24 hours

=  $24 \times 60 \text{ min} = 1440 \times 60 \text{ seconds}$

= 86400 seconds



*The second is defined as the 9192 631770 times the period of oscillation of radiation from the cesium atom.*

- Temperature:** (Hotness or coldness of a body)

The units of temperature are Celsius ( $^{\circ}\text{C}$ ), Fahrenheit ( $^{\circ}\text{F}$ ), Kelvin (K)

To convert  $^{\circ}\text{C}$  to  $^{\circ}\text{F}$  or vice-versa, the following relation is used :

$$\frac{C}{5} = \frac{F - 32}{9}$$

And to convert  $^{\circ}\text{C}$  into Kelvin (K)

$$K = ^{\circ}\text{C} + 273$$

## MEASUREMENT OF LENGTH

**Length** is defined as the distance between any two points.

The S.I. unit of length is metre.

Smaller lengths are measured in centimetre (cm) or millimetre (mm). Larger lengths like distance between two cities is measured in kilometres (km).

Very large distances like distance between stars or distance between sun and earth are measured in **Light years (ly)**.

**One light year** is the distance travelled by light in vacuum in one year.

$$1 \text{ ly} = 9.46 \times 10^{15} \text{ m}$$

## Instruments Used for Measuring Length

Most commonly used instruments for measuring lengths are metre scale, measuring tape and metre rod.

For measuring the length, breadth or height of a cuboidal box metre scale can be used.

Metre rod is usually used by the cloth merchant to measure the length of a piece of cloth.

Tailor use a tape to take the measurements of different parts of body of a person.

For correct measurement, zero (0) mark of the scale must be coincides with the one edge of the object whose length is to be measured.

**NOTE:** For accurate measurement the eye of the observer must be in front of the point of measurement. If the position of eye is wrong, then the **parallax error** tends to occur.

Length of a curved line can be measured with the help of a thread. A knot is tied at one end of the thread & placed at one point the starting point of a curved line. Then go on stretching the thread along the curve keeping the thread taut. Then tie another knot on reaching the end point of the curved line. Now the length of thread can be measured using a metre scale. This length of thread gives the length of the curved line.

## MEASUREMENT OF VOLUME

**Volume** is the space occupied by an object. An object of regular shape like cube or cuboid will have length ( $\ell$ ), breadth ( $b$ ) and height ( $h$ ). Therefore volume can be measured by determining the length of each side and using the formula  $\text{volume} = l \times b \times h$

Volume of an irregular object can be determined by immersing it in water. The volume of water displaced by the irregular object can be measured with the help of a measuring cylinder. Thereby using the principle that volume of object immersed is equal to the volume of water displaced by the object, volume of irregular object can be determined.

## MEASUREMENT OF MASS

**Mass** is the quantity of matter contained in a body. The S.I. unit of mass is kilogram (kg).

Mass is measured by a beam balance or a physical balance.

Physical balance measures the mass of a body by comparing it with a known standard mass.

**NOTE:** Accuracy of physical balance is not affected by gravity.

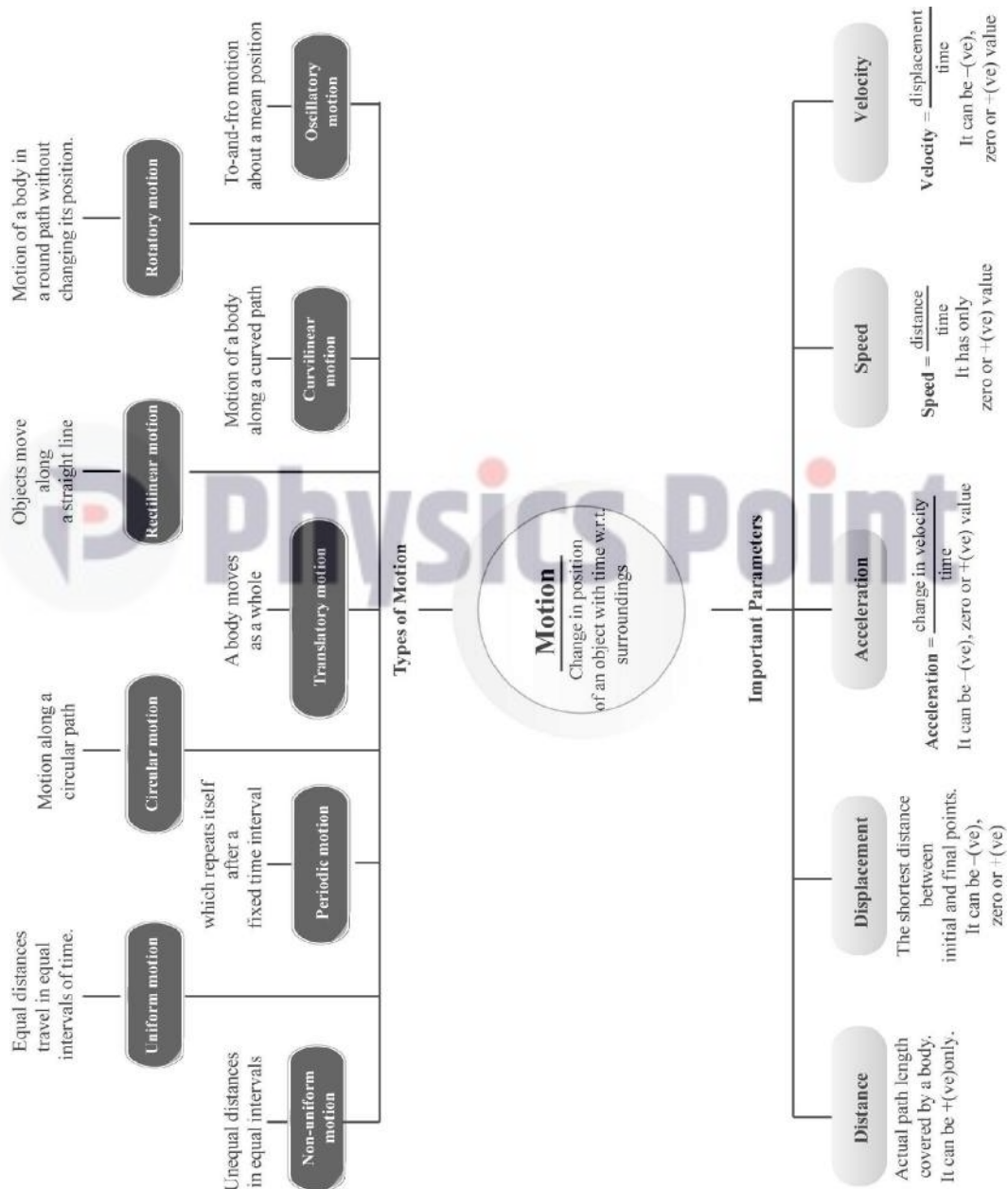
Both arms of the physical balance are of equal length. So using the principle of moments, in equilibrium masses in both the pans of the balance should be equal. Hence with the help of a known mass in one pan, mass of an object in the other pan can be determined.



Kilogram is defined as the mass of a specific platinum-iridium alloy cylinder kept at the international Bureau of weights and measures at Sevres France.



## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

1. Motion and rest are ..... terms.
2. Invention of ..... change the mode of transport significantly.
3. Every measurement consists of ..... and .....
4. Motion of a child on a swing is .....
5. Motion of needle of a sewing machine is .....
6. S.I. unit of a length is .....
7. 1 metre is equal to .....
8. Motion of potter's wheel is .....
9. Curved length can be measured by .....
10. A free ..... from tree is an example of rectilinear motion.

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

1. The direction of motion of a body can be changed without application of any force.
2. A body is said to be in motion only if its position changes with time.
3. The motion of a spinning top is circular.
4. A freely falling body is the example of non uniform motion.
5. A body undergoing circular motion may also have linear motion.
6. All periodic motions are oscillatory by nature.
7. Phases of moon, which is a periodic event can be used to measure time.
8. Diameter of a spherical object can't be measured by using a metre scale.
9. A standard unit is always a fixed measure of a physical quantity.
10. The choice of a length – measuring device depends upon the type of measurement to be made.

11. The SI unit of distance is km.
12. A cloth merchant uses a tape for measurement.
13. Rotating fan is an example of periodic motion.
14. Ruler/metre rod can be used for measurement of curved length.
15. Ancient people never used foot scale for the measurement of length.
16. Distance between stars is measured in light years.
17. Cubit was used for the measurement of length.
18. Motion of freely falling ball is an example of linear motion.
19. We cannot make mistake if we use a correct metre scale.
20. Striking carom coin is an example of a random motion.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column I have to be matched with statements (p, q, r, s) in column II.

1.
 

| Column I           | Column II        |
|--------------------|------------------|
| (A) 1 metre        | (p) 1 decimetre  |
| (B) 100 decametre  | (q) 1000 metre   |
| (C) 100 millimetre | (r) 10 decimetre |
| (D) 1 kilometre    | (s) 10 metre     |
| (E) 1 decametre    | (t) 1 kilometre  |
2.
 

| Column I               | Column II                         |
|------------------------|-----------------------------------|
| (A) Motion             | (p) Potter's wheel                |
| (B) Rectilinear motion | (q) Spinning top                  |
| (C) Rotatory motion    | (r) Any moving object             |
| (D) Periodic motion    | (s) Car moving on "straight road" |
| (E) Circular motion    | (t) Motion of earth               |
3.
 

| Column I                                                                          | Column II            |
|-----------------------------------------------------------------------------------|----------------------|
| (A) The motion in which the particles of a body travel through the same distance. | (p) Vibratory motion |
| (B) The motion which occurs again and again at irregular intervals of time.       | (q) Rotatory motion  |

- (C) A motion in which a body moves about a fixed axis, without changing its position. (r) Translatory motion
- (D) A repetitive motion in which the moving object undergoes a change in shape. (s) Non-periodic motion
- (E) A length which is  $1/1000$  part of a metre. (t) kilometre
- (F) A length equal to 1000 m (u) millimetre  
(v) Periodic motion
4. **Column I** **Column II**
- (A) A bag of rice (p)  $10^4 \text{ cm}^2$
- (B) Distance between Hyderabad and Delhi (q) kg
- (C) 1 h 10 min (r) km
- (D)  $1 \text{ m}^2$  (s)  $10^3 \text{ mm}^3$
- (E)  $1 \text{ cm}^3$  (t) 4680 s

**Very Short Answer Type Questions**

**DIRECTIONS :** Give answer in one word or one sentence.

- Define motion?
- What do you know about straight line motion?
- What is the current unit of measurement of length?
- What is the current system of measurement of length?
- Hour hand of a clock does not seem to be moving. Is it at rest?
- What kind of motion do wheels of moving bike perform?

- How many millimetre are there in  $1 \text{ cm}^3$ ?
- What do you understand by the term 'year'?
- Define measurement?
- What do you know about unit?

**Short Answer Type Questions**

**DIRECTIONS :** Give answer in 2-3 sentences.

- Write an example of vibrational motion.
- When we travel in plane are we in motion or rest?
- Write two devices that are used to measure length.
- The height of a person is 19.65 m. Present it in cm and mm.
- Give two examples of modes of transport used on land.
- What are the imprecise methods of measurement?
- Explain three rules to measure length.
- Which invention transfigure the mode of transportation? Explain.
- Classify the following as Periodic, Circular or Straight line motion :
  - Motion of wheel of a bicycle
  - Motion of a child on swing
  - Motion of a car moving on a straight road.
  - Motion of hands of a clock

**Long Answer Type Questions**

**DIRECTIONS :** Give answer in 4-5 sentences.

- How can we calculate the length of a curved line? Explain.
- Explain the correct method of measurement of length.

# 2

# EXERCISE

**Text Book Questions**

- Give two examples each of modes of transport used on land, water and air.
- Fill in the blanks:
  - One meter is \_\_\_\_\_ cm.
  - Five kilometer is \_\_\_\_\_ m.
  - Motion of a child on a swing is \_\_\_\_\_.
  - Motion of the needle of a swing machine is \_\_\_\_\_.
  - Motion of a wheel of a bicycle is \_\_\_\_\_.
- Why can a pace or footstep not be used as a standard unit of length?
- Arrange the following lengths in their increasing magnitude.  
1 m, 1 centimeter, 1 kilometer, 1 millimeter.
- The height of a person is 1.65 m. Express it into cm and mm.
- The distance between Radha's home and her school is 3250 m. Express this distance into km.
- While measuring the length of a knitting needle,

the reading of the scale at one end is 3.0 cm and at the other end 33.1 cm. What is the length of the needle?

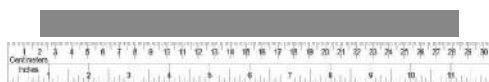
8. Write the similarities and differences between the motion of a bicycle and ceiling fan that has been switched on.
9. Why could you not use an elastic measuring tape to measure distance? What would be some of the problems you would meet in telling someone about a distance you measured with an elastic tape?
10. Give two examples of periodic motion.

### NCERT Exemplar Questions

1. The distance between Delhi and Mumbai is usually expressed in units of
  - (a) decametre
  - (b) metre
  - (c) centimetre
  - (d) kilometre
2. Which of the following does not express a time interval?
  - (a) A day
  - (b) A second
  - (c) A school period
  - (d) Time of the first bell in the school
3. The given figure shows a measuring scale which is usually supplied with a geometry box. Which of the following distances cannot be measured with this scale by using it only once?



- (a) 0.1 m
  - (b) 0.15 m
  - (c) 0.2 m
  - (d) 0.05 m
4. A piece of ribbon folded five times is placed along a 30 cm long measuring scale as shown in the figure below.

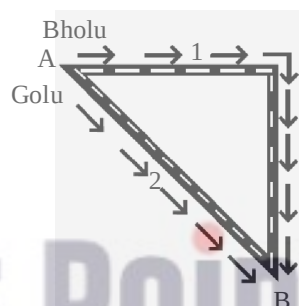


The length of the ribbon is between

- (a) 1.15 m – 1.25 m
  - (b) 1.25 m – 1.35 m
  - (c) 1.50 m – 1.60 m
  - (d) 1.60 m – 1.70 m
5. Paheli moves on a straight road from point A to point C. She takes 20 minutes to cover a certain distance AB and 30 minutes to cover the rest of distance BC. She then turn back and takes 30 minutes to cover the distance CB and 20 minutes to cover the rest of the distance to her starting

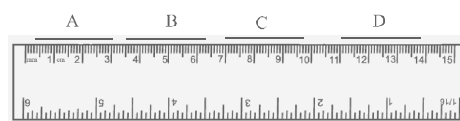
point. She makes 5 rounds on the road the same way. Paheli concludes that her motion is

- (a) only rectilinear motion.
  - (b) only periodic motion.
  - (c) rectilinear and periodic both.
  - (d) neither rectilinear nor periodic.
6. Bholu and Golu are playing in a ground. They start running from the same point A in the ground and reach point B at the same time by following the paths marked 1 and 2 respectively as shown in the figure given alongside. Which of the following is/are true for the given situation?

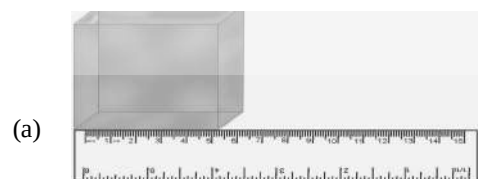


As compared to Golu, Bholu covers a

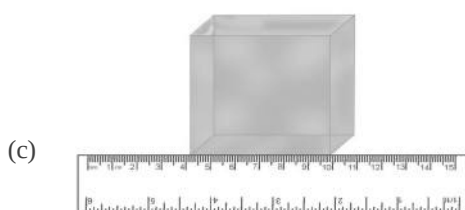
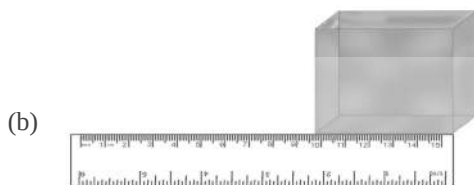
- (a) longer distance but with a lower speed.
  - (b) longer distance with a higher speed.
  - (c) shorter distance with a lower speed.
  - (d) shorter distance with a higher speed.
7. Four pieces of wooden sticks A, B, C and D are placed along the length of 30 cm long scale as shown in the figure below. Which one of them is 3.4 cm in length?



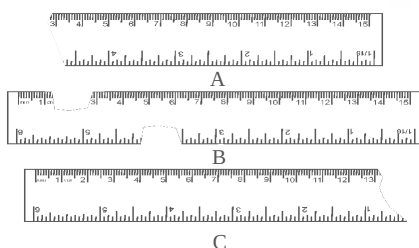
- (a) A
  - (b) B
  - (c) C
  - (d) D
8. Which of the following figures shows the correct placement of a block along a scale for measuring its length?



(a)



9. You are provided three scales A, B and C as shown in the figure given below to measure a length of 10 cm.



For the correct measurement of the length you will use the scale

- (a) A only  
(b) B only  
(c) C only  
(d) Any of the three scales
10. Correct the following.  
(i) The motion of a swing is an example of rectilinear motion.  
(ii)  $1 \text{ m} = 1000 \text{ cm}$
11. Write one example for each of the following types of motion.  
(i) Rectilinear  
(ii) Circular  
(iii) Periodic  
(iv) Circular and periodic

12. The photograph given alongside shows a section of a grille made up of straight and curved iron bars. How would you measure the length of the bars of this section, so that the payment could be made to the contractor?



13. Four children measured the length of a table which was about 2 m. Each of them used different ways to measure it.

- (i) Sam measured it with a half metre long thread.  
(ii) Gurmeet measured it with a 15 cm scale.  
(iii) Reena measured it using her handspan.  
(iv) Salim measured it using a 5 m long measuring tape.

Which one of them would get the most accurate length? Give reason for your answer.

14. How are the motions of a wheel of a moving bicycle and a mark on the blade of a moving electric fan different? Explain.

15. Three students measured the length of a corridor and reported their measurements. The values of their measurements were different. What could be the reason for difference in their measurements? (Mention any three.)

16. Boojho was riding in his bicycle along a straight road. He classified the motion of various parts of the bicycle as (i) rectilinear motion, (ii) circular motion and (iii) both rectilinear as well as circular motion. Can you list one part of the bicycle for each type of motion? Support your answer with reason.

17. Match the events related to motion in Column I with the types of motion given in Column II.

#### Column I

#### Column II

- (A) A moving wheel of a sewing machine (p) Circular motion  
(B) Movement of tip of the minute hand of a clock in one hour (q) Rotational motion  
(C) A moving swing (r) Periodic motion
18. While travelling in a train, it appears that the trees near the track are moving whereas co-passengers appear to be stationary. Explain the reason.

### HOTS Question

1. What kind of motions does a screw that is turned undergo?

## 3

## EXERCISE

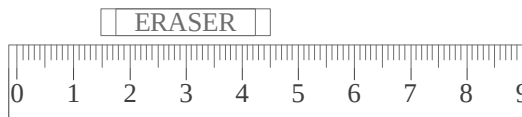
## Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choice (a), (b), (c) and (d) out of which ONLY ONE is correct.

- Which of the following is an ancient means of transport?  
(a) Cycle rickshaw (b) Aeroplane  
(c) Horse back (d) Train
- Arrange the following water transport according to their development; from earliest to modern day  
(i) ships  
(ii) motorised boats  
(iii) logs of wood with cavity  
(iv) woods joined to form a streamlined boat  
(a) (iv), (ii), (iii), (i)  
(b) (i), (ii), (iii), (iv)  
(c) (iii), (iv), (ii), (i)  
(d) (ii), (i), (iv), (iii)
- Identify the odd one out:  
(a) Foot (b) Animal back  
(c) Carriages (d) Carts
- How did a vehicle reach Mars?  
(a) Through magic  
(b) Through aeroplanes  
(c) Through spacecraft  
(d) Through parachute
- Which of the following inventions made a great impact on modes of transport?  
(a) Invention of fire  
(b) Invention of paper  
(c) Invention of wheel  
(d) Invention of tools
- Arrange the following modes of transport from the earliest to the recent  
(i) Supersonic jets (ii) Steam engine  
(iii) Bullock cart (iv) Aeroplane  
(v) Automobiles  
(a) (iii), (v), (ii), (iii), (i)  
(b) (iii), (ii), (v), (iv), (i)  
(c) (i), (iv), (v), (ii), (iii)  
(d) (ii), (iii), (v), (iv), (i)
- When did monorails come into existence?  
(a) Early 19th century  
(b) Mid 19th century  
(c) 20th century  
(d) 16th century
- \_\_\_\_\_ is the comparison of an unknown quantity with a known quantity.  
(a) Motion (b) Distance  
(c) Measurement (d) Device
- The known fixed quantity of a measurement is called \_\_\_\_  
(a) Distance (b) Tool  
(c) Length (d) Unit
- Why is there a need for some standard unit of measurement?  
(a) To avoid confusion  
(b) To measure accurately  
(c) To have uniformity  
(d) All of the above
- Which of the following were units of measurements not used in ancient days?  
(a) Cubit (b) Hand span  
(c) Foot length (d) Metre
- Indus valley people built many geometrical buildings. What can be concluded from this?  
(a) They did not know about measurements  
(b) They had very little idea of measurements  
(c) They were experts in measuring lengths  
(d) None of the above
- How much is one cubit?  
(a) Length of palm  
(b) Length of foot  
(c) Length from elbow to finger tip  
(d) Length of outstretched arms
- How did people measure a yard of cloth in early days?  
(a) distance between outstretched arms  
(b) distance between elbow and finger tip  
(c) distance between outstretched arm and the chin  
(d) distance between one arm and chin
- Which unit of length was commonly used by Romans?  
(a) hand span (b) foot  
(c) pace or steps (d) cubit

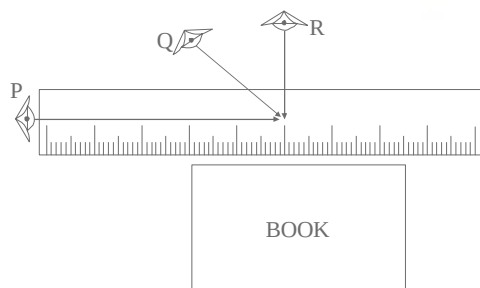


16. 'Angul' and 'mutthi' were units of \_\_\_\_\_  
(a) weight  
(b) length  
(c) volume  
(d) flowers quantity
17. Who are credited to have created the standard unit of measurement?  
(a) Romans  
(b) British  
(c) Indians  
(d) French
18. The S.I. unit of length is \_\_\_\_\_  
(a) Cubit  
(b) Angul  
(c) Metre  
(d) Centimetre
19. To measure the length of cloth which of the following device would be useful?  
(a) metre scale  
(b) measuring tape  
(c) metre rod  
(d) thread
20. On what factors does the choice of a length measuring device depend?  
(a) Type of device  
(b) Type of measurement  
(c) Type of surface to be measured  
(d) Type of unit
21. While measuring the length of a paper the reading of the scale at one end is 2.0 cm and at the other end is 15.5 cm. What is the length of the paper?  
(a) 15.5 cm  
(b) 14.5 cm  
(c) 13.5 cm  
(d) 17.5 cm
22. Which of the following is used to measure length of a curved surface?  
(a) only a metre scale  
(b) only a graph paper  
(c) only a thread  
(d) both (a) and (c)
23. If the objects move along a straight line, the motion is called \_\_\_\_\_ motion.  
(a) circular  
(b) rectilinear  
(c) periodic  
(d) rotatory
24. Which of the following exhibits circular motion?  
(a) blades of fan  
(b) hands of clock  
(c) soldiers marching  
(d) both (a) and (b)
25. Which of the following does not exhibit rectilinear motion?  
(a) wheels of a moving bus  
(b) wheels of a moving bicycle  
(c) minutes hand of a clock  
(d) Football rolling on a ground
26. A boy plucked the strings of guitar. Which type of motion does it exhibit?  
(a) Circular  
(b) Rectilinear  
(c) Periodic  
(d) Non periodic
27. The arms of a soldier marching along the streets exhibit \_\_\_\_\_  
(a) rotatory motion  
(b) circular motion  
(c) periodic motion  
(d) rectilinear motion
28. Study the following motions of a sewing machine  
(i) Wheel of the machine  
(ii) Needle of the machine  
(a) Both (i) and (ii) exhibit circular motion  
(b) (i) is circular and (ii) is rectilinear  
(c) Both exhibit rectilinear motion  
(d) (i) is circular and (ii) is periodic motion
29. What type of motion does a rolling ball exhibit on ground?  
(a) Rotatory motion  
(b) Rectilinear motion  
(c) Periodic motion  
(d) Both (a) and (b)
30. Which of the following shows motion?  
(a) River flowing  
(b) Bird flying  
(c) Blood flowing inside a body  
(d) Earth spinning  
(e) All of the above
31. Which of the following is the S.I. unit of length?  
(a) Hand span  
(b) Cubit  
(c) Metre  
(d) Foot span
32. What fraction of a metre is 1 mm?  
(a) thousand  
(b) hundred  
(c) thousandth  
(d) hundredth
33. Arrange the following units of length in an ascending order.  
m, km, cm, mm  
(a) cm, mm, km, m  
(b) mm, cm, m, km  
(c) m, km, mm, cm  
(d) km, m, cm, mm
34. What is the length of the eraser



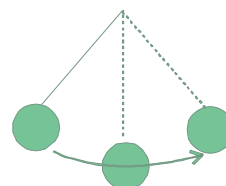
- (a) 4.5 cm  
(b) 3.5 cm  
(c) 3.0 cm  
(d) 6 cm

35. Kumar is a tailor who has to take body measurements to stitch clothes that fit perfectly. Which of the following is most likely to be used by him?  
 (a) wooden scale (b) hand span  
 (c) measuring tape (d) metre rod
36. Krishan's teacher asked him to measure the length of a bench using a measuring tape. Why did the teacher ask him to use measuring tape?  
 (a) It is new device to measure lengths  
 (b) It is very convenient to use  
 (c) It uses standard units of measurement  
 (d) It is only device available
37. A pencil measures 105 mm in length. Which among the following is also its correct length  
 (a) 10.5 cm (b) 1.05 cm  
 (c) 0.105 cm (d) 10.5 cm
38. Which of the following is the most appropriate unit for measuring thickness of a coin?  
 (a) km (b) m  
 (c) cm (d) mm
39. The given figure shows the positions of eye while measuring the length of a book.



Which of these positions are inaccurate techniques?

- (a) Q and R (b) P and R  
 (c) Q and P (d) P, Q and R
40. A boy throws a stone from a building. What kind of motion is this?  
 (a) circular (b) rotatory  
 (c) rectilinear (d) periodic
41. Karan is playing football. The motions shown by the ball are  
 (a) rectilinear + periodic  
 (b) periodic + circular  
 (c) only rectilinear  
 (d) rectilinear + circular
42. Which of the following movements are circular but not rectilinear?  
 (a) ball delivered by fast bowler  
 (b) wheel of a moving bicycle  
 (c) spinning wheel  
 (d) drill that bores into the ground
43. What kind of motion is shown by the ball shown in the figure:-



- (a) rectilinear (b) circular  
 (c) both (a) and (b) (d) periodic
44. Which of the following show movements without changing their place?  
 (i) seconds hand of a clock  
 (ii) opening and closing of door  
 (iii) flying bird  
 (a) Only (i) and (iii)  
 (b) Only (ii) and (iii)  
 (c) Only (i) and (ii)  
 (d) All the three
45. Which of the following statements is false?  
 (a) A guitar shows periodic motion  
 (b) A ceiling fan shows circular motion  
 (c) Pendulum of a clock show rectilinear motion as well as circular  
 (d) Motion of a swing is to and fro.

### More than One option Correct

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choice (a), (b), (c) and (d) out of which ONE OR MORE may be correct.

1. The motion of the wheels of a horse driven cart is:  
 (a) vibratory  
 (b) translatory  
 (c) rotational  
 (d) circular and translatory
2. Which of the following is/are in uniform motion?  
 (a) A bus leaving the bus stop.  
 (b) Rotation of earth  
 (c) Train moving with a constant speed in a straight line.

- (d) Motion of a football player in the field
3. With regards to type of motion, which of the following statement is/are true?
- Swinging of arms of a soldier while marching is oscillatory
  - The beating of our heart and expansion/contraction of lungs are periodic
  - Motion of a spinning top is circular motion
  - A freely falling body undergoes rectilinear motion
4. Which of the following statement is/are incorrect?
- Arm length or a footstep can be used as a standard unit of length in olden days
  - The needle of a sewing machine undergoes circular motion
  - Motion of a body thrown upward at an angle is rectilinear
  - Multiples and submultiples of a unit are used for measurement of bigger or smaller quantities.
5. Nagender is playing soccer. The motion (s) described by the ball is/are
- curvilinear
  - circular
  - oscillatory
  - non-uniform
6. Which of the following is/are in periodic motion?
- A freely falling body
  - A swinging pendulum
  - Rotation of earth
  - A flying kite
7. When a drill bores a hole in a piece of wood, it describes:
- rotatory motion
  - translatory motion
  - curvilinear motion
  - None
8. Which of the following is/are not making translatory motion?
- A ball delivered by a spin bowler
  - A drill that bores a piece of wood
  - A spinning wheel
  - Moving rear wheel of a bicycle on its stand

### Multiple Matching Questions

**DIRECTIONS :** Following questions has four statements (A, B, C and D) given in Column I and five or six statements (p, q, r, s) in column II. Any given

statement in column I can have correct matching with one or more statement(s) given in column II. Match the entries in column I with entries in column II.

| 1. | Column I          | Column II                           |
|----|-------------------|-------------------------------------|
|    | (A) Standard unit | (p) cubit                           |
|    | (B) Ancient unit  | (q) metre                           |
|    |                   | (r) kilometre                       |
|    |                   | (s) handspan                        |
|    |                   | (t) yard                            |
| 2. | Column I          | Column II                           |
|    | (A) Bullock cart  | (p) Modern means of transport       |
|    | (B) Chariots      | (q) ancient means of transport      |
|    | (C) Space craft   | (r) Developed in 1790 by the French |
|    | (D) Metric System |                                     |

### Passage Based Questions

**DIRECTIONS :** Read the passage(s) given below and answer the questions that follow.

#### Passage I

A system having a set of standard units of measurement which was accepted all over the world is called International system of units (S.I. system)

- The S.I. system of units is based on
  - F.P.S. system
  - Metric system
  - both of these
  - None of these
- The metric system of units was created by
  - Germans
  - Indians
  - Chinese
  - French
- In S.I. system of units, the standard unit of distance is
  - kilometre
  - metre
  - centimetre
  - All of these

#### Passage II

In ancient times, the length of a foot, the width of a finger and the distance of a step were used as different units of measurement.

- Which of the following was used as a unit of length in ancient Egypt?
  - Cubit
  - Foot
  - Yard
  - All of these
- The unit of measurement of length used by ancient Romans was
  - foot
  - yard
  - pace or steps
  - None of these

6. For measurement of small length, which of the following were used in ancient India?  
 (a) *Angul* (b) *Mutthi*  
 (c) Both (a) and (b) (d) Neither (a) nor (b)

### Passage III

Observe a tailor working on a sewing machine. The sewing machine remains at the same location while its wheel moves with a circular motion. It also has a needle that moves up and down continuously, as long as wheel rotates.

7. Select the one that remains at rest when you were making the above observation.  
 (a) Tailor  
 (b) Sewing machine  
 (c) Both tailor and sewing machine  
 (d) None of the above is correct
8. In this observation the circular motion was observed in  
 (a) Wheel of machine  
 (b) Needle of machine  
 (c) Both (a) and (b)  
 (d) None of the above is correct
9. The up and down motion of the needle of sewing machine can be classified as  
 (a) rotatory motion  
 (b) circular motion  
 (c) periodic motion  
 (d) None of these

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select one of the current options (a), (b), (c) and (d) given below in each questions.

- (a) Both A and R are true and R is the correct explanation of A.  
 (b) Both A and R are true but R is not the correct explanation of A.  
 (c) A is true but R is false.  
 (d) A is false but R is true.

1. **Assertion (A) :** In International system of units the unit of length is centimetre.

**Reason (R) :** If a centimetre were divided into

ten equal parts then each part is equal to a millimetre.

2. **Assertion (A) :** In ancient times bullock cart was used as a means of transport.

**Reason (R) :** Aeroplanes were developed only in 1800 AD.

3. **Assertion (A) :** If an object travels in such a way that it comes back to the starting position, then the displacement is zero but, the distance travelled is not zero.

**Reason (R) :** The displacement is the shortest distance between the initial and final position of the body whereas, distance is the actual path length covered by an object.

4. **Assertion (A) :** While measuring the length, the eye of the observer should be exactly above that point of measurement to avoid the parallax error.

**Reason (R) :** The scale used to measure the length of the object must be greater than the length of the object.

5. **Assertion (A) :** Motion of moon around the earth is a circular motion.

**Reason (R) :** In a circular motion, the distance of object from a fixed point remains the same.

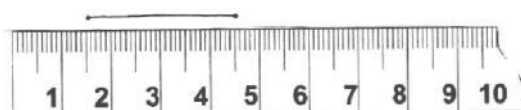
6. **Assertion (A) :** The motion of a ball rolling on the ground is nothing but a rectilinear motion.

**Reason (R) :** The motion of ball rolling on the ground is a combination of different types of motion.

### Integer Type Questions

**DIRECTIONS :** Following are integer based/ Numeric based questions. Each question, when worked out will result in one integer or numeric value.

1. What is the length of the string as shown in figure below.



- (a) 1.5 cm (b) 4.5 cm  
 (c) 3.5 cm (d) 3.0 cm
2. A cheetah the fastest animal can achieve a peak value of velocity 100 km/h upto a distance less than 500 m. If a cheetah spots his prey at a distance of 100 m, what is the minimum time it will take to get its prey? Your answer will be between 0 to 9.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- relative
- wheel
- number, unit
- periodic
- periodic
- meter
- 10 decimetre
- rotational
- measuring tape
- falling apple
- When a body moves in straight line, it is called as rectilinear motion.
- Metre.
- SI system.
- No, it moves slowly.
- Wheel makes rotational motion.
- $1 \text{ cm} = 10 \text{ mm}$   
 $1 \text{ cm}^3 = 10 \text{ mm} \times 10 \text{ mm} \times 10 \text{ mm} = 1000 \text{ mm}^3$ .
- Time taken by the earth to revolve around the sun is called a year.
- The comparison of an unknown quantity with a standard known quantity is known as measurement.
- A quantity adopted as a standard of measurement of a physical quantity is called a unit.

### True/False

- |           |           |
|-----------|-----------|
| 1. False  | 2. False  |
| 3. False  | 4. True   |
| 5. True   | 6. False  |
| 7. True   | 8. False  |
| 9. True   | 10. True  |
| 11. False | 12. False |
| 13. False | 14. False |
| 15. True  | 16. True  |
| 17. True  | 18. True  |
| 19. False | 20. True  |

### Match the Column

- A — r, B — t, C — p, D — q, E — s
- A — r, B — s, C — q, D — t, E — p
- A — r, B — s, C — q, D — p, E — u, F — t
- A — q, B — r, C — t, D — p, E — s

### Very Short Answer Type Questions

- If a body moves from its position, then it is said to be in motion.

### Short Answer Type Questions

- Motion of guitar string and tabla surface are vibrational motion.
- Relative to earth, we are in motion and relative to plane or any other things in plane, we are at rest.
- The two devices that are used to measure length are:  
(i) Metre scale (b) Screw gauge.
- $1 \text{ m} = 100 \text{ cm} = 1000 \text{ mm}$   
 $\therefore$  The height of the given person in cm will be 1965 cm.  
 $\therefore$  The height of the given person in mm will be 19650 mm.
- The mode of transport which are used on land are : 1. Bus 2. Car
- Foot, handspan and arm length are used to measure the length. These are inexact methods of measurement.

7. (i) Length of the scale, that you are using to measure, must be greater than the length of an object.  
 (ii) The eye must be placed just above the point, that you are reading, otherwise there will be an error due to parallex.  
 (iii) If the zero mark of the scale is damaged or the edge of the scale is not smooth, then start the measurement from another mark.
8. Invention of wheels brought a tremendous change in the lives of people, especially in the field of transportation. It made the movement from one place to another much easier, less tiring and time saving. However, before the invention of wheels, people had to walk to cover distances, which was time consuming as well as tiring. After the invention of wheel, it is used in maximum modes of transportation. Bullock cart, bus, car, train and others are based on wheels. The mechanical design of wheels is such that it makes the means of transport like bus, car, train, etc. movable from one place to another with less effort.
9. (i) Circular motion  
 (ii) Periodic motion  
 (iii) Straight motion  
 (iv) Circular motion
2. (i) First, we must choose a suitable device for measuring the length of an object, like a measuring tape is used to measure the growth of a tree while a measuring scale is used to measure the length of a book.  
 (ii) When we measure the length of an object with a scale, we should place the scale in contact with an object along its length and align the zero mark of the scale with the starting position of the object.  
 (iii) While taking the reading, eye must be placed vertically above the point where the measurement has to be taken, otherwise there will be an error in the reading which is taken due to parallex.  
 (iv) If the scale is damaged from the edge or if it is not smooth and if the zero mark on the scale is damaged, then start the measurement from another mark. Subtraction of the reading at this mark from the reading at the other end will give the correct length of an object along which the scale is placed in contact with it.

## 2

## EXERCISE

## Text Book Questions

## Long Answer Type Questions

1. Draw a curved line CD. Take a thread and make a knot at one of its end. Keep the knot made in the thread on point C of the line. Place a small portion of the thread along the line, keeping it tight using your fingers and thumb. Keep on stretching the thread on the curved line till you take the thread to the point D of the line. Make a mark on the thread where it touches the other end of the line at point D. Now, stretch the thread along a metre scale and the length between the knot in the beginning and mark on the thread is measured through scale. This measured length on scale will give you the length of the curved line CD.
1. On land: Car, Train  
 In water: Boat, Ship  
 In air: Aeroplane, Helicopter.
2. Fill in the blanks:
  - (i) One meter is 100 cm.
  - (ii) Five kilometer is 5000 m.
  - (iii) Motion of a child on a swing is circular motion.
  - (iv) Motion of the needle of a swing machine is periodic motion.
  - (v) Motion of a wheel of a bicycle is circular motion
3. We cannot use pace or a footstep as standard unit of length as the size of foot and the footstep will not be the same for every individual. Thus, the measurement will not be same for different people.



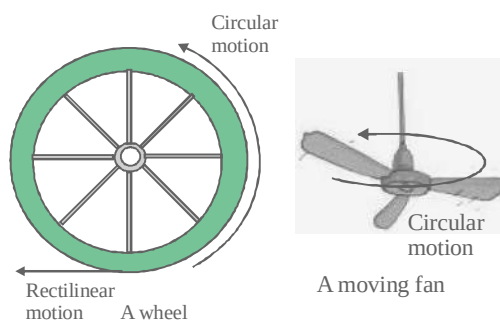
4. 1 millimeter, 1 centimeter, 1 meter, 1 kilometer.
5.  $1.65 \text{ m} = 165 \text{ cm} = 1650 \text{ mm}$ .
6.  $3250 \text{ m} = 3.25 \text{ km}$ .
7. Length of needle =  $33.1 \text{ cm} - 3.0 \text{ cm} = 30.1 \text{ cm}$ .
8. Similarities: Wheel of a bicycle and ceiling fan both shows circular motion.

Differences: Cycle moves in rectilinear motion but ceiling fan does not move in rectilinear motion.

9. Elastic tap will not give accurate measurement because it stretches in length and reduces in size when not stretched. While telling the measurement taken with an elastic tape. We have to tell whether the tape was stretched and by how much. This is very difficult.
10. Examples of periodic motion-
  - (i) Pendulum
  - (ii) Child on the swing

### NCERT Exemplar Questions

1. (d) kilometre
2. (d) Time of the first bell in the school
3. (c) 0.2 m
4. (b)
5. (c) rectilinear and periodic both.
6. (b) longer distance with a higher speed.
7. (c)
8. (b)
9. (d)
10. (i) The motion of a swing is an example of periodic motion.  
(ii)  $1 \text{ m} = 100 \text{ cm}$
11. (i) Falling stone  
(ii) Tips of the hands of a clock  
(iii) Motion of pendulum  
(iv) Hands of a clock
12. The length can be measured by using a thread which can be further measured with the help of a scale.
13. Salim would get the most accurate length. The reason is that in this case the length of the table can be measured in one go because the measuring tape is longer than the table. In the other cases the chance of making an error is higher due to multiple measurements. In case of Sam, he can only measure the lengths which are exact multiples of a half metre.
14. The wheel of a moving bicycle depicts circular as well as rectilinear motion whereas a blade of a moving electric fan shows only circular motion.



15. Some of the reasons for difference in their measurements could be:
  - Different measuring devices were used.
  - The smallest length that could be measured by different devices may be different.
  - Measurement may not be along the shortest length in all three cases.
  - The end of the corridor may not be easily accessible.
  - The measuring devices may be faulty (not standardised).
16. (i) Handle bar or seat because handle or seat is moving along a straight road, not rolling.  
(ii) Pedal because it is rolling around a fixed centre by the foot.  
(iii) Wheel because it is rolling and also moving along a straight road.
17. (a) – (ii); (b) – (i); (c) – (iii)
18. When we see the trees from a moving train, their position is changing with respect to us. Hence, they appear to be moving. On the other hand, the position of co-passengers is not changing with respect to us, hence they appear to be stationary.

### HOTS Questions

1. A screw undergoes circular (rotation) and periodic motions.

### 3 EXERCISE

#### Multiple Choice Questions

1. (c) Long ago people travelled on horse backs to move from place to place.
  2. (c) Today ships of various sizes are used to carry passengers and goods.
  3. (c) The other three are ancient means of transport. Carriages were motor driven and came in 19th century.
  4. (c) Spacecraft carried the vehicles on Mars which collected samples of soil from Mars and clicked photos.
  5. (c) With the invention of wheel, new modes of transport developed such as cycles, buses, carts, rails, carriages, wagons etc.
  6. (b)
  7. (c) Electric trains, monorails and spacecrafts are 20th century contributions.
  8. (c)
  9. (d) Span, foot, metre are eg. of units.
  10. (d) Handspans and foot lengths may vary from person to person so they are not accurate units.
  11. (d) All the others were used in ancient days.
  12. (c) Indus valley people built perfect geometric constructions so they must have very good idea about measurements.
  13. (c) Cubit was used as a unit of length in Egypt and other parts of world.
  14. (c)
  15. (c)
  16. (b) In ancient India, these units were used to measure small lengths.
  17. (c)
  18. (c) Metre is the S.I. unit of length.
  19. (c) For correct measurement, we must use the right device.
  20. (c) For different surfaces, there are different devices.
  21. (c) The correct length is  $(15.5 - 2.0) = 13.5$  cm.
  22. (d) First we need a thread to take the length of curved surface and then a scale to measure the length of thread.
  23. (b)
  24. (c)
  25. (c) Minutes hand of a clock exhibit circular motion.
  26. (c) It is an example of periodic motion.
  27. (c) Arms move to and fro so it shows periodic motion.
  28. (d) Needle moves up and down so it shows periodic and wheel shows circular motion.
  29. (d) The ball rotates as well as moves on the ground.
- 
30. (e) All these show some kind of movement.
  31. (c) S.I. unit of length is metre.
  32. (c)  $1000 \text{ mm} = 1 \text{ m}$ , or  $\frac{1}{1000} \text{ m} = 1 \text{ mm}$ .
  33. (b) mm is smallest and km is largest.
  34. (c)  $(4.5 - 1.5 = 3.0 \text{ cm})$ .
  35. (c) Measuring tapes are flexible and can bend so it can be used to measure body sizes.
  36. (c) A measuring tape uses standard unit of measurement.
  37. (a)  $105 \text{ mm} = \frac{105}{10} \text{ cm} = 10.5 \text{ cm}$ .
  38. (d) For smaller lengths millimetre is use.
  39. (c) The correct way is to keep the eye exactly above the point where measurement is to be taken.
  40. (c) This is an example of motion in straight line.
  41. (d) A ball rotates as well as moves forward.
  42. (c) A spinning wheel only moves in circular motion and not cover any distance.
  43. (d) The ball is moving to and fro in regular intervals so it is periodic motion.

44. (c) A flying bird changes its position.  
 45. (c) A pendulum moves to and fro. So it exhibits periodic motion.

**More than One option Correct**

1. b, c    2. b, c    3. a, b, d    4. b, c  
 5. a, d    6. b, c    7. a, b    8. c, d

**Multiple Matching Questions**

1. (c)  $A \rightarrow q, r; B \rightarrow p, s, t$   
 2. (b)  $A \rightarrow q; B \rightarrow q; C \rightarrow p; D \rightarrow r$

**Passage Based Questions**

1. (b)    2. (d)    3. (b)  
 4. (a) The length from elbow to the finger tip was referred to as *cubit* in ancient Egypt and used as a unit of measurement.  
 5. (c) The Romans measured with their pace or steps.  
 6. (c) *Angul* (finger) and *mutthi* (fish) were used in ancient India for small length measurements.  
 7. (c) [Since, there was no change in the position of tailor or of machine with respect to their surroundings so both of them are at rest.]  
 8. (a) The wheel moves with circular motion.  
 9. (c)

**Assertion/Reason**

1. (d) A is not true, R is true.  
 [In S.I. system the unit of length is metre.]  
 2. (c) A is true, R is false.  
 3. (a) i.e. A is true, R is true, R is correct explanation of A  
 4. (c) i.e. A is true, R is false,  
 5. (a) Both A and R are correct and R is correct explanation of A.  
 6. (d) A is not true, R is true.

**Integer Type Questions**

1. (d) Length of the string =  $4.5 - 1.5 = 3.0$  cm  
 2. Peak velocity of Cheetah = 100 km/h

$$= \frac{100 \times 1000}{3600} \text{ m/s}$$

Distance between cheetah and its prey = 100 m

Therefore,

Time taken by Cheetah to reach its prey

$$= \frac{\text{Distance between Cheetah and prey}}{\text{Peak velocity of Cheetah}}$$

$$= \frac{100 \times 3600}{100 \times 1000} = 3.65 \approx 4\text{s}$$

# Chapter 11

# LIGHT SHADOW AND REFLECTION

## INTRODUCTION

Light is a form of energy which helps us in seeing objects. When light falls on an object, some of the light gets reflected. The reflected light comes to our eyes and we are able to see an object.

### SOURCES OF LIGHT – NATURAL AND ARTIFICIAL

The objects that give out light are called *sources of light*.

There are two types of source of light

1. **Natural sources** : Sun and stars are natural sources of light.
2. **Man-made (or artificial sources)** : Electric bulb, glowing tube-light, fire, burning candle etc are all man-made sources of light.

### LUMINOUS AND NON-LUMINOUS OBJECTS

The objects which emit their own light are called **luminous objects**. For e.g. Sun, stars, torch, fire, flame of a candle are luminous objects. We can see luminous objects due to the light emitted by them.

The objects which do not emit their own light are called **non-luminous objects**. For e.g. Earth, table, chair, flowers etc., are non-luminous objects. Non-luminous objects are visible only if the light is falling on them from luminous objects.



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Sometimes luminous objects give off light at different wave-length which is invisible. These materials are called fluorescent materials.

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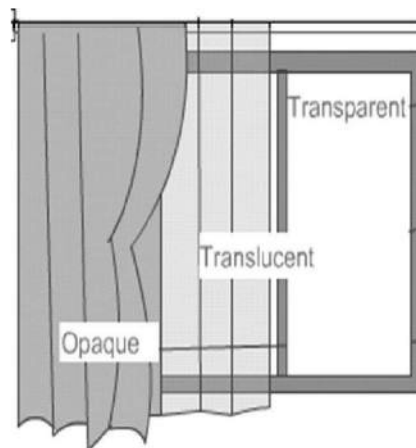
### TRANSPARENT, TRANSLUCENT AND OPAQUE OBJECTS

An object which allows most of the light to pass through it is called **transparent object**. For e.g. Air, glass, water, etc.

An object which allows only a part of the light to pass through it is called **translucent object**. For e.g., Milky white plastic, frosted glass etc.

An object which does not allow light to pass through it is called **opaque object**. For e.g., wood, cement, metal

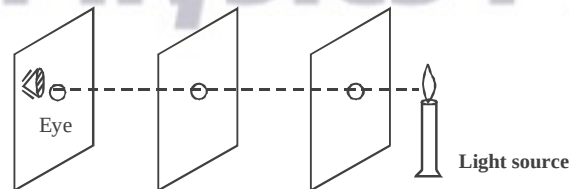
sheet etc.



Ultraviolet rays can go through translucent objects. Due to this a person behind this object can get a sunburn on a Sunny day.

## RECTILINEAR PROPAGATION OF LIGHT

Light travel in a straight line. It is known as **rectilinear propagation** of light.



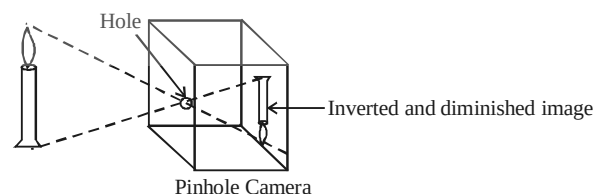
Speed of light is different in different media. Speed of light is maximum in vacuum i.e.,  $3 \times 10^8$  m/s.

If you see the flame through the holes at same level, the flame is visible but if one of the cardboard is displaced such that holes are not in straight line the flame of the candle will not be visible. This suggests that light travels in a straight line.

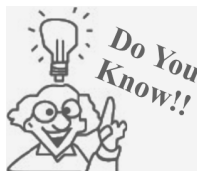
**NOTE:** The straight line indicating the path of the light is called a ray.

## PINHOLE CAMERA

A pinhole camera works on principle of rectilinear propagation of light and pin-hole acts as a lens.



The box is closed from all sides and a forested glass sheet covers one side, containing a very small hole in the centre. An inverted image of the object is formed on it.

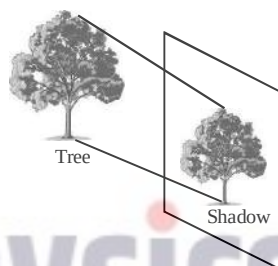


Artists from the sixteenth century onwards used a pinhole camera to help them get the correct colour proportions for a painting.

## SHADOWS AND IMAGES

### Shadows

When light falls on an opaque object, it obstructs the path of light and shadow is formed. Thus, *shadow is the region of absence of light.*



Shadow is longest in the early morning and in the late afternoon.

**The main requirements for the formation of a shadow are :**

- (i) A source of light
- (ii) An opaque obstacle
- (iii) A screen behind the obstacle.

### Important characteristics of a shadow

- (1) Shadow is formed when path of light is obstructed through an opaque object.
- (2) Shadow lies to the opposite side of the source of light.
- (3) The size of a shadow changes according to the position of source of light w.r.t the object.

### Image

When rays of light after reflection meet then image of object is formed. It is an impression of an object.

**Comparison of shadow and image:**

|    | Shadow                                                                     | Image                                                                                 |
|----|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1. | Shadow is the region of absence of light due to obstruction in its path.   | Image is the impression of an object formed when rays of light after reflection meet. |
| 2. | Shadow is always dark.                                                     | Image has all the colours of the object.                                              |
| 3. | Shadow may be bigger or smaller in size than the actual size of an object. | Image formed by a plane mirror is of the same size as that of the object.             |





Image formed by convex mirror is always smaller than object and the image formed by concave mirror may be larger, smaller or equal to the size of the object depends upon the position of the object from the mirror.

## SOLAR AND LUNAR ECLIPSE

Solar and lunar eclipse are formed due to the shadows only.

### Solar eclipse

We know that moon revolves around the earth. When moon comes in between the sun and the earth, then the shadow of moon falls on the earth creating darkness over a small region of earth. This incident is known to be solar eclipse. Since the size of moon is smaller as compared to the sun, so the region of total darkness (umbra) is small and region of partial darkness (penumbra) is bigger.

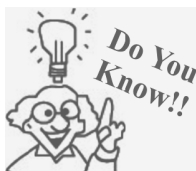


There are 2 to 5 solar eclipses each year.

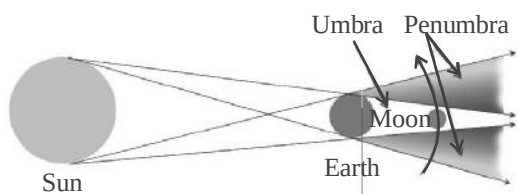


### Lunar eclipse

When during the revolution earth comes between the sun and the moon then shadow of earth is formed on the moon, due to which it appears to be dark. This phenomenon is called lunar eclipse. Since the size of earth is bigger than that of moon, so the region of total darkness (umbra) is more than the region of partial darkness (penumbra).



The Danjon scale is used to describe the darkness of a total lunar eclipse.

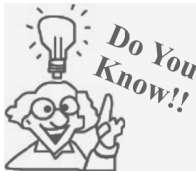


## REFLECTION OF LIGHT

When a ray of light falls on an opaque object, it bounces back. This *bouncing back of light into the same medium is called reflection of light*. Non-luminous objects are visible because they reflect light rays falling on them.

## Reflection of light from a smooth and rough surface

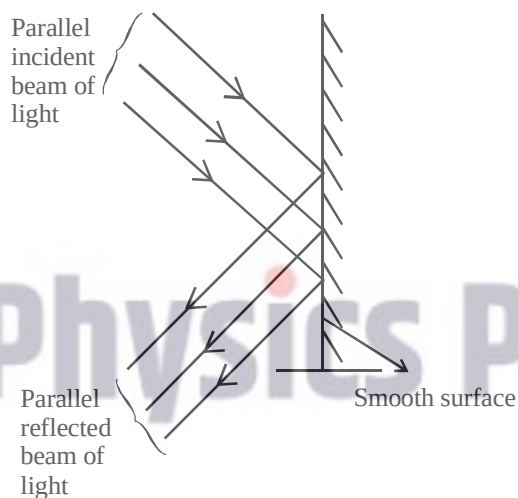
Reflection of light from a smooth surface is called **regular reflection**. In regular reflection a parallel beam of incident light is reflected back as a parallel beam in one direction. Plane mirror and highly polished metal surfaces produce regular reflection. Images are formed by regular reflection.



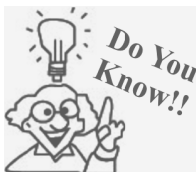
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*In early age mirrors are formed by polishing a volcanic rock called obsidian which was glassy and black.*

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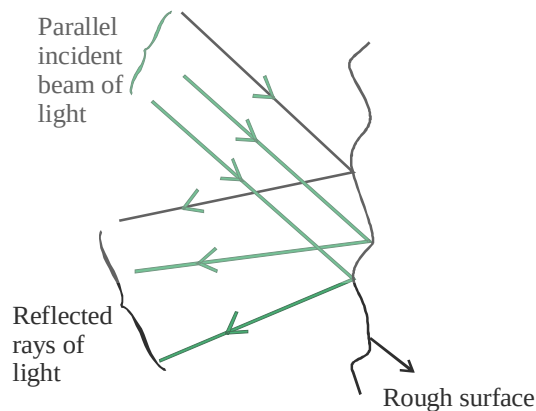
When a parallel beam of light falls on a rough surface then light is reflected in **different direction**, it is known as **diffuse reflection** or **irregular reflection**. Rough surfaces like wall, table, cardboard, etc. produce diffuse reflection.



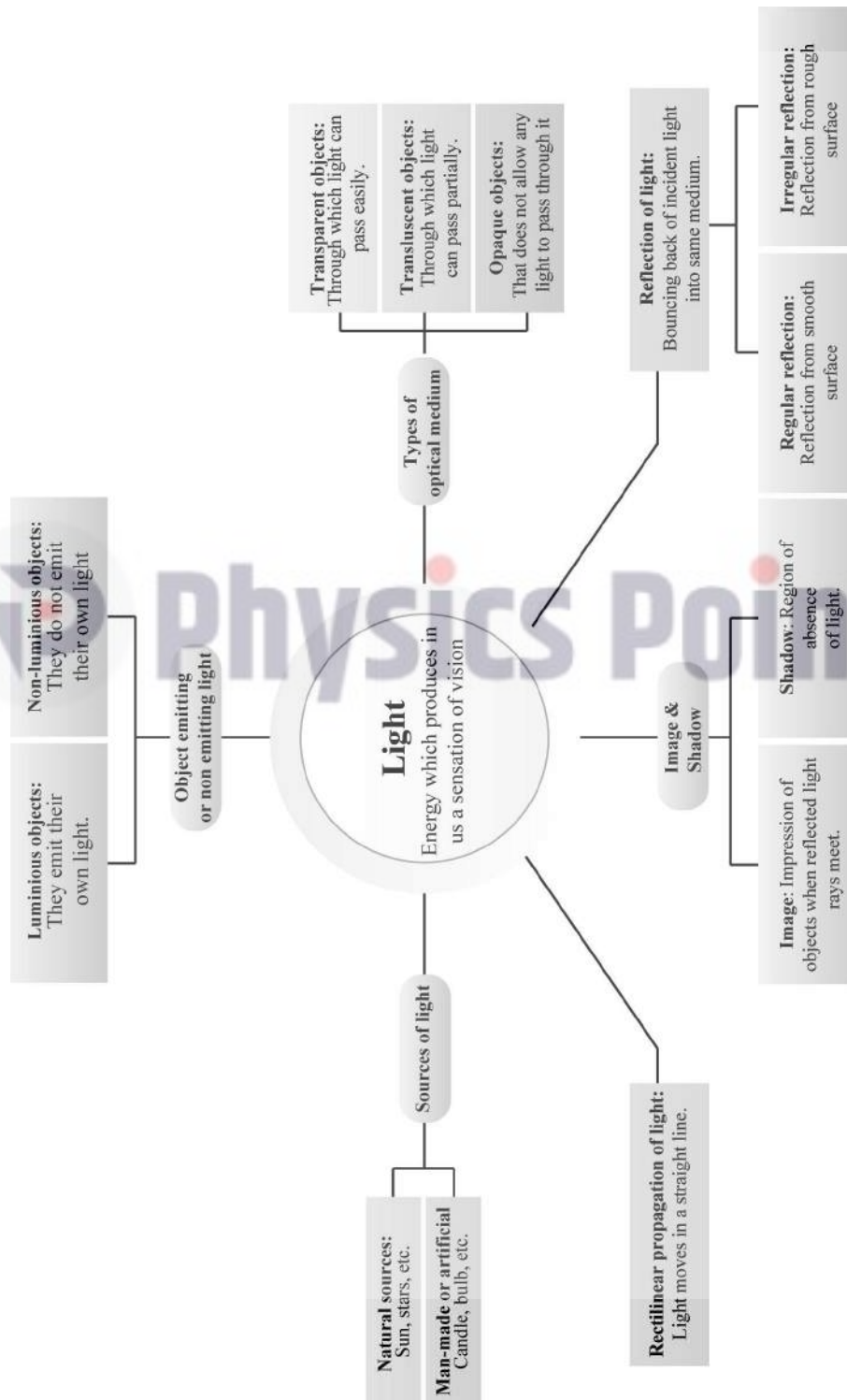
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*We are able to see an object due to diffuse reflection.*

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# Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

1. In lateral inversion ..... happens.
2. By ..... device you can see image of sun?
3. The process of returning back of light ray from a shining surface is called .....
4. The image formed in water is .....
5. The shape of a shadow depends upon the .....
6. .... of the rays of light is Virtual?
7. Image formed by a pinhole camera is .....
8. Image formed by a plane mirror is .....
9. Shadow of a red object will be .....
10. Image of sun through a pinhole camera can be seen as .....
11. Objects that emit or give out their own light are called .....
12. A candle is a ..... source of light.
13. The speed of light is .....
14. If the distance of the object from the plane mirror is 4 cm, the distance of the image from the object is .....
15. A ..... object is one through which light can easily pass.
16. A collection of rays along a definite direction is called .....
17. You can see your face in a mirror due to the ..... property of light.
18. A ..... is an instrument used to view objects above the surface.
19. The shadow of an object is formed on ..... side of the light source.
20. Umbra and penumbra are formed when ..... is bigger than .....
21. A pin hole camera is based on the ..... of light.

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

1. Image formed by a plane mirror is always black and white.
2. Image formed by a plane mirror is inverted.
3. Lateral inversion takes place in the image formed by a plane mirror.
4. Shadow is of equal size and shape of an object.
5. Shadow is of same colour as that of an object.
6. The Moon is a luminous source of light.
7. Candle light travels in a zig-zag path.
8. One can see an eclipse with a pinhole camera without hurting eyes.
9. An oily paper is translucent.
10. The Moon is transparent.
11. The Moon is a natural source of light.
12. An object which does not emit light is called a non – luminous body.
13. Translucent bodies do not cast shadows.
14. A ray of light is the path along which light travels.
15. The earth, moon and other planets do not cast shadow.
16. Shadow of an object can be bigger than the object itself.
17. The image of an object viewed through a pin hole camera may or may not be inverted.
18. The darker part of a shadow is called penumbra.
19. Shadow is formed due to reflection of light.
20. Light cannot be converted into other forms of energy.
21. Light cannot be absorbed by any object.
22. The earth is a source of light.
23. The television screen is a light source.
24. Shadows are matter.
25. Shadows are always of the same shape and size as the object.

**Match the Column**

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column I have to be matched with statements (p, q, r, s, t) in column II.

- | Column I           | Column II                    |
|--------------------|------------------------------|
| (A) Jugnu          | (p) Reflects the light       |
| (B) Light          | (q) Forms image of object    |
| (C) Mirror         | (r) Travels in straight line |
| (D) Pinhole camera | (s) Non – luminous           |
| (E) Moon           | (t) A luminous source        |
- | Column I                | Column II                      |
|-------------------------|--------------------------------|
| (A) Umbra               | (p) Lunar eclipse on Moon      |
| (B) Penumbra            | (q) Region of total darkness   |
| (C) Shadow of the Earth | (r) Luminous source            |
| (D) Shadow of Moon      | (s) Region of partial darkness |
| (E) Burning candle      | (t) Solar eclipses on Moon     |
- | Column I                                                                   | Column II                           |
|----------------------------------------------------------------------------|-------------------------------------|
| (A) An optical medium which has different composition at different points. | (p) $3 \times 10^8 \text{ ms}^{-1}$ |
| (B) A body which does not allow light to pass through it                   | (q) Ray of light                    |
| (C) The speed of light                                                     | (r) Luminous                        |
| (D) The path along which light energy travels in a given direction.        | (s) Opaque                          |
| (E) A body emitting light on its own                                       | (t) Heterogeneous                   |

**Very Short Answer Type Questions**

**DIRECTIONS :** Give answer in one word or one sentence.

- Is Moon a luminous source of light?

- Write a name of a living luminous source of light.
- Can we form shadow with the help of light and an opaque object only.
- When does lunar eclipse occur?
- Why do we write laterally inverted letters on ambulance?
- Is shadow two dimensional or three dimensional?
- Can you form image of a transparent material?
- Define translucent materials?
- Define light?
- What are transparent materials?
- What is an opaque material?
- How we are able to see our face in the mirror?
- How does light travel?

**Short Answer Type Questions**

**DIRECTIONS :** Directions : Give answer in 2-3 sentences.

- Moon is shining in the sky, then why it is called non luminous?
- What do you understand by incandescent body?
- What are the conditions for the formation of shadow?
- Write two effects of light on plants.
- Explain reflection of light?
- Write the properties that are exhibited by light?
- Write the difference between transparent and translucent object.
- Show an experiment which proves that light always travel in a straight line.
- Explain the construction and use of pinhole camera.
- Name three artificial and natural sources of light?

**Long Answer Type Questions**

**DIRECTIONS :** Give answer in 4-5 sentences.

- What is a shadow? Explain a simple process for shadow formation.
- Explain about solar eclipse and lunar eclipse. Also, give the ray diagrams.

# 2 EXERCISE

## Text Book Questions

1. Rearrange the boxes given below to make a sentence that helps us understand opaque objects.

OWS AKE OPAQ UEO BJEC TSM SHAD

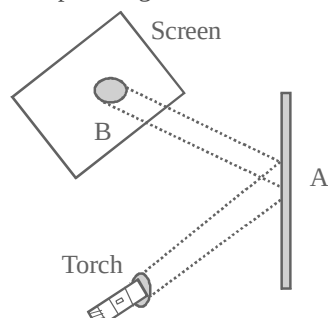
2. Classify the objects or materials given below as opaque, transparent or translucent and luminous or non-luminous:

Air, water, a piece of rock, a sheet of aluminium, a mirror, a wooden board, a sheet of polythene, a CD, smoke, a sheet of plane glass, fog, a piece of red hot iron, an umbrella, a lighted fluorescent tube, a wall, a sheet of carbon paper, the flame of a gas burner, a sheet of cardboard, a lighted torch, a sheet of cellophane, a wire mesh, kerosene stove, sun, firefly, moon.

3. In a completely dark room, if you hold up a mirror in front of you, will you see a reflection of yourself in the mirror?
4. Can you think of creating a shape that would give a circular shadow if held in one way and a rectangular shadow if held in another way?

## NCERT Exemplar Questions

1. Observe the picture given below carefully.



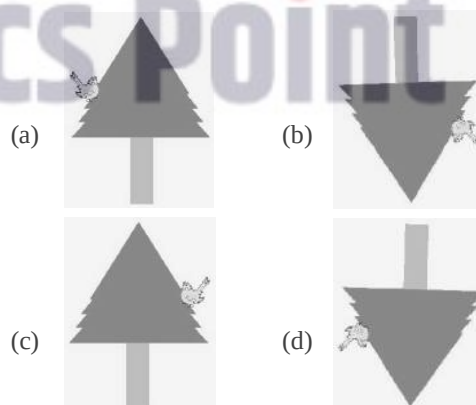
A patch of light is obtained at B, when the torch is lighted as shown. Which of the following is kept at position A to get this patch of light?

- (a) A wooden board
- (b) A glass sheet

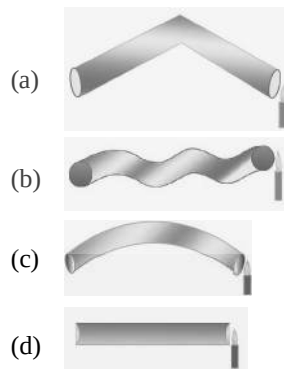
- (c) A mirror
- (d) A sheet of white paper



A student observes a tree given in above figure through a pin hole camera. Which of the diagrams (a) to (d), depicts the image seen by her correctly?



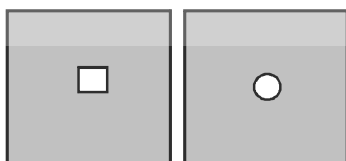
3. Four students A, B, C, and D looked through pipes of different shapes to see a candle flame as shown in figure given below.



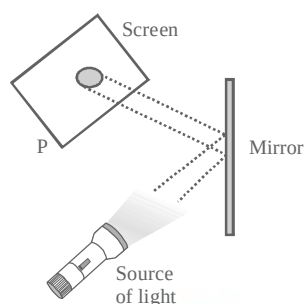


Who will be able to see the candle flame clearly?

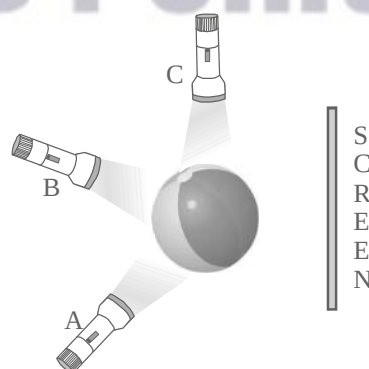
- (a) A (b) B  
(c) C (d) D
4. Which of the following is not always necessary to observe a shadow?  
(a) Sun (b) Screen  
(c) Source of light (d) Opaque object
5. Paheli observed the shadow of a tree at 8:00 a.m., 12:00 noon and 3:00 p.m. Which of the following statements is closest to her observation about the shape and size of the shadow?  
(a) The shape of the shadow of the tree changes but the size remains the same.  
(b) The size of the shadow of the tree changes but the shape remains the same.  
(c) Both the size and shape of the shadow of the tree change.  
(d) Neither the shape nor the size of the shadow changes.
6. Which of the following can never form a circular shadow?  
(a) A ball  
(b) A flat disc  
(c) A shoe box  
(d) An ice cream cone
7. Two students while sitting across a table looked down on to its top surface. They noticed that they could see their own and each other's image. The table top is likely to be made of  
(a) unpolished wood.  
(b) red stone.  
(c) glass sheet.  
(d) wood top covered with cloth.
8. You have 3 opaque strips with very small holes of different shapes as shown in figure. If you obtain an image of the sun on a wall through these holes, will the image formed by these holes be the same or different?



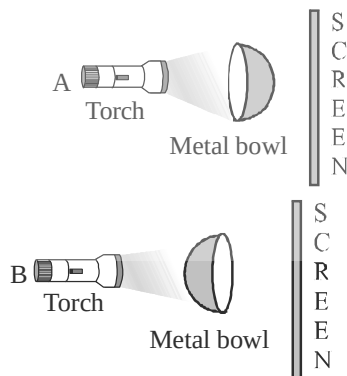
9. Observe the picture given in figure. A sheet of some material is placed at position 'P', still the patch of light is obtained on the screen. What is the type of material of this sheet?



10. Three torches A, B and C shown in figure given below are switched on one by one. The light from which of the torches will not form a shadow of the ball on the screen?

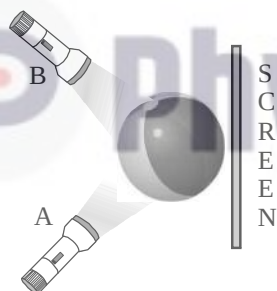


11. Look at the figure.



Will there be any difference in the shadow formed on the screen in A and B?

12. Correct the following statements.
  - (i) The colour of the shadow of an object depends on its colour.
  - (ii) Transparent objects allow light to pass through them partially.
13. Suggest a situation where we obtain more than one shadow of an object at a time.
14. On a sunny day, does a bird or an aeroplane flying high in the sky cast its shadow on the ground? Under what circumstances can we see their shadow on the ground?
15. You are given a transparent glass sheet. Suggest any two ways to make it translucent without breaking it.
16. A torch is placed at two different positions A and B, one by one, as shown in figure.



The shape of the shadow obtained in two positions is shown in figure given below.

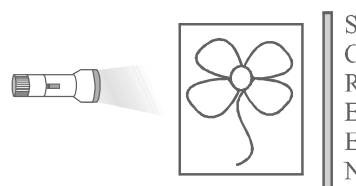


Match the position of the torch and shape of the shadow of the ball.

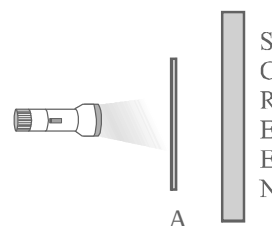
17. A student covered a torch with red cellophane sheet to obtain red light. Using the red light she obtains a shadow of an opaque object. She repeats this activity with green and blue light. Will the colour of the light affect the shadow? Explain.
18. Is air around us always transparent? Discuss.
19. Three identical towels of red, blue and green colour are hanging on a clothes line in the sun.

What would be the colour of shadows of these towels?

20. Using a pin hole camera a student observes the image of two of his friends, standing in sunlight, wearing yellow and red shirt respectively. What will be the colours of the shirts in the image?
21. In the figure given below, a flower made of thick coloured paper has been pasted on the transparent glass sheet. What will be the shape and colour of shadow seen on the screen?



22. A football match is being played at night in a stadium with flood lights ON. You can see the shadow of a football kept at the ground but cannot see its shadow when it is kicked high in the air. Explain.
23. A student had a ball, a screen and a torch in working condition. He tried to form a shadow of the ball on the screen by placing them at different positions. Sometimes the shadow was not obtained. Explain.
24. A sheet of plywood, a piece of muslin cloth and that of a transparent glass, all of the same size and shape were placed at A one by one in the arrangement shown in figure given below. Will the shadow be formed in each case? If yes, how will the shadow on the screen be different in each case? Give reasons for your answer.



### HOTS Question

1. Why is the shadow of an aeroplane flying high in the sky not seen on the ground?

## 3

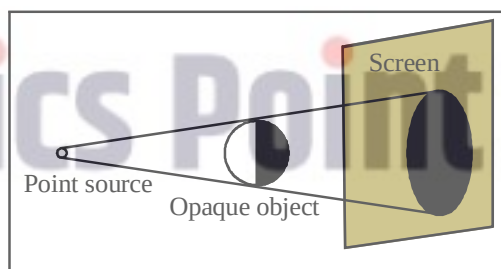
## EXERCISE

## Multiple Choice Questions

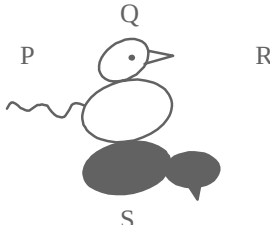
**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

- Which of the following emits light energy?
  - Cricket
  - Glow worm
  - Bat
  - Rat
- Light shows:
  - rectilinear propagation
  - random propagation
  - curvilinear propagation
  - none
- Translucent objects:
  - Allow light to pass through them
  - radiates light
  - absorb most of the light and allow a partial amount to pass through them.
  - does not allow light to pass through.
- We see moon because:
  - it emits light.
  - it absorbs sunlight.
  - it reflects sunlight
  - it is a luminous source.
- Metals are shiny because of:
  - reflection of light.
  - rectilinear propagation of light.
  - absorption of light.
  - radiation of light.
- Increase in the size of the hole in a pin hole camera will result in a:
  - sharp image
  - blurred image
  - erect image
  - multiple image
- Umbra and penumbra are clearly visible when:
  - the source of light is small and the object (opaque) is big.
  - the source of light is big and the object (opaque) is small.
  - both source of light and the object are big and placed far apart.
  - both source of light and the object are small and placed nearer to each other.
- Penumbra is seen:
  - inside the umbra
  - out side the umbra
  - away from the umbra
  - none of the above
- Some times, when we pass under a tree covered with large number of leaves, we notice small patches of sunlight under it. These circular images are images of:
  - tree
  - leaves
  - sun
  - none of the above
- You cannot see a burning candle by using a bent pipe. This is because:
 
  - light gets bent along the pipe.
  - light travels in straight line.
  - light gets reflected.
  - light gets absorbed.
- Light is a form of energy produced by a
  - luminous object
  - non-luminous object
  - transparent object
  - opaque object

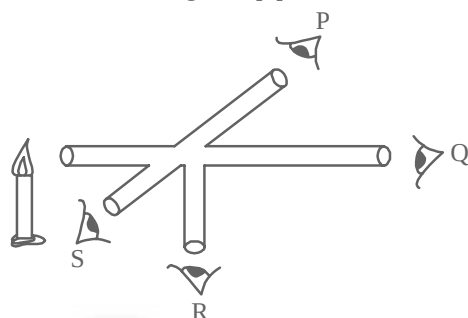
12. Planets are example of  
(a) luminous object  
(b) non-luminous object  
(c) translucent object  
(d) transparent object
13. Which of these conditions is/are essential for a shadows to be produced?  
(a) A light source  
(b) An opaque object  
(c) A screen/surface  
(d) All of the above
14. An artificial source of light is  
(a) sun (b) firefly  
(c) jellyfish (d) electric bulb
15. Which of these materials could produce a shadow?  
(a) A clear glass slab  
(b) A milky white plastic  
(c) Clear water  
(d) A piece of wood
16. A..... image can be obtained on a screen.  
(a) real (b) virtual  
(c) erect (d) inverted
17. When a person sees himself in a mirror, what do his eyes observe?  
(a) A virtual image whose rays originate at the person.  
(b) A virtual image formed from light that originate behind the mirror.  
(c) A real image whose rays appear to originate at the person.  
(d) A real image whose rays originate behind the mirror.
18. The objects that cast shadow are  
(a) transparent (b) translucent  
(c) opaque (d) luminous
19. What happen to light rays when they strike an uneven surface from same direction?  
(a) They are reflected in the same direction  
(b) They are reflected in many directions  
(c) They are absorbed by the surface  
(d) They pass through the surface and are diffracted
20. If a student stand 3 m in front of a mirror, what is the distance between he and his image?  
(a) 1.5 m (b) 3 m  
(c) 6 m (d) 7.5 m
21. You can see round the corners by using a:  
(a) magnifying glass (b) pin hole camera  
(c) telescope (d) periscope
22. The shadow below a tree has bright spots in it because:  
(a) leaves attract the light.  
(b) the light bends around the leaves to form circular spots.  
(c) the gaps between the leaves acts as pin holes  
(d) leaves reflect light.
23. A big ball is placed in front of a point source as shown in the figure. The shadow will mostly consist of:



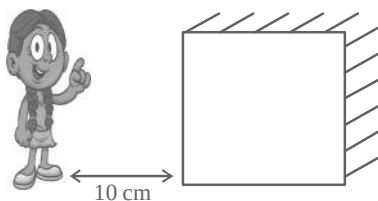
- (a) umbra  
(b) penumbra  
(c) both umbra and penumbra  
(d) no shadow will form.
24. Penumbra only is formed by a/an:  
(a) point source of light  
(b) extended source of light  
(c) both A and B  
(d) none of the above
25. At which of the following times, the length of a shadow of a tree will be longest:  
(a) At 9 AM (b) At 11 AM  
(c) At 12 PM (d) At 1 PM
26. A window glass is usually:  
(a) transparent (b) translucent  
(c) opaque (d) none of the above
27. Which of the following allows light to pass through easily?  
(a) A metal plate (b) A glass of water  
(c) A book (d) A cloth

28. Which of the following reflects light best?  
 (a) A mirror (b) A piece of paper  
 (c) A cloth (d) A wooden table
29. Which of the following absorbs light best?  
 (a) A mirror  
 (b) A piece of white paper  
 (c) A black wallet  
 (d) A green leaf
30. In which material can light transmit best?  
 (a) A glass block  
 (b) A piece of blank paper  
 (c) A spot of black ink  
 (d) A placid lake surface
31. The following are some objects collected by Ahaan for some light experiment  
 (i) Candle (ii) Torch  
 (iii) Paper (iv) Leaf  
 (v) Bulb (vi) Match stick  
 Which of three objects are luminous?  
 (a) (i) and (ii) only  
 (b) (i), (ii) and (vi) only  
 (c) (i), (ii), (iii) only  
 (d) (i), (ii), (v) and (vi) only
32. What happens when light falls on a book?  
 (a) Light passes through the book  
 (b) A part of light gets reflected from book and enters our eyes.  
 (c) The book gives out some signal that enables us to see it.  
 (d) Electrical energy is given out by the book.
33. Which of the following is grouped incorrectly.  
 Opaque Transparent Translucent  
 (a) Table Plastic Water  
 (b) Metal block Cellophane Frosted glass  
 (c) Mirror Butter paper Plain paper  
 (d) Glass Clean water Wire mesh
34. When Amit looked at a lighted bulb through an object he could see a faint glow but not the torch. This suggest that the object is \_\_\_\_\_  
 (a) Transparent (b) Translucent  
 (c) Opaque (d) Luminous
35. Why does an Opaque object form a shadow when placed in the path of light?  
 (a) Because light is a form of energy  
 (b) Because light gets reflected  
 (c) Because Opaque object allows light to pass through  
 (d) Because Opaque object does not allow light to pass through it.
36. Look at the following figure of a toy with its shadow.
- 
- Which of the following is the position of sun with respect to the given shadow?  
 (a) P (b) Q  
 (c) R (d) S
37. Boojho placed a pipe in the garden. He observed the shadow of the pipe at 8.00 a.m. 12.00 noon and at 3.00 p.m. Which of the following observations is correct?  
 (a) Shadow is longest at 12.00 noon  
 (b) Shape of shadow of pipe changes but size remains the same.  
 (c) Neither shape nor size changes.  
 (d) Shadow is shortest at 12.00 noon.
38. There is no dark shadow formed by the glass when light falls on it. This is because. \_\_\_\_\_  
 (a) Light is very dim  
 (b) Glass is transparent  
 (c) Glass is opaque  
 (d) Light does not fall properly
39. Which of the following statements is correct.  
 (i) Moon is a luminous body  
 (ii) Transparent objects do not cast shadows  
 (iii) Opaque objects allow some light to pass  
 (iv) A shadow is of the same shape as object  
 (a) Only (i) and (ii)  
 (b) Only (iii) and (iv)  
 (c) Only (ii) and (iv)  
 (d) Only (i) and (iii)
40. What happens when you increases the distance between the pinhole and the screen in a pinhole camera?  
 (a) Brightness of image changes.  
 (b) Size of image changes  
 (c) Image remains inverted.  
 (d) All of these
41. When we pass under a tree covered with large number of leaves, we see small circular patches of sunlight. What exactly are these circular patches?

- (a) Shadows of sun  
(b) Pinhole images of sun  
(c) Mirror images of sun  
(d) Real sun.
42. Look at the following set-up. Four student P, Q, R and S want to see the flame of the candle through pipes. Identify which student can see the flame through the pipe?



- (a) P (b) Q  
(c) R (d) S
43. Kajal places a candle in front of these cardboards, each with a hole in them and tries to look the flame from the other side. What conclusion can be drawn from this experiment?
- (a) Light can be reflected  
(b) Eye can see luminous objects  
(c) Light travels in straight line  
(d) Cardboard can cast a shadow.
44. The mirror image of 'STAR' will be  
RATS  
RVLS  
STAR  
RAT2
45. A girl stands 10cm away from a plane mirror if she moves few steps away from the mirror what will happen to the image size in the mirror?



- (a) Size of image will increase  
(b) Size of image will decrease  
(c) Size of image will remain same  
(d) Cannot say

46. Which of the following statements is correct
- (a) Reflection of light produces mirror images.  
(b) Mirror images are of same colour as the object.  
(c) Mirror images have the same shape as the object.  
(d) All of these.

### More than One option Correct

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choice (a), (b), (c) and (d) out of which ONE OR MORE may be correct.

- Which of the following are the properties of a plane mirror image?  
(a) The image is the same size as the object.  
(b) The image is virtual.  
(c) The image is laterally inverted.  
(d) The image real.
- Shadow moves on screen with:  
(a) when the source moves parallel to the screen  
(b) when the object moves parallel to the screen  
(c) change in colour of source of light  
(d) all of the above
- An opaque object forms a shadow when placed in light because:  
(a) light gets reflected  
(b) opaque object do not allow light to pass through it  
(c) light travels in a straight line  
(d) light produces umbra and penumbra
- Which of the following are NOT true?  
(a) A pin hole camera can take pictures of moving objects.  
(b) A ray of light which bounces off the surface of a mirror is called a reflected ray.  
(c) The image formed on the screen of a pin hole camera is not inverted.  
(d) A region of total darkness is called umbra.
- Which of the following is a natural luminous source?  
(a) Candle (b) Glow worm  
(c) Torch light (d) Sun



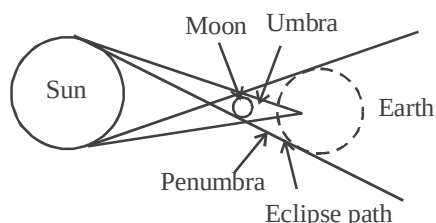
6. Opaque objects:
  - (a) allow light to pass through them
  - (b) do not allow light to pass through them
  - (c) emit light
  - (d) reflects the light falling on it
7. Which of the following is/are not light source?
  - (a) A planet                      (b) A star
  - (c) A metal strip              (d) A burning candle
8. The image through a pin hole camera is?
  - (a) Virtual and erect
  - (b) Inverted and small
  - (c) Magnified and erect
  - (d) real
9. Which of the following is/are translucent substances?
  - (a) Ground glass              (b) Muddy water
  - (c) Iron plate                  (d) Leather belt

### Passage Based Questions

**DIRECTIONS :** Study the passage and answer the following questions.

#### Passage I

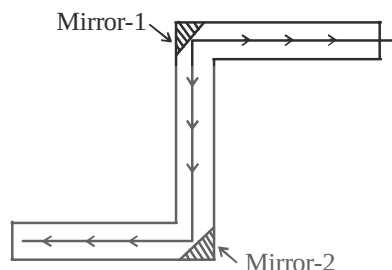
On the basis of the given diagram answer the following questions.



1. 'Region of full shadow' is called
  - (a) umbra                      (b) penumbra
  - (c) source                      (d) curved path
2. 'Region of partial shadow' is called
  - (a) umbra                      (b) penumbra
  - (c) source                      (d) curved path
3. In solar eclipse, sun's light blocks out on the surface of
  - (a) Moon                      (b) Sun
  - (c) Earth                      (d) All of these

#### Passage II

You can make a simple periscope by placing two mirrors in a 'Z' shaped box as shown in figure below.



4. Periscope is a device
  - (a) used in U-boats
  - (b) that makes use of reflection of light
  - (c) Both the above
  - (d) None of these
5. Periscope is a device
  - (a) that uses reflections to see around corners
  - (b) that uses the property of light that light travels in straight lines
  - (c) Both the above
  - (d) None of these
6. Which of the following device makes use of reflection of light?
  - (a) Kaleidoscope
  - (b) Periscope
  - (c) Both of the above
  - (d) None of these

#### Passage III

Luminous objects give off their own light, such as the sun and stars. Fireflies and glow-worms are luminous. Non-luminous object do not give off light or glow.

7. Sun is a
  - (a) non-luminous object
  - (b) luminous object
  - (c) transparent object
  - (d) opaque object
8. Fireflies is
  - (a) a glowing object
  - (b) a deep sea fish
  - (c) both (a) and (b)
  - (d) neither (a) nor (b)
9. Non-luminous objects
  - (a) have their own light
  - (b) are visible when they reflect the light fall on them from luminous objects
  - (c) do not give off light
  - (d) both (b) and (c)

### Passage IV

Take a comb in your right hand and bring it to your hair and look at yourself in mirror. You can see your own face in the mirror. This is your mirror image.

10. In your mirror image you appear to be holding the comb in your
  - (a) left hand
  - (b) right hand
  - (c) comb is not visible
  - (d) None of these is correct
11. The images of an object formed in a pin hole camera and that in a mirror are
  - (a) quite similar      (b) quite different
  - (c) can't say          (d) All are incorrect
12. The image formed in a mirror is due to
  - (a) reflection of light
  - (b) bending of light
  - (c) Both the above
  - (d) None of these

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

1. **Assertion (A) :** Shadow forms when light falls on a wooden block.

**Reason :** Light is reflected when it bounces off a surface.

2. **Assertion (A) :** Solar and lunar eclipses are results of shadow formation.

**Reason :** Sun is essential for shadow formation.

3. **Assertion (A) :** Shadow is formed when an opaque object comes in the path of light.

**Reason (R) :** An opaque body does not allow any light to pass through it.

4. **Assertion (A) :** When we look into the mirror, we see our own face inside the mirror.

**Reason (R) :** Mirror is made of a transparent substance that allows the light to pass through it.

5. **Assertion (A) :** When the light from a source falls on a mirror it gets reflected.

**Reason (R) :** On being reflected there is no change in the direction of light.

6. **Assertion (A) :** Mirror reflection gives clear images.

**Reason (R) :** Images are quite similar to shadows.

7. **Assertion (A) :** Shadow is always black.

**Reason (R) :** A shadow only shows the outline of an object.

8. **Assertion (A) :** Image has the colour of the object.

**Reason (R) :** Image gives only the outline of the object.

9. **Assertion (A) :** In cars the windshields made of glass are used.

**Reason (R) :** Those substances through which things can be seen clearly are called transparent substances.

### Multiple Matching Questions

**DIRECTIONS :** Following questions has four statements (A, B, C and D) given in Column I and five or six statements (p, q, r, s) in column II. Any given statement in column I can have correct matching with one or more statement(s) given in column II. Match the entries in column I with entries in column II.

| Column I            | Column II                   |
|---------------------|-----------------------------|
| (A) The torch bulb  | (p) Luminous                |
| (B) Pin-hole camera | (q) Forms an inverted image |
| (C) Sun             | (r) Region of full shadow   |
| (D) Umbra           |                             |

### Integer Type Questions

**DIRECTIONS :** Following are integer based/Numeric based questions. Each question, when worked out well result in One integer or numeric value.

1. Given are some items. Identify how many are luminous objects. Your answer will be between 0-9? firefly, smoke, fog, a lighted torch, a wooden board, piece of rock, a mirror, Sun

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- Left of an object appears right of an image.
- Pinhole camera
- Reflection
- Erect.
- Shape of the object.
- Normal ray.
- Erect.
- Erect but laterally inverted
- Black.
- Circular
- Luminous objects
- man made
- 300,000,000 ms<sup>-1</sup>
- 8 cm
- transparent
- beam of light
- reflection
- periscope
- opposite
- object, source of light
- rectilinear propagation
- True
- False
- True
- True
- False
- False
- False
- False
- True
- False
- False
- True
- False
- False

### True/False

- False
- False
- True
- False
- False
- False
- False
- True
- True
- False
- False

- True
- False
- True
- True
- True
- True
- False
- False
- False
- False
- False
- False
- False
- True
- False
- False

### Match the Column

- A – t, B – r, C – p, D – q, E – s
- A – q, B – s, C – p, D – t, E – r
- A – t, B – s, C – p, D – q, E – r

### Very Short Answer Type Questions

- No.
- Jugnu, firefly.
- No, a screen is always needed.
- When earth comes between sun and moon.
- So that we can see right in rearview mirror.
- Two dimensional.
- No, clear image cannot be formed.
- Materials through which light can pass partially are called translucent materials. We cannot see clearly through it. For example : Wax paper.
- Light is a source of energy. It cannot be seen but it enables us to see things.
- Materials that allow light to pass through them are called transparent materials. We can see clearly through it. For example : Glass.
- Material that does not allow light to pass through them is called opaque materials. We cannot see through them. For example : Wood.

12. The light from the face strikes at the surface of the mirror and is reflected from the surface of it and reaches our eye. Hence, we are able to see our face in the mirror.
13. Light travel in a straight line.

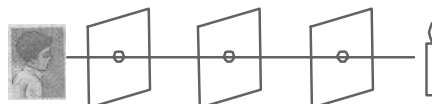
### Short Answer Type Questions

1. Moon shines because of sun's light falling on it.
2. If we a metal make it emits light. This is called incandescent body.
3. We need light source, opaque object and a screen.
4. The two effects of light on plants are :
  - (i) Plants use light for the preparation of their own food through the process of photosynthesis.
  - (ii) Some plants (like sunflower) move in the direction of light.
5. When a beam of light is incident on a smooth surface, a part of it bounces back into the same medium. This is known as reflection of light.
6. Some important properties of light are as follows:
  - (i) Light always travels in a straight line, which is called rectilinear propagation of light.
  - (ii) When light is obstructed by an opaque object, then a shadow of an object is formed behind it.
  - (iii) Light exhibits the property of reflection.

| S. No. | Transparent object                                      | Translucent object                                                          |
|--------|---------------------------------------------------------|-----------------------------------------------------------------------------|
| 1.     | They allow the light to pass through them completely.   | 1. They allow the light to pass through them partially.                     |
| 2.     | Air, glass and water are examples of transparent object | 2. Milky white plastic and frosted glass are examples of translucent object |

8. The light always travels in a straight line. This can be shown by performing a simple activity. For this, first of all let us take three cardboards of equal size. Now, a hole is made at the center of each cardboard at the same level. The three cardboards are placed on a flat table and aligned linearly as shown in the figure. A candle is lighted at one end of the table with its flame at the level of the holes and is seen at the other end. It is observed that the light of the

candle is seen effortlessly. Now, the middle of the three cardboards is displaced from its position. Now, we are unable to see the light. The reason behind this is that the light traveling in the straight line is obstructed due the misalignment of the cardboard. This proves that light always travels in a straight line.



9. Take two boxes such the at one can slide into the other with no gap in between them. Cut the same side of each box. Make a small hole in the middle of the opposite side of the larger box and cut out a square from the middle of the opposite side of the smaller box. This open square should be covered with a tracing paper. Slide the smaller box inside the larger one in such a way that its side with the tracing paper is inside.
10. Natural sources of light are :
  - (i) Stars, (ii) Firefly, (iii) Sun.
 Artificial sources of light are :
  - (i) Electric bulb
  - (ii) Candle
  - (iii) Gas lamp.

### Long Answer Type Questions

1. Opaque objects do not allow light to pass through them. When an opaque objects is placed in the path of light, then the light is obstructed by an object leading to the formation of a dark patch known as the shadow of the object, which can be taken on a screen placed behind it.

**Shadow formation :** To form a shadow, there must be (i) a light source (ii) a screen (iii) an opaque object placed between the light source and the screen. For shadow formation, we can follow the given steps :

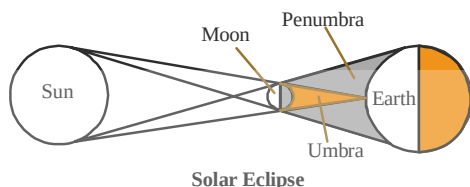
**Step – 1 :** Take an opaque object.

**Step – 2 :** Throw light on it from a light source.

**Step – 3 :** Put a screen behind the object.

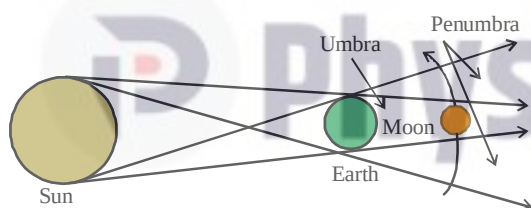
In this way, a shadow of an object can be obtained on the screen.

2. **Solar Eclipse :** When the sun, the earth and the moon comes in a straight line with the moon in between then the shadow of the moon falls on the earth. This results in solar eclipse. Solar eclipse takes place on a new moon days.



Solar Eclipse

**Lunar Eclipse :** When the sun, the earth and the moon comes in a straight line with the earth in between the moon and the sun, then the shadow of the earth falls on the moon. This results in Lunar eclipse. Lunar eclipse takes place on a full moon day. The shadow consists of two parts. One part is the darkest part of the shadow, where light does not reach from the source of light and this part is known as umbra. Other part is not completely dark, where some light reaches from the source of light and this part is known as penumbra. Penumbra surrounds the umbra.



## 2

## EXERCISE

### Text Book Questions

1. OPAQ | UEO | BJEC | TSM | AKE | SHAD | OWS
2. No image in the mirror will be seen in a dark room. This is because an image is formed by reflection of light rays. If there is no light, no image is formed.

| Object                 | Opaque / Transparent / Translucent | Luminous / Non-luminous |
|------------------------|------------------------------------|-------------------------|
| Air                    | Transparent                        | Non-luminous            |
| Water                  | Transparent                        | Non-luminous            |
| A piece of rock        | Opaque                             | Non-luminous            |
| A sheet of aluminium   | Opaque                             | Non-luminous            |
| A mirror               | Opaque                             | Non-luminous            |
| A wooden board         | Opaque                             | Non-luminous            |
| A sheet of polythene   | Transparent                        | Non-luminous            |
| A CD                   | Transparent                        | Non-luminous            |
| Smoke                  | Transparent                        | Non-luminous            |
| A sheet of plane glass | Transparent                        | Non-luminous            |

|                            |             |              |
|----------------------------|-------------|--------------|
| Fog                        | Transparent | Non-luminous |
| A piece of red hot iron    | Opaque      | Luminous     |
| An umbrella                | Opaque      | Non-luminous |
| A lighted fluorescent tube | Opaque      | Luminous     |
| A wall                     | Opaque      | Non-luminous |
| A sheet of carbon paper    | Opaque      | Non-luminous |
| The flame of a gas burner  | Transparent | Luminous     |
| A sheet of cardboard       | Opaque      | Non-luminous |
| A lighted torch            | Opaque      | Luminous     |
| A sheet of cellophane      | Transparent | Non-luminous |
| A wire mesh                | Transparent | Non-luminous |
| Kerosene stove             | Opaque      | Luminous     |
| Sun                        | Opaque      | Luminous     |
| Firefly                    | Opaque      | Luminous     |
| Moon                       | Opaque      | Non-luminous |

4. A cylinder.



When light falls on the top surface of the cylinder, the shadow obtained is circular and when the light falls on the side of the cylinder, the shadow obtained is rectangular.

### NCERT Exemplar Questions

1. (c) A mirror
2. (b)
3. (d)
4. (a)
5. (c)
6. (c)
7. (c)
8. The image obtained will be the same in all the three cases.
9. A sheet of transparent material is placed at 'P'.
10. The light of torch at position C will not form a shadow of the ball on the screen.
11. No
12. (i) The colour of the shadow of an object does not depend on its colour.  
(ii) Translucent objects allow light to pass through them partially or transparent objects allow most of the light to pass through them.

13. We can obtain more than one shadow of an object if light from more than one source falls on it. For example, during a match being played in a stadium, multiple shadows of players are seen.
14. No. Shadow of the bird can only be seen when the bird is flying very low, close to the ground.
15. (i) By applying oil, grease, butter on it or pasting a butter paper on it.  
(ii) Grinding (rubbing) the surface of the glass by any abrasive material.
16. A  $\longrightarrow$  a, B  $\longrightarrow$  b
17. The colour of light will not affect the shadow, because shadow is the dark patch formed when an object obstructs the path of light and hence no light reaches in the shadow region.
18. Air around us is transparent but when thick smoke, thick clouds, etc., are present in the air it does not remain transparent.
19. The colour of shadows of all three towels will be the same. This is because shadows are always black in colour.
20. The colours of the image of the shirts will be the same as the colour of the shirt. This is because a pin hole camera has only a small aperture through which light passes and forms the image.
21. The shadow formed will be dark and of the shape of the flower along with the stalk.
22. We can see the shadow of football lying on the ground because the ground acts as a screen for it. However, when the football is kicked high, the ground, which is acting as a screen is away from the football, hence no shadow of the football will be formed on the ground.
23. Some of the reasons can be  
(i) The screen is away from the ball.  
(ii) The beam of light from the torch is falling parallel to the screen on the ball.  
(iii) The torch is kept away from the ball.
24. Shadow will not be formed in each case. Shadow will be formed by the sheet of plywood and the piece of muslin cloth. The sheet of plywood will form a dark shadow as it blocks the path of light completely. The piece of muslin cloth will form a lighter shadow as it allows light to pass through it partially.

### HOTS Question

1. This is because the size of a flying aeroplane is very small with respect to the ground.

## 3

### EXERCISE

### Multiple Choice Questions

1. (b)      2. (a)      3. (c)      4. (c)
5. (a)      6. (b)      7. (d)      8. (b)
9. (c)      10. (b)
11. (a) Luminous objects produce their own light.
12. (b) Planet reflects sun's light that falls on them and shines.
13. (d)      14. (d)
15. (d) An opaque object is required to produce a shadow.
16. (a) Virtual image is always erect and it cannot be taken on screen. Image formed on screen is always real and inverted.
17. (d) Real and inverted image is formed on the retina.
18. (c) Objects that reflect the light falls on them can cast shadow.
19. (b) The reflection will be irregular reflection.
20. (c) Distance between object and image becomes double the distance between object and mirror.
21. (d)      22. (c)      23. (a)      24. (b)
25. (a)      26. (a)      27. (b)      28. (a)
29. (c)      30. (a)
31. (d)
32. (b)
33. (b)
34. (b) Translucent objects do not allow whole light to pass through.
35. (d) Since Opaque objects obstructs light, a dark patch in the shape of object is formed.
36. (b)
37. (d) Shape of shadow remains same but size varies depending on the position of sun. It is longest in the morning and the evening and shortest at moon.
38. (b) For a shadow to form, the object should be opaque.
39. (c)      40. (d)
41. (b) We see pinhole images of sun as the gaps between leaves act as several pinholes.



42. (b) Only Q will be able to see the flame because light travels in a straight line.
43. (c) If the holes are in straight line you will be able to see the candle.
44. (b) Mirror images are laterally inverted, i.e., left right inverted.
45. (b) Image size decreases if distance between object and mirror increases.
46. (d) All these are characteristics of mirror images.
11. (b) In a pinhole camera it is *inverted* (i.e., upside down) and in a mirror it is turned right to left.
12. (a)

#### Assertion/Reason

#### More than One option Correct

1. (a, b, c) 2. (a, b) 3. (b, c) 4. (a, c)
5. (b, d) 6. (b, d) 7. (a, c) 8. (b, d)
9. (a, b)

#### Passage Based Questions

1. (a) Umbra is darker region.
2. (b) Penumbra is lighter region.
3. (c) In solar eclipse, sun's light block out on the surface of earth.
4. (c) 5. (c) 6. (c)
7. (b) Because sun has its own light.
8. (c) 9. (d)
10. (a)

1. (a) Both (A) and (R) are correct and (R) is the correct explanation of (A).
2. (c) (A) is true but (R) is false.
3. (a) Both A and R are correct, Reason R is correct explanation of Assertion A.
4. (c) A is correct, R is false.
5. (c) A is correct, R is false.  
[The direction of reflected ray is not the same as that of light ray falling on mirror.]
6. (c) A is correct, R is false.  
[Images are quite different from shadows.]
7. (a) Both (A) and (R) are correct and (R) is correct explanation of (A).
8. (c) (A) is true but (R) is false.
9. (b)

#### Multiple Matching Questions

1. (a)  $A \rightarrow (p)$ ;  $B \rightarrow (q)$ ;  $C \rightarrow (p)$ ;  $D \rightarrow (r)$

#### Integer Type Question

1. (3) Firefly, a lighted torch and sun.

# Chapter 12

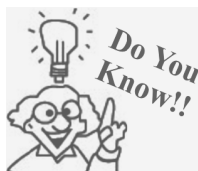
# ELECTRICITY AND CIRCUITS

## INTRODUCTION

Electricity plays a very important role in our everyday life. It is one of the most useful forms of energy used by us. We use electricity for various purpose like to heat or cool our rooms, to run our televisions, to light up our houses etc. Various electrical appliances are used by us. Let us discuss the source of the electrical energy and how the appliances work in an electric circuit.

### ELECTRIC CHARGE

It was observed that when a glass rod rubbed with a silk cloth, is brought near another glass rod rubbed with silk, both the glass rods repel each other. But if a glass rod rubbed with silk is brought near an ebonite rod rubbed with fur, then they attract each other.



---

*The rubbing induces a build-up of static electrical charge. The rain drops and hailstones are usually negatively charged acquired by rubbing.*

---

This happens because on rubbing a glass rod with silk or ebonite rod with fur, there is a transfer of charge from one body to another. The charges acquired by glass rods are of same nature but charge acquired by ebonite is of different nature. So all these observations lead to a conclusion that

- (i) *There are only two types of charges viz. positive (proton) and negative (electron).*
- (ii) *Like charges repel each other and unlike charges attract each other.*

The positively charged particles present in the nucleus of an atom are called **protons** and the negatively charged particles present outside the nucleus are called **electrons**.

**Electric charge** is a fundamental property of matter. Atom on the whole is neutral (no charge) but transfer of electrons creates positive charge on the object which delivers the electrons and negative charge on the object which receives those electrons.

The **S.I. unit** of charge (Q) is coulomb (C).

### ELECTRIC CURRENT

The orderly motion of electrons in a particular direction gives rise to electric current.

Mathematically, *electric current (I) is defined as the rate of flow of charge.*

$$I = \frac{Q}{t}$$

The S.I. unit of electric current is ampere (A)

$$1\text{ A} = \frac{1\text{ coulomb}}{1\text{ sec.}}$$

**NOTE:** We also use smaller units for measuring current, such as milliampere ( $1\text{ mA} = 10^{-3}\text{ A}$ ) and microampere ( $1\mu\text{A} = 10^{-6}\text{ A}$ ).



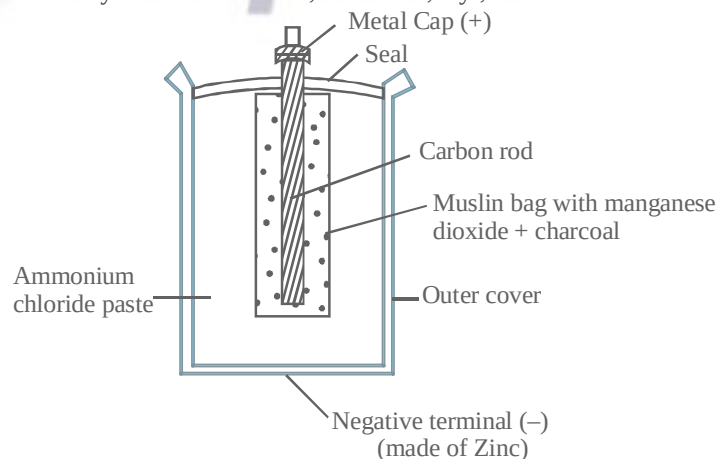
On average, a current of 20,000 A flows in a lightning bolt, even if the bolt lasts for only a fraction of second. 50 mA is enough to be fatal for a human.

When a source of current is connected, to an electrical appliance, the electric current flows in one direction i.e., from negative terminal to the positive terminal within the cell and from positive to negative terminal outside the cell.

### ELECTRIC CELL

Electric cell is a device which converts chemical energy into electrical energy. It is a source of electric current. It has two terminals viz. positive and negative.

Dry cell is the most commonly used cell in torches, transistors, toys, calculators and other electrical appliances.



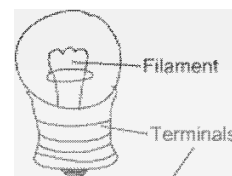
The chemicals in the cell react to produce current. A dry cell supplies current till the chemicals are exhausted and cannot react anymore.

The combination of more than one cells is termed as a battery. Battery is used when one cell cannot provide sufficient amount of current to the appliance.



The first electric battery was developed by Alessandro volta about 200 years ago. He discovered that when two strips of different metals were put in a sulphuric acid solution and connected with a wire, electricity began to flow.

A torch bulb is made up of spherical glass which is attached to a metallic base. There is a filament inside the bulb. The filament is attached to two wires. One of the wires is attached to the metallic base of the bulb. Another wire is attached to the side of the metallic portion of the bulb. The side of the bulb is the negative pole, while the bottom is the positive pole.



**Connecting the torch bulb to the cell:** For this, you need to attach the wires to the two ends of the cell. The positive pole of the cell should be connected to the positive terminal of the bulb. Similarly, the negative pole of the cell should be connected to the negative terminal of the bulb.

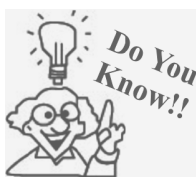
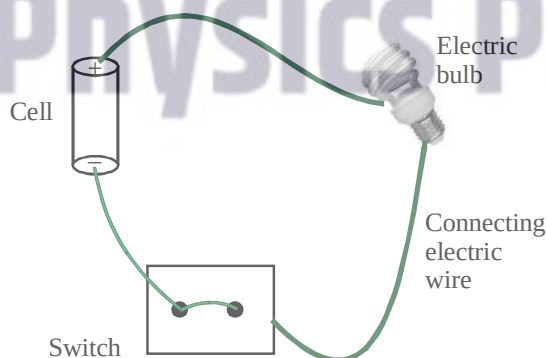
**NOTE:** When we provide 'cells' to our torch and press its button, it glows and produces light.

**Possible reasons for a torch bulb failing to glow:**

- Connections may be loose.
- The bulb may be fused.
- The cell's energy may be sapped.

## ELECTRIC CIRCUIT

Electricity requires a path to flow from the positive terminal to the negative terminal of a cell. *An arrangement or connection that provides the path to the current to flow from positive to the negative terminal outside the electrical cell via different electrical components is known as an electrical circuit.*



*Electric cell can produce strong electric shocks of around 500 volts, for both self defense and hunting.*

It is important to note here that the bulb will glow only if positive and negative terminal of an electric cell are connected to the two terminals of the bulb.

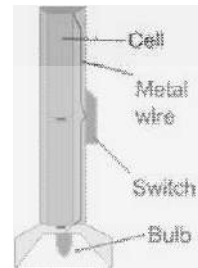
**Open circuit:** If no current is flowing through the electric circuit, then it is said to be open circuit. When the switch is in OFF mode, then it is an open circuit.

**Closed circuit:** The electric circuit through which the current is flowing, is known as closed circuit. When the switch is ON then the circuit is closed.

**Electrical Switch:** This is a device which helps in making or breaking an electric circuit. An electric switch allows us to use electric current as and when required. Switches are seen in many electrical devices and also in household wiring.

**Structure of Torch**

A torch is made up of a cylindrical or cubical casing. The casing can be metallic or non-metallic. The cells are kept inside the casing. The bottom of the casing has a spring which is attached to the metallic wire. The spring helps in keeping the cells snugly fit in place. The metallic wire is attached to a switch. The switch is then attached to the negative terminal of the holder. The positive end of the holder touches the positive terminal of the cell at top. The bulb fits inside the holder.

**DIFFERENT COMPONENTS OF AN ELECTRIC CIRCUIT**

1. **Connecting wire:** A metal wire usually made of copper or aluminium acts as a connecting wire. It connects all the components of an electrical circuit.

Symbol of connecting wire: —————

2. **Cell:** The source of current in an electric circuit

Symbol of cell: —+|—

3. **Battery:** A combination of two or more cells joined in series is called a battery.

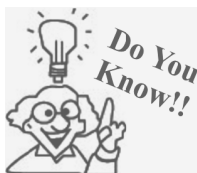
Symbol of battery: —+|||—

4. **Plug key (or switch):** A plug key is the electric switch in the circuit which controls the flow of current.

Symbol of  Open key (OFF)  Closed key (ON)

5. **Ammeter:** It is an instrument used for measuring the magnitude of current in an electric circuit.

Symbol of ammeter —(A)—



*Benjamin Franklin demonstrated that lightning is electricity. He tied a key to kite string during a thunderstorm and proved that static electricity and lightning were the same thing.*

**CONDUCTORS AND INSULATORS**

The materials which allow the electric current to flow through them are called **conductors**. Most of the metals conduct electricity, so they are used as connecting wires. For e.g., silver, copper, aluminium, etc. Silver is the best conductor of electricity.

Materials which do not allow the electric current to flow through them are called **insulators**. For e.g., plastic, rubber, bakelite, leather etc. are insulators. Insulating material is used for insulation of connecting wires. PVC is the most commonly used insulating material.

## Concept Map





## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- Central cap of the cell acts as ..... terminal.
- Container of the cell acts as ..... terminal.
- Be ..... while handling electric appliances.
- An electric circuit is a \_\_\_\_\_ of flow of current.
- Conductors are materials which \_\_\_\_\_ flow of electricity.
- Insulators are materials which \_\_\_\_\_ flow of electricity.
- A tester is used by electrician to determine \_\_\_\_\_.
- In a torch light battery, there are \_\_\_\_\_ terminals, \_\_\_\_\_ and \_\_\_\_\_.
- In an electric circuit, the direction of current is taken to be from \_\_\_\_\_ to \_\_\_\_\_ terminal of the cell.
- A circuit breaker provided in our domestic electric supply is essentially a \_\_\_\_\_.
- A closed circuit has its every part made of \_\_\_\_\_.
- A microwave oven used in home converts \_\_\_\_\_ energy into \_\_\_\_\_ energy.

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- Electric cell converts money into electric energy.
- If the filament of a wire gets broken, even then it can glow.
- A circuit that allows the current to flow is called a closed circuit.
- A circuit that does not allow the current to flow is called a closed circuit.
- Aluminium is a good conductor of electricity.
- Electricity like heat and light is a form of energy.
- Electric current can flow through walls of a house.
- The metal electric wires can be replaced with plastic wire to allow flow of current.

- A piece of thermocole is an insulator.
- A bulb is fused when its filament is broken.
- A switch is used only to prevent flow of current.
- The path of electric current is called a circuit.
- Human body is a bad conductor of electricity.
- The air gap surrounding an electric circuit acts as an insulator.
- A cell will always have two terminals.

## Match the Column

**DIRECTIONS :** Each questions contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column I have to be matched with statements (p, q, r, s) in column II.

- |     |                                                                          |                            |
|-----|--------------------------------------------------------------------------|----------------------------|
| 1.  | <b>Column I</b>                                                          | <b>Column II</b>           |
| (A) | The path along which electric current flows.                             | (p) Electric current       |
| (B) | A device which converts chemical energy into electrical energy.          | (q) Insulator              |
| (C) | A material which does not allow the electric current to pass through it. | (r) Cell                   |
| (D) | The energy which flows in an electric circuit.                           | (s) Conductor              |
| (E) | A material which allow the electric current to flow through it.          | (t) Electric circuit       |
| 2.  | <b>Column I</b>                                                          | <b>Column II</b>           |
| (A) | Battery                                                                  | (p) Completes the circuits |
| (B) | Torch                                                                    | (q) Source of electricity  |
| (C) | Switch                                                                   | (r) Helps to see in dark   |
| 3.  | <b>Column I</b>                                                          | <b>Column II</b>           |
| (A) | Metal cap                                                                | (p) Negative terminal      |
| (B) | Metal disc                                                               | (q) Thin wire in a bulb    |
| (C) | Filament                                                                 | (r) Positive terminal      |

- |           |                            |                  |
|-----------|----------------------------|------------------|
| <b>4.</b> | <b>Column I</b>            | <b>Column II</b> |
|           | (A) Outer case of bulb (p) | Metal            |
|           | (B) Filament (q)           | Tungsten         |
|           | (C) Base of bulb (r)       | Glass            |

### Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

- What is electricity?
- Name two electrical devices.
- How does an electric bulb glow?
- What is the direction of current in an electric circuit?
- How do we arrange cells in an electrical device?
- What is inside the glass case of a bulb?
- Why does an electric bulb not glow when both the wires are connected to the same terminal of a cell?
- Give one difference between a cell and a battery.
- What are the essential components of an electric circuit?
- Why should you not touch electric appliances and switches with wet hands?
- Write two precautions that you must follow while handling electricity.
- When a bulb is fused, it does not light up. Explain why.
- Why do we remove plastic coatings from connecting wires before making circuits?
- What is an electric cell?
- What are conductors?
- How does an electric cell produce electricity?

17. Why do we get an electric shock?

18. What is a fused bulb?

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

- Mention two advantages of a dry cell.
- What are insulators? Give one example.
- Name some of the devices in which electric cells are used.
- Name two insulators and two conductors.
- Explain why all the light bulbs and fans go off if the main switch is turned off in your house?
- What is a battery? Explain it with a figure.
- What types of cells are used in calculators? What are the main advantages of using such type of cells?
- How does an electric cell produce electricity?
- Why does a cell stop producing electricity after sometime?
- Distinguish between the following.
  - Insulator and Conductor
  - Open circuit and Closed circuit
  - Open switch and Closed switch

### Long Answer Type Questions

**DIRECTIONS :** Give answer in four to five sentences.

- Explain an electric cell with the help of a labelled diagram.
- Do you know about an electric switch? What is the purpose of using it? Give some examples of electrical appliances where electric switches are used.

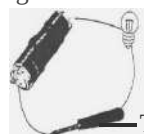
## 2 EXERCISE

### Text Book Questions

- Fill in the blanks:**
  - A device that is used to break an electric circuit is called .....
  - An electric cell has ..... terminals. Make 'true' or 'false' for the following statements.
    - Electric current can flow through metals.
    - Instead of metal wires, a jute string can be

used to make a circuit.

- Electric current can pass through a sheet of thermocol.
- Explain why the bulb would not glow in the arrangement shown figure.



Tester/screw driver

4. Complete the drawing shown in figure to indicate where the free ends of the two wires should be joined to make the bulb glow.



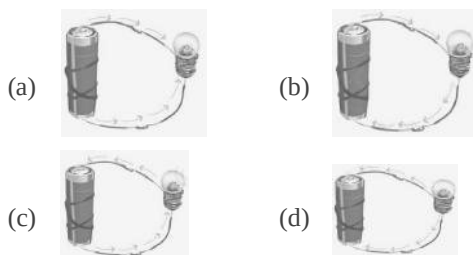
5. What is the purpose of using an electric switch? Name some electrical gadgets that have switches built into them.
6. Would the bulb glow after completing the circuit shown in figure (Q.4) if instead of safety pin we use an eraser?
7. Would the bulb glow in the circuit shown in figure.



8. Using the “conduction tester” on an object it was found that the bulb begins to glow. Is that object a conductor or an insulator? Explain.
9. Why should an electrician use rubber gloves while repairing an electric switch at your home? Explain.
10. The handles of the tools like screwdrivers and pliers used by electricians for repair work usually have plastic or rubber covers on them. Can you explain why?

### NCERT Exemplar Questions

1. Choose from the options a, b, c and d in the figure given below, the figure which shows the correct direction of current.



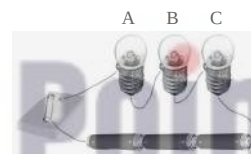
2. Choose the incorrect statement.
- A switch is the source of electric current in a circuit.
  - A switch helps to complete or break the circuit.
  - A switch helps us to use electricity as per our requirement.
  - When the switch is open there is an air gap between its terminals.

3. In an electric bulb, light is produced due to the glowing of
- the glass case of the bulb.
  - the thin filament.
  - the thick wires supporting the filament.
  - gases inside glass case of the bulb.

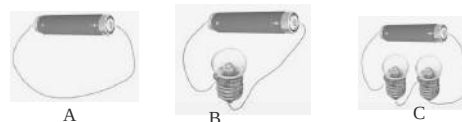
4. In the following arrangement, the bulb will not glow if the ends A and B are connected with



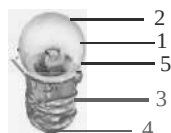
- a steel spoon.
  - a metal clip.
  - a plastic clip.
  - a copper wire.
5. In the circuit shown below, when the switch is moved to 'ON' position



- the bulb A will glow first.
  - the bulb B will glow first.
  - the bulb C will glow first.
  - all bulbs will glow together.
6. Filament of a torch bulb is
- a metal case.
  - metal tip at the centre of the base.
  - two thick wires.
  - a thin wire.
7. Paheli is running short of connecting wires. To complete an electric circuit, she may use a
- glass bangle.
  - thick thread.
  - rubber pipe.
  - steel spoon.
8. In which of the following circuits A, B and C given below, the cell will be used up very rapidly?



9. Figure given below shows a bulb with its different parts marked as 1, 2, 3, 4, and 5. Which of them label the terminals of the bulb?



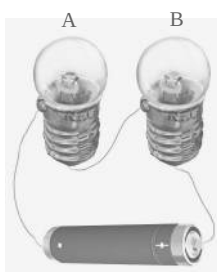
10. You are provided with a bulb, a cell, a switch and some connecting wires. Draw a diagram to show the connections between them to make the bulb glow.
11. Will the bulb glow in the circuit shown below? Explain.



12. An electric bulb is connected to a cell through a switch as shown in figure below. When the switch is brought in 'ON' position, the bulb does not glow. What could be the possible reason/s for it? Mention any two of them.



13. A torch requires 3 cells. Show the arrangement of the cells, with a diagram, inside the torch so that the bulb glows.
14. When the chemicals in the electric cell are used up, the electric cell stops producing electricity. The electric cell is then replaced with a new one. In case of rechargeable batteries (such as the type used in mobile phones, camera and inverters), they are used again and again. How?
15. Paheli connected two bulbs to a cell as shown in the figure given below.



- She found that filament of bulb B is broken. Will the bulb A glow in this circuit? Give reason.
16. Why do bulbs have two terminals?
17. Which of the following arrangements A, B, C

and D given below should not be set up? Explain, why.



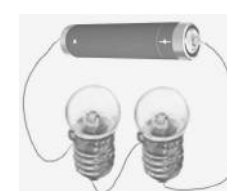
A



B

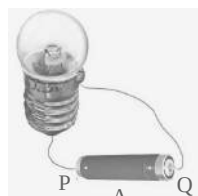


C



D

18. A fused bulb does not glow. Why?
19. Paheli wanted to glow a torch bulb using a cell. She could not get connecting wires, instead, she got two strips of aluminium foil. Will she succeed? Explain, how.
20. Boojho has a cell and a single piece of connecting wire. Without cutting the wire in two, will he be able to make the bulb glow? Explain with the help of a circuit diagram.
21. Figures A and B, show a bulb connected to a cell in two different ways.



- (i) What will be the direction of the current through the bulb in both the cases. (Q to P or P to Q)
- (ii) Will the bulb glow in both the cases?
- (iii) Does the brightness of the glowing bulb depend on the direction of current through it?
22. A torch is not functioning, though contact points in the torch are in working condition. What can be the possible reasons for this? Mention any three.

### HOTS Questions

- How can you explain that the human body is a good conductor of electricity?
- A charge of 150 coulomb flows through a wire in one minute. Find the electric current flowing through it.

## 3

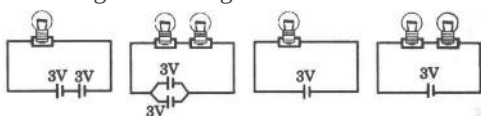
## EXERCISE

## Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

1. Which of the following tasks require electricity?  
(a) To light up homes, offices  
(b) To operate pumps to lift water from wells  
(c) To run mixer grinder in kitchen  
(d) All the above
2. From where do we get electricity?  
(a) From office  
(b) From power station  
(c) From underground  
(d) From factory
3. If there is no electric supply, which of the following can be used to see in dark?  
(a) A stick  
(b) An electric bulb  
(c) A torch  
(d) A match
4. Where does a torch get electricity from?  
(a) From bulb (b) From filament  
(c) From electric cell (d) From switch
5. Which of the following does not use electric cells?  
(a) Alarm clock (b) Wrist watch  
(c) Camera (d) Ceiling fan
6. The metal cap in an electric cell is the ..... terminal while metal disc is the ..... terminal.  
(a) Negative, positive  
(b) Negative, negative  
(c) Positive, positive  
(d) Positive, negative
7. From where does electric cell produce electricity?  
(a) From water (b) From metal cap  
(c) From chemicals (d) Cannot say
8. The thin wire in a bulb that gives off light is called .....  
(a) Terminal (b) Filament  
(c) Fuse wire (d) Live wire
9. Why are the two terminals of the bulb not allowed to touch each other?  
(a) Electric sparks will occur  
(b) The bulb will start glowing  
(c) The bulb will not glow  
(d) More electricity will be used
10. Why doesn't a bulb glow even if the correct connections are made?  
(i) Battery is dead  
(ii) Switch is closed  
(iii) Filament is broken  
(a) Only (i)  
(b) Only (ii)  
(c) Only (i) and (iii)  
(d) Only (ii) and (iii)
11. The bulb in a circuit will glow when electric current.  
(a) Starts flowing to the bulb  
(b) Flows through the glass covering  
(c) Flows through the filament  
(d) Flows out of the bulb
12. What is the role of switch in an electric circuit?  
(a) To complete the circuit  
(b) To break the circuit  
(c) Both (a) and (b)  
(d) Neither (a) nor (b)
13. Which of the following materials can be used to make electric wires?  
(a) Rubber (b) Wood  
(c) Thermocol (d) Copper
14. Identify conductors from the following list: Aluminium, silver, plastic, rubber, iron, human body.  
(a) Plastic, human body  
(b) Aluminium, silver  
(c) Iron, human body  
(d) Both (b) and (c)
15. When two charged bodies are connected by a conducting wire:  
(a) the charge is lost.  
(b) the bodies are heated.  
(c) charge flows from one body to another.  
(d) Can't say

16. Electric current is:  
 (a) rate of flow of charge.  
 (b) interaction of charges.  
 (c) flow of voltage.  
 (d) flow of electric potential.
17. In which of the following circuits will the bulb or bulbs glow the brightest?



- (a) A (b) B  
 (c) C (d) D
18. A fuse rated for 5A will allow \_\_\_\_\_ current to pass through:  
 (a) 5A (b) less than 5A  
 (c) more than 5A (d) both A and B
19. The wire of a fuse should have:  
 (a) low melting point:  
 (b) more thickness.  
 (c) very high resistance.  
 (d) higher strength and low conductivity.
20. Emergency light used in our homes has:  
 (a) button cell  
 (b) voltaic cell  
 (c) storage cell  
 (d) dynamo/generator
21. Which one of the following is a bad conductor of electricity?  
 (a) Acid (b) Coal  
 (c) Distilled water (d) Human body
22. Commonly used safety fuse wire is made up of:  
 (a) tin  
 (b) lead  
 (c) nickel  
 (d) an alloy of tin and lead
23. What will happen if the interior of an electric bulb is filled with oxygen gas?



- (a) The bulb will glow brighter.  
 (b) The bulb will last long.  
 (c) The bulb will not last long.  
 (d) The bulb will not glow at all.

24. Over head electric cables passing through poles are NOT insulated because:  
 (a) insulation will cause energy loss.  
 (b) air is a bad conductor.  
 (c) the wires will get heated.  
 (d) it is costly.
25. The metal disc provided at one end of a common cell is the:



- (a) switch (b) positive terminal  
 (c) negative terminal (d) spring
26. If the two terminals of a cell are connected directly with a wire, then:



- (a) more electrical energy will be stored in the cell  
 (b) no current will flow in the wire  
 (c) the chemical gets used up very fast  
 (d) nothing will happen
27. Wires used in home are usually covered with insulators like plastic or rubber. This is done to:  
 (a) prevent rusting.  
 (b) make handling easier.  
 (c) make the wire durable.  
 (d) prevent shock and short circuit.
28. In a battery electrical energy is obtained from:  
 (a) storage of electricity.  
 (b) chemical reactions.  
 (c) interaction between positive and negative terminals.  
 (d) none of the above.
29. A bulb glows when:  
 (a) current flows through its filament.  
 (b) it is heated.  
 (c) battery is replaced.  
 (d) shown to light.



30. Electrons are  
(a) negatively charged particles  
(b) positively charged particles  
(c) neutral particles  
(d) None of these
31. A cell is represented by symbol  
(a)   
(b)   
(c)   
(d) 
32. An ammeter is  
(a) a combination of two or more cells.  
(b) a source of current.  
(c) used to control the flow of current.  
(d) an instrument used for measuring the magnitude of current.
33. Human body is  
(a) a good conductor of electricity  
(b) a non-conductor of electricity  
(c) a very poor conductor of electricity  
(d) None of these
34. To close or open the electric circuit we use  
(a) connecting wire (b) ammeter  
(c) plug key (d) cell
35. When we switched OFF an electric circuit, the circuit becomes  
(a) open (b) closed  
(c) cannot say (d) partially open
36. In a closed electric circuit, current flows  
(a) in the direction of flow of electrons  
(b) in the direction opposite to the flow of electrons.  
(c) negative terminal to positive terminal of cells  
(d) None of these
37. Inside a cell current flows from  
(a) positive terminal to negative terminal  
(b) negative terminal to positive terminal  
(c) positive terminal to positive terminal  
(d) either (a) or (b)
38. Electric cell converts  
(a) electric energy into chemical energy  
(b) heat energy into electric energy  
(c) chemical energy into electric energy  
(d) electric energy into light energy
39. There is a force of attraction between  
(a) like charges only  
(b) opposite charges only  
(c) both (a) and (b)  
(d) None of these
40. Connecting wire is made of electric  
(a) conductor (b) insulator  
(c) both (a) and (b) (d) None of these
41. If a body is positively charged, then it has  
(a) less number of electrons  
(b) excess of protons  
(c) excess of neutrons  
(d) None of these
42. Which of the following is the best insulator?  
(a) carbon (b) paper  
(c) graphite (d) ebonite
43. The S.I. unit of charge is  
(a) ampere (b) coulomb/sec  
(c) coulomb (d) volt
44. Electric cell is used in  
(a) mobile phones (b) transistor  
(c) cameras (d) all of these
45. Metal that can be used to make a connecting wire is  
(a) copper (b) silver  
(c) aluminium (d) all of these
46. An electric cell is used as a source of electricity in :  
(a) wrist watches (b) alarm clocks  
(c) transistor radios (d) All of these
47. Which part of the electric cell generally acts as positive terminal of the cell?  
(a) Metal disc  
(b) Metal cap  
(c) Either metal disc or metal cap  
(d) All the above are correct
48. Which part of the electric bulb gives off light, when the bulb is switched on?  
(a) Positive terminal (b) Negative terminal  
(c) Filament (d) None of these
49. In an electric circuit a switch is provided. The main function of switch is to  
(a) make the bulb glow easily  
(b) avoid the electric shocks  
(c) allow the easy flow of charges in the circuit  
(d) make or break the circuit

### More than One option Correct

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONE OR MORE may be correct.

- Electric heaters used for cooking have the filament of the heating coil on a plate made up of clay because:
  - clay is a bad conductor of heat
  - clay is a bad conductor of electricity
  - clay is a good conductor of heat
  - clay is a good conductor of electricity
- Which of the following statement is NOT correct?
  - A thick fuse wire can withstand a higher current
  - A mobile phone uses a storage cell
  - Electric current can jump a gap, if it is too small (of the order of mm)
  - A battery some times have one terminal only
- Which of the following are not correct?
  - When electric circuit is closed, no current flows through it.
  - Rubber is a good example of electric insulator.
  - Mica is an example of good conductor of electricity.
  - Switch is a device used to close or open an electric circuit.
- What are the possible risk when an electrical appliance is used in wet places?
  - The fuse blows
  - The user gets an electric shock
  - Fire occurs
  - More water overflows out the appliance
- One of the reasons why a bulb will not glow even if correct connections are made is because:
  - the battery is dead
  - filament is broken
  - switch is not closed
  - the electric wires are made of copper
- Which of the following statements are correct?
  - The path along which electric current flows is called a circuit.

- A switch allows current to flow in a circuit when closed.
  - Bulb in a simple circuit glows when the switch is open.
  - In an electric circuit, current flow is due to ions
- The filament of an electric bulb:
    - has high resistance
    - has high melting point
    - is very thin
    - undergo oxidation easily

### Multiple Matching Questions

**DIRECTIONS :** Following question has four statements (A, B, C and D) given in Column I and four statements (p, q, r and s) in Column II. Any given statement in Column I can have correct matching with one or more statement(s) given in Column II. Match the entries in Column I with entries in Column II.

- |           |                 |                                    |
|-----------|-----------------|------------------------------------|
| <b>1.</b> | <b>Column I</b> | <b>Column II</b>                   |
|           | (A) Conductor   | (p) Copper                         |
|           | (B) Insulator   | (q) Plastic                        |
|           |                 | (r) Gold                           |
|           |                 | (s) Rubber                         |
| <b>2.</b> | <b>Column I</b> | <b>Column II</b>                   |
|           | (A) Conductor   | (p) e.g., Wood, plastic            |
|           | (B) Insulators  | (q) Allow current to pass          |
|           |                 | (r) Metals, water                  |
|           |                 | (s) Does not allow current to pass |
| <b>3.</b> | <b>Column I</b> | <b>Column II</b>                   |
|           | (A) Conductor   | (p) Aluminium                      |
|           | (B) Insulator   | (q) Rubber                         |
|           |                 | (r) Thermocol                      |
|           |                 | (s) Iron                           |
|           |                 | (t) Glass                          |
|           |                 | (u) Silver                         |
| <b>4.</b> | <b>Column I</b> | <b>Column II</b>                   |
|           | (A) Conductor   | (p) Plug tops                      |
|           | (B) Insulator   | (q) Electric wires                 |
|           |                 | (r) Sockets                        |
|           |                 | (s) Gloves                         |

**Passage Based Questions**

**DIRECTIONS :** Read the passage(s) given below and answer the following questions.

**Passage I**

An electric cell is a source of electricity. Such cells are used in alarm clocks, wrist watches, transistor radios, cameras, etc.

1. The electric cell has
  - (a) a number of terminals
  - (b) only one terminal
  - (c) two terminals
  - (d) None of the above is correct
2. An electric cell is used
  - (a) as a source of electrical energy
  - (b) as a source of muscular energy
  - (c) Both the above
  - (d) None of the above
3. A cell is generally provided with a metal cap that generally acts as
  - (a) its positive terminal
  - (b) its negative terminal
  - (c) sometimes positive and sometimes negative terminal
  - (d) None of the above

**Passage II**

Those materials which do not allow electric current to pass through them are called insulators e.g., air, cork, rubber, thermocole, paper, etc. Insulators are used for covering electrical wires, plug tops, switches and other parts of electrical appliances.

4. Air is an insulator of electricity because air has no –
  - (a) electrons
  - (b) free electrons
  - (c) protons
  - (d) None of these
5. House wiring electric wires are generally covered with rubber. It is because, rubber is
  - (a) a good conductor
  - (b) a partial conductor
  - (c) easily available
  - (d) an insulator
6. We can turn OFF the switch without getting an electric shock because
  - (a) it is covered with an insulating material
  - (b) it is covered with conducting material
  - (c) our hand is bad conductor of electricity
  - (d) None of these

7. Covers of electric plugs are made up of
  - (a) conductors
  - (b) metals
  - (c) insulators
  - (d) all of these

**Passage III**

An electric bulb has a filament that is connected to the terminals. The two terminals of filament are fixed with two thick wires which provide support to it. These terminals are fixed in such a manner that they do not touch each other.

8. Where is the filament fixed in the electric bulb?
  - (a) Near the positive terminal
  - (b) Near the negative terminal
  - (c) In the middle
  - (d) None of the above is correct
9. Filament is
  - (a) a thin wire that gives off light when bulb is switched on
  - (b) fixed to two thick wires which provide support to it
  - (c) Both the above are correct
  - (d) None of these is correct
10. Which of the following statement(s) is/are correct?
  - (a) The two terminals of a bulb are fixed in such a way that they do not touch each other.
  - (b) The two terminals of a bulb are fixed in such a way that they touch each other.
  - (c) The two terminals of a bulb are connected to the same terminal of the electric cell.
  - (d) None of the above is correct

**Passage IV**

An arrangement in which two terminals of an electric cell are connected to two terminals of the bulb is known as electric circuit. Current flows from positive to negative terminal in closed circuit. Filament of bulb is made up of tungsten.

11. What is the direction of flow in an electric circuit?
  - (a) From positive terminal to negative terminal of electric cell.
  - (b) From negative terminal to positive terminal of electric cell
  - (c) Both the above are correct
  - (d) None of the above is correct

12. Which of the following statement(s) is/are correct ?
- The bulb in the circuit may not glow if the bulb is fused
  - The bulb in the circuit may not glow if its filament is broken
  - Both the above
  - None of the above
13. The filament of bulb is made of
- a metal
  - tungsten
  - Both the above are correct
  - None of these is correct
4. **Assertion (A) :** An electric bulb has two terminals.  
**Reason (R) :** The two terminals of an electric bulb are fixed in such a way that they do not touch each other.
5. **Assertion (A) :** An electric bulb glows, only when an electric current passes through it.  
**Reason (R) :** In an electric circuit the direction of current is taken from negative to positive terminal of the electric cell.
6. **Assertion (A) :** In a closed electric circuit the current passes from one terminal of the electric cell to the other terminal.  
**Reason (R) :** Generally the metal disc of a cell acts as positive terminal.

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select one of the current options (a), (b), (c) and (d) given below in each questions.

- Both A and R are true and R is the correct explanation of A.
  - Both A and R are true but R is not the correct explanation of A.
  - A is true but R is false.
  - A is false but R is true.
1. **Assertion (A) :** Connecting wire is used to connect all components of electric circuit.  
**Reason (R) :** Connecting wire is made of electric conductor.
2. **Assertion (A) :** Bulbs filament is made up of conductors.  
**Reason (R) :** Tungsten is a good conductor of electricity.
3. **Assertion (A) :** An electric cell has two terminals.  
**Reason (R) :** One of the terminals is called the positive terminal and the other is called the negative terminal.
7. **Assertion (A) :** Silver is not used to make electric wires.  
**Reason (R) :** Silver is a bad conductor.
8. **Assertion (A) :** Copper is used to make electric wires.  
**Reason (R) :** Copper is a poor conductor of electricity.
9. **Assertion (A) :** A domestic electric appliance working on a three pin, will continue working even if the top pin is removed.  
**Reason (R) :** The third pin is used only for safety purpose.
10. **Assertion (A) :** Insulators do not allow the current to flow through themselves.  
**Reason (R) :** They have no free charge carriers.
11. **Assertion (A) :** Air is an insulator.  
**Reason (R) :** Those materials that do not allow electric current to pass through them are called insulators.

### Integer Type Questions

**DIRECTIONS :** Following are integer based question. Each question, when worked out will result in one integer from 0 to 9.

1. Some materials are given below. By using the "Conduction tester" how many objects will allow the electricity to pass through? Your answer will between 0-9?  
 Air, thermocol, iron, silver, rubber, wood, copper

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- positive
- negative
- careful
- path
- allow
- do not allow
- flow of electric current
- Two, positive, negative
- positive, negative
- fuse
- conducting material
- Electrical, heat

### True/False

- |           |          |           |          |
|-----------|----------|-----------|----------|
| 1. False  | 2. False | 3. True   | 4. False |
| 5. True   | 6. True  | 7. False  | 8. False |
| 9. True   | 10. True | 11. False | 12. True |
| 13. False | 14. True | 15. True  |          |

### Match the Column

- A → t; B → r; C → q; D → p; E → s
- A → q; B → r; C → p
- A → r; B → p; C → q
- A → r; B → q; C → p

### Very Short Answer Type Questions

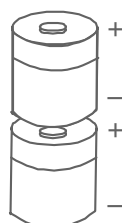
- It is a form of energy.
- Fan, bulb.
- When current passes through filament, it gets red hot and emits light.
- +ve terminal to -ve terminal.
- We generally arrange cells in series.
- Filament
- The current flows from one terminal to the other. When both wires are connected to same terminal, current will not flow.

- A cell produces electricity by chemical reactions taking place in it. Battery is made up of two or more cells joined together.
- Connecting wires, bulb, switch and cell are the essential components of an electric circuit.
- Water is a good conductor of electricity and current passes very quickly through wet hands. Therefore, it can give us an electric shock.
- (i) Wear rubber gloves or slippers.  
(ii) Never touch switches with wet hands.
- When a bulb is fused its filament breaks, which in turn breaks the electric circuit. Thus, current does not pass through it.
- To take out wire ends, plastic ends needs to be removal.
- It is a source of electricity.
- Materials through which an electric current can flow are called conductors.
- The electric cell produces electricity due to chemical reactions that occurs inside it.
- We get an electric shock because our body is a conductor of electricity.
- When the filament of a bulb is broken, it is called a fused bulb.

### Short Answer Type Questions

- It can convert chemical energy into electricity and can also store it.
- Materials through which an electric current cannot flow are called as insulators. For example : rubber.
- The devices which make use of the electric cells are : (i) Transistor radio (ii) Camera (iii) Wrist watch (iv) Alarm clock.
- The two insulators are :  
(i) Plastic (ii) Rubber  
The two conductors are :  
(i) Aluminium (ii) Copper
- When mains switch is turned off, all the lights and fans go off in our house because the current flows in our house appliances through the main switch. When it is turned off, flow of current stops and our lights and fans go off.

6. When two or more than two electric cells are connected together in such a way that the positive terminal of one cell is connected to the negative terminal of the other, then we call it as a battery. A simple figure showing the combination of two electric cells to form a battery is shown below :



7. The cells used in calculators are known as button cells, as they resemble with the shape of a button. The plates of these cells are made from compounds of nickel and cadmium. The main advantage of these cells is that they can stay in an active stage for months without any leakage.
8. The chemical energy stored in the chemicals stored inside a cell will convert into electrical energy. When the chemicals of the cells are used up, it stops producing electricity.
9. When the chemicals in the electric cell are used up, the electric cell stops producing electricity. Since all the chemicals are used, no chemical reaction takes place which will produce energy.

10. (a)

| S.no. | Insulator                                                           | Conductor                                                    |
|-------|---------------------------------------------------------------------|--------------------------------------------------------------|
| (i)   | Materials which do not allow electric current to pass through them. | Materials which allow electric current to pass through them. |
| (ii)  | For example, plastic, rubber, etc.                                  | For example, glass, air, etc.                                |

(b)

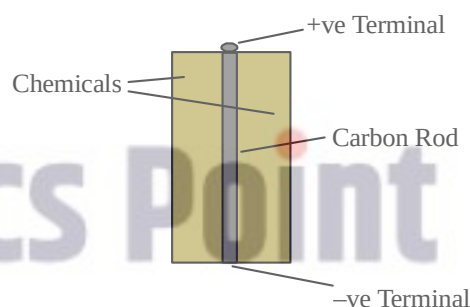
| S.no. | Open circuit                                | Closed circuit                       |
|-------|---------------------------------------------|--------------------------------------|
| (i)   | Circuit having a gap in its path.           | Circuit which forms a complete path. |
| (ii)  | The bulb does not light up in this circuit. | The bulb lights up in this circuit.  |

(c)

| S.no. | Open switch                                                   | Closed switch                                              |
|-------|---------------------------------------------------------------|------------------------------------------------------------|
| (i)   | When the switch breaks the circuit, it is called open switch. | When the switch completes the circuit, it is called closed |
| (ii)  | Current does not flow in an open switch.                      | Current flows in a closed switch.                          |

### Long Answer Type Questions

1. An electric cell consists of cylindrical pot which is covered by a thick paper sheet.



It consists of two terminals. One is called positive terminal and the other is called negative terminal. The metal cap is the positive terminal and the metal disc is the negative terminal of the electric cell.

The production of electric current takes place due to the chemical reactions inside the cell. The chemicals are present between the outermost covering of the cell and carbon rod.

2. An electric switch is a device used to complete or break an electric circuit. Usually, it is manually operated.

**Purpose of using electric switch :** In 'ON' position, the switch allows the current to flow through the circuit. Thus, the circuit becomes a closed circuit.

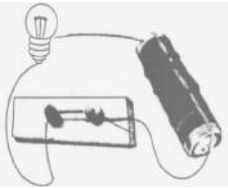
In 'OFF' position, the switch does not allow current to flow through the circuit. Thus, the circuit becomes an open circuit.

**Examples :** Electrical appliances such as fans, electric lamps, washing machines, juicers and mixers, TV, radio, etc. have switches.

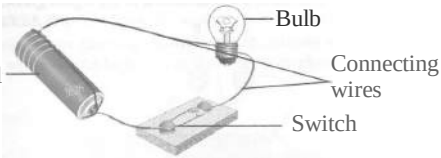


## 2 EXERCISE

### Text Book Questions

- (a) switch (b) two
- (a) True (b) False (c) False
- The bulb would not glow in the arrangement shown in figure because the one end of tester/screw driver is made up of plastic which does not allow the electric current to flow through it.
- 
- Electric switch is used to make electric circuit open or closed for a particular appliance and hence with the help of a switch we can use an appliance according.
- No, since eraser is an insulator so it does not allow the current to pass. Hence the bulb will not glow.
- Yes, the electric circuit is closed so the bulb will glow.
- Yes, if the object is good conductor of electricity then current will pass through conduction tester and the bulb will glow. Hence the object will be a conductor of electricity.
- Our body is good conductor of electricity and rubber is insulator. During repairing work if the body comes in contact with current carrying wire then there will not be any accident as rubber does not allow the passage of current through it. Hence electrician uses rubber gloves while repairing an electric switch.
- Plastic or rubber is an insulator which does not allow electric current to pass through it. The handles of the tools like screwdrivers and pliers used by electricians for repair have covering of plastic or rubber so that electric current may not pass through these tools to the body of the electrician to harm him.

### NCERT Exemplar Questions

- (b)      2. (a)      3. (b)      4. (c)
- (d)      6. (d)      7. (d)
- In circuit A the cell will get used up rapidly.
- Labels 3 and 4 mark the terminals of the bulb.
- 
- No. The bulb will not glow in this circuit because the switch is open and the circuit is incomplete. Due to this there will be no current flow.
- The reasons could be
  - the bulb is fused.
  - the cell is a used one.
  - break in connecting wire.
  - loose connections. (Any two)
- 
- Rechargeable batteries can be recharged by providing them appropriate current.
- No, bulb A will not glow as the circuit is not complete.
- Bulbs have two terminals to connect the filament with the circuit so that the current can pass through it and get accumulated.
- Arrangement A is not desirable and should not be set up. This will exhaust the cell very quickly.
- In a fused bulb the filament is broken and the circuit is incomplete. The current will not flow and the bulb will not glow.
- Yes. Aluminium foils can act as connecting wires. Aluminium is a good conductor of electricity.
- Yes, using the arrangement given below he can succeed in getting the bulb glow.
- 
- In Fig. (A) Q to P and in Fig.(B) P to Q.
  - Yes, because the circuit is complete in both cases.
  - No
- The possible reasons could be
  - the bulb may be fused.
  - the cells may have been used up.
  - the cells are not placed in the correct order.
  - the switch is faulty. (Any three)

### HOTS Questions

1. If we stand barefoot on the ground and touch an electric wire, we will get an electric shock. This is because human body is a good conductor of electricity. Without slippers, current can easily pass through.
2. Charge (Q) = 150 coulomb  
Time (t) = 1 minute = 60 sec.  
As we know,

$$\begin{aligned}\text{Current (I)} &= \frac{Q}{t} \\ &= \frac{150}{60} = 2.5 \text{ A}\end{aligned}$$

### 3 EXERCISE

#### Multiple Choice Questions

1. (d) All these tasks require electricity.
2. (b) A power station provides us with electricity.
3. (c) A torch can be used for providing light when there is no current.
4. (c) Electricity to the bulb in a torch is provided by electric cell.
5. (d) Ceiling fan runs on electricity supplied to the house.
6. (d) Positive, Negative
7. (c) The chemicals stored inside the electric cell produce electricity.
8. (b) Filament is the part that glows when bulb is switched on.
9. (c) If the two terminals are joined the bulb will not glow.
10. (c) If the connections are correct, then either battery is dead or bulb is fused (filament broken)
11. (c) When the path of electric current is complete than only the bulb will glow.
12. (c) Switch completes the circuit when it is on and allows current to flow to the bulb. When the switch is in off position it breaks the flow of current and bulb stops glowing.
13. (d) Copper is a conductor of electricity so it is used in making wires.
14. (d) Metals are conductors of electricity. Our body also conducts electricity so we must be careful.
15. (c)
16. (a)
17. (a)
18. (d)
19. (a)
20. (c)
21. (c)
22. (d)
23. (c)
24. (b)
25. (c)
26. (c)
27. (d)
28. (b)
29. (a)
30. (a) Electrons are negatively charged particles ( $e = 1.6 \times 10^{-19} \text{ C}$ )
31. (a)
32. (d) An ammeter is an instrument which is used for measuring the magnitude of current in a closed circuit. It is always connected in series to the circuit.
33. (a) Human body is a good conductor of electricity.
34. (c)
35. (a) When we switched OFF an electric circuit, the circuit becomes **open** and there is no current flows in the circuit.
36. (b) In a closed circuit current flows in the direction opposite to the flow of electrons.
37. (b) In a closed electric circuit inside a cell current always flows from negative to positive terminal.
38. (c) The chemicals in the cell react to produce current.
39. (b) Opposite charges attract each other and like charges repel each other.
40. (a) Connecting wire is used to connect all the components of electric circuit so that electric current can flow through them. Thus, it is bound to made up of electric conductor.
41. (a) Positively charged means deficiency of electrons.
42. (d)
43. (c) The S.I. unit of charge is coulomb.
44. (d) Electric cell is a source of electricity. It is used in transistors, cameras, mobile phones, etc.
45. (d) Connecting wire is made up of conductor of electricity. Generally metals are good conductor of electricity.
46. (d)
47. (b)
48. (c)
49. (d)

**More than One option Correct**

1. (a, b)    2. (a, c, d)    3. (a, c)    4. (a, b, c)  
5. (a, b, c)    6. (a, b)    7. (a, b, c)

**Multiple Matching Questions**

1. A  $\rightarrow$  p, r; B  $\rightarrow$  q, s  
2. A  $\rightarrow$  q, r; B  $\rightarrow$  p, s  
3. A  $\rightarrow$  p, s, u; B  $\rightarrow$  q, r, t  
4. A  $\rightarrow$  q, r; B  $\rightarrow$  p, s

**Passage Based Questions**

1. (c) There are two terminals of a cell.  
2. (a) A cell is used as a source of electrical energy.  
3. (a)  
4. (b) free electrons are required to conduct electricity.  
5. (d)    6. (a)  
7. (c) Covers of electric plugs are made up of insulators because insulators do not allow electric current to pass through.  
8. (c)    9. (c)    10. (a)  
11. (a)    12. (c)  
13. (b) Tungsten is a metal.

**Assertion/Reason**

1. (a) Both (A) and (R) are true and R is the correct explanation of (A).  
2. (b) Both (A) and (R) are true (R) is not the correct explanation of (A).  
3. (b) Both Assertion A and Reason R are correct but Reason R is not the correct explanation of Assertion A.  
4. (b)  
5. (c) Assertion A is true, Reason R is false.  
6. (c)  
7. (c) Silver is a good conductor of electricity but it is not used to make electric wires because it is expensive.  
8. (c) Copper is used to make electric wires because electricity can pass through it very easily.  
9. (a)  
10. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).  
11. (a)

**Integer Type Question**

1. (3) Iron, Silver and Copper allow electricity to pass through it.

# Chapter 13

## FUN WITH MAGNETS

### INTRODUCTION

Magnet was discovered about 4000 years ago. We observe that filings of some materials like iron, nickel, cobalt etc., cling to magnets, however other things around us like wood, plastic etc. are not affected by the presence of magnet near them. The name magnetite has been derived from magnesia and magnets are named after magnetite.

You must have often observed that when a refrigerator door is opened a little and left, it shuts by itself. Also many cupboard doors also click shut the same way. It happens because they have magnets inside. Thus we can define magnets as the materials which attract certain substances (magnetic) like iron, cobalt, nickel etc.

**Magnet:** An object which attracts magnetic materials; like iron, cobalt and nickel; is called magnet.

**Discovery of Magnet:** Magnet was discovered by an ancient Greek shepherd; named Magnes. Once; while he was fiddling with his stick, the metallic end of the stick got stuck with the rocks. Those rocks contained the natural magnet, magnetite. The story of magnetite spread far and wide. Some people believe that magnetite was discovered at a place called Magnesia.

**Natural Magnet:** Magnet which is found naturally is called natural magnet.

**Artificial Magnet:** Magnet which is made by humans is called artificial magnet.

### MAGNETIC AND NON - MAGNETIC MATERIALS

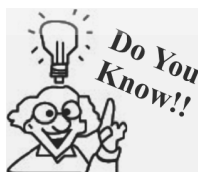
Magnets are made in different shapes and they are named according to the shape, e.g., bar magnet, dumb-bell shaped magnet, horse-shoe magnet, cylindrical magnet, etc.



Bar magnet



Horse Shoe magnet



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*The ancient greeks observed electric and magnetic phenomena as early as 700 B.C. They found that a piece of amber when rubbed attracts pieces of straw or feathers.*

---

**Magnetic Materials:** Materials which are attracted towards a magnet are called magnetic materials, e.g. iron, nickel and cobalt.

**Non-magnetic Materials:** Materials which are not attracted towards a magnet are called non-magnetic materials, e.g. aluminium, zinc, wood, rubber, etc.

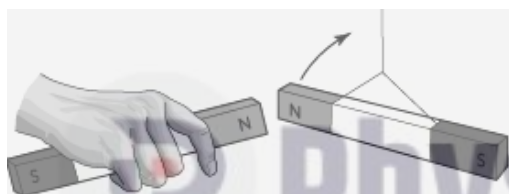
**Poles of a Magnet:** A magnet has two poles, viz. north pole and south pole. The magnetic power is concentrated on the poles of a magnet. When a bar magnet is suspended to move freely, it always points in the north-south direction. The north pole of the magnet points towards the north and the south pole of the magnet points towards the south.

### Interaction Between Poles of Magnet: Attraction and Repulsion

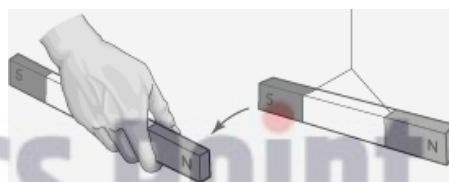
It is observed that when the ends of two magnets are brought near each other, they either pull towards or push away from each other. The pulling of magnets towards each other is termed as **attraction** and pushing away from each other is called **repulsion**.

When North pole of a magnet is brought near the North pole of another magnet or South pole of a magnet is brought near the South pole of another magnet, they repel each other i.e., like poles repel each other.

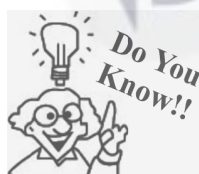
But when North pole of a magnet is brought near the South pole of another magnet, they attract each other i.e., unlike poles attract each other.



**Like poles repel**



**Unlike poles attract**



Magnets help in case of mental unrest by applying the south pole of a weak magnet to the forehead for about 10 minutes daily.

**Use of Magnet in finding directions:** Magnetic compass is a simple device which has been in use since ages; to find directions. Magnetic compass was discovered in ancient China. The sailors and travelers found magnetic compass very useful in finding directions.

Magnetic compass is composed of a small box with a glass top. The magnetic needle is placed on a pivot around which it can rotate freely.



**Magnetic compass**

### TYPES OF MAGNETS

There are two types of magnets

1. **Temporary magnets**
2. **Permanent magnets**

1. **Temporary magnets :** Temporary magnets are those which retain their magnetic properties only over a short interval of time. Temporary magnets are usually made of iron, cobalt or nickel. They behave as magnets under the influence of a strong magnet and lose their magnetism as soon as the strong magnet is removed. Electromagnets are temporary magnets.

**Electromagnets :** The magnets in which the magnetism has been produced by passing electric current through them are called electromagnets.

Electromagnets behave as magnets so long as the current is flowing through them and the magnetism disappears as soon as the flow of current stops. The strength of electromagnets depends on the magnitude of current flowing through them.






---

*Superconductors are the strongest magnets that are made from coils of wire.*

---

#### Uses of electromagnets

- Electromagnets are used to lift tons of scrap metal because the strength of electromagnets can be increased as per the requirement.
  - Electromagnets are used in the door bell, electric fan, etc.
2. **Permanent magnets :** *The magnet whose magnetism lasts for a long time or does not lose its magnetism is called **permanent magnet**.*  
 e.g. One of the everyday examples is a refrigerator magnet for hanging notes on refrigerator door. Horseshoe magnets and weld clamp magnets are example of permanent magnets.

**NOTE:** Permanent magnets can be made up of four different materials (i) ceramic (ii) alnico (iii) samarium cobalt and (iv) neodymium iron boron.




---

*Earth's magnetic field helps migration of birds from one place to another.*

---

#### MAGLEV TRAIN

The word Maglev stands for magnetic levitation. Maglev train is a train that uses magnets to float above a track. The **principle** of a maglev train is that like poles repel and unlike poles attract each other.

The magnets are arranged in a specific manner that moves the train along the guideway. Maglev train floats above the track, so it experiences very less friction. Thus, speed of a maglev train is very high exceeding 500 km/h.

#### LOSS OF MAGNETISM

A permanent magnet can lose its magnetic properties i.e., demagnetised under following conditions:

- (i) Mishandling or rough handling.
- (ii) Two magnets if stored with North pole alongside the North pole of the other magnet for a long time.
- (iii) Hammering or heating.
- (iv) Dropping a magnet from a height.

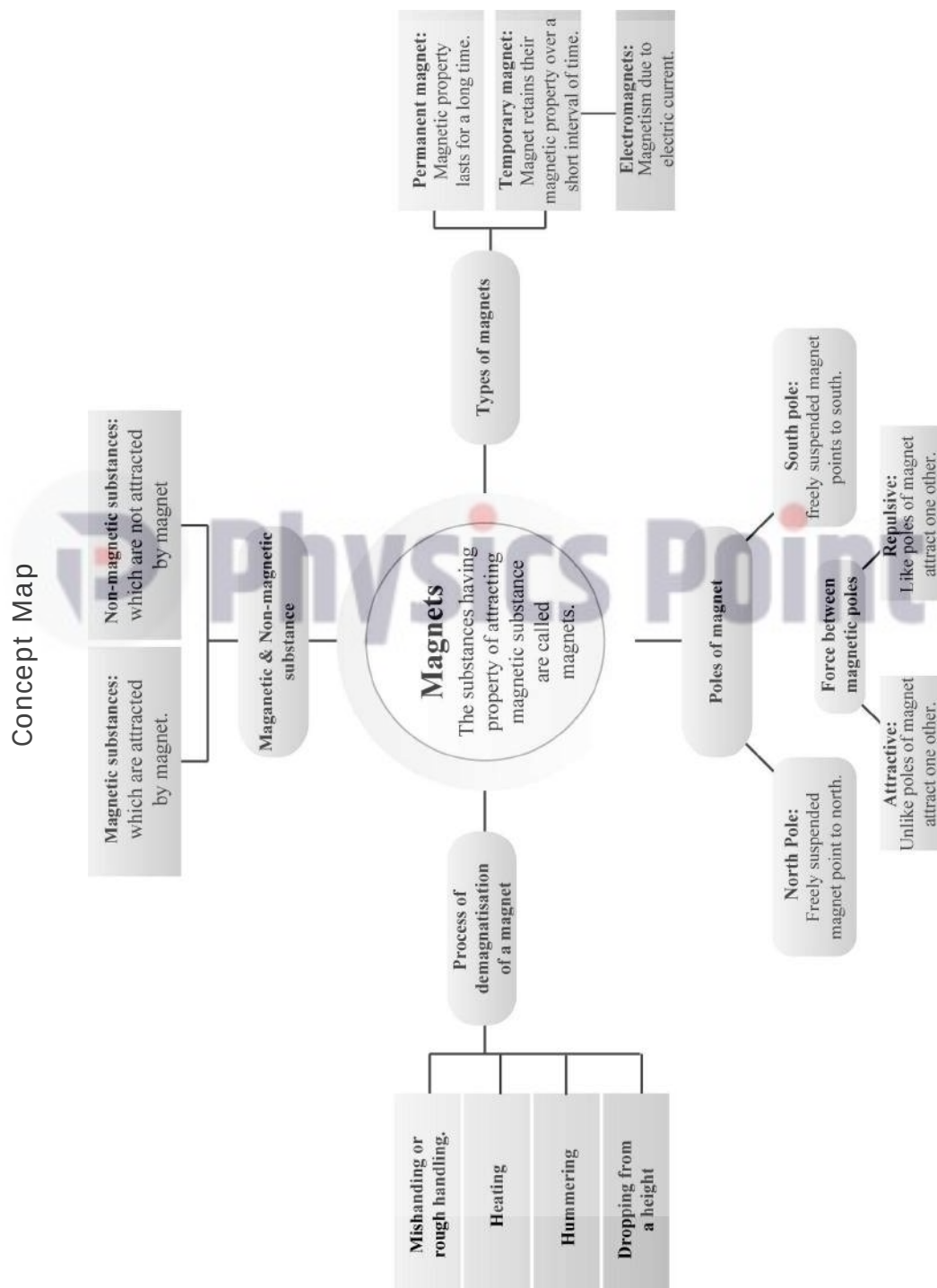
In order to prevent magnet from getting demagnetised, a piece of iron called **keeper** is placed across the poles of the magnet.

**Making your own magnet:** With the help of a permanent magnet you can change a piece of iron into a magnet. For this, you need to place the iron piece on a flat surface. Then rub the permanent magnet on the iron piece for many times. Your hand movement should always be in the same direction, while doing this. After some time, the iron piece would attain magnetic property.

#### Storing a magnet:

- (a) Bar magnets should be kept in pairs. Their unlike poles should be kept on the same side. A wooden piece must be placed between them. A piece of soft iron should be placed at their ends.
- (b) For storing a horse-shoe magnet, you should place a piece of iron across the two poles.
- (c) Magnets should be kept away from speakers, CD, television, music system, computer, etc.





## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- ..... and ..... are two poles of magnet.
- Load stone is used for .....
- ..... is a confirmatory evidence of pure magnet.
- Strength of a bar magnet is minimum at .....
- A horse shoe magnet has ..... poles.
- The materials which are attracted by a magnet are called .....
- A magnet always has .....poles.
- A bar magnet, which suspended will always align towards ..... and ..... direction.
- The blade used in a pencil sharpener is a ..... material.
- Artificial magnets can be made on various shapes, such as ..... and .....
- ..... poles of two magnets repel each other.
- Maximum amount of iron filings will get stuck to ..... of a bar magnet.
- We can magnetise a magnetic materials by using a ..... or .....
- A ..... is used by sailors to find direction in sea.
- A magnet will lose its property by ..... or .....

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- We can find east – west direction with the help of a magnet.
- Glass is a magnetic material.
- A cylindrical magnet has only one pole, either north or south pole.
- You can separate scrap iron from waste by the help of a magnet.
- A magnetic material will not get attracted if you keep the magnet at a long distance from it.
- A blade gets attracted by both the poles of a magnet.

- The north pole of a magnet will attract north pole of another magnet if they are kept very near to each other.
- Artificial magnets can be made from non – magnetic materials also.
- Magnetite is an ore of magnet.
- A compass uses a magnetic needle to show directions.
- Permanent magnets are of iron only.
- Pole of the freely suspended magnet pointing towards geographic south is called North pole.
- For a bar magnet, minimum magnetism is at the centre of magnet.
- Artificial magnets are temporary magnets only.
- Wood is a magnetic material.
- For storing safely, bar magnets are kept in pair.
- An iron magnet can pull natural magnet also.
- By using magnets, we can lift only small items.
- Nickel and cobalt are magnetic materials.
- Soft iron pieces are kept apart from the two poles of magnets when storing them, to avoid demagnetization.

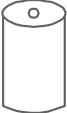
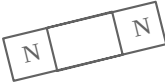
## Match the Column

**DIRECTIONS :** Each questions contains statements given in two columns which have to be matched statements (A, B, C, D, E) in column I have to be matched with statements (p, q, r, s, t) in column II.

- |           |                                                                 |                         |
|-----------|-----------------------------------------------------------------|-------------------------|
| <b>1.</b> | <b>Column I</b>                                                 | <b>Column II</b>        |
| (A)       | A freely suspended bar magnet comes to rest in the direction    | (p) Pair                |
| (B)       | Magnetite                                                       | (q) North-South         |
| (C)       | Bar magnet                                                      | (r) Repel               |
| (D)       | Magnetic poles occur in                                         | (s) Artificial magnet   |
| (E)       | Similar poles of magnet                                         | (t) Natural magnet      |
| <b>2.</b> | <b>Column I</b>                                                 | <b>Column II</b>        |
| (A)       | A naturally occurring magnet                                    | (p) Horse - shoe magnet |
| (B)       | An artificial magnet bent in the form of U                      | (q) Lodestone           |
| (C)       | The end of a freely suspended magnet which points towards north | (r) Magnetic compass    |

- (D) A magnetic device used for finding geographic directions  
 (E) A magnet which occurs naturally and is not made by any artificial means

3. **Column I** **Column II**

- (A)  (p) Horse shoe  
 (B)  (q) Ring  
 (C)  (r) Cylindrical  
 (D)  (s) Bar  
 (E)  (t) Needle

13. Two bar magnets when brought together get stuck. What conclusions will you draw from this observation?  
 14. If a compass is kept near an iron body will it be able to show correct direction. If not, why?  
 15. What will happen if audio cassettes or CD's are kept near magnet?  
 16. Fill Column B with the words given in the box below.

|     | A             | B |
|-----|---------------|---|
| (a) | N – N Poles   |   |
| (b) | Magnetite     |   |
| (c) | Compass       |   |
| (d) | N – S Poles   |   |
| (e) | Plastic       |   |
| (f) | Electromagnet |   |

|                       |            |                    |
|-----------------------|------------|--------------------|
| Non magnetic material | attraction | finding directions |
| Artificial magnet     | repulsion  | natural magnet     |

17. From the items given in the box below find out the ones that use magnets and those that do not.

|     |       |               |        |           |
|-----|-------|---------------|--------|-----------|
| fan | Radio | electric bulb | heater | ATM cards |
|-----|-------|---------------|--------|-----------|

### Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

- Define is magnetite?
- If a horse wears a horse shoe magnet, what will happen to the magnet?
- Which country discovered the use of magnet?
- Which material is to be used to make a permanent magnet?
- If we gently break a bar magnet from its centre, will two poles get free?
- What happens when the north pole of a magnet is placed near the north pole of another magnet?
- Define a magnet?
- Which magnet is used in an electric bell?
- In which direction, a freely suspended magnet aligns itself?
- Where are the poles of a magnet located?
- A bar magnet has no markings to indicate its north or south pole. How will you determine these poles?
- How can you find out a magnet of the same size and shape kept with a number of iron bars?

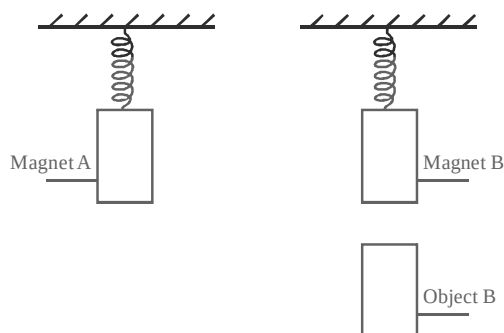
| Use magnets | Do not use magnets |
|-------------|--------------------|
|             |                    |

18. Classify the objects given in the box below into magnetic and non magnetic substances.

|        |        |            |
|--------|--------|------------|
| eraser | copper | iron balls |
| brass  | needle | silver     |

| Magnetic materials | Non magnetic materials |
|--------------------|------------------------|
|                    |                        |

19. Does an isolate magnetic pole exist like an isolate electric charge?  
 20. The spring shown below stretched less when object B was placed under magnet A.



What object is B likely to be?

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

- Write two magnetic and two non-magnetic materials.
- Define temporary magnet? Which material is used to make these magnets?
- Write the properties of a magnet.
- Define magnetic keeper?

- How is a magnet demagnetized?
- Explain attractive and directive properties of a magnet.
- Why does the freely suspended magnet always align itself in the north – south direction?
- Write three uses of magnets.
- You are given a strip of iron. How will you convert it into a magnet? What do you call this type of magnet?
- Describe type of magnets with the help of diagram. Label their poles too.

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

- Where are the pole of a bar magnet located? Suggest a method to locate them.
- Give two reasons by which magnets lose their magnetic properties.
  - What safety measures will you follow to store horseshoe magnet.
  - How is a compass used to find out the directions?

## 2

## EXERCISE

### Text Book Questions

- Fill in the blanks in the following:
  - Artificial magnets are made in different shapes such as ....., ..... and .....
  - The materials which are attracted towards a magnet are called .....
  - Paper is not a ..... material.
  - In olden days, sailors used to find direction by suspending a piece of .....
  - A magnet always has ..... poles.
- State whether the following statement are true or false:
  - A cylindrical magnet has only one pole. (T/F)
  - Artificial magnets were discovered in Greece. (T/F)
  - Similar poles of a magnet repel each other. (T/F)
  - Maximum iron filings stick in the middle of a bar magnet when it is brought near them. (T/F)
  - Bar magnets always point towards North-South direction. (T/F)
  - A compass can be used to find East-West direction any place. (T/F)
  - Rubber is a magnetic material.
- It is observed that a pencil sharpener gets attracted by both the poles of a magnet although its body is made of plastic. Name the material that might have been used to make some part of it.
- Column I shows different positions in which one pole of a magnet is placed near that of the other. Column II indicates the resulting action between them for each situation. Fill in the blanks.

| Column I | Column II  |
|----------|------------|
| N – N    |            |
| N – ...  | Attraction |
| S – N    |            |
| ... – S  | Repulsion  |

5. Write any two properties of a magnet.
6. Where are poles of a bar magnet located?
7. A bar magnet has no markings to indicate its poles. How would you find out near which end is its north pole located?
8. You are given an iron strip. How will you make it into a magnet?
9. How is a compass used to find directions?
10. A magnet was brought from different directions towards a toy boat that has been floating in water in a tub. Effect observed in each case is stated in Column I. possible reasons for the observed affects are mentioned in Column II. Match the statements given in Column I with those in Column II.

**Column I**

(A) Boat gets attracted towards the magnet.

(B) Boat is not affected by the magnet.

(C) Boat moves towards the magnet if the north pole of the magnet is brought near its head.

(D) Boat moves away from the magnet when north pole is brought near its head.

(E) Boat floats without changing its direction.

**Column II**

(p) Boat is fitted with a magnet with North Pole towards its head.

(q) Boat is fitted with a magnet with South Pole towards its head.

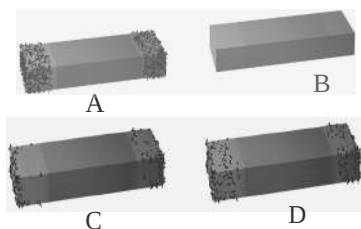
(r) Boat has a small magnet fixed along its length.

(s) Boat is made of magnetic material.

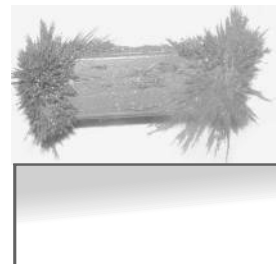
(t) Boat is made of non-magnetic material.

**NCERT Exemplar Questions**

1. Four identical iron bars were dipped in a heap of iron filings one by one. The figures given below show the amount of iron filings sticking to each of them.



- (i) Which of the iron bars is likely to be the strongest magnet?
  - (ii) Which of the iron bars is not a magnet? Justify your answer.
2. Boojho dipped a bar magnet in a heap of iron filings and pulled it out. He found that iron filings got stuck to the magnet as shown.



- (i) Which regions of the magnet have more iron filings sticking to it?
  - (ii) What are these regions called?
3. A toy car has a bar magnet laid hidden inside its body along its length. Using another magnet how will you find out which pole of the magnet is facing the front of the car?
4. You are provided with two identical metal bars. One out of the two is a magnet. Suggest two ways to identify the magnet.
5. Boojho kept a magnet close to an ordinary iron bar. He observed that the iron bar attracts a pin as shown below.



What inference could he draw from this observation? Explain.

6. Match Column I with Column II. (One option of A can match with more than one option of B)

**Column I**

- (A) Magnet attracts  
(B) Magnet can be repelled  
(C) Magnet if suspended freely  
(D) Poles of the magnet can be identified

**Column II**

- (p) Rests along a particular direction  
(q) Iron  
(r) Iron filings  
(s) Iron filings

7. Fill in the blanks
  - (i) When a bar magnet is broken; each of the broken part will have ..... pole/poles.
  - (ii) In a bar magnet, magnetic attraction is ..... near its ends.

8. Paheli and her friends were decorating the class bulletin board. She dropped the box of stainless steel pins by mistake. She tried to collect the pins using a magnet. She could not succeed. What could be the reason for this?
9. How will you test that 'tea dust' is not adulterated with iron powder?
10. You are provided with two identical metal bars. One out of the two is a magnet. Suggest two ways to identify the magnet.
11. Three identical iron bars are kept on a table. Two out of three bars are magnets. In one of the magnet the North-South poles are marked. How will you find out which of the other two bars is a magnet? Identify the poles of this magnet.
12. Describe the steps involved in magnetising an iron strip with the help of a magnet.
13. Suggest an activity to prepare a magnetic compass by using an iron needle and a bar magnet.
14. Suggest an arrangement to store a U shaped magnet. How is this different from storing a pair of bar magnets?

### HOTS Questions

1. A tailor was stitching buttons on his shirt. The needle has slipped from his hand on to the floor. Can you help the tailor to find the needle?
2. How do magnet trains run without touching the ground?

## 3

# EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

1. Look at the following objects. In which of these objects a magnet is used?

(a) Pin holder



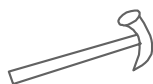
(b) Plastic toy



(c) Glass tumbler



(d) Hammer



2. We come across many household objects in which lids/covers have magnets. What is the purpose of such magnets?

- (a) So that containers are safe
- (b) To make containers look beautiful
- (c) To make containers air tight
- (d) To facilitate their frequent usage

3. Which of the following shapes of magnet are possible?



P

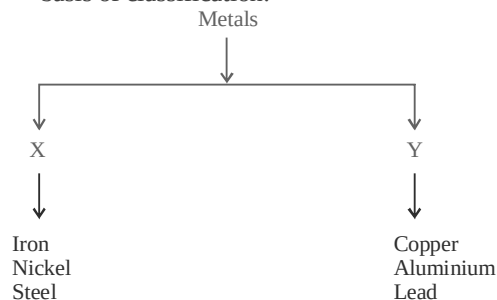


Q



R

- (a) Only P and Q      (b) Only Q and R  
(c) Only P and R      (d) P, Q, and R
4. Mahesh puts two things in each of the following boxes.  
Box (i) : Marble ball and silver bar  
Box (ii) : Copper coin and iron nail  
Box (iii) : Aluminium box and steel pins  
Box (iv) : Steel nail and nickel coins  
In which of these boxes can we use a magnet to separate things?  
(a) (i) and (ii)      (b) (ii) and (iii)  
(c) (i) and (iii)      (d) (ii), (iii) and (iv)
5. Anuj classified metals into the following groups 'X' and 'Y'. Which of the following is the correct basis of classification.





- |     | X                             | Y                          |
|-----|-------------------------------|----------------------------|
| (a) | Can be magnetised             | Cannot be magnetised       |
| (b) | Can sink                      | Cannot sink                |
| (c) | Cannot be attracted by magnet | Can be attracted by magnet |
| (d) | Can conduct electricity       | Cannot conduct electricity |
6. Read the following table and answer the question that follows
- |         | X | Y                   | Z                       |
|---------|---|---------------------|-------------------------|
| Magnets |   | Magnetic substances | Non Magnetic substances |
- To which groups does vases made of cobalt and copper belong to.
- |     | Cobalt | Copper |
|-----|--------|--------|
| (a) | X      | Y      |
| (b) | Y      | Z      |
| (c) | Z      | Y      |
| (d) | Y      | X      |
7. A matchbox containing an unknown object is placed on a thin cardboard as shown below.
- 
- When the bar magnet moves it is able to drag the match box along. Can you guess which of the following objects is inside the box?
- (a) Toothpicks (b) Marbles  
(c) 10-paise coins (d) Steel balls
8. Ramesh marked the following regions on the bar magnet before dipping the magnet into a sack of iron fillings. Which part of the bar magnet will be observe that attracts maximum amount of iron fillings?
- 
- (a) P and Q (b) Q and R  
(c) R and S (d) P and S
9. Nikhil has a small piece of metal and a thread he wants to find out whether the metal is a magnet or not. How can he do it?
- (a) He needs a compass  
(b) He can suspend the metal with the thread and see if it comes to rest in N-S direction  
(c) He need to bring another strong magnet near the metal  
(d) There is no way he can find out
10. If you have a bar magnet and two iron pieces all of then of same size and shape, how can you identify them?
- (a) By using a compass  
(b) By using another magnet  
(c) By using a thread  
(d) By using all the three
11. Kunal placed a metal ball near a bar magnet. He that the ball moved away. What can be concluded about the metal ball?
- (a) It is made up of magnetic substance  
(b) It is made up of copper  
(c) It is a magnet  
(d) It is not a magnet
12. Two magnets X and Y are placed near each other as shown below. How will the magnets move?
- 
- (a) Y will stick to X  
(b) Y will move away  
(c) X will turn in clockwise direction  
(d) Y will turn in anticlockwise direction
13. Why does a compass needle always point in north direction?
- (a) Compass is made up of magnetic material.  
(b) The needle of compass is a magnet with the pointer seeking south pole of earth  
(c) The needle of compass is a magnet with pointer seeking north pole of earth  
(d) The needle is made up of non magnetic material
14. Kunal magnetised a piece of iron marked as W, X, Y and Z using the stroking method as shown in the figure
-

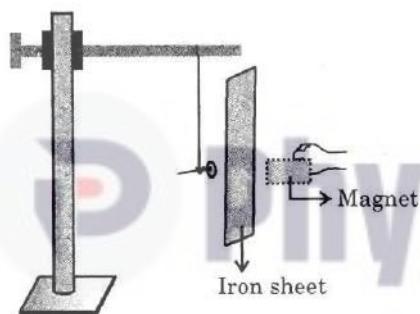
Which of these parts of iron piece will become the south-seeking pole?

- (a) W (b) X  
(c) Y (d) Z

15. What will happen if magnets are dropped from height repeatedly?

- (a) They will become stronger  
(b) They will lose their magnetic properties  
(c) No change will occur  
(d) First they will become weak and then become strong.

16. An iron nail is suspended as shown. A strong bar magnet is placed behind an iron sheet as shown in the figure, near the suspended nail. What will happen?

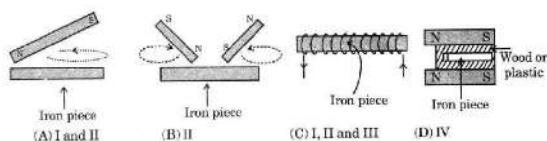


- (a) The nail will move towards the magnet due to attraction  
(b) The nail will NOT move towards the magnet  
(c) The magnet will move towards the nail  
(d) The nail will be attracted only if the 'S' pole of the magnet is kept near it

17. Harish was asked to identify a piece of soft iron put in a basket of 10 magnets of same shape and size. Which is the easiest way of identifying the iron piece at the earliest?

- (a) By picking up one magnet at a time and suspending it.  
(b) By picking up two magnets at a time and conduct repulsion test.  
(c) By bringing another strong magnet near the basket.  
(d) By dropping all magnets into water.

18. Which of the following is NOT the correct method to make a magnet?

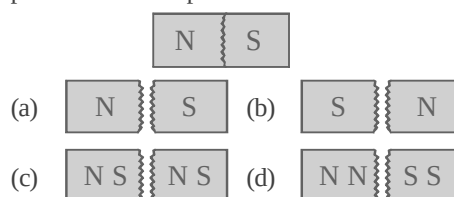


- (a) I and II (b) II  
(c) I, II and III (d) IV

19. A compass is used for:

- (a) alignment along N – S direction  
(b) to find direction in sea  
(c) to attract magnetic materials  
(d) both a and b

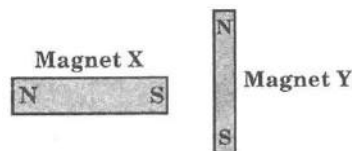
20. A bar magnet is cut into two pieces as shown below. What will be the configuration of the poles of the two pieces?



21. When two substances repel each other then:

- (a) one of them must be a magnet  
(b) both of them must be magnets  
(c) one of them must be non magnetic  
(d) both of them must be non magnetic

22. A small magnet Y is placed near a heavy magnet X as shown in the figure. How will the magnets move?



- (a) Y will move away  
(b) Y will turn clockwise  
(c) Y will turn anti clockwise  
(d) X and Y, both will turn clockwise

23. Articles from which group can be attracted by 'P' but cannot attract other objects?

| P      | Q                  | R              |
|--------|--------------------|----------------|
| Magnet | Magnetic substance | Non-substances |

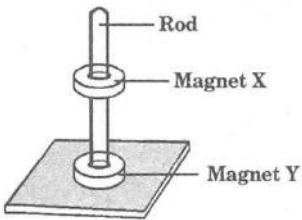
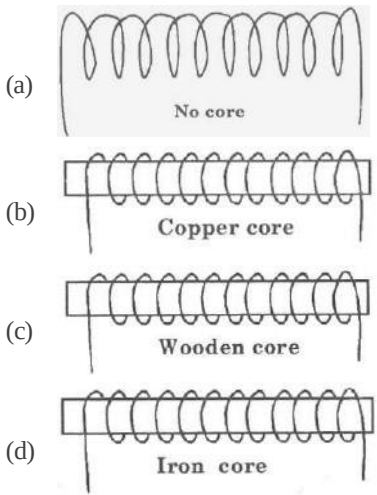
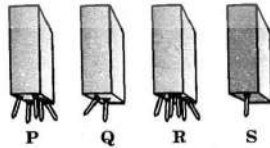
- (a) P (b) Q  
(c) R (d) P & Q

24. A ring made up of copper can be placed in which group of the above question.

- (a) P (b) Q  
(c) R (d) either Q or P

25. After repeated rubbing with a magnet in the same direction, a piece of substance fails to get magnetised, it should be in the group(s):

- (a) P and Q (b) Q and R  
(c) Q (d) R

26. Articles from which group(s) can be attracted by a magnet?  
 (a) P and Q (b) Q and R  
 (c) Only Q (d) Only R
27. An object is repelled by a magnet. It must be placed in the group:  
 (a) P (b) Q  
 (c) R (d) none of these
28. In many household articles we can find a magnet instead of a lock or a bolt in the doors. Magnets are used in such places mainly to:  
 (a) facilitate frequent usage  
 (b) ensure safety  
 (c) make the article airtight  
 (d) make the article look beautiful
29. To find the S-pole of a compass is to find the end of the compass needle that:  
 (a) is attracted to an iron  
 (b) points to the north  
 (c) repel by the S-pole of a magnet  
 (d) attract by the S-pole of a magnet
30. A bar is confirmed to be a magnet when it:  
 (a) attracts all metal  
 (b) attracts another magnet  
 (c) attracts an unmagnetised piece of iron  
 (d) repels a compass needle
31. The most suitable material to be used as the core of an electromagnet is:  
 (a) steel (b) soft iron  
 (c) copper (d) ceramic
32. Two ring magnets, X and Y are put through a rod as shown below. Magnet X float above magnet Y because \_\_\_\_\_.
- 
- (a) magnet X is lighter than magnet Y  
 (b) magnet Y is more powerful than magnet X  
 (c) the like poles of both magnets are facing each other  
 (d) the unlike poles of both magnets are facing each other
33. What is the reason to pivot the compass needle on a sharp pin?  
 (a) to minimise the magnetic effect on the pin  
 (b) to maximise the magnetic effect on the pin  
 (c) to minimise the friction between the pin and the compass needle  
 (d) to ensure that the compass needle will not drop from the pivoted point
34. Why does a compass always points to the north?  
 (a) The compass is made of a magnetic material.  
 (b) The compass is a magnet with the pointer as the south seeking pole.  
 (c) The compass is a magnet with the pointer as the north seeking pole.  
 (d) The compass is an electromagnet that is charged by rubbing when the needle is turning.
35. When one end of an iron rod is placed near a compass:  
 (a) it is always the N-pole of the compass that points towards it  
 (b) it is always the S-pole of the compass that points towards it  
 (c) any pole of the compass may points towards it  
 (d) the compass needle will not be affected by iron rod
36. Which coil produces the strongest electromagnet for a given flow of current?
- 
- (a) No core  
 (b) Copper core  
 (c) Wooden core  
 (d) Iron core
37. Four bar magnets P, Q, R and S were dipped into a cup of nails.
- 
- P Q R S

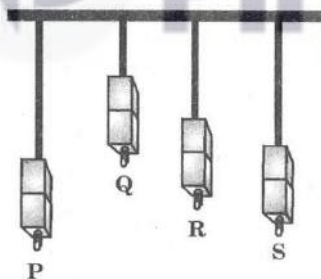
The number of nails picked up by the magnets were counted and recorded in the table below.

| Magnet | Number of nails picked up by the magnet |
|--------|-----------------------------------------|
| (P)    | 5                                       |
| (Q)    | 2                                       |
| (R)    | 6                                       |
| (S)    | 1                                       |

Which one of the following statements is correct?

- The longer the magnet, the more nails it can pick up.
- The thinner the magnet, the fewer nails it can pick up.
- The number of nails picked up does not depend on the size of the magnet.
- The number of nails picked up depends on the length of the magnet.

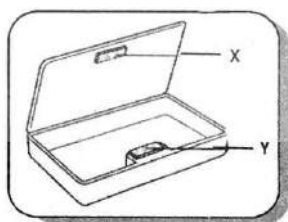
38. The diagram below shows the distance from which four magnets, P, Q, R and S can attract a steel clip from a table.



Arrange the magnets in ascending order of their magnetic strengths.

- P, S, R, Q
- Q, R, S, P
- P, S, Q, R
- R, S, P, Q

39. Manoj has a box like pencil case that makes use of two pieces of magnets, X and Y, to shut itself. He wanted to know how the magnets were arranged, so he split the casing to examine them.



Which one of the following side views of the

pencil case shows the correct position of the poles of magnets X and Y?

(a) Magnet X

Magnet Y

(b) Magnet X

Magnet Y

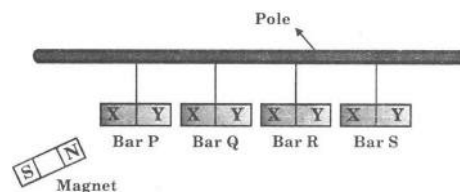
(c) Magnet X

Magnet Y

(d) Magnet X

Magnet Y

40. Sriram suspended 4 bars from a pole. He brought the North pole of a bar magnet near parts X and Y of each bar. He recorded his observations in the table below.



| Metal bar | Magnet and part X | Magnet and part Y |
|-----------|-------------------|-------------------|
| Bar P     | Pushed            | Pulled            |
| Bar Q     | Nothing happened  | Nothing happened  |
| Bar R     | Pulled            | Pushed            |
| Bar S     | Pulled            | Pulled            |

Which of the following sets correctly represents metal bars A, B, C and D?

| Bar P          | Bar Q      | Bar R      | Bar S      |
|----------------|------------|------------|------------|
| (A) Magnet     | Copper bar | Magnet     | Iron bar   |
| (B) Magnet     | Iron bar   | Magnet     | Copper bar |
| (C) Copper bar | Magnet     | Iron bar   | Magnet     |
| (D) Magnet     | Iron bar   | Copper bar | Iron bar   |

**More than One option Correct**

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b) (c) and (d) out of which ONE OR MORE may be correct.

- Which of the following contain a magnet in it?  
(a) Torch (b) Radio  
(c) Fan (d) Compass
- Which of the following materials is/are not suitable for the core of an electromagnet?  
(a) Steel (b) Soft iron  
(c) Copper (d) Aluminium
- Magnets lose their properties significantly if:  
(a) left in the open  
(b) heated strongly  
(c) dropped from a height  
(d) none
- Which of the following is/are magnetic material(s)?  
(a) Steel (b) Copper  
(c) Nickel (d) Aluminum
- Which of the following statements is/are not true?  
(a) The north pole of a magnet will attract north pole of another magnet if they are kept very near to each other.  
(b) Artificial magnets can be made from non magnetic materials also.  
(c) Magnetite is an ore of iron.  
(d) Isolated magnetic poles does not exist
- When a bar magnet is being suspended freely,  
(a) it will come to a rest in the north-south direction.  
(b) it will come to a rest in the east-west direction.  
(c) it will not point to a fixed direction.  
(d) N – pole of the bar magnet will point to the geographical north.
- In which of the following a permanent magnet is not used:  
(a) in magnetic door catches  
(b) in electric bells  
(c) in compasses  
(d) mixers
- When one end of a magnet is placed near a compass, the pointer (N-pole) of the compass turns and points at the magnet because:  
(a) the pointer points at any end of a magnet  
(b) the end away from the compass is a N-pole

- (c) the end near the compass is a S-pole  
(d) a magnet always attracts the pointer of a compass

- When the S-pole of a magnet is placed near an unknown pole of another magnet, the two magnets  
(a) repel each other because the unknown pole is a N-pole  
(b) repel each other because the unknown pole is a S-pole  
(c) attract each other because the unknown pole is a N-pole  
(d) can either attract or repel
- A natural magnet is known as:  
(a) magnetite (b) lode stone  
(c) haematite (d) solenoid

**Passage Based Questions**

**DIRECTIONS :** Study the given paragraph(s) and answer the following questions.

**Passage I**

A shepherd named Magnes lived in Greece used to take his herd of sheep and goats on a mountain for grazing. He always carried a stick to control his herd. The stick had a small piece of iron attached to one end. One day he had to pull hard to free his stick from a rock on the mountain side.

- Why has Magnes to pull hard to free his stick from a rock on the mountain side on that particular day?  
(a) His stick was stuck in the bushes on the mountain.  
(b) He was holding his stick in such a way that the portion of stick having small piece of iron attached was held by him in his hand.  
(c) The portion of stick having iron piece attached to it was pointing towards rock and get attracted strongly by the rock  
(d) None of these
- The credit for the discovery of natural magnet goes to  
(a) Mendes (b) Mendel  
(c) Magnes (d) None of these
- Magnes lived in  
(a) Ancient India (b) Ancient China  
(c) Egypt (d) Ancient Greece

### Passage II

One of the important property of magnet is that a freely suspended magnet always rests in the same direction (North-South).

4. The freely suspended magnet always rests in
  - (a) east-west direction
  - (b) north-south direction
  - (c) west-north direction
  - (d) None of these
5. We want to find the exact direction at a place, to find this
  - (a) we can look at the rising sun at that place and then our face is in east direction, on our left will be north.
  - (b) we can use a magnetic compass and find the direction by looking at its dial.
  - (c) both the above methods give us an exact knowledge of the directions.
  - (d) None of the above is correct
6. One end of magnetic needle in the magnetic compass is coloured red. This end of the needle always points
  - (a) towards south      (b) towards north
  - (c) towards east      (d) towards west

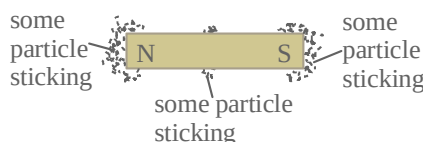
### Passage III

The trains that use magnets to float above a track is called Maglev (Magnetic Levitation) trains. This trains work on the principle that like poles repel and unlike poles attract each other. Due to magnetic force of attraction and repulsion this vehicle moves in forward direction. This train does not require wheels.

7. Maglev train
  - (1) floats above the guideway
  - (2) experiences very less friction
  - (3) does not require wheels
  - (a) (1) only                      (b) (1) and (3)
  - (c) (3) only                      (d) (1), (2) and (3)
8. Maglev trains work on the principle that
  - (a) like poles repel each other
  - (b) unlike poles attract each other
  - (c) both (a) and (b)
  - (d) None of these
9. What is used in Maglev trains instead of wheels?
  - (a) Bar magnets
  - (b) Horse shoe magnets
  - (c) Natural magnets
  - (d) Electromagnets

### Passage IV

You are provided with a soil and asked to find out if the given soil contains some magnetic substance or not? You rubbed a magnet in the soil and then pulled out the magnet. Your magnet appeared as shown below:



10. The soil provided to you
  - (a) contains magnetic substance
  - (b) does not contain any magnetic substance
  - (c) Both the above are correct
  - (d) None of the above is correct
11. The substance sticking to the magnet is
  - (a) iron
  - (b) cobalt
  - (c) nickel
  - (d) any magnetic substance

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

1. **Assertion (A) :** It is easier to bring North pole of a magnet to South pole of other magnet.  
**Reason (R) :** There is a force of attraction between unlike poles of magnet.
2. **Assertion (A) :** Tennis ball attracts towards a magnet  
**Reason (R) :** Tennis balls is a non-magnetic object.
3. **Assertion (A) :** Iron is a non-magnetic substance.  
**Reason (R) :** Iron is attracted towards a magnet.



4. **Assertion (A)** : A magnet attracts cobalt.  
**Reason (R)** : A horse shoe magnet is rectangular in shape.
5. **Assertion (A)** : Maglev is the train which does not require wheels.  
**Reason (R)** : Maglev train experiences very less friction.
6. **Assertion (A)** : Strength of electromagnet depends on the magnitude of current flowing through them.  
**Reason (R)** : Electromagnets are used to lift heavy weights.
7. **Assertion (A)** : The north pole of a freely suspended magnet points towards geographic north.  
**Reason (R)** : Using pieces of iron we can make artificial magnets.
8. **Assertion (A)** : A compass is a magnetic device that is used by sailors to find directions.  
**Reason (R)** : The sailor can find directions by use of dial of magnetic compass even if there is no magnetic needle fixed in the compass.
9. **Assertion (A)** : A simple magnetic compass can be prepared by inserting a magnetised iron needle in a piece of cork and allow the cork to float in water kept in a bowl.  
**Reason (R)** : In the above arrangement the needle must touch water while floating.

### Multiple Matching Questions

**DIRECTIONS** : Following questions has four statements (A, B, C and D) given in column I and five

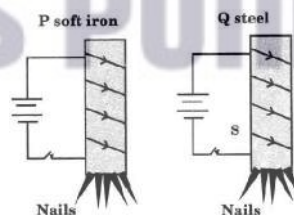
or six statements (p, q, r, s) in column II. Any given statement in column I can have correct matching with one or more statement(s) given in column II. Match the entries in column I with entries in column II.

| Column I     | Column II        |
|--------------|------------------|
| (A) Magnetic | (p) Iron         |
| (B) Copper   | (q) Non-Magnetic |
|              | (r) Silver       |
|              | (s) Nickel       |

### Integer Type Questions

**DIRECTIONS** : Following are integer based/ Number based question. Each question, when worked out will result in one integer or numeric value

1. The figures below show a coil wound on a soft iron core P, and an identical coil wound on a steel core Q. Five nails are attracted to each of them when the current is on. The switches are then opened.



The probable number of nails still attracted to P and Q are:

- (a) 0, 0                      (b) 0, 5  
 (c) 5, 0                      (d) 5, 5

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- North Pole (N) and South Pole (S).
- Knowing direction.
- Repulsion
- At the centre of magnet
- Two
- magnetic materials
- two
- north and south
- magnetic material
- bar (cuboid), circular
- Like
- both poles
- magnet, on electric current
- Compass
- hammering or heating

### True/False

- |          |           |           |
|----------|-----------|-----------|
| 1. True  | 2. False  | 3. False  |
| 4. True  | 5. True   | 6. True   |
| 7. False | 8. False  | 9. False  |
| 10. True | 11. False | 12. False |
| 13. True | 14. False | 15. False |
| 16. True | 17. True  | 18. False |
| 19. True | 20. True  |           |

### Match the Column

- (A) → (q); (B) → (t); (C) → (s); (D) → (p); (E) → (r)
- (A) → (q); (B) → (p); (C) → (t); (D) → (r); (E) → (s)
- (A) → (r); (B) → (s); (C) → (t); (D) → (p); (E) → (q)

### Very Short Answer Type Questions

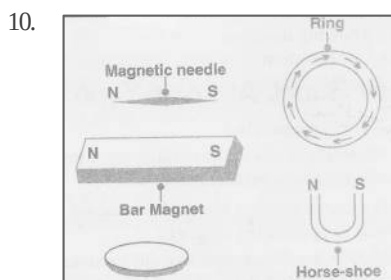
- Magnetite is one of the natural ore of iron and also known as natural magnet.
- Shortly, it will de – magnetize due to continuous striking to land.
- Magnet was first discovered in Greece.
- Hard steel and alloy are used to make permanent magnet.
- No, the two pieces will act as individual magnets.
- They will repel each other.

- A material which shows an attraction for magnetic materials such as iron, cobalt and nickel is called a magnet. When it is suspended freely, it points in the geographical north –south direction.
- In an electric bell, U – shaped magnet is used.
- A freely suspended magnet always aligns itself in the geographical north–south direction.
- At the ends
- Suspend freely
- A bar magnet to attract them
- They are opposite poles
- No
- Data gets spoiled
- |                   |                       |
|-------------------|-----------------------|
| <b>A</b>          | <b>B</b>              |
| (a) N–N poles     | repulsion             |
| (b) Magnetite     | natural magnet        |
| (c) Compass       | finding directions    |
| (d) N–S poles     | attraction            |
| (e) Plastic       | non-magnetic material |
| (f) Electromagnet | Artificial magnet     |
- Use magnets**  
Fan, Radio, ATM cards
- Do not use magnets**  
electric bulb, heater
- Magnetic materials**  
needles, iron balls
- Non-magnetic materials**  
eraser, brass, copper  
silver
- No
- Magnetic material

### Short Answer Type Questions

- The two magnetic materials are :  
(i) Iron (ii) Cobalt  
The two non-magnetic materials are :  
(i) Leather (ii) Plastic
- Temporary magnet is the magnet which loses its magnetism as soon as the source of magnetism is removed. It is usually made up of soft iron.
- The important properties of a magnet are given as follows :  
(a) They have directive property i.e., when suspended freely, a magnet always aligns itself in north–south direction.  
(b) They have attractive property i.e., magnet attracts magnetic materials like iron, cobalt and nickel towards itself.

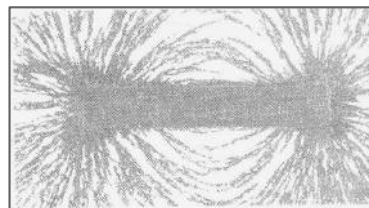
4. A magnetic keeper is a piece of soft iron. In keepers, two magnets are arranged with their opposite poles lying side by side. A piece of wood should be kept between them and two pieces of soft iron (keepers) placed across the poles.
5. A magnet can be demagnetized :
  - (i) By heating,
  - (ii) By hammering the magnet violently.
6. (i) **Attractive property** : A magnet has the property to attract some substances like iron, cobalt and nickel when brought near it. This property of magnet is called as an attractive property.
- (ii) **Directive property** : If we suspend a magnet freely with a thread, then it always aligns itself in the geographic north-south direction when it comes to rest. This is called as directive property of a magnet.
7. Earth behaves like a huge bar magnet, with poles at its ends. The north pole of this bar magnet points approximately towards the geographical South Pole and its south pole points approximately towards the geographical North Pole. The north pole of a freely suspended magnet points towards the geographical North Pole because it is attracted by the earth's magnetic South Pole and the south pole of a freely suspended magnet points towards the geographical South Pole because it is attracted by the earth's magnetic North Pole. Hence, the freely suspended magnet always aligns itself in the north-south direction.
8. Magnets have various uses. They are used in magnetic compass, electric motors refrigerator doors, electric bells, T.V., radio, computers, etc.
9. A strip of iron can be converted into magnet by passing electricity through it. It is called electromagnet, which is a temporary magnet.



### Long Answer Type Questions

1. The poles of the bar magnet are located at its two end point.

Place a magnet on paper and sprinkle some iron filling on it. It is observed that the iron fillings gets attracted more strongly towards the two ends of the magnet as compared to its central portion indicating that the poles are located at these two ends of the magnet.



2. (i) Magnets can lose its magnetic properties if:
    - (1) exposed to heat.
    - (2) they are dropped or banged on enough to bump their domains out of alignment.
    - (3) They are burnt up to their curie point (the temperature that they demagnetize completely).
  - (ii) Safety measures to follow while storing, horseshoe magnets :
    - Always wear safety goggles when handling large magnets.
    - Always wear gloves when handling magnets to prevent pinching.
    - Children should never be allowed to play with neodymium magnets.
    - Keep magnets at least 20 cm away from sensitive electronic and storage devices.
  - (iii) When the magnet is suspended freely with the thread, it aligns itself in the geographic north-south direction. We use this property of magnet in compass which is used to give us the direction at a particular place.
- The diagram of the compass is shown in the figure below :



## 2 EXERCISE

### Text Book Questions

- Artificial magnets are made in different shapes such as **bar magnet**, **horse shoe** and **cylindrical**.
  - The materials which are attracted towards a magnet are called **magnetic**.
  - Paper is not a **magnetic** material.
  - In olden days, sailors used to find direction by suspending a piece of **magnet**.
  - A magnet always has **two** poles.
- (i) False (ii) False
  - (iii) True (iv) False
  - (v) True (vi) True
  - (vii) False
- Iron
- | Column I | Column II  |
|----------|------------|
| N – N    | Repulsion  |
| N – S    | Attraction |
| S – N    | Attraction |
| S – S    | Repulsion  |
- Properties of magnet:
  - Attracts object made of iron, nickel or cobalt.
  - Directs north-south direction.
- On two ends of the bar magnet.
- The bar magnet is hanged freely with the help of a thread. The end pointing to north is the north pole of the magnet.
- An iron strip is kept on table. One end of bar magnet is dragged over the iron strip from one end to the other. This process is repeated. The iron strip is converted to a magnet.
- The compass always shows North and South directions. Knowing North-South direction, one can always find out East and West directions also.
- (i) (d) (ii) (e)
  - (iii) (b) (iv) (a)
  - (v) (c)

### NCERT Exemplar Questions

- A
  - B because there are no iron filings sticking to it.
- The end of the magnet has more iron filings attached to it.
  - These regions are called poles of the magnet.

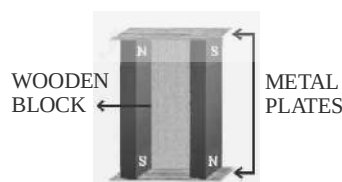
- If the front of the toy car gets attracted to the north pole of the given magnet then it is the south pole of the bar magnet hidden inside the car.
- By suspending the metal bars
  - By attracting iron filings
  - Using another magnet
- The magnetic properties are induced into the iron bar and it acts like a magnet till the magnet is kept near it.
- (a) – (ii), (iii), (iv); (b) – (iii); (c) – (i); (d) – (iii)
- two
  - more
- The pins are made of stainless steel which is a non/magnetic material.
- By using a magnet. If it has iron powder they will stick on to the magnet.
- By suspending the metal bars
  - By attracting iron filings
  - Using another magnet
- The magnet with known poles will attract and repeat two ends of a magnet and attend both the end of an ordinary bar.
- By rubbing the iron with a magnet as shown in the figure below.



- Magnetise the needle and set it in a way that it may rotate freely suspend it.
- U shaped magnet-One metal plate is placed across the two poles of the U shaped magnet.



Bar magnet- Use two metal plates and one wooden block, arrange them as shown in the figure



**HOTS Questions**

1. The needle can be found by using a magnet. Since needle is magnetic, when a magnet is waved over the floor, it will stick to the magnet.
2. A huge magnetic field is created by electrified coils in the guideway walls, which propel the train.

**3 EXERCISE****Multiple Choice Questions**

1. (a) A pin holder has a magnet which keeps the pins stuck to it.
2. (d) Magnets in the lids facilitate in frequent usage of the containers as the containers get closed easily.
3. (d) All these shapes of magnets are possible.
4. (b) Iron nails and steel pins will be removed by magnets. In box (iv) both steel nails and nickel coins will stick to magnet, so magnet cannot be used to separate things.
5. (a) The group X consist of iron, nickel and steel which are magnetic substances.
6. (b) Cobalt is a magnetic substances and copper is a non magnetic substance
7. (d) Steel get dragged along with bar magnet.
8. (d) Poles P and S will attract maximum amount of iron fillings
9. (b) A freely suspended magnet always comes to rest in N-S direction.
10. (c) By suspending all three things with a thread one by one, we can find out which one is a magnet.
11. (c) This is a repulsion test. Metal ball is a magnet so when brought near the same pole of a bar magnet it repelled and moved away.
12. (d) Since like poles repel and unlike poles attract, Y will turn anticlockwise so that N pole of Y gets attracted to S pole of X.
13. (c) Since the pointer of needle seeks north pole of earth, we can say that the compass shows north direction as north pole is attracted towards geographical south pole of earth.
14. (d) During stroking method 'the end 'W' from where the process starts becomes same pole as the magnet and the pole Z at other end becomes opposite pole. So 'Z' will become south seeking pole.
15. (b) Tampering causes magnets to lose their magnetic properties.
16. (b)
17. (b)
18. (d)
19. (d)
20. (c)
21. (b)
22. (c)
23. (b)
24. (c)
25. (d)
26. (a)
27. (a)
28. (a)
29. (c)
30. (d)
31. (b)

32. (c)
33. (c)
34. (c)
35. (c)
36. (d)
37. (c)
38. (a)
39. (c)
40. (a)

**More than One option Correct**

1. (b), (c), (d)
2. (a), (c), (d)
3. (b), (c)
4. (a), (c)
5. (a), (b)
6. (a), (d)
7. (b), (d)
8. (b), (c)
9. (b), (c)
10. (a), (b)

**Passage Based Questions**

1. (c)
2. (c)
3. (d)
4. (b)
5. (b) Using sun for finding directions may not be very exact.
6. (b) The red end is north seeking end i.e., north pole
7. (d) As the train is wheelless hence experiences very less friction.
8. (c) A series of propulsion coils (Electromagnet) are placed along the guideway of Maglev. This vehicle experiences an attractive force from the coil a head of it and a repulsion force from the coil behind it, both forces pushing the vehicle in forward direction,
9. (d)
10. (a)
11. (d) A substance that is attracted towards magnet is called a magnetic substance. All the substances given (i.e., Iron, Cobalt and Nickel) are magnetic substance.

**Assertion/Reason**

1. (a)
2. (d) Tennis ball does not attract towards a magnet.
3. (d) A is false, R is true.
4. (c) A is true, R is false.
5. (b) Maglev train does not require wheels because it works on the principle that like poles repel and unlike poles attract each other.
6. (a) Strength of electromagnets can be increased as per the requirement.
7. (b) Both A and R are correct but R is not correct explanation of A.
8. (c) To find direction there has to be a magnetic needle fixed in the compass.
9. (c) The needle must not touch the water.

**Multiple Matching Questions**

(A) → p, q, r; (B) → p

**Integer Type Questions**

- (b) 0, 5

# Chapter 14

## WATER

### INTRODUCTION

About three fourth of Earth's surface is covered with water. Water is found in rivers, seas, oceans, soil, air, plants and animals. Man is dependent on plants and animals which are in turn dependent on air, water and soil, etc. All such substances which are used by man for sustenance of life and his welfare are called resources and those that are found in nature are called natural resources.

**Importance of water :** Water is the most important substances required by us. Without water, we cannot live. Water is used in agriculture, industries, for washing, bathing, drinking, cooking, cleaning and several other purposes. Our body has 70% water by weight while water melon has 99% water.

Water from water bodies like rivers, seas, oceans and lakes evaporates because of the heat of sun. Plants also give out water from their leaves during transpiration. Water vapour rises and as they reach higher up in the atmosphere they cool and condenses to form water droplets. These water droplets coalesce from clouds. The clouds cool further and when they become too heavy, they fall down on earth as rain. This is called **precipitation**.

The rainwater falls on seas, rivers and other water bodies. Water from land also flows into rivers through streets. Some rainwater may seep underground as groundwater. This water is used in houses; agriculture and industries. Finally this water too goes into rivers and seas. Snow from mountains also melt and flows into rivers. The water in oceans, seas, rivers and lakes evaporate again. This cycle goes on and in this way water cycle goes on in nature.

**Fog :** During winter, sometimes, condensation of water vapours start near the surface of earth. These condensed vapour do not form rain clouds.

Instead they appear near the earth surface as fog.



**Hail or snow :** Sometimes when rain falls on high mountains or when it is too cold, the water get solidify and becomes snow. When snow falls it is called hail.



**Dew :** During winter nights, when air becomes very cool, the vapours near the earth's surface condense and form water droplets. These appear as dew on leaves, flowers, railings, etc.



## Cloud Formation

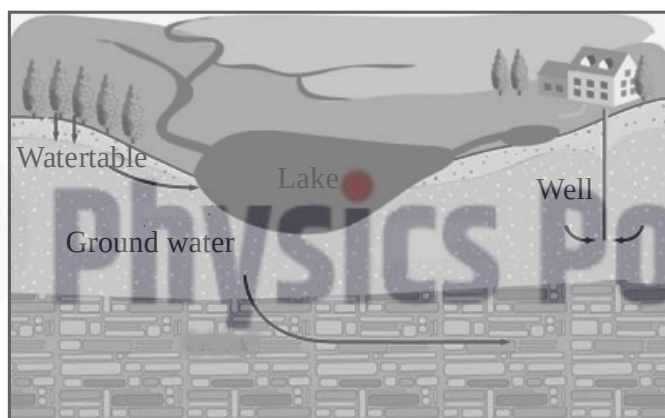
When water vapour reaches very high in the atmosphere, it condenses because of low temperature. This leads to “cloud formation”. When too much water vapour accumulates in the cloud, it is unable to hold water. The condensed vapour then falls down on the earth in the form of rain or snow or sleet. Thus, the water which escapes from the earth’s surface comes back. The rainwater comes down on the ground and flows to the river, ponds and finally to the ocean. Some of the rainwater seeps down the ground to recharge ground water.

## Sources of Water

**Rainwater :** Rain is the main source of water. It is free from germs but may contain dust particles. There are some dissolved gases such as carbon dioxide and sometimes acids may also pollute rain water causing acid rain.

**Groundwater :** When rain falls on the ground, some water penetrate the soil and accumulate on the non-porous rocky layer. This is called underground water and the level of water is called water table.

Sometimes the groundwater may come out at the surface to form a natural spring. It may also form a lake.



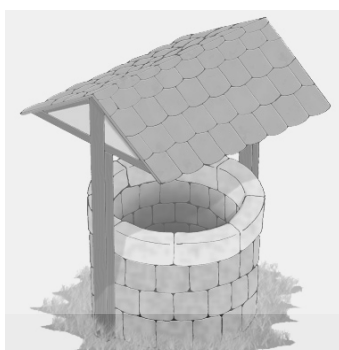
Ground water

Groundwater passes through several layers of sand and rocks. It gets filtered through these layers and is free from suspended impurities. However, it may be contaminated with germs and some dissolved salts of calcium and magnesium.

We can obtain groundwater by digging wells and tube.

### Water Fact!

It takes 3000 l of water to produce one kilo of rice and 4500 l to make 1 tonne of steel.



Well



Hand pump

**Surface water :** Rainwater that runs off the surface of earth to form streams, lakes and rivers is called surface water. Snow melts and the water flows down to rivers and lakes. Surface water is highly contaminated with germs, suspended impurities and dissolved salts. Sewage water from houses and industries are also discharged into rivers. River water needs to be cleaned before being supplied to cities and towns for drinking. If uncleaned water is consumed, it may cause dangerous diseases like jaundice, cholera and typhoid.

### Sea Water

Rivers and streams finally flow into sea and so they are the largest reservoirs of natural water. Sea water is the most impure water. It contains dissolved common salt. Due to this sea water is salty and is called saline water. It is unfit for drinking, cannot be used in irrigation and in industries.

People must use water judiciously otherwise there will be a severe water crisis.



Oceans contains more than 97% of earth's total water



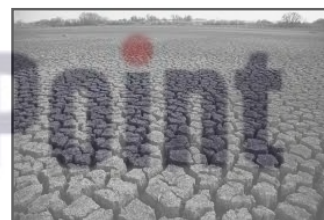

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*Water has been the main cause of development of some civilizations like Indus valley & Egyptian civilizations.*

---

**Disadvantage of no rainfall at all :** Rain is the main source of water. Less or no rainfall can convert an area into a desert. If there is no rainfall for a long period, in continuation, it may lead to **drought**. There will be no crop, no food for humans and animals. There will be loss of life. An economic crisis will occur in the region and this will become a natural calamity.

**Problem due to heavy rain :** If there is heavy rainfall, then also problem will rise. The fields will get flooded and crops will be damaged. Again there will be shortage of food and fodder. Collection of rain water will also disrupt the normal life of peoples. Many roads and bridges will get damaged and there will be loss to life and property. Low lying areas will be flooded and people have to be shifted.



Draught area

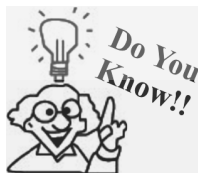


Waterlogging

### Factors affecting shortage of water

- (i) Increase in population has increased the demand for water.
- (ii) Change in lifestyle of people has increased the consumption of water.
- (iii) Urbanisation has decreased the groundwater reserves as concrete roads do not allow seepage of water.
- (iv) Industrial demand for water is increasing many times.

**Conservation of water :** In summers people face shortage of water because the level of groundwater goes down and so there is no water in wells and tube wells. If there is low rainfall the situation becomes even more grim. There is scarcity of drinking water. Therefore, management of water resources is very important and in this water conservation plays an important role.




---

*On an average world's industries are utilising four times the amount of water used by world's entire population at home.*

---

### Measures for conservation of water

1. Development of watershed plan for drinking, irrigation and industrial areas.
2. Carrying out surveys to identify over exploited areas.
3. Artificial recharging of ground water.
4. Adoption of flood control methods.
5. Transfer of excess water to deficit areas by interlinking of rivers.
6. Adopting water harvesting methods.
7. Avoiding misuse of water.
8. Organising people awareness programmes.

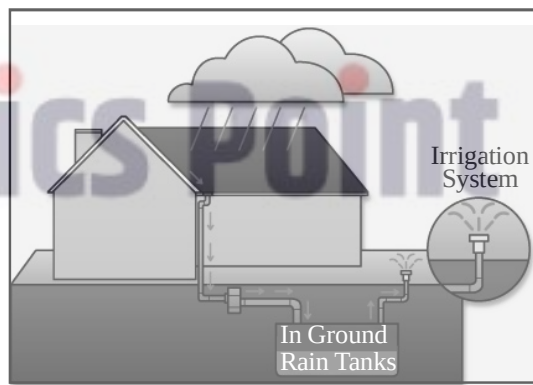
**Rain water Harvesting :** Rain water simply flows into drains and is lost. Instead this rain water can be collected and used later. This is called harvesting of rain water.



*Trees help in the process of water cycle. If deforestation occurs at the present rate, there will be insufficient rainfall. We should plant more trees.*

Rain water from roof tops and kitchen weather can be collected in underground tanks. Water from these tanks percolate underground and recharge the aquifers.

**Preventing water pollution :** We can also conserve water by protecting the water bodies from pollution. We should not dump garbage and harmful chemicals from factor in water bodies. Dirty water is bad for marine line. Even plants and animals die around polluted water. If humans consume polluted water they may suffer from many diseases.

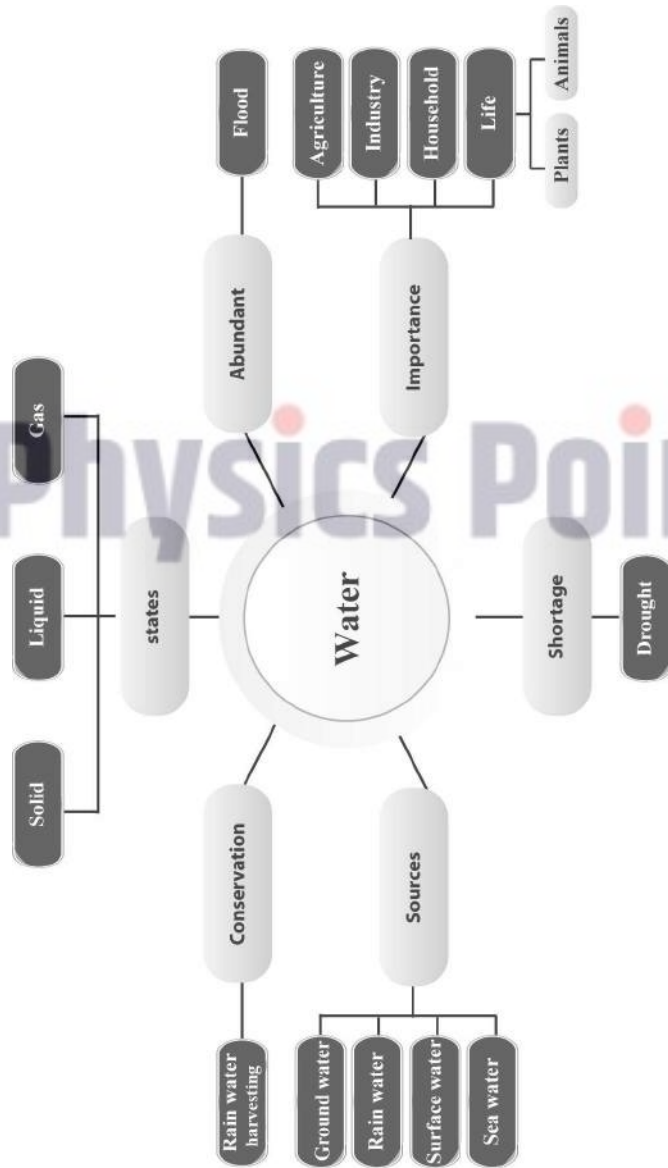


**Rainwater Harvesting**

### KEYWORDS

- **Condensation :** Process by which water vapour in air changes into liquid water.
- **Evaporation :** Process by which liquid water turns into vapour.
- **Transpiration :** Process by which plants lose water in the form of water vapour into the atmosphere.
- **Water cycle :** The cyclic movement of water from the atmosphere to the Earth and back to the atmosphere through various processes is called water cycle.
- **Drought :** Abnormally long period of insufficient or no rainfall is called drought.
- **Famine :** Lack of food in a region for a long period is called famine.
- **Rain water harvesting :** The process of collecting and storing rainwater from roofs or a surface catchment is called rainwater harvesting.

## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- Drought is a natural ..... caused due to ..... rains over a long time.
- ..... is another ..... calamity caused ..... rains in short time.
- ..... and ..... are two forms of precipitations.
- For generation of ..... and ..... electricity water is required in high quantities.
- Flood causes excessive damage to ..... and .....
- The process by which a plant prepares its food by the help of water and sunlight is known as .....
- Sea water is ..... as it has a huge amount of dissolved salt.
- The surface of the ground water is called .....
- Rain fall occurs when clouds come in contact with ..... and ..... takes place.
- Wet clothes under shade dry because of .....
- The process of release of water through leaves of a plant is called .....
- In a cloud, the size of the droplets increase causing rainfall due to the process of .....
- The process of collecting rain water in huge pits is called .....
- Substances which cause water pollution are called .....
- ..... water is the purest form of natural water.
- The kinetic energy of water is used to produce tidal energy.
- Water vapour is present in air only during monsoon season.
- Ground water does not evaporate. It can only be taken out either by pumping or by digging well.
- Water vapour condenses to form tiny droplets of water only in the upper layers of air where it is cooler.
- Spring water is one of the natural water resources.
- Wet clothes drying under shade get dry because of evaporation.
- Fog appearing on a cold winter morning is the example of evaporation.
- Water vapour is lighter than surrounding air.
- Water cycle happens only once in a year, during monsoon.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched. Statement (A, B, C, D) in column I have to be matched with statements (p, q, r, s, t) in column II.

- | Column I                       | Column II     |
|--------------------------------|---------------|
| (A) Drinking                   | (p) 1 mug     |
| (B) Washing                    | (q) 2 bottles |
| (C) Brushing                   | (r) 1 bucket  |
| (D) Bathing                    | (s) 4 buckets |
| (a) A → p; B → r; C → q; D → s |               |
| (b) A → q; B → s; C → p; D → r |               |
| (c) A → r; B → q; C → p; D → s |               |
| (d) A → s; B → r; C → q; D → p |               |
- | Column I                      | Column II             |
|-------------------------------|-----------------------|
| (A) Natural sources of water  | (p) hand pumps, taps  |
| (B) Man Made sources of water | (q) rivers, lakes     |
|                               | (r) streams, springs  |
|                               | (s) wells, tube wells |

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- Water helps in regulating our body temperature.

- (a)  $A \rightarrow p, r; B \rightarrow q, r$   
 (b)  $A \rightarrow p, q; B \rightarrow r, s$   
 (c)  $A \rightarrow q, r; B \rightarrow p, s$   
 (d)  $A \rightarrow r, s; B \rightarrow p, q$
3. **Column I** **Column II**  
 (A) Earth's 2/3rd (p) Saline water  
 (B) Sea (q) ground water  
 (C) River and lakes (r) water  
 (D) Rain (s) freshwater  
 (a)  $A \rightarrow p; B \rightarrow s; C \rightarrow q; D \rightarrow r$   
 (b)  $A \rightarrow s; B \rightarrow p; C \rightarrow r; D \rightarrow q$   
 (c)  $A \rightarrow q; B \rightarrow r; C \rightarrow p; D \rightarrow s$   
 (d)  $A \rightarrow r; B \rightarrow p; C \rightarrow s; D \rightarrow q$
4. **Column I** **Column II**  
 (A) Evaporation (p) loss of water by plants  
 (B) Condensation (q) change of water into vapour  
 (C) Transpiration (r) changes of vapour into water  
 (a)  $A \rightarrow r; B \rightarrow q; C \rightarrow p$   
 (b)  $A \rightarrow p; B \rightarrow p; C \rightarrow r$   
 (c)  $A \rightarrow q; B \rightarrow p; C \rightarrow r$   
 (d)  $A \rightarrow q; B \rightarrow r; C \rightarrow p$
5. **Column I** **Column II**  
 (A) Evaporation (p) fog in the morning  
 (B) Condensation (q) steam rising from tawa when water is sprinkled  
 (r) dew on leaves  
 (s) steam coming out from kettle  
 (a)  $A \rightarrow p, q; B \rightarrow r, s$   
 (b)  $A \rightarrow q, s; B \rightarrow p, r$   
 (c)  $A \rightarrow p, r; B \rightarrow q, s$   
 (d)  $A \rightarrow q, r; B \rightarrow p, s$
6. **Column I** **Column II**  
 (A) Flood (p) circulation of water in nature  
 (B) Drought (q) excessive rain  
 (C) Water cycle (r) little or no rain  
 (a)  $A \rightarrow r; B \rightarrow q; C \rightarrow p$   
 (b)  $A \rightarrow p; B \rightarrow r; C \rightarrow q$   
 (c)  $A \rightarrow q; B \rightarrow r; C \rightarrow p$   
 (d)  $A \rightarrow q; B \rightarrow p; C \rightarrow r$
7. **Column I** **Column II**  
 (A) Rain water harvesting (p) water vapour & dirt

- (B) Clouds (q) rain  
 (C) Precipitation (r) collecting rain water for future use.  
 (a)  $A \rightarrow r; B \rightarrow q, C \rightarrow p$   
 (b)  $A \rightarrow p; B \rightarrow r, C \rightarrow q$   
 (c)  $A \rightarrow q; B \rightarrow p, C \rightarrow r$   
 (d)  $A \rightarrow r, s; B \rightarrow p, c \rightarrow q$

### Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

- Water is present on earth in which states of matter?
- Write the chemical formula of water.
- Why is sea water salty or saline?
- Which property of water is responsible to maintain the body temperature?
- Describe condensation.
- How can we get drinking water from the sea?
- Which form of water is the most dense : solid, liquid or vapour?
- How does water cycle help in maintaining global climate?
- Why is sea water not fit for drinking?
- What is the cause of drought?
- Define fog?
- Explain transpiration.
- Name the two sources of natural water.
- You might have noticed that rains do not occur even when clouds are there. Why does it happen?
- Water scarcity is a problem in our country. What are the ways in which we can conserve water?
- Why is the rain water not salty?
- How does water cycle help us?
- Take out a bottle of cold water or soft drink can from your freezer and leave it for some time. There will be a puddle of water around its bottom. Why does it happen?
- Why do you feel cool when wind blows on your body when you are sweating?
- Is the water table or the level of ground water the same every where? If not, why? Do you have to dig very deep if you want water on top of a mountain that has forests in it?
- Why is water cycle necessary for existence of life on earth.
- Excess flood causes damage. How does it cause damage?



23. During monsoon, what is the best way to dry your school uniform faster?
24. Is drying of clothes faster or slower during rainy season? Explain.
25. Name the states of water.
26. How much water is present approximately in the following?
  - (a) Human body                      (b) Watermelon
  - (c) Green vegetables              (d) Tomatoes
  - (e) Grapes                              (f) Oranges
  - (g) Chicken                            (h) Milk
27. How much water is available for human consumption on the surface of earth?
28. Name two methods of water purification.
29. What is the advantage of using earthen pots in rural areas?
30. What is meant by drip irrigation?
31. What is meant by water logging?
12. Why we use water as coolant in the radiator of engines?
13. How can we conserve water?
14. How are clouds formed?
15. Explain the water cycle.
16. Describe water cycle with the help of labelled diagram.
17. What is meant by water table?
18. If precipitation occurs in solid form, it is known by which name?
19. Which calamity occurs if there is no or less rainfall in an area?
20. How clouds are non-saline even though maximum evaporation is from sea that is saline?
21. When we iron wet clothes, the steam rises, why?
22. What is the major objective of rain water harvesting?
23. Why evaporation process is faster in the sunlight than in shade?
24. Name gaseous form of the water.

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. Describe the formation of rain.
2. Write the three ways by which water evaporates.
3. In arctic region, when ice is formed in oceans, how do aquatic animals survive there?
4. Is oxygen soluble in water? How is it important?
5. How does hail occur during precipitation?
6. Why is water essential for plants?
7. How is marine life dependent on oceans?
8. How do fish and aquatic plants survive in water?
9. How the lakes and ponds are formed?
10. Why do wet clothes dry up quickly in sunlight as compared to shades?
11. Which liquid is known as universal solvent and why?

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. Write different uses of water.
2.
  - (i) What is rain water harvesting system? Explain.
  - (ii) Name the major source of water on earth.
  - (iii) Write the percentage of water present in human body.
3. Water is one of our most precious commodities and no life can survive without it. It has been predicted that water scarcity will become the subject of "Wars" in the near future. Write any two ways in which water is getting polluted. Write any two methods to stop water pollution at your level.

# 2

# EXERCISE

### Text Book Questions

1. Fill up the blanks in the following:
  - (a) The process of changing of water into its vapour is called .....
  - (b) The process of changing water vapour into water is called .....
  - (c) No rainfall for a year or more may lead to ..... in that region.
  - (d) Excessive rains may cause .....
2. State for each of the following whether it is due to evaporation or condensation:
  - (a) Water drops appear on the outer surface of a glass containing cold water.

- (b) Steam rising from wet clothes while they are ironed.
  - (c) Fog appearing on a cold winter morning.
  - (d) Blackboard dries up after wiping it.
  - (e) Steam rising from a hot girdle when water is sprinkled on it.
3. Which of the following statements are "true" ?
- (a) Water vapour is present in air only during the monsoon. ( )
  - (b) Water evaporates into air from oceans, rivers and lakes but not from the soil. ( )
  - (c) The process of water changing into its vapour, is called evaporation. ( )
  - (d) The evaporation of water takes place only in sunlight. ( )
  - (e) Water vapour condenses to form tiny droplets of water in the upper layers of air where it is cooler. ( )
4. Suppose you want to dry your school uniform quickly. Would spreading it near an anghiti or heater help? If yes, how?
5. Take out a cooled bottle of water from refrigerator and keep it on a table. After some time you notice a puddle of water around it. Why?
6. To clean their spectacles, people often breathe out on glasses to make them wet. Explain why the glasses become wet.
7. How are clouds formed?
8. When does a drought occur?

### NCERT Exemplar Questions

1. Most of the water that falls on the land as rain and snow, sooner or later goes back to a sea or an ocean. Explain how it happens.
2. Dissolve two spoons of common salt in half a cup of water. Now if you want to get the salt back, what will you do?
3. Explain the process of rooftop rainwater harvesting with the help of a suitable diagram.
4. Look at Fig.



Write down activities shown in this figure in which water is being used.

5. Write any two activities which require more than a bucket of water
6. Write any two activities which require less than one bucket of water.
7. Why do wet clothes placed on a clothes line get dry after some time? Explain.
8. Water kept in sunlight gets heat from sun and is evaporated. But how does water kept under the shade of a tree also gets evaporated? Explain.
9. How do the areas covered with concrete affect the availability of ground water?
10. Why is there a need for conserving water? Give two reasons.
11. Fill in the blanks selecting words from the following list snow, rain, clouds, vapour, evaporation, transpiration. Water, as ..... goes into atmosphere by the processes of ..... and ..... and forms ....., which on condensation fall in the form of ..... and .....
12. Most of the water that falls on the land as rain and snow, sooner or later goes back to a sea or an ocean. Explain how it happens?
13. How sea water reaches a lake or pond?
14. Dissolve two spoons of common salt in half a cup of water. Now if you want to get the salt back, what will you do?
15. Explain the process of rooftop rain water harvesting with the help of a suitable diagram.

### HOTS Questions

1. What is meant by conservation of water? Suggest three methods to conserve water.
2. What is rainwater harvesting? Describe the method of rainwater harvesting.

## 3

## EXERCISE

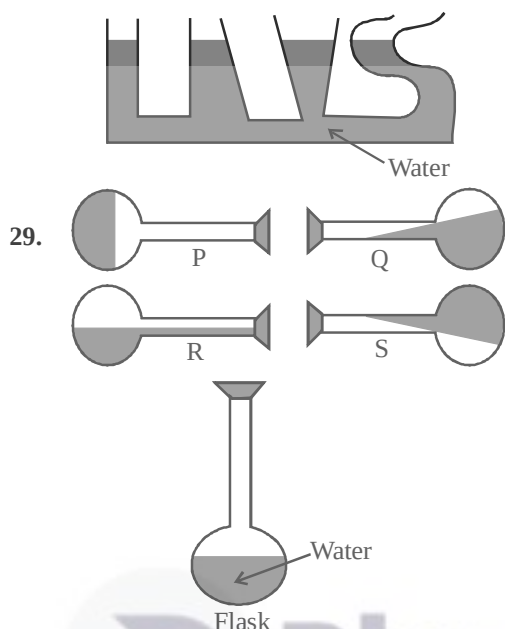
## Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

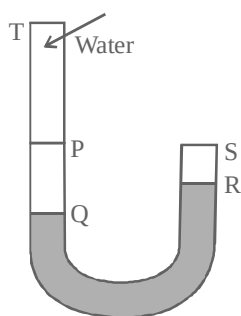
- Which of the following emits light energy?
  - Cricket
  - Glow worm
  - Bat
  - Rat
- Light shows:
  - rectilinear propagation
  - random propagation
  - curvilinear propagation
  - none
- Translucent objects:
  - allow light to pass through them
  - radiates light
  - absorb most of the light and allow a partial amount to pass through them.
  - does not allow light to pass through.
- We see moon because:
  - it emits light.
  - it absorbs sunlight.
  - it reflects sunlight
  - it is a luminous source.
- Metals are shiny because of:
  - reflection of light.
  - rectilinear propagation of light.
  - absorption of light.
  - radiation of light.
- Increase in the size of the hole in a pin hole camera will result in a:
  - sharp image
  - blurred image
  - erect image
  - multiple image
- Umbra and penumbra are clearly visible when:
  - the source of light is small and the object (opaque) is big.
  - the source of light is big and the object (opaque) is small.
  - both source of light and the object are big and placed far apart.
  - both source of light and the object are small and placed nearer to each other.
- Penumbra is seen:
  - inside the umbra
  - outside the umbra
  - away from the umbra
  - none of the above
- Some times, when we pass under a tree covered with large number of leaves, we notice small patches of sunlight under it. These circular images are images of:
  - tree
  - leaves
  - sun
  - none of the above
- You cannot see a burning candle by using a bent pipe. This is because:
 
  - light gets bent along the pipe.
  - light travels in straight line.
  - light gets reflected.
  - light gets absorbed.
- If there are no rains at a place for a long time it results in
  - floods
  - drought
  - either floods or drought
  - None of these
- The basic idea behind rain water harvesting is
  - to harvest water
  - to harvest crops
  - to catch water where it falls
  - All of the above
- Which of the following is an example of reuse of water to prevent its wastage?
  - By reusing the water from washing clothes to cook
  - By discharging factory waste in rivers and canals

- (c) By discharging sewage and waste materials into oceans  
(d) By reusing the water from washing clothes to wash floor
14. Water cycle can be represented as
- ```

      Ocean water  —A→  Water vapour
            ↑          ↓
          D          B
            ↓          ↓
      Rain ←—C— Clouds
  
```
- The process that occurs in step 'A' is called  
(a) Evaporation (b) Transpiration  
(c) Condensation (d) None of these
15. In water cycle the process that takes place before rains is called  
(a) Evaporation (b) Condensation  
(c) Precipitation (d) Melting
16. Water vapours enter the air (or atmosphere) by which of the following processes?  
(a) Evaporation of ocean water  
(b) Transpiration occurring in plants  
(c) By evaporation of sweat of animals  
(d) All of the above
17. If various steps of water cycle are marked as below:  
A for rains  
B for evaporation of water  
C for water in rivers and lakes  
D for cloud formation  
If we take B as the first step in water cycle then the correct arrangement of letters A, B, C and D to correctly represent the water cycle will be  
(a) B, D, A, C (b) B, A, C, D  
(c) B, C, D, A (d) B, D, C, A
18. In water cycle we studied that water enters in air by some processes. If we say that water vapours that enter the air by process 'A' and by 'B', gets converted into water droplets which of the following correctly identifies 'A' and 'B'?  
(a) A = evaporation  
B = process of change of water vapours into liquid  
(b) A = The process involved in the disappearance of water from plate kept in sunlight  
B = The process by which a wheat plant loses water to the atmosphere  
(c) A = The process by which forest plants lose water to the atmosphere  
B = The process involved in the conversion of water vapours to liquid water  
(d) (a) and (c) are correct
19. Select the process that plays an important role in bringing water back to earth.  
(a) Evaporation (b) Condensation  
(c) Transpiration (d) None of these
20. Which of the following is not a form of precipitation?  
(a) Hailstorm (b) Snow  
(c) Rain (d) None of these
21. Hardness of water is due to presence of  
(a) salts of calcium  
(b) salts of magnesium  
(c) Both (a) and (b)  
(d) None of these
22. Which natural disaster causes famine?  
(a) Flood (b) Earthquake  
(c) Drought (d) All of these
23. Aquatic plants take in oxygen from  
(a) air in the atmosphere  
(b) dissolved air in water  
(c) do not need oxygen  
(d) None of these
24. What percentage of water is readily available to us?  
(a) 3% (b) 97%  
(c) 60% (d) 40%
25. We cannot use seawater because  
(a) sea water is salty  
(b) sea water is polluted  
(c) of high cost  
(d) sea water cannot be transported
26. Water table refers to  
(a) level of surface water  
(b) level of sea water  
(c) level of groundwater  
(d) None of these
27. What is the source for ground water?  
(a) Subsoil water  
(b) condensation of air trapped in soil  
(c) Rain water  
(d) All of the above
28. What do you conclude from the figure shown here?  
(a) Water takes shape of its container.  
(b) Water level always tends to remain horizontal.  
(c) Water has no definite shape.  
(d) All of the above



30. Rajesh started pouring water into the 'U' tube shown in the figure. What will be the maximum water level?



- (a) TS (b) PS  
(c) TR (d) PR
31. The process of changing ice into water is known as:  
(a) freezing (b) melting  
(c) boiling (d) vapourization
32. Boiling water consists of:  
(a) hot air (b) hot steam  
(c) bubbles (d) vapour
33. Which of the following gases are found dissolved in water?  
(a) Oxygen (b) Carbon dioxide  
(c) A and B (d) Air
34. Where will you find saline water?  
(a) Wells (b) Ponds  
(c) Rain water (d) Sea
35. Read the following statements carefully and answer the questions?  
(i) Water expands when cooled to become ice.  
(ii) Water vapour is present in air.  
(iii) Melting and freezing take place at  $0^{\circ}\text{C}$ .  
(a) Statement I is true, but II and III are false.  
(b) Statement II is true, but I and III are false.  
(c) Statement I, II and III are true.  
(d) Statement III is true, I and II are false.
36. Which of the following statement is NOT correct?  
(a) Melting and freezing takes place at  $100^{\circ}\text{C}$  and  $0^{\circ}\text{C}$  respectively.  
(b) Steam is hot water vapour.  
(c) When water vapour is cooled, it condenses and becomes a liquid.  
(d) Both evaporation and condensation can take place at different temperature.
37. Sunny put a pot of water to boil. When the water boils, there will be a change in its:  
1. Temperature 2. State 3. Colour  
(a) 1 only (b) 1 and 2 only  
(c) 2 and 3 only (d) 1, 2 and 3
38. A change in ..... causes a change in the state of water:  
(a) volume (b) mass  
(c) temperature (d) shape
39. Water absorbed by the earth's surface and made available underneath is known as:  
(a) water table (b) saline water  
(c) stream (d) ground water
40. Clouds are formed due to:  
(a) evaporation  
(b) condensation  
(c) both evaporation and condensation  
(d) vapourisation
41. Soil erosion takes place due to:  
(a) floods (b) drought  
(c) transpiration (d) all of the above

### More than One option Correct

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b) (c) and (d) out of which ONE OR MORE may be correct.

- Which of the following are the properties of a plane mirror image?
  - The image is the same size as the object.
  - The image is virtual.
  - The image is laterally inverted.
  - The image real.
- Shadow moves on screen with:
  - when the source moves parallel to the screen
  - when the object moves parallel to the screen
  - change in colour of source of light
  - all of the above
- An opaque object forms a shadow when placed in light because:
  - light gets reflected
  - opaque object do not allow light to pass through it
  - light travels in a straight line
  - light produces umbra and penumbra
- Which of the following are NOT true?
  - A pin hole camera can take pictures of moving objects.
  - A ray of light which bounces off the surface of a mirror is called a reflected ray.
  - The image formed on the screen of a pin hole camera is not inverted.
  - A region of total darkness is called umbra.

### Multiple Matching Questions

**DIRECTIONS :** Following questions has four statements (A, B, C and D) given in column I and five or six statements (p, q, r, s) in column II. Any given statement in column I can have correct matching with one or more statement(s) given in column II. Match the entries in column I with entries in column II.

| 1. | Column I          | Column II                                      |
|----|-------------------|------------------------------------------------|
|    | (A) Drought       | (p) Rivers                                     |
|    | (B) Surface water | (q) Absence of rain for long time              |
|    | (C) Floods        | (r) Lakes                                      |
|    | (D) Water cycle   | (s) Excess rains                               |
|    |                   | (t) Circulation of water between ocean to land |

### Passage Based Questions

**DIRECTIONS :** Study the given paragraph(s) and answer the following questions.

#### Passage I

Apart from drinking, there are so many activities for which we use water. Most of the water is in oceans and seas. We draw drinking water from taps which is further drawn from a well or a lake etc.

- We need water for which of the following?
  - Baking
  - Brushing
  - Cooking
  - All of these
- We need water for
  - industries
  - producing many things
  - Both the above
  - None of these
- Choose the correct option?
  - All of us (i.e., Indians) get drinking water from taps.
  - The water that we get from taps is also drawn from a lake, or a river or a well.
  - Both the above
  - None of these

#### Passage II

If we put some water in a plate and allow the plate to lie in open in sunlight we find that the water from the plate disappears. Moreover even if we keep the plate in shade the water still disappears.

- The process by which the water disappears from the plate is
  - Evaporation
  - Condensation
  - Transpiration
  - Precipitation
- The process of disappearance of water from the plate occurs
  - rapidly in sunlight
  - rapidly in shade
  - with same speed in day and night
  - occurs only in day time
- If we take sea water in plate and allow it to stand in sunlight till whole of the water disappears, we find that
  - nothing is left in the plate



- (b) some solid is left behind
- (c) some liquid is left behind
- (d) None of the above is correct

### Passage III

Only a small fraction of water available on the earth is fit for use of plants, animals and humans. The total amount of water on earth remains the same, but the water available for use is very limited and is decreasing with over usage.

7. Why is the demand for water increasing day by day?
  - (a) The quantity of water used per person is increasing day by day
  - (b) The number of persons using water is increasing
  - (c) More and more water is being used by industries
  - (d) Only (b) and (c) are correct
8. We have a lot of water in oceans, then how is it said that the amount of usable water is limited?
  - (a) Sea water is not fit for all our uses
  - (b) Sea water can not be used directly by us for drinking
  - (c) Sea water can not be used directly for plant production
  - (d) All of the above
9. How is it that total amount of water on earth remains same though it is consumed by us for various activities on a large scale?
  - (a) Because of water cycle
  - (b) Because of transpiration
  - (c) Because of condensation
  - (d) Because of water harvesting

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

1. **Assertion (A)** : The sea water is saline.  
**Reason (R)** : The sea water contains many dissolved salts.
2. **Assertion (A)** : Role of oceans in supplying usable water is quite important.  
**Reason (R)** : When the sea water reaches us, in various other forms of sources of water, it is no more saline.
3. **Assertion (A)** : Sea water changes to water vapours by the process of transpiration in the presence of sunlight.  
**Reason (R)** : When sea water changes into water vapour it leaves the dissolved salts behind.
4. **Assertion (A)** : In such areas where there is no vegetation the rain water flows quickly and has no effect on the top layer of soil of that area.  
**Reason (R)** : When water level rises in rivers, ponds, etc. Due to excessive rains it causes floods.
5. **Assertion (A)** : During drought there is a shortage of food and fodder.  
**Reason (R)** : Droughts result in conservation of water.
6. **Assertion A** : Level of ground water below the surface of earth at a given place is known as water table.  
**Reason R** : Excess use of groundwater in cities is resulting in lowering of water table.

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Your answers to these items using codes given below.

### Integer Type Questions

**DIRECTIONS :** Following are integer based/Numeric based questions. Each question, when worked out will result in one integer or numeric value.

1. Some resources are given below. Identify how many are the sources of water?  
Trees, Fog, Seas, Cereals, Rubber, Lakes, Oceans, Rivers, Coal, Springs.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- calamity, less/no
- Flood, natural, excess
- Snow, rain
- thermal, hydro
- crops, domestic life.
- photosynthesis
- saline
- water table
- cold air, condensation
- evaporation
- transpiration
- condensation
- rain water harvesting
- pollutants
- Rain

### True/False

- |         |           |          |          |
|---------|-----------|----------|----------|
| 1. True | 2. True   | 3. False | 4. False |
| 5. True | 6. True   | 7. True  | 8. False |
| 9. True | 10. False |          |          |

### Match the Column

- |        |        |        |        |
|--------|--------|--------|--------|
| 1. (b) | 2. (c) | 3. (d) | 4. (d) |
| 5. (b) | 6. (c) | 7. (d) |        |

### Very Short Answer Type Questions

- In all three states, i.e., solid, liquid and vapour.
- H<sub>2</sub>O.
- It has many salts dissolved in it, that's why it is saline.
- Evaporation.
- When temperature gets down, vapour condenses to form water.
- By desalinization, we can use saline water so as to get drinking water from sea.
- Liquid form of water has the highest density.
- Water cycle plays an important role in the global climate,

- Water cycle maintains the temperature on land.
- Water cycle regulates the ground water level.
- Sea water contains large amount of salt in dissolved state. Hence, it is not fit for drinking.
- When rainfall does not happen for more than a year in a region, then that region faces deficiency of water, which is known as drought.
- Fog is a form of condensed water vapours on dust particles in air and it occurs near the surface of the earth during winter season.
- Plants lose their excess water through their pores of leaves, in the vapour form. This process is called transpiration.
- The two sources of natural water are :  
(i) River water (ii) Lake water
- No formation of water droplets
- Water harvesting, afforestation, soil erosion
- Pure form
- Balancing water vapour
- Moisture present in air
- Evaporation leads to cooling
- Same everywhere
- Maintains ecological balance
- Uprooting of trees, death
- Hot press
- Slower because of less availability of sunlight, i.e., low temperature
- Solids, Liquids, Gases
- (a) 75% (b) 90% (c) 55–60% (d) 90% (e) 90% (f) 90% (g) 75% (h) 95%
- 3%
- Chlorination, Distillation
- Cool water
- Water availability to the roots of plants
- Accumulation of water

### Short Answer Type Questions

- When the small droplets meet, they join to form heavier droplets. After some time their size gets so large that it break and start falling down

- towards earth. This is called precipitation. If water is in the liquid form, then it is called rain.
2. Water evaporates from sea, lakes and other water surface. Water also evaporates from wet lands, clothes, etc. Water also evaporates from plant as transpiration.
  3. Only surface water freezes as ice, but below the frozen surface, temperature does not fall below  $4^{\circ}\text{C}$ . This temperature is optimum for the survival of aquatic animals in arctic region.
  4. Yes, oxygen is soluble in water. It is the source of oxygen which is important for aquatic habitats.
  5. When water reaches earth in the frozen form, it is called hail.
  6. Water is the medium by which plant sucks all necessary minerals from soil, takes food to various parts and absorbs oxygen. Water is also necessary for photosynthesis.
  7. For marine life, ocean is most important and vital. It provides them habitat and is the source of oxygen. Without oxygen they won't be able to breathe, move and will die.
  8. Oxygen is slightly soluble in water. Fish and aquatic plants need oxygen to survive and they inhale this dissolved oxygen for their survival.
  9. Lakes and ponds are formed by the collection of rain water in low lying areas and leakage from the ground water reserves also adds water to it.
  10. Wet clothes dry up due to the evaporation of water. Rise in temperature of the surrounding increases the rate of evaporation and the temperature in sunlight is generally greater than that in shades.
  11. Water is known as universal solvent because it dissolves most of the salts and substances in it.
  12. Engines release large amount of heat. This heat gets consumed in the conversion of water (present in radiator) into water vapours, therefore engine parts are not heat up.
  13. We can conserve water by following ways :
    - (1) Do not waste water and repair all the water leaking taps.
    - (2) Do not use drinking water in garden or in cleaning.
    - (3) Do not throw any waste in ponds or rivers to prevent its pollution.
  14. The water vapours that go into air, rise up along with air. As the air moves up, water vapours get cooler and cooler. At sufficient heights, air becomes so cool that the water vapours present in it condense into tiny droplets of water. When these water droplets come closer, they combine to form slightly bigger droplets. In this way, their size becomes larger. Once the size of these droplets becomes large, then they collectively appear to us as clouds.
  15. Water from the oceans and surface of the earth goes into air as vapours and returns as rain, hail or snow and finally goes back to the oceans. The circulation of water in this manner is known as water cycle. This circulation of water between ocean and land is a continuous process. It maintains the supply of water on land.
  - 16.
  17. The level below the ground upto which all the pore space is filled with water is called water table. It is known as hail storm.
  18. Draught.
  19. It is only pure water that evaporates from sea and salt remains in sea. Thus, clouds are non-saline.
  20. Because heat water evaporates.
  21. Rain water harvesting is done to utilize rain water to recharge the ground water and to use it during scarce condition.
  22. During sunlight, heat is more hence evaporation is more.
  23. Steam or water vapour.

### Long Answer Type Questions

1. Water is used :
  - (i) for drinking and cooking.
  - (ii) for bathing and cleaning.
  - (iii) in agriculture, to produce food.
  - (iv) in industries, to perform different activities.
  - (v) for generating electricity.
2. (i) Rain water harvesting is a technique in which rain water is collected from the rooftop to a storage tank. Then this water is allowed to seep into a pit in the ground.

Finally, it seeps into the soil to recharge or refill ground water.

- (ii) Sea water.
- (iii) 70% of water is present in human body.
- 3. (i) By industrial waste.
- (ii) By human activities.

#### Measures to stop water pollution :

- (i) By not throwing waste materials and garbage into water.
- (ii) By sensitizing people about harmful effects of water pollution.

**Associated Value :** We should discourage any activity in our life that may cause water pollution.

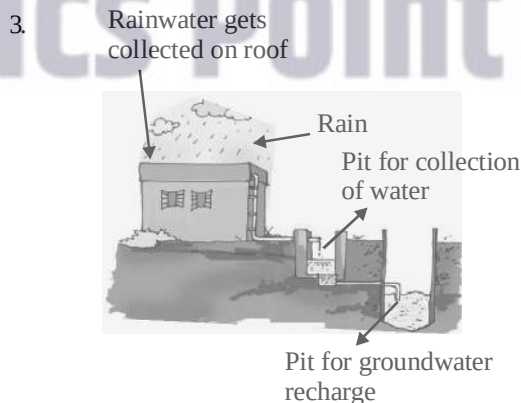
## 2 EXERCISE

### Text Book Questions

1. (a) The process of changing of water into its vapour is called **evaporation**.
- (b) The process of changing water vapour into water is called **condensation**.
- (c) No rainfall for a year or more may lead to **drought** in that region.
- (d) Excessive rains may cause **floods**.
2. (a) Condensation (b) Evaporation
- (c) Condensation (d) Evaporation
- (e) Evaporation
3. (a) Not true (b) Not true
- (c) True (d) Not true
- (e) True
4. Yes, spreading it near an anghiti or heater will surely help as heater and anghiti are source of heat which vaporize the water of the wet clothes and thus help in drying.
5. The puddle of water seen around the cooled bottle of water is due to the condensation effect as the water vapour present in the air around the bottle get condensed after colliding with bottle.
6. Water vapour also gets released during exhalation process along with carbon dioxide. These water vapour gets attached with the glasses of the spectacles and then condensed in the presence of air surrounding it and thus making it wet.
7. When the air moves up, it gets cooler and cooler and after reaching sufficient heights, the air becomes so cool that the water vapour present in it condenses to form tiny drops of water called droplets which remain floating in air and thus clouds are formed.
8. Drought occurs when an area does not receive rainfall for a period of year or more. Also, the soil continues to lose water by evaporation and transpiration and becomes dry and the ground water may also become scarce which may lead to drought.

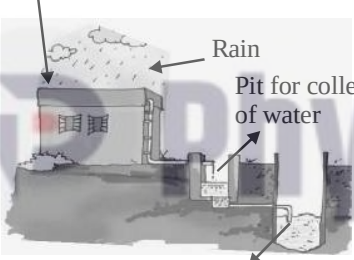
### NCERT Exemplar Questions

1. Snow in the mountains melts into water. This water flows down the mountains in the form of streams and rivers. Some of the water that falls on land as rain, also flows in the form of rivers and streams. Most of the rivers cover long distances on land and ultimately fall into a sea or an ocean.
2. Water can be removed from the salt solution by heating it on a stove or keeping it in the sun in a plate for few hours. The water will be evaporated leaving behind the salt.



4. (i) Bathing
- (ii) Washing clothes
5. (i) Washing 10 clothes
- (ii) Irrigating a crop field
6. (i) Brushing your teeth
- (ii) Washing a handkerchief
7. Water present in wet clothes is converted into water vapour due to evaporation and leaves them dry.
8. Air around us gets heated from sunlight. This warm air provides heat for evaporation of water kept in the shade.
9. Areas covered with concrete reduce the seepage

- of rain water into the ground and this reduces the availability of ground water.
10. (i) Increasing population need more water.  
(ii) Availability of water is decreasing day-by-day.
  11. vapour, evaporation, transpiration, clouds, snow, rain.
  12. Snow/Rain → Streams/ Rivers → Sea/Ocean.
  13. Evaporation of water from sea, which form clouds in the sky. These clouds form rain. Rain water flows into lake or pond.
  14. Water may be removed from the salt solution by heating it on a stove or keeping it in the sun in a plate for few hours.

15. 

Rainwater gets collected on roof

Rain

Pit for collection of water

Pit for groundwater recharge

- (ii) Another method, a big pit is dug near house for collecting rainwater. This pit is filled with different layers of bricks, coarse gravels and sand or granite pieces.

### 3 EXERCISE

#### Multiple Choice Questions

1. (b) 2. (a) 3. (c) 4. (c) 5. (a)
6. (b) 7. (d) 8. (b) 9. (c) 10. (b)
11. (b) 12. (c) 13. (d) 14. (a) 15. (b)
16. (d) 17. (a)

Evaporation of water(B) → Cloud formation(D)

↑ ↓  
(C) Water in river and lakes ← Rains (A)

18. (d) A = evaporation or transpiration, B = condensation
19. (b) Condensation plays an important role in bringing water back to earth.
20. (d) 21. (c) 22. (c) 23. (b) 24. (a)
25. (a) 26. (c) 27. (c) 28. (d) 29. (c)
30. (b) 31. (b) 32. (b) 33. (c) 34. (d)
35. (c) 36. (a) 37. (b) 38. (c) 39. (d)
40. (c) 41. (a)

#### More than One option Correct

1. (a, b, c) 2. (a, b) 3. (b, c) 4. (a, c)

#### Multiple Matching Questions

1. (b) A → (q); B → (p), (r); C → (s); D → (t)

#### Passage Based Questions

1. (d) 2. (c)
3. (b) Some of us get drinking water from other sources such as wells, lakes, etc.
4. (a)
5. (a) It occurs slowly in shade and rapidly in presence of sunlight.
6. (b) The salts dissolved in sea water are left as solid residue.
7. (d) 8. (d) 9. (a)

#### Assertion/Reason

1. (a) 2. (b)
3. (d) A is false, R is true.  
[It occurs by process of evaporation.]
4. (d) 5. (c) 6. (b)

#### Integer Type Questions

1. (5) Seas, Lakes, Oceans, Rivers and Springs.

#### HOTS Questions

1. Careful and economical use of water and avoiding its wastage is called conservation of water. Suggestions for conserving water.  
(i) Use only the required quantity of water.  
(ii) Trees and forests help in causing rainfall. So to conserve water, we should plant more trees.  
(iii) By collecting rainwater in tanks, ponds or by constructing dams.
2. Rainwater harvesting is the collection of rainwater and storing for future use. In this system rainwater is collected from the rooftops by means of pipes into storage tank for later use.

#### Methods of rainwater harvesting:

- (i) Rooftop rainwater harvesting. In this system, the rainwater from the rooftop is collected in a storage tank, through pipes.

# Chapter 15

## AIR AROUND US

### INTRODUCTION

Air is also an important natural resource. Air is present everywhere, in water, around us, in soil and within plants and animals. Life on Earth is not possible without air. Air cannot be seen but it can be felt. When air blows hard, leaves and branches start moving. This movement signifies presence of air. Strong moving air is called wind and strong winds cause storms.

**Presence of Air :** We can feel air when we switch on a fan. We feel the cool breeze (air).

**Atmosphere :** The thin layer of air surrounding the Earth is called the atmosphere. All plants and animals need air to breathe.



**Air Balloons**

#### Properties of air

- Air occupies space.
- Air exerts pressure.
- Air cannot be seen but it can be experienced.

The atmosphere extends upto 1000 km above the surface of Earth. However this air gets thinner and thinner as we go up. That is why mountaineers have to carry their own oxygen supply in oxygen cylinders. Ninety nine percent of air is found up to a height of 30 km above the surface of Earth.

**NOTE:** Presence of water vapours in air is important for water cycle.

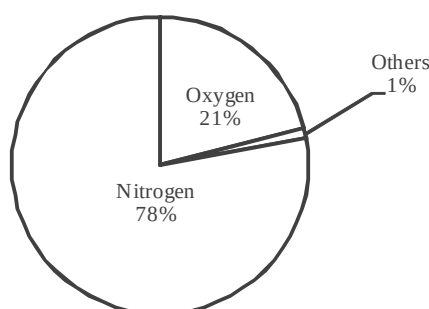


### Composition of air

Air is a mixture of gases, water vapour and dust particles. Lavoisier was the first scientist to prove that air is a mixture of gases and not a compound.

He found that

- (1) Air is a mixture of gases. Oxygen is the active part of air and make up about one fifth of air by volume.
  - (2) When certain substances are burnt in air, they combine with oxygen.
- So air is a mixture and not a compound.



Composition of dry air. Dry air is without water vapour.

|    | Gas                                          | Percentage by volume |
|----|----------------------------------------------|----------------------|
| 1. | Nitrogen                                     | 78.09                |
| 2. | Oxygen                                       | 20.95                |
| 3. | Rare gases (including 0.93% argon and 0.018% | 01.00                |
| 4. | Carbon dioxide                               | 0.02 to 0.04         |
| 5. | Impurities                                   | Variable             |

**NOTE:** You are advised to breathe through nose and not through mouth.

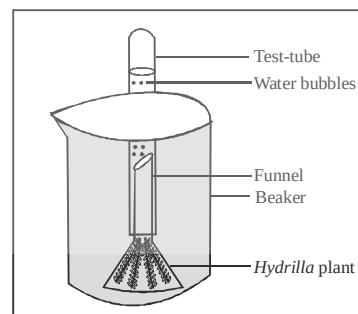
**Interesting Fact :** Until the 18th century, people thought that air is a single substance. In 1774, Joseph Priestley showed that part of air has oxygen. This proved that air is a mixture and not a single substance. The combustion of petrol releases poisonous gases like carbon monoxide, nitrogen dioxide, nitrogen monoxide, lead, dust, etc. which mixes with air and pollute it. Impurities from factories like sulphur dioxide, dust and smoke get mixed up with air.

### Constituents of air

- (a) **Nitrogen :** Air contains 78% of nitrogen. It occupies about 4/5th of volume of dry air. Nitrogen is inert gas but it is needed by plants and animals for making amino acids.
- (b) **Oxygen :** Air contains about 21% oxygen.

### To show that plants produce oxygen during photosynthesis

Take a beaker half filled with water and place a water plant (say, *Hydrilla*) in the beaker. Invert a glass funnel and place it over the plant and cover the open end of the funnel with a test tube. (Before doing so, fill the test tube with water and cover its opening with your thumb. Then, invert the tube into the funnel.) Place the beaker in sunlight and



Experiment shows that plants produce oxygen

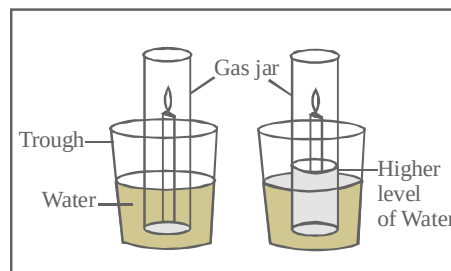
observe. You will notice bubbles of gas escaping from the leaves of the plant and filling the test tube. Introduce a glowing splint near the mouth of the test tube. It continues to glow, proving the presence of oxygen gas in the air.

**Conclusion:**

Plants produce oxygen during the process of photosynthesis and liberate it into the atmosphere.

**To show oxygen is used in burning**

Fix a candle in the centre of a trough. Fill the trough with water more than half. Light the candle. Place a gas jar over the burning candle upside down as shown in the figure alongside. Observe and say what is happening? Does burning candle burns continuously or gets extinguished? It extinguishes after a while and at the same time, the level of water in the gas jar rises. Can you explain why this happens? After putting the gas jar on the burning candle, the candle burns for while, because there is some oxygen in the air, which helps burning. When all oxygen is consumed in burning, the candle extinguishes.



Experiment shows that oxygen is required in burning

**Conclusion:** Oxygen helps in burning.

**Uses of oxygen**

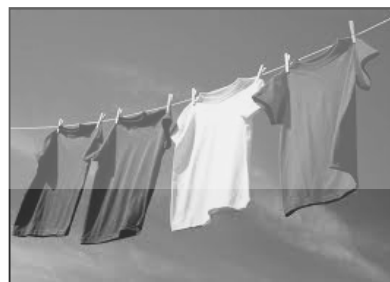
1. Oxygen is necessary for breathing and burning.
  2. It is needed in hospitals for artificial respiration.
  3. Mountaineers, sea divers and astronauts carry oxygen cylinders with them as supply of oxygen decreases as we go up.
  4. Oxygen is needed by aquatic plants and animals.
  5. It is used for welding purposes and for cutting of metal at high temperatures.
  6. Liquid oxygen is needed in rockets for combustion of fuels.
- (c) **Carbon dioxide** : Carbon dioxide occupies a very small percentage of air but is very important for existence of all plant life. It occupies 0.02 - 0.04% of air by volume. It is released during
- (i) combustion of fuels like coal, diesel, petrol, etc.
  - (ii) the process of respiration.
  - (iii) decomposition of vegetable matter and fermentation.

**Uses of carbon dioxide**

1. It is used as a fire extinguisher since it is heavier than air and does not burn.
2. Solid carbon dioxide is called dry ice. It is used as a refrigerant.
3. It is used in preparation of aerated drinks like soda water.
4. Plants use carbon dioxide to prepare their own food by the process of photosynthesis. Oxygen is given out during the process.

- (d) **Water Vapour** : Air contains water vapour. We know this because when air comes in contact with a cool surface, water drops are seen. Water vapour is important for water cycle.

The clothes dry on clothesline. The water from wet clothes evaporates and form water vapour. This mixes with air. Amount of water vapour in air is called **humidity**.



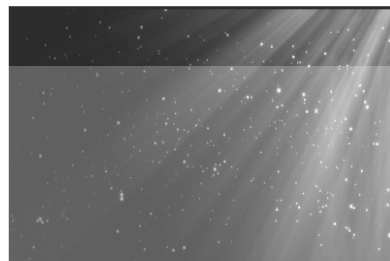
Air contains water vapour

- (e) **Dust and Smoke :** Dust particles can be seen in a beam of sunrays. These dust particles are present in air. Content of dust particles vary from time to time from place to place. When it rains, dust particles in the atmosphere settles down. That is why weather is clean after rainy season. Air also contains smoke released from factories and vehicles.

**Respiration :** It is process by which air rich in oxygen is breathed in by an organism and air rich in carbon dioxide is breathed out.



*The air that we breathe out is saturated with water. Through this we can lose about one third of a litre of water every day.*



Air contains dust particles

Air support life – All living things breathe in oxygen. Oxygen is needed to get energy from food. Living things on land breathe in oxygen present in air. The air that is taken in through nose enters the lungs. Here the oxygen is absorbed from the air and used by the body.

Living things that live under the soil breathe in air present in soil. If you put water on the soil you may see some bubbles of air. This is because air is trapped between soil particles which escape when water is added. Plants that live in water logged soil such as mangroves, have roots that grow out of the soil to get air.



Mangroves

### Activity

*To prove that the soil also entraps air (oxygen).*

Take a lump of dry soil in a beaker. Add some water to it. Do you observe bubbles start coming out from the soil. Yes, it is air entrapped in soil. Organisms living in burrows and holes formed in deep soil get this entrapped air.

But, when it rains heavily, these burrows and holes are filled with water, air is expelled. It becomes very difficult for these animals to remain there. So they come out of burrows and holes.

Some animals that live in water, e.g., whales come up to the surface to breathe in oxygen from air. Fish have organs called gills. They breathe in oxygen dissolved in water. When water enters the gills, oxygen dissolved in water is absorbed.

### Activity

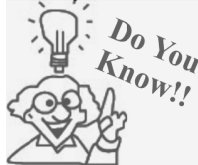
*How do fishes and other aquatic animals breathe in water?*

*Where from the aquatic animals get oxygen?*

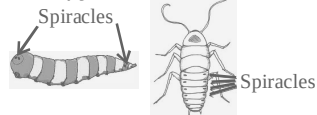
Have some water in a beaker. Heat it slowly on a tripod stand. After sometime, you can observe lot of bubbles at the bottom of the beaker, which start rising up and break up at the outer surface of water. Where do these bubbles come from? These bubbles are mainly of oxygen present in air which has been dissolved in water. Aquatic animals use this oxygen and survive.

Plants have small openings called stomata on the lower side of leaves through which air is taken in. Plants that float on water like water lily have stomata on the upper surface. Underwater plants like tape grass have no stomata. They breathe in oxygen dissolved in water through their body surface.

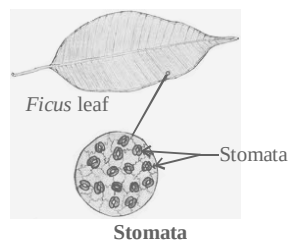
Amphibians like frog, newt and salamander need systems for breathing both in air and water. Crocodile and aligator swim with the snout above water surface to breathe easily through nostrils.



*Insects like cockroach and housefly take in oxygen through tiny holes in their body called spiracles.*

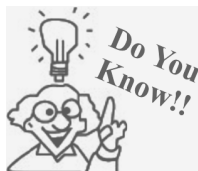


*Leaf has pores on both surfaces (called stomata) for exchange of gases.*



**Frog**

Frogs have lungs to breathe in air when they are on land. In water they breathe through moist skin.

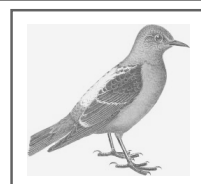


*Earthworms respire through their skin surface that is moist due to mucous.*

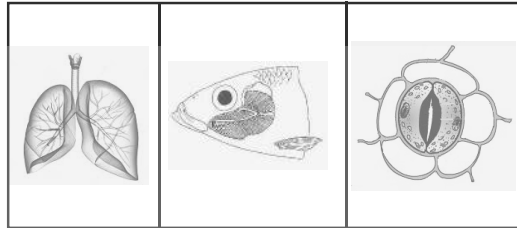


Birds have an efficient respiratory system. They need high levels of oxygen during flight. Their lungs have air sacs that remain open all the time. Mammals breathe with the help of lungs. They take in oxygen and give out carbon dioxide.

**NOTE:** Earthworms come out of soil during heavy rains.



**Bird**



Respiration in animals and plants

**Balance of oxygen :** The amount of oxygen in the atmosphere remains constant because of oxygen and carbon dioxide cycle that operate together in nature. All animals breathe out carbon dioxide. Plants take in carbon dioxide and exhale oxygen. Humans and other animals inhale oxygen. This process goes on forever. Plants and animals are interdependent on each other.

Some human activities however disturb this balance. Such activities include deforestation, use of fossil fuels, pollution, industries, etc.

#### Other uses of Air

1. Windmill runs with the help of air. It is used to generate electricity.
2. Gliders, parachutes, yachts and aircraft all need air to sail and fly.



Some uses of air



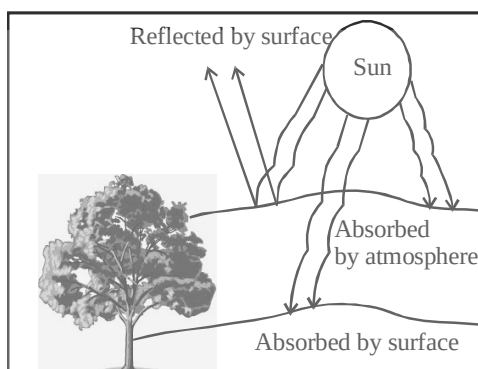
Windmill

3. Insects, birds and bats need air to fly.
4. Some fruits and seeds need air to disperse their seeds.
5. Air is needed for winnowing.
6. Tyres are filled with air to run vehicles.
7. Air helps in pollination of several flowers.

**Ozone :** There is another layer of gas called ozone in the upper atmosphere. It prevents harmful rays of the sun from reaching Earth. These are ultraviolet rays and may cause skin cancer and eye problems.

**Role of Atmosphere :** Atmosphere causes weather changes. When the sun shines brightly, it heats the Earth. The air also gets heated. Hot air rises and cold air pushes in to take its place. This is how wind blows. Blowing of storms and cyclones is also due to movement of air. The water vapour in the air is responsible for rainfall and snowfall. Thus the atmosphere is responsible for weather changes. The atmosphere helps to maintain the temperature of the Earth. The heat of the sun is partly absorbed by the atmosphere, and partly is reflected back. This prevents the Earth from becoming very hot during the day. At night the trapped heat prevents the Earth from cooling down too much. Thus the atmosphere acts as a blanket around the earth and helps to keep

the earth's surface at right temperature for life to exist.



**Air pollution :** Air is getting polluted day by day due to some human activities. Some major causes of contamination of air are

- (i) Burning of fossil fuels like coal, petroleum
- (ii) Smoke from vehicles
- (iii) Harmful gases from industries
- (iv) Burning of wood, plastic tyres
- (v) Deforestation



Due to poor quality of air, people find it difficult to breathe. It may cause diseases like asthma and lung cancer. It also affects plant life and crops.

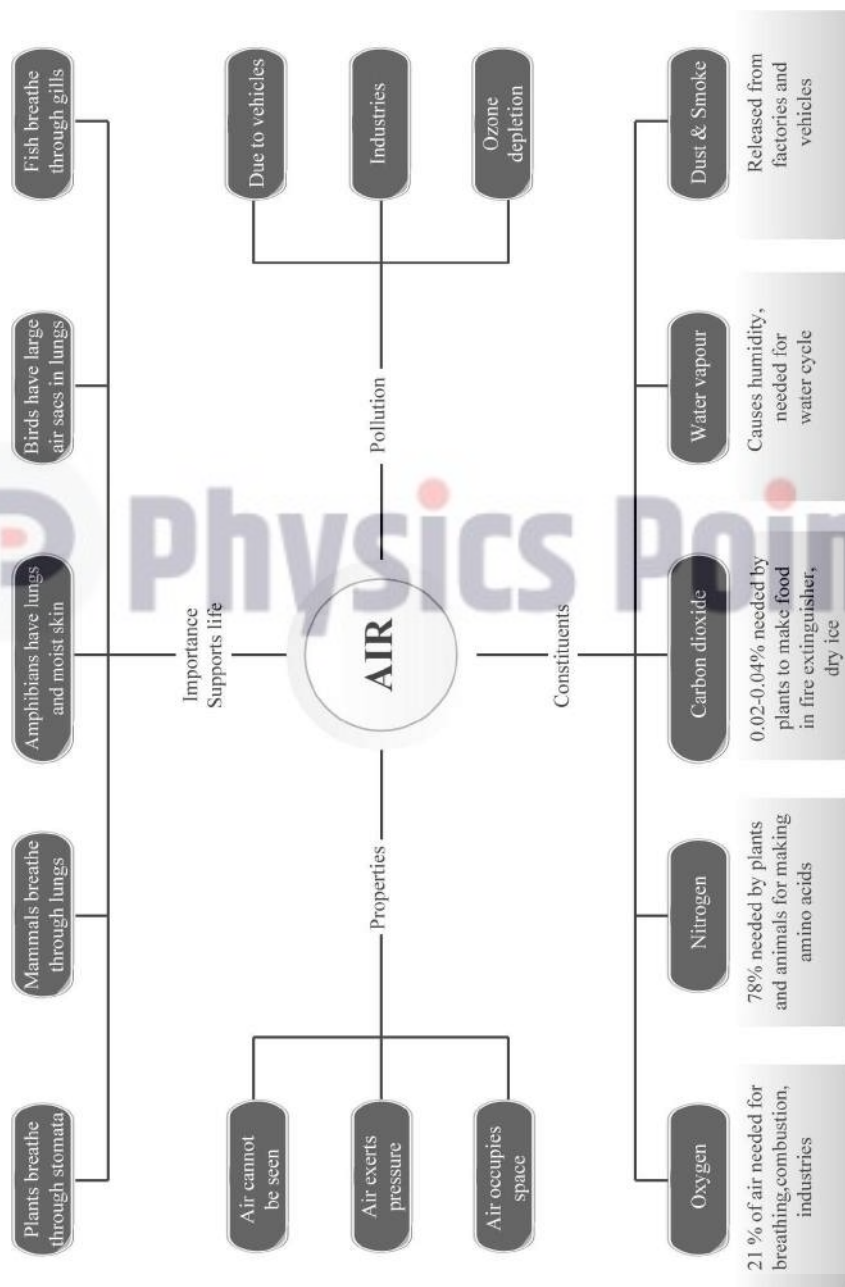
In order to protect our environment we should plant more trees, recycle plastics, avoid using fossil fuels, etc.

### KEYWORDS

- **Atmosphere :** It is the thick blanket of air surrounded the Earth's surface.
- **Gravity :** The pull of the earth on bodies.
- **Humidity :** Amount of water vapour present in air at any place and time.
- **Ozone :** A gas present in upper atmosphere that prevents us from harmful ultraviolet rays of the sun.



## Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- The earth is surrounded by a layer of air called the .....
- Air occupies ..... and has .....
- Air can exert pressure in ..... and ..... direction.
- The major constituents of air are .....
- During the process of photosynthesis, plants produce one of the constituents of air .....
- Dust and smoke cause ..... of air when present in excess.
- Aquatic animals breathe oxygen ..... in water.
- Oxygen ..... combustion.
- Air is not a pure substance; it is a .....
- The downward pressure exerted on the surface of earth by the surrounding layer of air is called .....
- Air is ..... and .....
- The layer of air around the earth upto few km is known as .....
- ..... is required for burning.
- ....., ..... and ..... are inert gases.
- Moving air is known as .....
- Nitrogen is ..... and oxygen is ..... in air.
- Air and dust particles mixture with dark coloured gases is known as .....
- Plant produces food and ..... during photosynthesis.
- ..... is used for aeration of drinks like Coca-cola.

- Soil organisms take air present in .....

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- Wind mills generate new energy.
- Only oxygen is required by plants to synthesise food.
- Mountaineers carry hydrogen gas cylinder.
- Hydrogen is major constituent of air.
- Plants do not consume oxygen.
- Air is transparent.
- For winnowing, moving air is more effective.
- Air occupies a fixed space.
- Oxygen is around 20.8% in air.
- Air is mixture of three gases only.
- Oxygen cycle is essential for replenishment of the oxygen used up by the living organism.
- A fish survives in the water because it can breathe the air dissolved in the water.
- Smoke causes pollution of air.
- Water vapour helps in formation of cloud.
- Air contains more nitrogen than oxygen.
- Carbon dioxide supports combustion.
- Ultraviolet rays from the sun cannot reach us because of the atmosphere.
- A balloon filled with air will move up because it has negligible or no weight.
- Although the earth is surrounded by air, there is no air pressure acting on the surface of earth.
- Air is a matter because it has volume and mass.

**Match the Column**

**DIRECTIONS :** Each questions contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column I have to be matched with statements (p, q, r, s, t) in column II.

1. 

| Column I                  | Column II                    |
|---------------------------|------------------------------|
| (A) Oxygen                | (p) 78%                      |
| (B) Carbon dioxide        | (q) varies from time to time |
| (C) Nitrogen              | (r) 21%                      |
| (D) Water vapour and dust | (s) 0.03%                    |
2. 

| Column I                     | Column II          |
|------------------------------|--------------------|
| (A) Supports burning         | (p) water vapour   |
| (B) Photosynthesis           | (q) nitrogen       |
| (C) Rain                     | (r) oxygen         |
| (D) Does not support burning | (s) carbon dioxide |
3. 

| Column I           | Column II               |
|--------------------|-------------------------|
| (A) Oxygen         | (p) respiration         |
| (B) Dust and smoke | (q) photosynthesis      |
| (C) Carbon dioxide | (r) factories, vehicles |
4. 

| Column I       | Column II                              |
|----------------|----------------------------------------|
| (A) Storm      | (p) thin envelope of air around Earth. |
| (B) Atmosphere | (q) cannot be seen but felt            |
| (C) Air        | (r) fast moving air                    |
5. 

| Column I                       | Column II          |
|--------------------------------|--------------------|
| (A) Thin blanket of air        | (p) occupies space |
| (B) Air                        | (q) carbon-dioxide |
| (C) gas causing global warming | (r) atmosphere     |
6. 

| Column I      | Column II                  |
|---------------|----------------------------|
| (A) Fish      | (p) air spaces in soil     |
| (B) Earthworm | (q) directly from air      |
| (C) Human     | (r) dissolved air in water |
7. 

| Column I         | Column II                 |
|------------------|---------------------------|
| (A) Windmill     | (p) direction of wind     |
| (B) Air          | (q) generates electricity |
| (C) Weather cock | (r) dispersal of seeds    |

8. 

| Column I               | Column II          |
|------------------------|--------------------|
| (A) Pollutant          | (p) oxygen         |
| (B) Essential for life | (q) Water vapour   |
| (C) Water cycle        | (r) carbon-dioxide |

**Very Short Answer Type Questions**

**DIRECTIONS :** Give answer in one word or one sentence.

1. Which is the most abundant gas in our atmosphere?
2. When we put blanket on fire, it extinguishes fire, why?
3. For which process does a plant require carbon dioxide?
4. What are the product of photosynthesis?
5. What is the frozen form of carbon dioxide?
6. In which process does a plant take in oxygen?
7. What is meant by inert gases?
8. Which component of air is used by green plants to make their food?
9. What is the shape of air?
10. Which gas in the atmosphere is essential for respiration?
11. What is wind?
12. What is atmosphere?
13. How is atmosphere important to us, animals, birds and plants? Explain separately.
14. How are plants and animals dependent on each other for survival on earth?
15. Are you aware of any planet or satellite where there is no atmosphere? What is the major difference in those planets and earth?
16. What happens to the air in an empty glass when you fill the glass with water?
17. During cyclone and storm, the wind causes heavy change. Can you think of a way to use this wind energy?
18. On a hot summer day we feel cool when we stand under a fan. Why is it so?
19. Why do we feel suffocated and uncomfortable in a busy road with lot of vehicle traffic?

20. Fill column B with the words given in the box below:

Water vapour  
Carbon dioxide

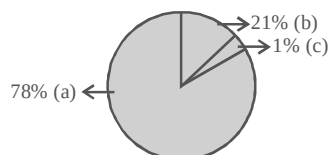
A

oxygen  
nitrogen

B

Supports burning  
Required by plants to make food  
Most abundant gas in the atmosphere

21. Mention the gases present in the atmosphere, seeing the diagram.



22. Mention three important properties of air.  
23. Why does a person feel uneasy while climbing high mountains?  
24. When does the amount of oxygen in air increases during day time or night time. Why?  
25. Among the constituents nitrogen, oxygen and carbon dioxide in the atmosphere which are used by animals and plants.

26. Write some modern appliances using air pressure.

### Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

- Mention two uses of air.
- How do aquatic animals take oxygen for respiration?
- List four activities that are possible due to the presence of air.
- What is the composition of air?
- Why do mountaineers carry oxygen cylinder with them?
- How can you say that both animals and plants are dependent on each other for their survival?
- Explain why is air considered a mixture.
- How can you verify that air occupies space?
- What is windmill? Write two uses of windmill.

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

- Air contains dust particles? Explain.
- Give an experiment to show that one-fifth of air is oxygen.

## 2

## EXERCISE

### Text Book Questions

- What is the composition of air?
- Which gas in the atmosphere is essential for respiration?
- How will you prove that air supports burning?
- How will you show that air is dissolved in water?
- Why does a lump of cotton wool shrink in water?
- The layer of air around the earth is known as .....
- The component of air used by green plants to make their food, is .....
- List five activities that are possible due to the presence of air.
- How do plants and animals help each other in the exchange of gases in the atmosphere?

### NCERT Exemplar Questions

- Which of the following statements is incorrect?  
(a) All living things require air to breathe.  
(b) We can feel air but we cannot see it.  
(c) Moving air makes it possible to fly a kite.  
(d) Air is present everywhere but not in soil.
- Wind does not help in the movement of which of the following?  
(a) Firki (b) Weather cock  
(c) Ceiling fan (d) Sailing yacht
- What is not true about air?  
(a) It makes the windmill rotate.  
(b) It helps in the movements of aeroplanes.  
(c) Birds can fly due to presence of air.  
(d) It has no role in water cycle.

4. Mountaineers carry oxygen cylinders with them because
- there is no oxygen on high mountains.
  - there is deficiency of oxygen on mountains at high altitude.
  - oxygen is used for cooking.
  - oxygen keeps them warm at low temperature.

5. Boojho took an empty plastic bottle, turned it upside down and dipped its open mouth into a bucket filled with water. He then tilted the bottle slightly and made the following observations.
- Bubbles of air came out from the bottle.
  - Some water entered the bottle.
  - Nitrogen gas came out in the form of bubbles and oxygen got dissolved in water.
  - No bubbles formed, only water entered the bottle.

Which observations is/are correct?

- (i) and (ii)
  - (iv) only
  - (iii) and (iv)
  - (i) only
6. Which of the following components of air is present in the largest amount in the atmosphere?
- Nitrogen
  - Oxygen
  - Water vapour
  - Carbon dioxide
7. The components of air which are harmful to living beings are
- nitrogen and carbon dioxide.
  - dust and water vapour.
  - dust and smoke.
  - smoke and water vapour.

8. Usha took a lump of dry soil in a glass and added water to it till it was completely immersed. She observed bubbles coming out. The bubbles contain
- water vapour
  - only oxygen gas
  - air
  - none of these

9. State whether the following statements are **true** or **false**. If false, correct them.

- Plants consume oxygen for respiration.
- Plants produce oxygen during the process of making their own food.
- Air helps in the movements of sailing yachts and glider but plays no role in the flight of birds and aeroplanes.
- Air does not occupy any space.

10. In a number of musical instruments, air plays an important role. Can you name some such instruments?

11. In the boxes of **Column I** the letters of some words got jumbled. Arrange them in proper form in the boxes given in **Column II**

Column I

- D I L L M W I N
- Y N O G X E

- M E S K O

- T U D S

Column II

- 
- 
- 
- 

12. Make sentences using the given set of words.

- 99%, oxygen, nitrogen, air, together
- Respiration, dissolved, animals, air, aquatic
- Air, wind, motion, called

13. A list of words is given in a box. Use appropriate words to fill up the blanks in the following statements

Air, oxygen, wind, water vapour, mixture, combination, direction, road, bottles, cylinders.

- The ..... makes the windmill rotate.
- Air is a ..... of some gases.
- A weather cock shows the ..... in which the air is moving at that place.
- Mountaineers carry oxygen ..... with them, while climbing high mountains.

14. Observe the picture given in Fig. carefully and answer the following questions.

- What is covering the nose and mouth of the police man?
- Why is he putting a cover on his nose?
- Can you comment on air quality of the place shown in the Fig.



15. Garima observed that when she left her tightly capped bottle full of water in the open sunlight, tiny bubbles were formed all around inside the bottle. Help Garima to know why it so happened?

16. Match the items of **Column I** with the items of **Column II**

Column I

- weather cock
- mountaineers
- fine hair inside the nose
- smoke
- wind

Column II

- gases and fine dust particles
- sailing yacht
- oxygen cylinders
- direction of air flow
- prevent dust particles

17. Explain the following observations very briefly
  - (a) A firki does not rotate in a closed area.
  - (b) The arrow of weather cock points towards a particular direction at a particular moment.
  - (c) An empty glass in fact is not empty.
  - (d) Breathing through mouth may harm you.
18. Write just a few sentences for an imaginary situation if any of the following gases disappear from the atmosphere
  - (a) oxygen
  - (b) nitrogen
  - (c) carbon dioxide
19. Paheli kept some water in a beaker for heating. She observed that tiny bubbles appeared before the water started to boil. She boiled the water for about 5 minutes and filled it in a bottle up to the brim and kept the bottle air tight till it cooled down to room temperature.
  - (a) Why did the tiny bubbles appeared?
  - (b) Do you think tiny bubbles will appear on heating the water taken out from the bottle? Justify your answer.
20. On a Sunday morning Paheli's friend visited her home. She wanted to see some flowering plants in the nearby garden. Both of them went to the garden. While returning from the garden they also observed some flowering plants on the road side. But to their surprise they found that the leaves and flowers of these roadside plants were

comparatively very dull. Can you help them to know why?

### HOTS Questions

1. Will the tiny air bubbles seen before the water actually boils, also appear if we do this activity by reheating boiled water kept in an airtight bottle?"
2. Why do you think, the policeman in the figure below is wearing a mask?



3. Why should you not sleep under the tree during the night?
4. On a Sunday morning Paheli's friend visited her home. She wanted to see some flowering plants in the nearby garden. Both of them went to the garden. While returning from the garden they also observed some flowering plants on the roadside. But to their surprise they found that the leaves and flowers of these roadside plants were comparatively very dull. Can you help them to know why?

## 3

## EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

1. Which of the following statements is incorrect
  - (a) We cannot see air but can feel air
  - (b) Air flowing at speed is called wind
  - (c) Moving air makes it impossible to fly kite
  - (d) Pages of a book flutter due to moving air
2. Which of the following methods need air?
  - (a) Sieving
  - (b) Hand picking
  - (c) Winnowing
  - (d) Filtration
3. Air moves with great speed during \_\_\_\_\_.
  - (a) drought
  - (b) flood
  - (c) volcanic eruptions
  - (d) cyclones
4. Which of the following can show the directions of wind?
  - (a) a windmill
  - (b) a barometer
  - (c) a weather cock
  - (d) a fikri
5. Identify the correct statement
  - (i) Air is present even in empty glass
  - (ii) Air does not occupy space
  - (iii) Air is transparent
  - (iv) Air has no colour
  - (a) Only (i) and (iii)
  - (b) Only (ii) and (iv)
  - (c) Only (i), (iii) and (iv)
  - (d) All of the four statements
6. The thin layer of air above the earth's surface is called \_\_\_\_\_.
  - (a) Lithosphere
  - (b) Atmosphere
  - (c) Mesosphere
  - (d) Hydrosphere



7. Why do mountaineers carry oxygen cylinders with them?
- Because they need oxygen to cook food
  - Because they need oxygen for combustion
  - Because oxygen is less at higher attitude
  - Because oxygen is more at high mountains
8. Which of the following statements is false?
- Air is a mixture of gases
  - Air is made up of only one substance
  - Air contains water vapour
  - Air helps in sailing boats
9. Which of the following helps in burning?
- Nitrogen
  - Oxygen
  - Carbon dioxide
  - Water vapour
10. Which of the following activities help in increasing water vapour content in air?
- Evaporation
  - Transpiration
  - Respiration
  - All of the above
11. Look at the following instrument. What is it used for?

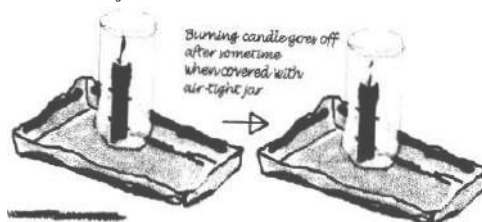


- To measure atmospheric pressure
  - To measure amount of rainfall in an area
  - To show direction of moving air at a place
  - To show North-South direction of a place
12. Rohan took an empty plastic bottle, turned it upside down and dipped its open mouth into a bucket filled with water. He then tilted the bottle slightly. Which of the following observations are correct?



- Some water entered the bottle
  - Bubbles of air were seen coming out.
  - No bubbles were found
  - Nitrogen gas come out in the form of bubbles and oxygen dissolved in water
- (i) and (ii)
  - (iii) and (iv)
  - (i) only
  - (iii) only

13. In the given figure, a burning candle is kept in the through containing water. The candle, blows off after some time when an inverted jar is placed over it. It is also observed that some water also rose in the jar. What could be the reason for this?



- Water entered the jar to blow off the candle
  - Water entered to fill up the empty jar
  - Air in jar was used up for burning of candle so some empty space was created. Water entered to occupy that empty space
  - Oxygen gets dissolved in water and so water rises
14. Look at the following things. Wind does not help in the movement of which of these things?



Hot air balloon



Firki



Ceiling fan

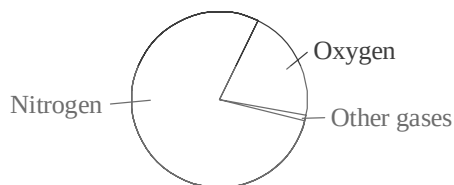


Sailing Yacht

- Hot air balloon
  - Firki
  - Ceiling fan
  - Sailing Yacht
15. Look at the following people cleaning the street. They are wearing masks. Why do you think they are wearing masks?

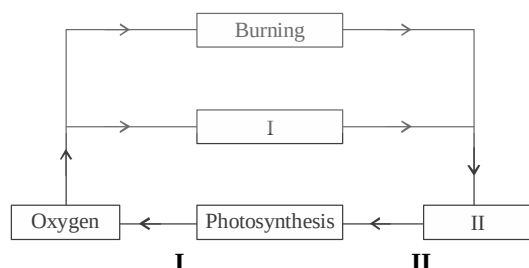


- Because they are unwell
  - Because they have to protect themselves from dust
  - Because air has oxygen that has to be filtered
  - So that carbon dioxide does not enter lungs
16. The following figure shows the composition of air

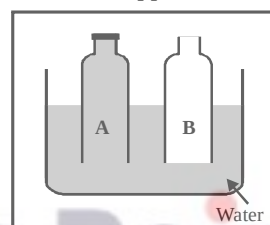


Based on this which of the following statement is correct.

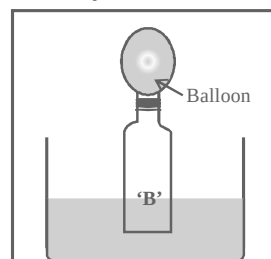
- (a) One-half part is nitrogen and one-half is oxygen and other gases  
 (b) One-fifth is oxygen and four fifth contains nitrogen and other gases  
 (c) Two-third part is nitrogen and one-third part is oxygen and one-tenth is other gases  
 (d) Three quarter part is oxygen and one-third is nitrogen and other gases
17. Identify who am I by studying the following clues.  
 (i) I am present in air  
 (ii) When you breathe I enter your lungs  
 (iii) You need me to produce energy.  
 I am \_\_\_\_\_  
 (a) Hydrogen (b) Oxygen  
 (c) Carbon dioxide (d) Nitrogen
18. Which of the following is incorrect about air?  
 (i) Air is a mixture of several gases  
 (ii) Air dissolved in water cannot be removed  
 (iii) Air helps in pollination of flowers and in dispersal of seeds  
 (iv) Density of air increases with increase in altitude  
 (a) (i) and (iii) (b) (ii) and (iv)  
 (c) (i) and (iv) (d) (iii) and (ii)
19. Reshuffle the following options to select a term used to describe the thick blanket of air covering the Earth.  
 (a) T I L S E E R P H O S  
 (b) S E E P H H R O Y D R  
 (c) P M S T A E E R H O  
 (d) N I W D
20. Study the following flow chart and fill in the boxes I and II given below :



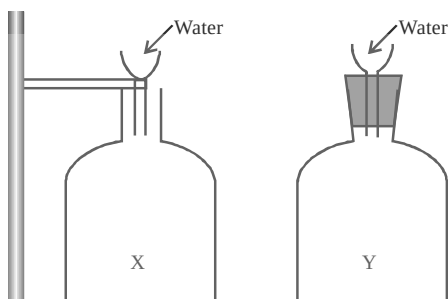
- (a) Carbondioxide Oxygen  
 (b) Respiration Carbon dioxide  
 (c) Carbon dioxide Respiration  
 (d) Oxygen Respiration
21. When lot of water vapour is present in air it is said to be .....  
 (a) dense (b) humid  
 (c) soluble (d) hot
22. Two plastic bottles with their bottoms cut off; and one bottle with its mouth sealed while the other bottle open are pushed into a trough of water. What will happen to the water level?



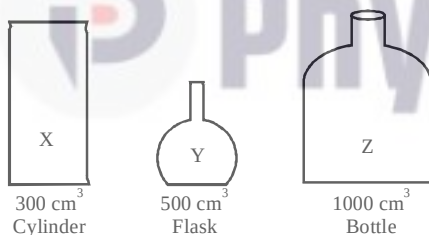
- (a) Level of water will be same in A and B.  
 (b) Level of water will be more in B than A.  
 (c) Level of water will be more in A than B.  
 (d) Level of water will not enter any of the bottle
23. Bottle 'B' Q.22 is now tied with a balloon on its mouth is pushed into water. The balloon inflates when the bottle is pushed into water. What conclusion can you draw from this experiment?



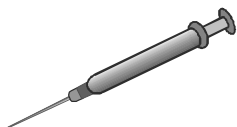
- (a) Water exerts upwards force  
 (b) Air exerts upwards force  
 (c) Air exerts atmospheric pressure  
 (d) Air occupies space
24. Water is poured into two bottles X and Y as shown in the figure. The mouth of bottle 'X' is open while that of 'Y' is sealed. What will happen?



- (a) Water will flow easily into both bottles easily.  
 (b) Water will flow easily into bottle X.  
 (c) Water will flow easily into bottle Y.  
 (d) Water will not flow into any of the bottles.
25.  $500 \text{ cm}^3$  of air is pumped into each containers of different shape and volume. What will be the volume of air in each of these containers?



- (a)  $X \rightarrow 300 \text{ cm}^3$ ;  $Y \rightarrow 500 \text{ cm}^3$ ;  $Z \rightarrow 1000 \text{ cm}^3$   
 (b)  $X \rightarrow 166 \text{ cm}^3$ ;  $Y \rightarrow 166 \text{ cm}^3$ ;  $Z \rightarrow 166 \text{ cm}^3$   
 (c)  $X \rightarrow 0 \text{ cm}^3$ ;  $Y \rightarrow 0 \text{ cm}^3$ ;  $Z \rightarrow 500 \text{ cm}^3$   
 (d)  $X \rightarrow 0 \text{ cm}^3$ ;  $Y \rightarrow 500 \text{ cm}^3$ ;  $Z \rightarrow 0 \text{ cm}^3$
26. Which of the following statement is true?  
 (a) In a large container, the air will expand.  
 (b) In a small container, the air will get compressed.  
 (c) Volume of air in a container, is the same as the volume of the container.  
 (d) All of the above
27. When you press the plunger of a syringe with liquid, the liquid is pushed and comes out of the needle. What inference can you draw from this example?



- (a) Compressed air has energy.  
 (b) Air exerts upward force.  
 (c) Air occupies space.  
 (d) Air is lighter than water.
28. Which of the following statements is true?  
 (a) Energy is stored when air is compressed.  
 (b) Compressed air exerts a force.  
 (c) Water can't be compressed.  
 (d) All of the above.
29. Which of the following doesn't use compressed air for its function?  
 (a) Air gun (b) Rifle  
 (c) Aerosol can (d) Tyre of a vehicle
30. Read the two sentence carefully and answer the question:  
 I. The compressed air in a tyre exerts a force large enough to lift a heavy car  
 II. In a syringe, the plunger compresses the liquid.  
 (a) Both statements are true  
 (b) Both statements are false  
 (c) Statement I is true but II is false  
 (d) Statement I is false but II is true
31. Mountaineers carry oxygen cylinders with them because:  
 (a) oxygen supports combustion.  
 (b) air becomes thinner as we go higher.  
 (c) air is dense but lacks oxygen in mountains.  
 (d) we don't get pure air there.
32. A plastic bag was tied to a part of the plant as shown. After a day, a substance X is found inside the plastic bag. What is X?  
 (a) Oxygen  
 (b) Hydrogen  
 (c) Water droplets  
 (d) Air
33. How could the animal be made to survive for a longer time?



- (a) By placing another mouse in it.  
 (b) By placing a green plant in it.  
 (c) By removing all the air through a vacuum pump.  
 (d) By placing a burning candle in it.

34. In the process of respiration, plants give out ..... and ..... .  
 (a) nitrogen and carbon dioxide  
 (b) carbon dioxide and water vapour  
 (c) food and oxygen  
 (d) food and carbon dioxide
35. Global warming takes place due to the increase of ..... in air.  
 (a) nitrogen  
 (b) carbon dioxide  
 (c) oxygen  
 (d) carbon monoxide
36. Which of the following plays an important role while drinking soft drinks with a straw?  
 (a) Humidity  
 (b) Temperature  
 (c) Atmospheric pressure  
 (d) Composition of air
37. Glass panels usually appear hazy because:  
 (a) water vapour settles on the tiny dust particles on the panel  
 (b) of chemical reactions  
 (c) it is the property of all transparent substances  
 (d) the glass is old
38. Air is a renewable source of energy. It can be used for:  
 (a) generating electricity  
 (b) moving a wind mill  
 (c) pumping water  
 (d) All of the above
39. We cannot feel the pressure of atmosphere because:  
 (a) pressure increases with increase in altitude.  
 (b) pressure decreases with increase in altitude.  
 (c) pressure acts in all directions equally.  
 (d) pressure is negligible.
40. The major components of the air are:  
 (a) nitrogen and carbon dioxide  
 (b) nitrogen and water vapour  
 (c) nitrogen and oxygen  
 (d) oxygen and carbon dioxide
41. Air is matter because it:  
 (a) exerts upward pressure  
 (b) exerts both upward and downward pressure  
 (c) it has mass (weight)  
 (d) it has both volume (occupies space) and mass

### More than One option Correct

- Air or wind play a role in:  
 (a) communication  
 (b) earthquakes  
 (c) respiration  
 (d) transpiration
- Green house gases are:  
 (a) oxygen  
 (b) nitrogen  
 (c) carbon dioxide  
 (d) methane
- The devices which can use air pressure are:  
 (a) automobile brakes  
 (b) electric motor  
 (c) windmill  
 (d) Jig Boring (drilling of borewell)
- The gaseous constituents which are present in minute quantities in air are:  
 (a) hydrogen  
 (b) helium  
 (c) carbon dioxide  
 (d) water vapour
- Which of the following releases carbon dioxide back into the atmosphere?  
 (a) Combustion of diesel in diesel engine  
 (b) Burning of sulphur in air  
 (c) Burning of coal  
 (d) In power generating stations

### Multiple Matching Questions

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched. Statement (A, B, C, D) in column I have to be matched with statements (p, q, r, s, t) in column II.

- | 1.  | Column I       | Column II                         |
|-----|----------------|-----------------------------------|
| (A) | Nitrogen       | (p) supporter of combustion       |
| (B) | Oxygen         | (q) Not a supporter of combustion |
| (C) | Carbon dioxide | (r) Colourless, odourless gas     |
| (D) | Smoke          |                                   |

### Passage Based Questions

**DIRECTIONS :** Read the passage(s) given below and answer the questions that follow.

#### Passage I

Until eighteenth century, people thought that air was just one substance. Now it has been experimentally proved that it is really not so. Air is a mixture of gases.

- Air is  
 (a) a mixture of liquids  
 (b) a mixture of liquid and gases

- (c) a mixture of gases  
(d) None of these
2. Air  
(a) contains gases and solids  
(b) contains gases and liquids  
(c) contains no solid or liquid  
(d) All of the above
3. Which of the following statement(s) is/are correct?  
(a) Water is present in air in vapour form  
(b) Water is not present in air  
(c) Water is present in air in liquid form  
(d) Water is present in air in solid form

**Passage II**

The earth is surrounded by a thin layer of air. Thin layer extends upto many kilometers above the surface of earth and is called atmosphere.

4. Which of the following statement(s) is/are correct?  
(a) The air surrounds the earth.  
(b) The thin layer of air that surrounds the earth extends only upto 2 kilometres above the surface of earth.  
(c) The thin layer of air that surrounds the earth extends upto 2 kms below the surface of earth.  
(d) All of the above are correct.
5. Which of the following statement(s) is/are correct?  
(a) Atmosphere is essential for plants.  
(b) Atmosphere is essential for human beings.  
(c) Atmosphere is essential for life.  
(d) None of these
6. Which of the following statement(s) is/are correct?  
(a) Atmosphere is the envelope of air that surrounds the earth.  
(b) Atmospheric gases contain nitrogen and oxygen.  
(c) Both the above are correct.  
(d) None of these

**Passage III**

If in a closed room there is some material that is burning, you may have felt suffocation. This is due to excess carbon dioxide that may be accumulating in the room. Plants and animals consume oxygen for respiration and produce carbon dioxide.

7. Which of the following is produced by animals during respiration?  
(a) Oxygen (b) Nitrogen  
(c) Carbon dioxide (d) All of these
8. Which of the following is consumed by plants and animals during respiration?

- (a) Oxygen (b) Nitrogen  
(c) Carbon dioxide (d) None of these
9. Plants consume which of the following during photosynthesis?  
(a) Oxygen (b) Nitrogen  
(c) Carbon dioxide (d) All of these

**Assertion/Reason**

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select one of the current options (a), (b), (c) and (d) given below in each questions.

- (a) Both A and R are true and R is the correct explanation of A.  
(b) Both A and R are true but R is not the correct explanation of A.  
(c) A is true but R is false.  
(d) A is false but R is true.

1. **Assertion (A) :** Air is a homogeneous mixture of gases.  
**Reason (R) :** The composition of every part of a homogeneous mixture is same.
2. **Assertion (A) :** The gases nitrogen and oxygen together make 90% (by volume) of air.  
**Reason (R) :** Air contains some dust particles.
3. **Assertion (A) :** Oxygen helps in burning of substances.  
**Reason (R) :** Burning of substances is a combustion process.
4. **Assertion (A) :** Atmosphere is essential for life on earth.  
**Reason (R) :** Carbon dioxide is a colourless, odourless gas present in air.
5. **Assertion (A) :** Aquatic animals use dissolved air (or oxygen) in water for respiration.  
**Reason (R) :** When fuel is burnt, a smoke is produced.

**Integer Type Questions**

**DIRECTIONS :** Following are integer based/ Numeric based questions. Each question, when worked out will result in one integer or numeric value.

1. Given are some gases. How many gases can cause combustion. Your answer will be between 0 - 9? Oxygen, Nitrogen, Carbon dioxide, Hydrocarbon propane, Methane.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- atmosphere
- space; weight
- upward and downward
- nitrogen and oxygen
- oxygen
- pollution
- dissolved
- supports
- mixture
- atmospheric pressure
- colourless, odourless
- atmosphere
- oxygen
- argon, Neon, Lithium Xenon
- wind
- 79%, 20.8%
- smoke
- oxygen
- carbon dioxide
- pores of soil

### True/False

- |          |           |           |           |
|----------|-----------|-----------|-----------|
| 1. False | 2. False  | 3. False  | 4. False  |
| 5. False | 6. True   | 7. True   | 8. False  |
| 9. True  | 10. False | 11. True  | 12. True  |
| 13. True | 14. True  | 15. True  | 16. False |
| 17. True | 18. False | 19. False | 20. True  |

### Match the Column

- (A) → (r); (B) → (s); (C) → (p); (D) → (q)
- (A) → (r); B → (s); (C) → (p); (D) → (q)
- (A) → (q); (B) → (r); (C) → (p)
- (A) → (r); (B) → (p); (C) → (q)
- (A) → (r); (B) → (p); (C) → (q)
- (A) → (r); (B) → (p); (C) → (q)
- (A) → (q); (B) → (r); (C) → (p)
- (A) → r; (B) → (p); (C) → (q)

### Very Short Answer Type Questions

- The most abundant gas in our atmosphere is nitrogen.
- It stops supply of oxygen, thus fire extinguish.
- Photosynthesis.
- Glucose and oxygen.
- Dry ice.
- Respiration.
- Inert gases do not react with other elements.
- Carbon dioxide is used by green plants to make their food.
- It occupies the shape of the vessel.
- Oxygen in the atmosphere is essential for respiration.
- When the air is in motion, then it is called wind.
- The layer of air around the earth is known as atmosphere.
- Respiration, Photosynthesis
- Respiration, Food
- Moon, no air
- Air escapes
- To make electricity
- Air evaporates the sweat
- Release of carbon monoxide
- Oxygen, Carbon dioxide, Nitrogen
- (a) Nitrogen (b) Oxygen (c) Carbon dioxide
- Compressibility, expansivity, diffusibility
- Decrease in atmospheric pressure
- During day time because plants release oxygen during day and Carbon dioxide at night.
- Animals – oxygen, Plants – nitrogen, carbon dioxide
- Boats, parachutes

### Short Answer Type Questions

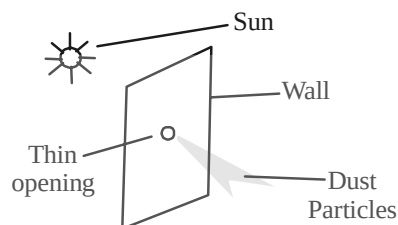
- The two uses of air are given as follows :  
(i) Air is used to inflate the tyres of vehicles.  
(ii) Air is used by plants and animals for respiration.
- Aquatic animals take the dissolved oxygen/air in water for respiration.
- The activities that are possible due to the presence of air are as follows :



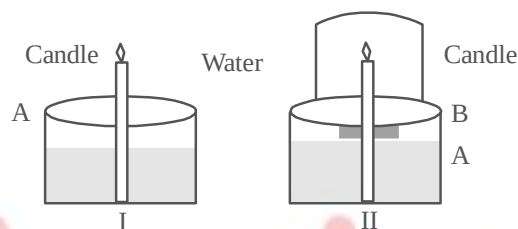
- (i) Respiration and water cycle.
  - (ii) Flying of birds and aeroplanes.
  - (iii) Dispersal of seeds.
  - (iv) Rotation of the windmill.
4. The air consists of following :  
Nitrogen (78%), Oxygen (21%), Carbon dioxide, water vapours, dust and other gases.
  5. As we move up in the atmosphere, the air becomes thin. Because of this, mountaineers feel little difficulty in inhaling oxygen. To overcome this problem, they carry oxygen cylinders along with them.
  6. Both plants and animals are interdependent on each other for their survival. Plants cannot survive for long without animals as they need  $\text{CO}_2$  for photosynthesis, which is exhaled by animals. Similarly in absence of plants, there will be no oxygen for animals to breathe in. Hence, we can see that both need each other and the balance of oxygen and carbon dioxide in the atmosphere is maintained by their presence.
  7. The air is considered a mixture because of the following reasons :
    - (a) Air consists of many gases like oxygen, nitrogen, carbon dioxide, etc.
    - (b) The composition of air varies from place to place.
  8. Air enters the balloon from your mouth, the air takes up the space in balloon. The balloon expands because air inside needs to take up more space.
  9. (a) A windmill is a machine that harnesses wind energy to grind grain, pump water, or generate electricity.  
(b) The windmill is used to draw water from tube wells and to run flour mills. They are also used to generate electricity.

### Long Answer Type Questions

1. On a sunny day, go to a room which is a little bit dark. In this room, choose a thin opening through which light can enter the room. If there is no opening in the room, than make one. From this opening we will see that a sharp beam of sunlight enters the room. In this beam, we will observe that there are some tiny solid like particles moving freely. These particles are the dust particles, and this shows the presence of dust particles in air.



2. Take a vessel and fill it with water as shown in figure below. Fill this vessel with water upto level A as shown in the figure below. Take a lighted candle and place it in the vessel.



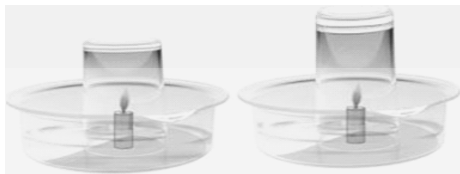
Place an inverted glass cylinder above the candle. After some time, the candle will stop burning. During this, water level of the vessel will rise to level B and fills up to one-fifth of the glass cylinder. Thus we conclude that one-fifth air is used in burning candle, which is oxygen.

## 2 EXERCISE

### Text Book Questions

1. Air contains gases mainly nitrogen, oxygen, small amount of carbon dioxide, water vapour and dust particles.
2. Oxygen gas in the atmosphere is essential for respiration.
3. **Step I:** Two shallow containers are taken and burning candles are fitted into it.  
**Step II:** Now, water is filled in the container at two different levels.  
**Step III:** Both the candles are then covered with glass.  
**Step IV:** After sometimes, we observed that the candles having less water in its container lights off.  
This happened because the container having more water contains more oxygen and therefore it burnt for more time. Thus, it is proved that air supports burning.

4.



Air has oxygen

**Step I:** Water in a pan is taken.

**Step II:** It is now boiled on stove.

**Step III:** We will observe tiny bubbles of water visible coming out from the bottom of the pan. These tiny bubbles are coming due to the air dissolved in water. Thus, this proves that air is dissolved in water.

5. The lump of cotton contains air in it. When it comes in contact with water, the air pushed out from the vacant space and dissolved in water and thus a lump of cotton wool shrink in water.
6. The layer of air around the earth is known as atmosphere.
7. The component of air used by green plants to make their food, is carbon dioxide.
8. Five activities that are possible due to the presence of air:
  - (i) Helps in seed dispersal and pollination.
  - (ii) Sailing of ships.
  - (iii) Flying of the birds and kites.
  - (iv) Gives us oxygen to respire.
  - (v) Helps in the rotation of windmill.
9. Plants take in carbon dioxide in during photosynthesis give out oxygen in the atmosphere while animals take in oxygen and breathe out carbon dioxide during respiration. In this way, plants and animals help each other in the exchange of gases in the atmosphere.

### NCERT Exemplar Questions

1. (d) 2. (c) 3. (d) 4. (b) 5. (a)
6. (a) 7. (c) 8. (c)
9. (a) True  
(b) True  
(c) False, air also helps in the flight of birds and aeroplanes.
- (d) False, it does occupy space.
10. Flute, shahnai, harmonium.
11. (a) WINDMILL (b) OXYGEN  
(c) SMOKE (d) DUST
12. (a) Oxygen and nitrogen together make up 99 per cent of the air.  
(b) Aquatic animals use dissolved air for respiration.  
(c) Air in motion is called wind.
13. (a) wind (b) Mixture  
(c) direction (d) cylinders
14. (a) Mask  
(b) To save himself from dirt/polluted air.  
(c) Air quality of the place is not good. It is due to the smoke and gases emitted by the automobiles along with dust particles present in the air.
15. Air dissolved in water starts escaping in the form of tiny bubbles due to heat from the sun.
16. (A)  $\rightarrow$  (s); (B)  $\rightarrow$  (r); (C)  $\rightarrow$  (t); (D)  $\rightarrow$  (p);  
(E)  $\rightarrow$  (q)
17. **Hint:**  
(a) Lack of air movement.  
(b) Shows the current direction of the wind.  
(c) Even the so called empty glass is not infact empty. It is filled with air.  
(d) You may inhale dust if present in air which may be harmful.
18. **Hint:**  
(a) There will be no life on earth.  
(b) Things will burn very fast.  
(c) The plants will not be able to prepare their food and hence there will be no life on earth.
19. (a) Tiny bubbles appeared due to the evolution of air dissolved in water.  
(b) No, tiny bubbles will not appear as there is no dissolved air in this water.
20. The road side plants had probably some dust and soot deposited on them and thus appeared dull.

**HOTS Questions**

- No. The bubbles are because of the air present in water. In an airtight bottle, no air is present.
- The exhaust of automobiles releases harmful gases which can affect the respiratory system drastically. Therefore, the policeman is wearing a mask to reduce the amount of pollutant intake.
- During night, trees release carbon dioxide and excess of carbon dioxide can cause suffocation.
- The roadside plants had probably some dust and soot deposited on them and thus appeared dull.

**3 EXERCISE****Multiple Choice Questions**

- (c) Moving air causes kite to fly.
- (c) During winnowing air carries lighter particles to greater distance and heavy materials fall into a heap.
- (d) During cyclones storms blow which are high speed winds. These are very destructive.
- (c)
- (c) Air does occupy space.
- (b) Atmosphere extends upto many kilometres above the surface of Earth.
- (c) As we go higher, the air becomes thinner and amount of oxygen decreases. This causes difficulty in breathing.
- (b) Air is not made up of only one substance but consists of many gases, water vapour and dust particles.
- (b) Oxygen helps in burning of things.
- (d) All these release water vapour in the atmosphere.
- (c) This is a weather cock used to show the direction in which air is moving at that place. The arrow points towards the direction of wind.
- (a) When bottle is tilted some air escapes in the form of bubbles and so water enters the bottle to fill the space.
- (c) There is a limited amount of oxygen in jar which is used up by the burning candle. When the oxygen is used up the candle blows off and water enters to fill up that space in jar left empty by oxygen.
- (c)
- (b) Air has lot of dust particles which gets increased when brooming is done. These are not good for our body and we can develop breathing problems if we inhale these dust particles. People cleaning streets should wear masks so that dust do not enter their lungs.
- (b) Air contains 78% nitrogen and 21% oxygen and 1% other gases. This comes out as 4/5th part nitrogen and other gases and 1/5th part oxygen.
- (b) Oxygen is taken in during breathing and energy is produced.
- (b) Air dissolved in water can be removed by heating and density of air decreases with increase in altitude.
- (c) Atmosphere is the thick blanket of air covering the Earth.
- (b) During respiration oxygen is taken in and carbon dioxide is released which is utilised by green plants to produce food by photosynthesis.
- (b) Humidity is the measure of water vapour in air.
- (b)
- (d)
- (c)
- (a)
- (b)
- (b)
- (d)
- (c)
- (c)
- (b)
- (c)
- (b)
- (c)
- (c)
- (a)
- (d)

**More than One option Correct**

- a, c
- c, d
- a, c, d
- a, b, c
- a, c, d

**Multiple Matching Questions**

- (b) A → q; B → p; C → r; D → r

**Passage Based Questions**

- (c)
- (a) Air contains some dust particles which are solids.
- (a) Air contains water vapours
- (a)
- (c)
- (c)
- (c)
- (a)
- (c)

**Assertion/Reason**

- (a)
- (d) A is incorrect and R is correct.  
[percentage of nitrogen + oxygen = 99%].
- (b)
- (b)
- (b)

**Integer Type Questions**

- 1 = Only oxygen helps in complete combustion.

# Chapter 16

## GARBAGE IN, GARBAGE OUT

### INTRODUCTION



Every single day tons of garbage is collected from houses, offices, schools and other organizations. Many things that we use in our day-to-day life can be reused, like you can write on both sides of paper and thus save many trees. Instead of using disposable plastic bags, you can use cloth bags and save a lot of energy, and also contribute to reducing the amount of garbage. Recycling other materials and then reusing them is a good way to save a lot of landfill space. The process of recycling is a continuous loop, that works when collected materials from garbage are turned into products. Then these products are bought and used again. By buying the products made from recycled materials, you will be supporting the industry that manufactures these products, and thus the loop of recycling goes on.

It's fun to buy new electronic gadgets, games, and devices. It's necessary to buy upgraded computers and phones every couple of years to keep up with advancing technology. It's cheaper to buy new devices than fix broken ones. It's easier to use disposables such as plastic cups or razors or cameras. We must take appropriate actions to manage our production and waste now.

### GARBAGE DISPOSAL

A large, low-lying area used to dispose garbage is known as a dump. A garbage dump is also used as landfill. Garbage collectors collect waste and then dispose it at garbage disposals. Garbage dumps have **flies, cockroaches and mosquitoes**, and later turn into breeding grounds for micro-organisms that may cause diseases. That is why these garbage dumps are usually located on the outskirts of a city. When garbage mixes with soil, it takes a longer time to decay. The soil becomes loose and a building cannot be constructed on such a landfill. Moreover, it takes 20 to 30 years for the soil to get ready for construction.

**Note:** Such an area is later converted into a park.

## Types of Waste

There are two types of wastes that we generate depending on their source.

**Biodegradable wastes** are those that can be decayed easily. The process of decaying is known as composting. Useful garbage components are fruit and vegetable waste, plant and animal waste, tea leaves, coffee grounds and paper. These useful components of garbage are converted into manure in the soil.

**Non- Biodegradable** wastes include polythene bags, plastics, glass, metals and aluminium foils. These take longer to decay. When these wastes decay, they release harmful gases that damage the environment. To avoid the adverse impact, these garbage items are sent for recycling.

For example, when leaves burn, they release harmful gases and causes air pollution. Moreover, they lead to asthma and lung diseases. That is why leaves should be buried so as to convert them into manure.



Biodegradable



Non-biodegradable

| The type of litter we generate and the approximate time it takes to degenerate |                                                    |
|--------------------------------------------------------------------------------|----------------------------------------------------|
| Type of litter                                                                 | Approximate time it takes to degenerate the litter |
| Organic waste such as vegetable and fruit peels, leftover foodstuff, etc.      | a week or two.                                     |
| Paper                                                                          | 10–30 days                                         |
| Cotton cloth                                                                   | 2–5 months                                         |
| Wood                                                                           | 10–15 years                                        |
| Woolen items                                                                   | 1 year                                             |
| Tin, aluminium, and other metal items such as cans                             | 100–500 years                                      |
| Plastic bags                                                                   | one million years                                  |
| Glass bottles                                                                  | undetermined                                       |

As a global society, our hierarchy for dealing with waste material must be:

**(i) reducing, (ii) reusing, (iii) recycling, and (iv) appropriate final disposal.** Reduction of waste generated at the source ought to be of primary concern. It should be followed by reusing goods and recycling what cannot be reused. Finally, when all other options are deemed impossible, the remainder of waste may be incinerated or put in landfills.

**Recycling bio-degradable wastes :** Biodegradable waste can be recycled by the method of composting. This is the oldest form of disposal. It is a natural process that recycles the nutrients in the waste to give manure or compost. The manure is rich in nutrients and is very good for growing plants. This method is clean, cheap and safe. It reduces the amount of disposable garbage.

**Note:** Shiny or plastic coated paper should not be used.

## VERMICOMPOSTING

The process of preparing **compost with the help of red worms** is called vermicomposting. The red worm is a type of earthworm that lives in the soil rich in organic matter, which is a combination of **nitrogen-rich and carbon-rich material** with plenty of moisture and microbes.

## Method of Vermicompositing

A vermicomposting pit is made with a wooden box or big cement rings.

A mesh is spread at the bottom of the pit.

Vegetable waste, fruit waste, waste paper which is not shiny or coated with plastic, is spread over the mesh.

Water is sprinkled to create moisture so that the red worms can live.

A vermicomposting pit takes nearly two to four weeks to completely convert waste into manure.

Waste material that is rich in oils, salt, meat and vinegar stops the growth of red worms. These red worms have a special structure called gizzards with which they grind food material. A red worm eats food equal to its weight every day. Red worms do not survive in too hot or too cold conditions.

**Note:** Avoid using excessive water. Do not compress the layer of waste. Keep it loose so that it contains sufficient air and moisture.

## Recycling



Vermicomposting

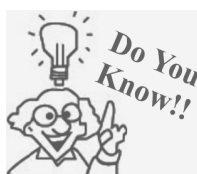


Articles made from waste

It is important to reuse things than discarding them as waste. Many nice articles can be made out of waste. Industries use recycled or waste paper to regenerate paper. Paper that is suitable for recycling is called "scrap paper". You can recycle old newspapers, magazines, notebooks and used envelopes.

## Steps involved in recycling paper

- Tear paper into small pieces.
- Soak these pieces in water for a day.
- Make a thick paste and spread it on a net or sieve.
- Let water drain off completely.
- Use an old cloth or newspaper to remove the extra water from the paste and dry it.
- Use this paste to get beautiful patterns.



- 
- One of the recycling fact according to the EPA, is that making paper from recycled materials can result in 74% less air pollution and 35% less water pollution, rather than making paper from wood pulp.
  - Recycling one ton of paper saves around 17 trees, 463 gallons of oil, 6,953 gallons of water and 3 cubic yards of landfill space.
  - An average British family throws away paper, which is worth 6 trees in their household garbage in a year.
-



### Disadvantages of using of polythene bags

Plastics are generally very resistant to environmental effects (sunshine, rain, frost, etc.), which is an advantage from the point of view of the consumer, but is a great detriment from the point of view of environment. Plastic bags and boxes remain intact for a long time in landfills. These plastics can also be burned, but this can create pollution and poisonous gases. Wastes of many kinds is and will continue to increase all around the world due to increasing consumerism, population size, wealth, and production. The materials are getting more and more complex, and more resistant to natural breakdown. To eliminate the waste is getting more difficult and expensive, and the storage of this increasing amount of waste is practically impossible.



We use many plastic items such as tooth brush, combs, containers, bottles, shoes, toys, wires, frames and bags everyday. Certain parts of vehicles like cars and buses, and electronic goods like radios, televisions and refrigerators, are all made of plastic. All these are useful to us in many ways, but using plastic is very harmful in terms of health and as well as the environment.

Plastics are not suitable for storing cooked food because they emit harmful chemicals when they are exposed to high temperatures. Using plastics causes health problems such as **heart disease, diabetes and reproductive dysfunction**. Harmful gases are emitted from burning plastics, which cause cancer and they kill living beings.



- *US citizens use 4 million plastic bottle every hour! However, only 25% of these plastic bottles are used for plastic recycling.*
- *Over 46,000 pieces of plastic debris float on every square mile of the ocean*
- *Every year, a person gets through 90 drink cans, 70 food cans and 107 bottles and 45 kg of plastic.*
- *Plastic waste is sorted out according to its type of plastic, and then recycled.*
- *Around 80% of energy gets saved when plastic is created from waste plastic, rather than the raw materials.*

That is why plastics should be disposed in the right way.

Plastics that do not contain the chemical, **BPA**, are usually licensed for storing food items.

Plastics thrown casually get into drains and sewages, often blocking the way and causing **water-logging**. A major cause of the floods in Mumbai, India, in August 2005 was the choking of the drainage system by plastic waste. So polythene bags should not be used for garbage disposal.

### Measures taken to prevent from the dangerous effects of plastics

Adopt healthy practices such as:

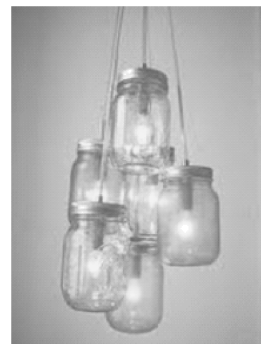
- Reduce, reuse and recycle plastics.
- Carry jute or cloth bags for shopping
- Do not store food items in plastic bags.
- Do not burn plastic items.
- Recycle plastics so that new plastic items can be made.



- Waste that does not decompose should be put in blue dustbins, while waste that decomposes easily should be put in green dustbins.

### Glass Recycling

- One of the most interesting thing about glass is that glass can be recycled again and again. As it never wears out. Most glass bottles and jars that we use contain at least  $\frac{1}{4}$  of the recycled material.
- Did you know that, the energy saved by recycling just one bottle can light a hundred watt light bulb for four hours!



### Other Facts on Recycling

- The first municipal dump was formed in ancient Athens in 400 B.C.
- Every year we dispose around 24 million tons of leaves and grass clippings, which can be used by converting to compost to conserve landfill space.
- Use and throw bags are a waste of trees (paper bags) or fossil fuels (plastic bags). Not just that, they also contribute to water pollution during their production. Reusable cloth or paper bags are a better alternative to single use bags.
- The recycling symbol was designed by Gary Dean Anderson in the year 1970.
- Plant waste like potato, orange, banana peels and grass cutting, leftover food, can quickly fill up the garbage can. This kind of waste can be easily used to make compost, which is a very good fertilizer for plants.
- Did you know that, up to 80% of an average car is recyclable?
- Taking a shower, instead of a bath can help save around 50 gallons of water!



### Metal Recycling :



- Recycling of aluminum can save up to 95% of energy which is required to make aluminum from bauxite ore?
- Tin cans are 99% steel, with a thin layer of tin added to prevent the tins from corroding.

**NOTE:** It is better to bury this food 2-3 cms deep inside the pit. Do not use waste that contain salt, pickles, oil, vinegar, meat or milk preparations as food. If these things are used in the pit then disease causing small organisms start growing in the pit. After few days, gently mix and move the top layers of your pit.

### Remember the 4 R's of managing waste :

- Refuse things that increase garbage
- Reduce garbage by consuming less and throwing less
- Reuse wherever possible
- Recycle

### KEYWORDS

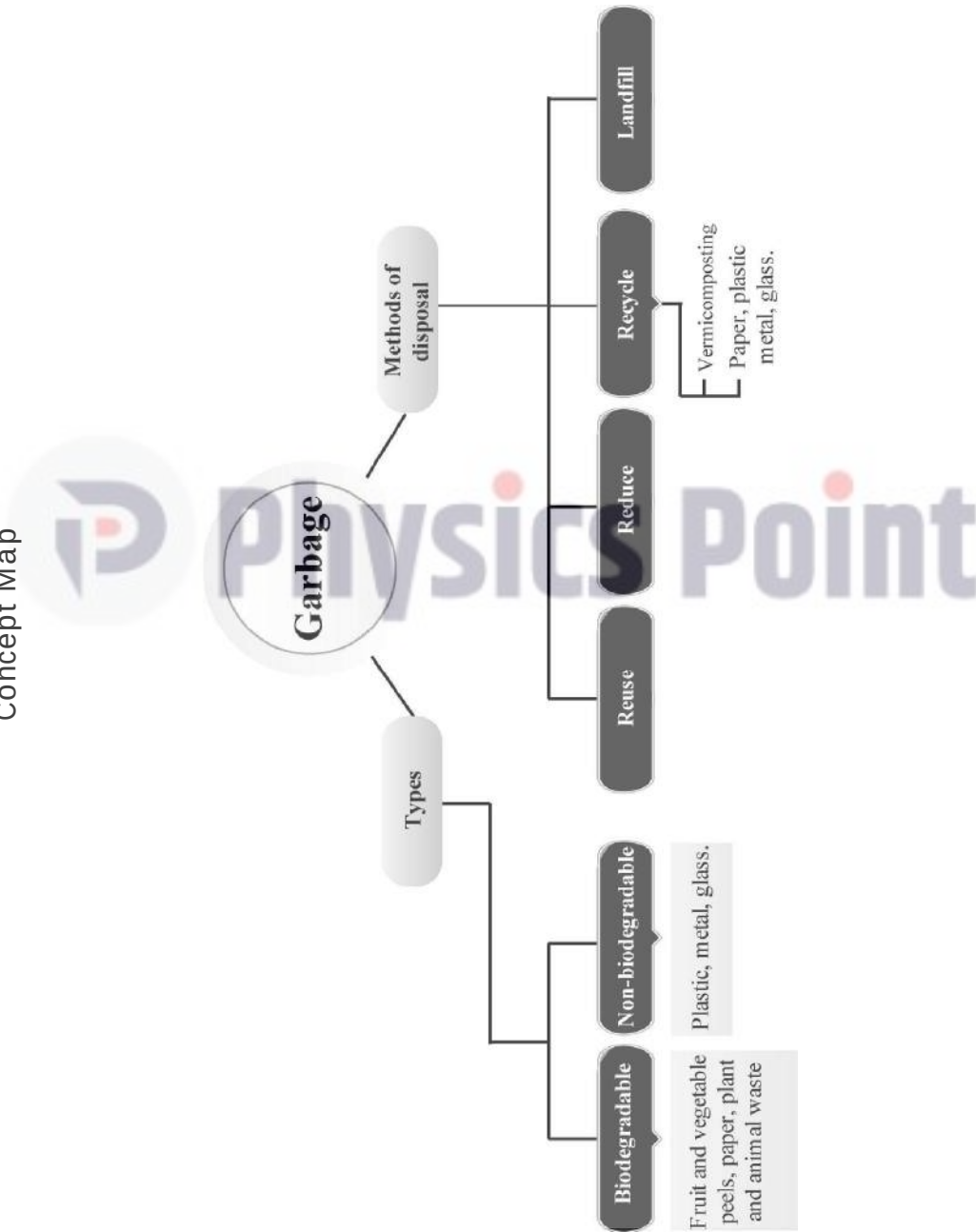
**Landfill :** Low lying open area used to dispose off the garbage of a town or city.

**Biodegradable waste :** Waste that will decay and mix with the soil.

**Non-biodegradable waste :** Waste that will not decay and mix with the soil.

**Vermicomposting :** A method of composting where compost is made from biodegradable waste with the help of redworms.

Concept Map



## 1

## EXERCISE

## Fill in the Blanks

**DIRECTIONS :** Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- ..... collects the garbage in trucks and take it to the landfills.
- Garbage has both ..... and ..... components.
- The rotting and conversion of some material into manure is known as .....
- The method of making compost from kitchen garbage using redworms is called .....
- Paper can be ..... to get useful products.
- Plastics cannot be converted into less harmful substances by the process of .....
- Earth worm is a farmer's .....
- ..... is a paste made up of paper, clay and rice husk.
- ..... and ..... helps in the decomposition of bio-degradable waste.
- ..... is a bio-degradable waste.
- Burning of plastic produces ..... gases.
- Redworms require ..... and .....
- Landfill areas are generally ..... areas.
- We shall ..... the use of plastics.
- Redworms do not have .....
- Recyclable waste are collected in ..... bins.
- ..... bins are used to collect rotten material.
- ..... concept is best to manage waste.

## True/False

**DIRECTIONS :** Read the following statements and write your answer as true or false.

- To reduce garbage, recycling of paper is done.
- Earthworms are useful for farmers.
- Garbage is necessary for cleaning our homes.
- We produce very less garbage.
- Red worm have gizzards for grinding the food.
- Garbage is useful to us.

- Landfill are later used as lakes.
- Aluminum foil is biologically degradable.

## Match the Column

**DIRECTIONS :** Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column I have to be matched with statements (p, q, r, s) in column II.

- |    |                                    |                                                        |
|----|------------------------------------|--------------------------------------------------------|
| 1. | <b>Column I</b>                    | <b>Column II</b>                                       |
|    | (A) Metals                         | (p) Bio-gas                                            |
|    | (B) Leaves                         | (q) Vermicompost                                       |
|    | (C) Cow dung                       | (r) Composting                                         |
|    | (D) Vegetable and food             | (s) Recyclable                                         |
|    | (E) Paper                          | (t) Recycling                                          |
| 2. | <b>Column I</b>                    | <b>Column II</b>                                       |
|    | (A) Low lying area                 | (p) Red worms                                          |
|    | (B) Compost produced with redworms | (q) Landfill                                           |
|    | (C) No teeth macro-organisms       | (r) Increases                                          |
|    | (D) 3R                             | (s) Vermicompost                                       |
|    | (E) Mixing meat during composting  | (t) Waste management                                   |
| 3. | <b>Column I</b>                    | <b>Column II</b>                                       |
|    | (A) Landfill                       | (p) Completely rotten garbage used for plant nutrients |
|    | (B) Manure                         | (q) Low lying areas where garbage of a city is dumped  |
|    | (C) Composting                     | (r) The process in which use of organisms is essential |
|    | (D) Vermi composting               | (s) Converting plants and animal wastes into manure    |
| 4. | <b>Column I</b>                    | <b>Column II</b>                                       |
|    | (A) Blue dustbins                  | (p) Plastics, metal and glass                          |
|    | (B) Green dustbins                 | (q) Wastes that rot completely when buried in soil     |

## Garbage In, Garbage Out

- |                      |                                |
|----------------------|--------------------------------|
| (C) Vermi composting | (r) Method of making compost   |
| (D) Red worms        | (s) Useful in vermi composting |
5. **Column I**                      **Column II**
- |                        |                                                        |
|------------------------|--------------------------------------------------------|
| (A) Food for red worms | (p) Tea, coffee                                        |
| (B) Gizzard            | (q) Structure used by red worm for grinding their food |
| (C) Paper mache        | (r) Paste made of paper and clay                       |
| (D) Plastics           | (s) When heated give out harmful gases                 |

## Very Short Answer Type Questions

**DIRECTIONS :** Give answer in one word or one sentence.

1. What should you do with the leftover food at home?
2. What is the effect of solid waste?
3. Which type of paper is difficult to be recycled?
4. What happens if the garbage is dumped at a place?
5. What should be done to aluminium foils and other metals found in the garbage?
6. What should be done to agricultural waste and cow dung?
7. What do you understand by the segregation of garbage?
8. What type of garbage is used for composting?
9. Define paper-mache?
10. Why shall we not burn dried leaves?

11. How do the redworms grind the food?
12. What is garbage?
13. Are all types of garbage harmful to us?
14. Describe landfill?

## Short Answer Type Questions

**DIRECTIONS :** Give answer in 2-3 sentences.

1. Give an example in which packaging could have been reduced.
2. Explain vermicomposting.
3. Which kind of garbage is not converted into compost by the redworms?
4. (a) How is it possible to manage the problems related to disposal of the garbage?  
(b) What is 'compost'?
5. Which food do the redworms eat?
6. The packaging increase the amount of garbage? How?
7. Write some advantages of waste recycling.
8. Define waste management? Is garbage disposal the responsibility of the government?

## Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences.

1. What is composting? Do you think it is better to use compost instead of chemical fertilizers? Why?
2. Write the main drawbacks of plastics.
3. Plastic production is increasing day by day in spite of the fact that plastic is harmful for the environment. What are the harmful effects of plastic usage?

## 2

## EXERCISE

## Text Book Questions

1. Which kind of garbage is not converted into compost by the redworms?
2. Have you seen any other organism besides redworms, in your pit? If yes, try to find out their names.
3. (a) Is garbage disposal responsibility only of the government?
4. (a) What do you do with left over food at home?  
(b) If you and your friends are given the choice of eating in a plastic plate or a banana leaf platter at a party, which one would you prefer and why?
- (b) Is it possible to reduce problems relating to the disposal of garbage?

5. (a) Collect pieces of different kinds of paper. Find out which of these can be recycled.  
(b) With the help of a lens look at the pieces of paper you collected for the above question. Do you see any difference in the material of a recycled paper and a new sheet of paper?
6. (a) Collect different kinds of packaging material. What was the purpose for which each one was used? Discuss in groups.  
(b) Give an example in which packaging could have been reduced?  
(c) Write a story on how packaging increases the amount of garbage.
7. Do you think that it is better to use compost instead of chemical fertilizers? Why?

### NCERT Exemplar Questions

1. Read the items mentioned in **Columns I** and **II** and fill in the related process in the **Column III**

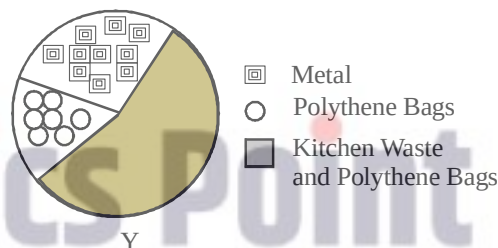
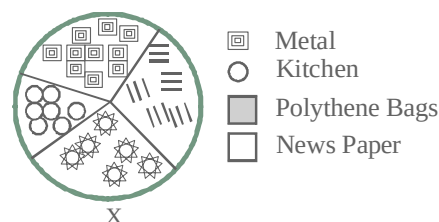
| Column I          | Column II                     |
|-------------------|-------------------------------|
| (a) Organic waste | Earthworms                    |
| (b) Garbage       | Dig pit and fill with garbage |
| (c) Old newspaper | Paper bags                    |

#### Column III

- (i) .....
  - (ii) .....
  - (iii) .....
2. Correct the definitions of certain terms given below by changing only one word.  
(i) Compost: Substances converted into manure for use in industries.  
(ii) Landfill: Garbage buried under water in an area.  
(iii) Recycling: Reuse of unused material in the same or another form.
  3. Provide the suitable term that expresses the meaning of each of the following statements.  
(a) Greeting cards made from newspaper.  
(b) Contents of the waste bins.  
(c) Worms converting certain kinds of waste into manure.  
(d) An area where a lot of garbage is collected, spread out and covered with soil.
  4. To what use can you put the following kinds of garbage and how?  
(i) Rotting smelly garbage  
(ii) Dry leaves collected in a garbage  
(iii) Old newspapers
  5. Beera, a farmer would clear his field everyday, and burn dry leaves fallen on the ground. After

sometime he found that those living in huts near his field were suffering from cough and breathing problems. (i) Can you explain why? (ii) Also suggest an environment friendly way to dispose the dry leaves.

6. The pie charts shown in figure below are based on waste segregation method adopted by two families X and Y respectively.



Which of the two families X or Y do you think is more environmentally conscious and why?

7. Given below are steps in vermicomposting and each step has been given an alphabet. Rearrange the steps in the correct sequence and write the alphabets on the chart provided. One step is done for you.

F – Dig a pit in a suitable place in your garden.  
C – Spread sand on the floor of the pit.  
E – Add vegetable peels and fruits waste in the pit.

A – Sprinkle water to keep it moist.

D – Place red worms in the pit.

B – Cover with a gunny bag or grass.

Step 1 – F                      2 –

3 –                              4 –

5 –                              6 –

8. Recently, a ban on plastic bags has been imposed in many places? Is the ban justified? Give reasons in three sentences.
9. Why should we not burn plastic items?
10. Answer the following questions in one or two words or sentences.  
(i) Why should we prefer to use paper bags rather than polythene bags?



- (ii) Who, out of the following should properly dispose off the garbage father, mother, elder brother, younger sister?
  - (iii) Which one out of beetles, roundworms and earthworms are used for vermicomposting and why?
2. Why do rag-pickers always seem to suffer from some disease or the other?
  3. Some things can be recycled while some cannot. Why should we not throw away anything that can be recycled?
  4. What would happen if waste material is not collected from the waste material bins for many days?
  5. Why is an earthworm called a farmer's friend?
  6. Can a junk dealer be called the environment's friend? Give reasons to support your answer.

### HOTS Questions

1. If you and your friends are given the choice of eating in a plastic plate or a banana leaf platter at a party, which one would you prefer and why?

## 3

# EXERCISE

### Multiple Choice Questions

**DIRECTIONS :** This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which only one is correct.

1. Which of the following best describes a garbage?
  - (a) Useful items used in kitchen
  - (b) Discarded rubbish, domestic waste, used plastic
  - (c) Low lying open area
  - (d) Items that can be recycled
2. Which of the following things constitute garbage?
  - (a) Broken toys
  - (b) Used polythenes
  - (c) Used shoes
  - (d) All of the above
3. Who are supposed to take the garbage from bins?
  - (a) Gardener
  - (b) Safai Karamcharis
  - (c) Milkman
  - (d) District Collector
4. Where is all the garbage from a city dumped to?
  - (a) A park
  - (b) A river
  - (c) A landfill
  - (d) A lake
5. Which is the best place for landfill in a city?
  - (a) Near a school
  - (b) Outside the city
  - (c) Near a hospital
  - (d) Near a park
6. What happens to the garbage in a landfill?
  - (a) They are burnt
  - (b) They are buried
  - (c) They are separated into useful and non useful components and then spread and covered with soil
  - (d) They are spread as such and made into a park
7. What happens to the useful components of garbage?
  - (a) They are resold in the market
  - (b) They are converted into compost
  - (c) They are burnt
  - (d) They are dried
8. The rotting and conversion of some materials into manure is called .....
  - (a) Sericulture
  - (b) Pisciculture
  - (c) Composting
  - (d) Recycling
9. One often sees blue and green dustbins on the roadside. What kind of garbage are thrown into these?
 

| <u>Blue</u>                       | <u>Green</u>                    |
|-----------------------------------|---------------------------------|
| (a) Plastics                      | Metals, glass                   |
| (b) Kitchen, plant, animal wastes | Plastic, metals                 |
| (c) Plastics glass, metals        | Kitchen, plant and animal waste |
| (d) Kitchen waste                 | Glass                           |
10. Which of the following wastes do not rot when buried in soil?
  - (a) Dry leaves, fruit peels
  - (b) Juice cans, leather shoes
  - (c) Bottle caps, glass bottles
  - (d) Both (b) and (c)
11. Things like plastic and metals should be
  - (a) Burnt
  - (b) Recycled
  - (c) Composted
  - (d) Dumped in land fills

12. Solid kitchen wastes can be
  - (a) dumped in a pit (b) composted
  - (c) vermicomposted (d) All of the above
13. How can we get rid of dried leaves and rotten vegetables?
  - (a) By recycling
  - (b) By burning
  - (c) By composting them
  - (d) By adding chemicals to them
14. What are redworms?
  - (a) A kind of snail
  - (b) A type of tapeworm
  - (c) A kind of insect
  - (d) A kind of earthworm
15. Culturing of redworms to make compost is called .....
  - (a) Redcomposting (b) Sericulture
  - (c) Vermicomposting (d) Pisciculture
16. What all can be given as food to redworms?
  - (a) Plastic coated paper
  - (b) Used tea leaves
  - (c) Dried stalks of plants
  - (d) Both (b) and (c)
17. What will happen if you put salt, pickles, meat, vinegar and milk in pit as food for redworms?
  - (a) Redworms will eat them
  - (b) Disease causing organisms will grow
  - (c) Compost will form
  - (d) They will smell badly
18. Which structure helps the redworms to grind their food?
  - (a) Teeth (b) Mouth
  - (c) Tongue (d) Gizzard
19. Under what conditions can redworms grow best?
  - (a) Under dry weather
  - (b) Very hot and cold conditions
  - (c) Not very hot and cold weather with moisture
  - (d) Very sunny conditions
20. What are benefits of vermicompost?
  - (a) It can be used to replenish soil
  - (b) It saves money on chemical fertilizers
  - (c) It helps get rid of garbage
  - (d) All of the above
21. The garbage contains which of the following?
  - (a) Plastics
  - (b) Metal containers
  - (c) Groundnut shells
  - (d) All of these
22. Where do we throw away the garbage from our home?
  - (a) At a distant place
  - (b) At our door steps
  - (c) In dust bins
  - (d) All of the above
23. By whom is garbage taken away from dust-bins?
  - (a) By Safai-Karamcharis
  - (b) By birds and animals
  - (c) By wind
  - (d) All of these
24. Where do **Safai-Karamcharis** take the garbage after collecting it from dust-bins?
  - (a) To their homes
  - (b) To distant markets
  - (c) To landfills
  - (d) Any place of their choice
25. Landfill
  - (a) is a low lying open area
  - (b) is a low lying open area, where the garbage collected from a city or town is dumped
  - (c) is a place where truck loads of garbage are dumped
  - (d) All of the above are correct
26. How is garbage handled at the landfill site?
  - (a) It is spread as such over the landfill site
  - (b) It is separated into useful and non-useful components and then spread over the landfill site
  - (c) Both the above are correct
  - (d) None of the above is correct
27. How are useful components of garbage utilized?
  - (a) They are dumped in compost making areas
  - (b) They are taken to various factory sites
  - (c) They are used as such
  - (d) None of the above is correct
28. When somethings in garbage rots completely and did not smell, it
  - (a) becomes manure
  - (b) can be mixed with soil to provide nutrients to plants
  - (c) Both the above are correct
  - (d) None of the above are correct
29. The rotting and conversion of some materials into manure is called
  - (a) fertilization (b) utilization
  - (c) composting (d) None of these
30. In some cities we find dust bins of two different colours for collection of garbage. These dustbins

- are usually of which of the following two colours?
- (a) Green and yellow
  - (b) Green and red
  - (c) Blue and red
  - (d) Blue and green
31. Which kind of materials are to be collected in blue coloured bins?
- (a) Plastics
  - (b) Metals
  - (c) Glass
  - (d) Materials that can be used again
32. What kind of materials are to be collected in green coloured bins?
- (a) Kitchen waste
  - (b) Plant waste
  - (c) Animal waste
  - (d) Those materials that rot completely when buried in soil
33. Is it correct to burn the huge heaps of dried leaves that are collected at various places?
- (a) Yes
  - (b) No
  - (c) Can't say
  - (d) All are correct
34. What is vermicomposting?
- (a) It is a method of preparing compost
  - (b) It is a method of preparing compost with the help of organisms
  - (c) It gives a vermilion coloured compost
  - (d) All of the above are correct
35. The organisms that are used for vermicomposting are
- (a) a type of earthworm
  - (b) called red worm
  - (c) Both the above
  - (d) None of the above
36. The red worms used in vermi composting need food like
- (a) Deadworms
  - (b) Plastic bags
  - (c) Broken toys
  - (d) Vegetable and fruit wastes
37. To make a comfortable home for red worms
- (a) Dig a pit about 30 cm deep
  - (b) Dig a pit about 30 cm deep at a place which is very hot
  - (c) Dig a pit about 30 cm deep at a place which is very cold
  - (d) Dig a pit 30 cm deep at a place which is neither too hot nor too cold
38. Which of the following may be spread at the bottom of pit dug to make home for red worms?
- (a) A net
  - (b) Wire mesh
  - (c) Chicken mess
  - (d) Any one of net, chicken mess and wire mesh
39. Which of the following may be given as food for red worms?
- (a) Coffee
  - (b) Tea
  - (c) Vegetable and fruit wastes
  - (d) All of the above
40. For redworms the food should be
- (a) put at the top layer of soil
  - (b) put at the bottom (about 30 cm) deep of the pit
  - (c) put at about 2-3 cm deep inside the pit
  - (d) All the above are correct
41. The red worms
- (a) have teeth to grind their food
  - (b) do not have teeth to grind their food
  - (c) need not grind their food
  - (d) swallow their food
42. Which of the following structures help the redworms to grind their food?
- (a) Mouth
  - (b) Teeth
  - (c) Tongue
  - (d) Gizzard
43. Which of the following items when mixed in wastes help red worms in grinding their food?
- (a) Powdered egg shells
  - (b) Powdered sea shells
  - (c) Both the above
  - (d) None of these
44. Which of the following cannot be converted into less harmful substance by process of composting?
- (a) Peels of vegetables and fruits
  - (b) Plant and animal wastes
  - (c) Paper
  - (d) Plastics
45. Which of the following can be recycled?
- (a) Paper
  - (b) Metal containers
  - (c) Newspapers
  - (d) All of these can be recycled
46. There are two heaps of garbage. **Heap A** contains peels of fruits and vegetables, egg shells, tea leaves, food wastes, etc.

- Heap B** contains polythene bags, aluminium foils, old shoes and broken glassware.
- Heap A** and **Heap B** are buried separately in different pots and these pots are then covered with soil. After few days the soil is removed. Which of the two heaps will appear black in colour and why?
- (a) Heap A, in it the waste materials have rotten completely
  - (b) Heap B, in it the waste materials have rotten only partly.
  - (c) Both, in both the waste materials have rotten completely
  - (d) Neither A nor B, the waste materials in both of them have rotten only partly.
47. Incidences of disease like skin cancer increases if.....
    - (a) oxygen in air decreases
    - (b) nitrogen in air decreases
    - (c) carbondioxide in air increases
    - (d) ozone layer decreases
  48. What is the correct method to dispose garbage?
    - (a) To burn it
    - (b) To prepare manure from biodegradable garbage
    - (c) To recycle non-degradable garbage
    - (d) Both (b) & (c)
  49. Find the CORRECT statement
    - (a) Plants help in soil erosion.
    - (b) Embankments are built across the slopes of hills to avoid soil erosion.
    - (c) Stray animals help to stop the soil erosion.
    - (d) To prevent the soil erosion, the speed of flowing water is increased.
  50. Why disposal of garbage has become a serious problem in big cities?
    - (a) Garbage is collected in large quantities.
    - (b) Garbage contains materials like plastic and thermocol which do not decompose.
    - (c) Garbage is not separated into wet garbage and dry garbage.
    - (d) All of the above
  51. Banana peel : ..... : plastic : non-biodegradable.
    - (a) decomposer
    - (b) biodegradable
    - (c) non-biodegradable
    - (d) fruit
  52. How can you reuse plastic bottles and metal cans?
    - (a) By making compost from them
    - (b) By using them for storing things
    - (c) By melting them to form new products
    - (d) By either of these
  53. Which of these is causing most harm to the environment?
    - (a) Biodegradable waste
    - (b) Poisonous waste
    - (c) Both (a) and (b)
    - (d) Plastic bags.
  54. Low lying land used to dispose garbage is called
    - (a) garbage dump
    - (b) landfill
    - (c) dustbin
    - (d) None of these
  55. If you want to recycle vegetable waste, bones, dry flowers and saw dust you will
    - (a) make compost from them
    - (b) burn them
    - (c) use them in landfills
    - (d) throw them in a lake/sea river
  56. This is a paste made of clay and paper. It is prepared for recycling of paper. It is
    - (a) paper-mache
    - (b) clay
    - (c) paper
    - (d) None of these
  57. Why do we develop composting areas near the landfill?
    - (a) To make the look of landfill beautiful.
    - (b) It is compulsory to develop such sites.
    - (c) To utilize some useful components of the garbage.
    - (d) None of these is correct explanation.
  58. Why are two separate bins provided, for collecting garbage, in some cities?
    - (a) It helps the city to be categorised in a better city.
    - (b) These are provided to collect separately the materials those which do not rot into garbage heaps and the wastes that rot completely when buried in soil.
    - (c) These bins are in different colours and attracts us to put the garbage in these dustbins.
    - (d) None of the above is correct.
  59. After a landfill site has been converted into a park or play ground, no construction is allowed

- over it for a period of  $A \times 10$  years, where A is equal to
- (a) 1 (b) 2  
(c) 4 (d) 8
60. If the mass of a redworm is assumed as "A" gram. How much food can it eat in a day?
- (a) 1 g (b) 2 g  
(c) A g (d) 2A g

### Statement Based Questions

**DIRECTIONS :** Read the following statements carefully and choose the correct option.

- (i) People generate a lot of garbage in their day to day activities.

(ii) There should be awareness on how to minimize garbage amongst people of all age groups.

(a) (i) is true but (ii) is false  
(b) (ii) is true but (i) is false  
(c) Both are true  
(d) Both are false
- (i) Garbage from different places are collected and dumped in garbage parks.

(ii) All the garbage from a city are burnt to avoid spread of diseases.

(a) (i) is true but (ii) is false  
(b) (ii) is true but (i) is false  
(c) Both are true  
(d) Both are false
- (i) Once the landfill is completely full of garbage it can be used to construct a building over it.

(ii) The compost making areas are developed near a landfill for biodegradable wastes.

(a) (i) is true but (ii) is false  
(b) (ii) is true but (i) is false  
(c) Both are true  
(d) Both are false
- (i) A black colour and no foul smell indicates that rotting of garbage is complete.

(ii) A completely rotten garbage can be used as a manure in a garden.

(iii) Some items in the garbage rot fast, while some do not rot at all.

(a) Only (i) is true  
(b) Only (ii) is true  
(c) Only (iii) is true  
(d) (i), (ii) and (iii) all are true
- (i) There are two coloured bins provided by municipalities in cities.

(ii) The red dustbin is to collected kitchen waste and the black dustbin is used to collect metals, glass and plastics.

(a) (i) is true but (ii) is false  
(b) (ii) is true but (i) is false  
(c) Both are true  
(d) Both are false
- (i) The proper way of disposing off dried leaves and stalks of crops is burning them.

(ii) Burning leaves provide comfort to people in cold weather.

(a) (i) is true but (ii) is false  
(b) (ii) is true but (i) is false  
(c) Both are true  
(d) Both are false
- (i) Redworms are a kind of earthworms used for composting.

(ii) They are considered to be farmers foe.

(a) (i) is true but (ii) is false  
(b) (ii) is true but (i) is false  
(c) Both are true  
(d) Both are false
- (i) Pieces of plastic coated newspaper and card board can be spread over sand at the base of pit used for vermicomposting.

(ii) The layer of waste should be tightly pressed in the pit for vermicomposting.

(a) (i) is true but (ii) is false  
(b) (ii) is true but (i) is false  
(c) Both are true  
(d) Both are false
- (i) Red worms need very hot and humid conditions to survive.

(ii) They have special structures called gizzards.

(iii) Redworms love to eat pickles, oil, meat and milk products.

(a) Only (i) is true  
(b) Only (ii) is true  
(c) Only (iii) is true  
(d) (i), (ii) and (iii) all are true
- (i) Papers such as old newspapers, boxes and magazines can be recycled.

(ii) Metals such as tin and aluminium used as food cans cannot be recycled.

(iii) Food scraps such as fish bones, chicken can be reused.

- (a) Only (i) is true  
 (b) Only (ii) is true  
 (c) Only (iii) is true  
 (d) (i), (ii) and (iii) all are true
11. (i) Indiscriminate disposal of plastic wastes can cause environmental pollution.  
 (ii) Plastics produce toxic gases when burnt.  
 (a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
 (b) (i) and (ii) are correct and (ii) is correct explanation of (i)  
 (c) (i) is correct but (ii) is incorrect  
 (d) Both are incorrect
12. (i) Recycling helps to conserve energy.  
 (ii) Recycling reduces pollution.  
 (a) (i) is true but (ii) is false  
 (b) (ii) is true but (i) is false  
 (c) Both are true  
 (d) Both are false
13. (i) Plastics are ideal for storing eatables.  
 (ii) On heating plastics give out toxic gases which can cause cancer.  
 (a) (i) is true but (ii) is false  
 (b) (ii) is true but (i) is false  
 (c) Both are true  
 (d) Both are false
14. (i) Throwing garbage in plastic bags is harmful to animals like dogs and cows.  
 (ii) Plastic bags choke drains and sewer pipe.  
 (a) (i) and (ii) are correct but (ii) is not correct explanation of (i)  
 (b) (i) and (ii) are correct and (ii) is correct explanation of (i)  
 (c) (i) is correct but (ii) is incorrect  
 (d) Both are incorrect
15. (i) We should insist in using paper bags or cloth bags when we go shopping.  
 (ii) Paper, cloth or jute are biodegradable and environment friendly.  
 (a) (i) is true but (ii) is false  
 (b) (ii) is true but (i) is false  
 (c) Both are true  
 (d) Both are false

### Figure/Diagram Based Questions

**DIRECTIONS :** Carefully observe the following pictures/figures and answer the questions.

1. Look at this land which has all the garbage of the city dumped. What is it called?



- (a) Garbage house                      (b) Trash bin  
 (c) Landfill                              (d) Pond
2. Look at these children putting garbage heaps in pits. Why are they doing so?



- (a) To grow plants  
 (b) To recycle waste  
 (c) To make manure  
 (d) To remove useful things
3. Look at this garbage bin. What kind of waste will go into this bin?



- (a) Kitchen waste  
 (b) Plant products  
 (c) Those that can rot  
 (d) All of the above
4. Which of the following can be thrown into this bin?





- (a) Banana peels (b) Bread pieces  
(c) Broken glass bottles (d) Nuts shells
5. Farmers are often seen to clear their fields and burn the husk, dry leaves and other parts of crop in their fields. Why is this considered to be a bad practise?



- (a) It makes soil useless  
(b) It produces smoke and harmful gases  
(c) It produces lot of noise  
(d) Both (a) and (b)
6. Which one out of these are used for vermi-composting?



- (a) P (b) Q  
(c) R (d) S
7. Raju always uses paper bags instead of polythene bags to carry food items. Why should we prefer paper bags?



- (a) Because they are strong  
(b) Because they are environment friendly  
(c) Because they can be recycled  
(d) Both (b) and (c)

8. We often come across sites like this. Why should plastic bags not thrown in open?



- (a) Because they choke sewage  
(b) Because animals swallow plastic while eating food from garbage  
(c) Because plastic is not environment friendly  
(d) All of the above.
9. Observe some of these items given below :



Which of these items cannot be recycled?

- (a) P (b) Q  
(c) R (d) S
10. Observe and identify the following symbol.



- (a) Danger  
(b) Decomposting  
(c) Biodegradable waste  
(d) Recycle and Reuse

### Matching Based Questions

**DIRECTIONS :** Match Column I with Column II and select correct answer using the code below.

- | Column I              | Column II        |
|-----------------------|------------------|
| (A) Biodegradable     | (p) fruit peels  |
| (B) Non Biodegradable | (q) plastic cups |
|                       | (r) egg shells   |
|                       | (s) metal cans   |
- (a) (A) → (q), (s); (B) → (p), (r)  
(b) (A) → (p), (q); (B) → (r), (s)  
(c) (A) → (r), (s); (B) → (p), (q)  
(d) (A) → (p), (r); (B) → (q), (s)

- ## Passage Based Questions

**DIRECTIONS :** Read the paragraph(s) given below and answer the following questions.

### Passage I

At the landfill site the part of the garbage that can be reused is separated out from one that cannot be used as such. The non-useful component is then spread over the landfill and then covered with a layer of soil.

1. A landfill
  - (a) is any open space where we dump the garbage
  - (b) is any open low lying area where garbage is dumped
  - (c) is an isolated spot away from the residential area that is used for dumping the garbage
  - (d) All of the above are correct
2. After the separation of useful and non-useful components from the garbage at landfill site.
  - (a) the heap of useful components is spread over the landfill site
  - (b) the heap of non-useful components is spread over the landfill site
  - (c) Both the heaps are spread over the landfill site
  - (d) None of the above is correct
3. We develop compost pits near the landfill site
  - (a) to utilize the available land
  - (b) to utilize some of the useful components of garbage
  - (c) to utilize some of the non-useful components of garbage
  - (d) All of the above are correct

### Passage II

If you collect the garbage from your home and put it in separate pits covered with soil for a few days. You will find that something in the garbage rots. They form manure which is used for plants.

4. The rotting and conversion of some materials into manure is called
- (a) composting
  - (b) decomposting
  - (c) vermi composting
  - (d) All of these are correct

5. Which of the following observations was the correct reporting about all the pits after 4 days when the soil was removed?
- (a) All the material in all the pits rotted completely and there was no smell
  - (b) In some cases there was a partial rotting
  - (c) In some cases there was no change at all
  - (d) All of the above are correct
6. If you are asked to identify some of the items of your kitchen waste (*i.e.* garbage from kitchen), which of the following are likely to be present in it?
- (a) Fruit and vegetable peels
  - (b) Egg shells
  - (c) Dry leaves
  - (d) All of these

### Passage III

A type of earthworm called redworm is used for composting. This method of preparing compost with the help of redworms is called vermi composting.

7. For vermicomposting we have to dig a compost pit having a depth of about
- (a) 10 cm                      (b) 30 cm
  - (c) 50 cm                      (d) 90 cm
8. For vermicomposting we have to use redworms. We have to make a comfortable home for redworms. The home for red worms is made
- (a) with cement and concrete at the bottom of pit
  - (b) with net or chicken mesh at the bottom of pit
  - (c) both the above are correct
  - (d) None of these is correct
9. Redworms need which of the following for survival?
- (a) Very hot environment
  - (b) Very cold environment
  - (c) Moisture
  - (d) None of the above is correct

### Assertion/Reason

**DIRECTIONS :** The questions in this segment consists of two statements, one labelled as “Assertion A” and the other labelled as “Reason R”. You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

1. **Assertion (A) :** Garbage contains plastics, metal containers and other wrapping materials.

**Reason (R) :** Useful and non-useful components are separated out from the garbage at landfill site after spreading the garbage over landfill site.

2. **Assertion (A) :** After a landfill site is completely filled with garbage it is converted into a park.

**Reason (R) :** At a landfill site that has been converted into a park, no building is allowed to be constructed for next 50 years.

3. **Assertion (A) :** We develop some compost making areas near the landfill.

**Reason (R) :** It is done to utilise some of the useful components of garbage.

4. **Assertion (A) :** You are advised never to burn the dry leaves.

**Reason (R) :** They produce harmful gases when burnt.

5. **Assertion (A) :** Vermicomposting is done with the help of blue worms.

**Reason (R) :** We can recycle paper to get useful products.

# SOLUTIONS

Brief Explanations  
of  
Selected Questions

## 1 EXERCISE

### Fill in the Blanks

- Sweeper (Safai karamcharis)
- useful, non-useful
- composting
- Vermi composting
- recycle
- composting
- friend
- Paper mache
- Micro organism, earth worms
- Paper
- poisonous
- moderate temperature, humidity
- low lying
- minimize
- teeth
- green
- green
- Reduce, recycle and reuse

### True/False

- |          |          |
|----------|----------|
| 1. True  | 2. True  |
| 3. False | 4. False |
| 5. True  | 6. False |
| 7. False | 8. False |

### Match the Column

- |    |                                    |                      |
|----|------------------------------------|----------------------|
| 1. | <b>Column I</b>                    | <b>Column II</b>     |
|    | (A) Metals                         | (t) Recycling        |
|    | (B) Leaves                         | (r) Composting       |
|    | (C) Cow dung                       | (p) Bio-gas          |
|    | (D) Vegetable and food waste       | (q) Vermicompost     |
|    | (E) Paper                          | (s) Recyclable       |
| 2. | <b>Column I</b>                    | <b>Column II</b>     |
|    | (A) Low lying area                 | (q) Landfill         |
|    | (B) Compost produced with redworms | (s) Vermicompost     |
|    | (C) No teeth macro-organisms       | (p) Red worms        |
|    | (D) 3R                             | (t) Waste management |
|    | (E) Mixing meat during composting  | (r) Increases        |

- (A) → (q); (B) → (p); (C) → (s); (D) → (r)
- (A) → (p); (B) → (q); (C) → (r); (D) → (s)
- (A) → (p); (B) → (q); (C) → (r); (D) → (s)

### Very Short Answer Type Questions

- Leftover food at home is dumped into the compost pit
- If not handled properly, they give foul smell and give an ugly look to natural beauty.
- Plastic coated paper is difficult to recycle.
- It becomes breeding ground for flies and mosquitoes.
- They should be taken out and recycled.
- It must be used for running a biogas plant.
- Sorting out the garbage in various groups is known as segregation.
- Plant waste, animals wastes and waste food are used for composting.
- It is a paste made up of paper, clay and rice husk.
- It can be converted into useful manure by composting. Burning it, will produce harmful gases.
- Redworms have gizzard for grinding the food.
- Garbage is an unwanted or undesired material or substance. It is also referred as rubbish, trash, waste, or junk depending upon the type or material.
- No, some of the garbages that can be recycled or converted into compost are useful.
- A landfill is a site for the disposal of waste materials by burial and is the oldest form of waste treatment. It is a low lying open area, in which non-useful garbage is dumped.

### Short Answer Type Questions

- The usage of plastic bags must be reduced as packaging of cooked food items in plastic bags might affect our health. Also, plastic bags are non-recyclable and burning of plastic bags may release harmful gases that can cause health diseases.
- The method of preparing compost with the help of red worms is called vermi-composting.
- The garbage which contains piece of cloth, broken glass, aluminium wrappers, polythene bags, nails, broken toys, and old shoes cannot

- be converted into compost by redworms.
4. (a) The problems related to disposal of the garbage can be managed by land filling garbage can be dumped.  
(b) Compost is a mixture that consists largely of decayed organic matter and is used for fertilising and conditioning land.
  5. They eat food items like fruits and vegetable wastes, tea and coffee remains and weeds from the garbage.
  6. Plastic bags, cans, aluminium foils, and many other packaging materials are used and thrown after use as garbage. Things like ghee, oils, soaps, cereals, snacks, even vegetables are available in smaller packets in which a lot of packaging material is used.
  7. Waste recycling has some significant advantages. It :
    - (i) leads to less utilization of raw materials.
    - (ii) reduces environmental impacts arising from waste treatment and disposal.
    - (iii) makes the surroundings cleaner and healthier.
    - (vi) saves on landfill space.
    - (v) saves money.
    - (vi) reduces the amount of energy required to manufacture new products.
  8. Waste management is the collection, transportation, processing, recycling and reusing of the usable waste materials.  
Proper disposal of garbage should be a concern of every citizen, and not just of the government. Each and every individual must reduce activities that pollute the environment. A lot of waste is generated from homes, offices, schools, hospitals, etc. It includes food waste, paper, plastic, glass, metal, etc. Therefore, it is required that every individual must reduce the production of wastes and must help in the proper disposal of these wastes.
- (iii) It is cheaper than chemical fertilizers.
  - (iv) Chemical fertilizers do not decomposed easily by natural methods thus increase soil and water pollution.
  2. The drawbacks of plastics are :
    - (i) The major drawback of plastic is its non degradability.
    - (ii) Consuming food packed in plastic bags could be harmful to our health.
    - (iii) All kind of plastics give out harmful gases, on burning. These gases may cause many health problems, such as cancer, in humans.
    - (vi) Some animal such as cows swallow plastic bags filled with garbage, and they can die due to this.
    - (v) The plastics also block the sewage system and the drains as a result of which the water spills over the roads during rains.
  3. Harmful effects of plastic usage are :
    - (i) Environmental pollution : Burning plastics can cause pollution.
    - (ii) Plastic cause harm to the cattle/animals if enter inside their alimentary canal.
    - (iii) They choke drainage system and the water spills on the road.

**Associated Value:** We should discourage the use of plastic as a source of packaging, storing as it is non bio-degradable.

## 2 EXERCISE

### Text Book Questions

### Long Answer Type Questions

**DIRECTIONS :** Give answer in 4-5 sentences. (LAQ)

1. Converting plant and animals waste into manure is called composting.  
Yes, it is better to use compost instead of chemical fertilizer due to the following reasons :
  - (i) Compost provides better and natural nutrients to the growing plants.
  - (ii) It is better absorbed by the roots.
2. (a) Proper disposal of garbage should be a concern of every citizen, and not just of the government. Each and every individual must reduce activities that pollute the environment. A lot of waste is generated from homes, offices, schools, hospitals, etc. It includes food waste, paper, plastic, glass, metal, etc. Therefore, it is required that every individual must reduce the production of wastes and must help in the proper disposal of these wastes.  
(b) Yes, it is possible to reduce problems related to disposal of garbage. Here are some steps that can be observed by every

individual to reduce the problem of garbage disposal.

- (i) Avoid using plastic bags. Encourage shopkeepers to use paper bags or always carry a cloth or jute bag while shopping.
  - (ii) Save paper. Use both sides of paper to write.
  - (iii) Use separate bins for recyclable and non-recyclable waste.
  - (iv) Kitchen waste that includes fruit and vegetable peels, waste food, tea leaves, etc. can be used to make manure.
  - (v) Encourage your family, friends, and others to follow proper disposal practices.
4. (a) Left over food can be used to make compost which provides nutrients essential for the growth and development of plants.
  - (b) We would prefer to eat food in a banana leaf platter. This is because a leaf platter is a harmless substance that can be used to make manure by the process of composting, whereas plastic plates cannot be converted into harmless substances by composting. They remain in the environment and create many problems.
  5. (a) All type of paper can be recycled.
  - (b) It is impossible to find out the difference between a recycled and a new sheet of paper. However, it is believed that recycled paper is usually of low quality.
  6. (a) The different kinds of packaging materials commonly used includes:
    - (i) plastic bags for carrying eatables or other household things
    - (ii) cloth or jute bags for carrying fruits vegetables or other groceries.
    - (iii) paper bags for carrying small groceries, packing of food, etc.
  - (c) Packaging increases the amount of garbage as we keep on throwing the packaging materials carelessly on roads and other places. Also, since these packaging materials (mainly plastic covers) are non-recyclable, they keep lying on the roads and cannot be properly disposed off. Sometimes, they get into drains and sewer systems and block them, creating more problems.
  7. Yes, it is better to use compost instead of chemical fertilizers, Because compost is

prepared from plant and animal wastes, therefore, it easily gets decomposed. It does not add any harmful chemicals to the soil, whereas an excessive use of chemical fertilizers causes soil and water pollution.

### NCERT Exemplar Questions

1. (i) Vermicomposting  
(ii) Garbage disposal/landfill  
(iii) Recycle
2. (i) replace industries by agricultural fields.  
(ii) replace water by soil water and write soil  
(iii) replace unused by used
3. (a) Recycling (b) Garbage  
(c) Vermicomposting (d) Landfill
4. (i) Convert into compost.  
(ii) Use as manure.  
(iii) Recycle to make paper bags or paper pulp for handicrafts.
5. (i) Fumes and gases from burning materials that causes cough and breathing problems.  
(ii) For making manure dry leaves can be used.
6. X is more environmentally conscious because the kitchen waste and polythene bags are disposed off separately. They separate biodegradable waste and non-biodegradable wastes, which are processed separately.
7. Step 1 – F, 2 – C, 3 – E, 4 – B, 5 – A, 6 – D
8. Yes, the ban on plastic bags is justified. These plastic bags are not disposed off properly and are usually found scattered either on roadsides or in drains. These plastic bags clog the drains and the water overflows on the road. During rainy season, since they are non-biodegradable, cause a havoc.
9. Plastic items should not be burnt because
  - (i) They do not burn easily.
  - (ii) The cows may eat, these burnt pieces and choke them.
  - (iii) The gases released prove to be a health hazard for humans.
  - (iv) The ashes left on burning are toxic.
  - (v) Also causes soil pollution.
10. (i) Paper can be recycled, polythene bags do not degrade. Polythene bags are difficult to dispose off and get accumulated.
- (ii) Every member should properly dispose off the garbage. It is the responsibility of everyone to be environmentally conscious.
- (iii) Earthworms convert waste from plants and animals or their product into compost.



**HOTS Questions**

1. We would prefer the banana leaf platter because banana leaf is easily biodegraded whereas plastic plates are non-biodegradable and add up to the soil pollution.
2. Rag-pickers come across different sorts of wastes. While they are collecting rags they are subjected to chemical poisons, infectious materials and hazardous materials discarded as wastes. Since they are always malnourished they tend to suffer from diseases like tuberculosis and cancer, retarded growth and anemia.
3. Recycling things can reduce the amount of garbage produced. Therefore, recyclable things should not be thrown away.
4. (i) A toxic odour will develop in the surroundings.  
(ii) Large number of mosquitoes and pests will begin to settle.  
(iii) Many diseases will spread.  
(iv) The air gets polluted.  
(v) Unhygienic conditions will develop.
5. Earthworm helps in converting biodegradable wastes into compost which is very fertile for soil.
6. Yes, because he collects all the junk and deposits it for recycling. This way he helps in preventing waste accumulation in environment.
7. (b) few days, it changes into manure. The process of making manure is called composting.
8. (c) Blue bin is for wastes that can be recycled and used again while green bin is for all kinds of biodegradable wastes.
9. (d) Things made of glass, plastic and metals do not rot or take very long to rot.
10. (b) One should try to recycle non biodegradable items as much as possible.
11. (d) Any of these can be followed for kitchen waste.
12. (c) These can be composted into useful manure which can be used as a fertilizer.
13. (d)
14. (c) Preparing compost with the help of redworms is called vermicomposting.
15. (d) Redworms can feed on fruit and vegetables wastes, tea & coffee remains, weeds, dry stalks, etc.
16. (b) The organisms like bacteria will grow on these things and can spread diseases.
17. (d) Redworms do not have teeth. They have special structures called gizzard which help them to grind food.
18. (c) Redworms do not require very hot and cold conditions but need lot of moisture.
19. (d) Vermicompost is formed by using biodegradable wastes. It is rich in nutrients that can be added to soil to increase fertility. It is cost-effective too.
20. (d)
21. (d)
22. (c)
23. (a)
24. (c)
25. (b)
26. (b)
27. (a)
28. (c)
29. (c) It is called composting.
30. (d)
31. (d) Plastics, metals and glass are type of materials which can be used again.
32. (d)
33. (b) No, burning of dry leaves produces smoke and harmful gases which are injurious to our health.
34. (b)
35. (c) Redworm used in vermi composting is a type of earthworm.
36. (d)
37. (d)
38. (d)
39. (c)
40. (c)
41. (b) They do not have teeth to grind their food.
42. (d) They have a structure called 'gizzard' which helps them in grinding their food.

**3 EXERCISE****Multiple Choice Questions**

1. (b) All kinds of discarded rubbish, refused domestic waste, used plastic items and wrapping materials are called garbage.
2. (d)
3. (b) There are many Safai Karamcharis appointed by the Municipalities to take away the garbage and dump them in landfills.
4. (c) Landfill is a low lying open area in the outskirts of a city where garbage is dumped.
5. (b) Landfills should be outside the city.
6. (c) Garbage is first segregated in a landfill and then non-useful components are spread and covered with soil.
7. (b) Useful components can be converted into compost by burying them in a pit.
8. (c) When some useful wastes such as kitchen wastes are buried in pits and get rotten after

43. (c)    44. (d)    45. (d)    46. (a)  
 47. (d)    48. (d)  
 49. (b) Plant roots hold the soil and slow down soil erosion. Movement of the stray animals dig the soil and helps in soil erosion. If speed of water increases more erosion will occur.  
 Embankments built across the slopes will help in reducing soil erosion.  
 50. (d) All types of waste adds to the quantum of garbage in big cities.  
 51. (b)    52. (b)    53. (d)    54. (b)  
 55. (a)    56. (a)    57. (c)    58. (b)  
 59. (b)  $2 \times 10 = 20$  years  
 60. (c) It can eat food equal to its weight in a day.

### Statement Based Questions

- (c)
- (d) Garbage of a city are collected in a landfill meant for the purpose and there the garbage is either buried in pits or separated for recycling.
- (b) Once the landfill is full, it can be converted into a park or playground but buildings cannot be built for 20 years.
- (d)
- (a) Green dustbin is for kitchen waste and blue is for non biodegradable items.
- (d) Burning of crops should be made illegal as they produce harmful gases which are bad for health.
- (a) Redworms are farmers' friend as they help farmers in making soil rich in nutrients.
- (d) There should be no trace of plastic and toxic material in the pit and the waste should be placed loose so that the waste have sufficient air and moisture.
- (b) Redworms need moderate conditions i.e. not very hot and cold weather but some moisture is good. Pickles, oil, meat and milk products are not food for worms but other diseases causing organisms.
- (a) Metals can also be recycled and food scraps cannot be reused.
- (a) Plastics are made of chemicals and cannot be decomposed by micro-organism, that is why they are a hazard.
- (c)
- (b) We should not store eatables in plastics.
- (a) When stray animals look for food in these

bags, they end up swallowing these plastics. That is why we should not throw garbage in plastics bags.

15. (c)

### Figure/Diagram Based Questions

- (c) It is a low lying area to dump garbage.
- (c) The children are preparing manure by composting method.
- (d) The green bin is used to collect all kinds of biodegradable wastes.
- (c) Non biodegradable items are thrown in blue bins.
- (d) Burning of crops produces harmful gases that affect our lungs. It also degrades the soil.
- (b) Redworms are used for vermicomposting.
- (d) Paper bags are convenient and environment friendly as they can be easily decomposed. Paper can be recycled as well.
- (d)
- (b) Organic wastes cannot be recycled.
- (d) The symbol denotes recycling of wastes and reusing them so that environment is not harmed.

### Matching Based Questions

1. (d)    2. (b)    3. (c)    4. (a)  
 5. (c)

### Passage Based Questions

1. (b)    2. (b)    3. (b)  
 4. (a) It is called composting. For vermicomposting we need some organisms.  
 5. (d)    6. (d)    7. (b)    8. (b)  
 9. (c)

### Assertion/Reason

- (c) Assertion is correct but Reason is false. Useful and non-useful components are separated before spreading the garbage over landfill site.
- (c) Assertion is correct, Reason is false. Assertion is correct but Reason is incorrect. No building is allowed to be constructed for next 20 years not 50 years.
- (a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
- (a)
- (d) Assertion is wrong while, Reason is correct.

