Class 12 Physics
Important Questions

Chapter-Wise Conceptual & Numerical Questions with Step-by-Step Solutions

Chapter-wise Q&A | Solved Numericals | Formula Sheet | Important Derivations

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About This Question Bank

Class 12 Physics has both conceptual and numerical questions, and it's not always easy to tell which ones deserve the most practice before an exam. This question bank brings together the most important chapter-wise questions — conceptual and numerical — with full step-by-step solutions, key formulas, and important derivations, so you can revise efficiently and confidently.

How To Use This PDF

1. Revise the chapter concept first, from your notes or NCERT.
2. Attempt each question without looking at the solution.
3. Check your answer, and understand exactly where you went wrong.
4. Re-attempt the questions you missed after a few days — that's what makes a topic exam-ready.

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CHAPTER 01

Electric Charges and Fields

Conceptual Questions

1. Why does a charged body attract a small piece of uncharged paper?

The charged body induces opposite charges on the near side of the neutral paper (polarisation). The attractive force on the nearer, opposite charge is slightly stronger than the repulsive force on the farther, similar charge, so there is a net attraction.

2. Why can two electric field lines never cross each other?

If two field lines crossed, the field at that point would point in two directions at once, which is impossible since the electric field at any point has one unique direction.

3. State Gauss's law and give one situation where it simplifies calculations.

Gauss's law: total electric flux through a closed surface = (charge enclosed)/ε_0. It greatly simplifies field calculations for highly symmetric charge distributions such as an infinite sheet, a uniformly charged sphere, or a long straight wire.

Numerical Questions

Q1. Two point charges of +2 μC and +6 μC are placed 30 cm apart in air. Find the electrostatic force between them.

Given: $q_1 = 2 \times 10^{-6}$ C, $q_2 = 6 \times 10^{-6}$ C, r = 0.3 m
Formula: $F = kq_1q_2/r^2$ ($k = 9 \times 10^9$ N·m²/C²)
Calculation: $F = (9\times10^9 \times 2\times10^{-6} \times 6\times10^{-6}) / (0.3)^2$
Answer: F = 1.2 N (repulsive)

Q2. Using Gauss's law, find the electric field outside a uniformly charged sphere of total charge Q at distance r > R from its centre.

Given: Spherical Gaussian surface of radius r, charge enclosed = Q
Formula: $E \times 4\pi r^2 = Q/\varepsilon_0$
Calculation: Solve for E
Answer: $E = Q / (4\pi\varepsilon_0 r^2)$ — sphere behaves as a point charge at its centre

Important Formulas

- Coulomb's law: $F = kq_1q_2/r^2$
- Electric field: $E = F/q$
- Field due to infinite sheet: $E = \sigma/2\varepsilon_0$
- Gauss's law: $\varphi = Q_{enc}/\varepsilon_0$

CHAPTER 02

Electrostatic Potential and Capacitance

Conceptual Questions

1. Why is no work done in moving a charge along an equipotential surface?

The potential difference between any two points on the surface is zero, so $W = q\Delta V = 0$.

2. Why does inserting a dielectric increase the capacitance of a parallel plate capacitor?

The dielectric gets polarised, reducing the net electric field between the plates for the same charge, which increases capacitance since $C = Q/V$.

3. A capacitor is disconnected from a battery and its plate separation is increased. What happens to the stored energy?

Charge stays constant, so energy $U = Q^2/2C$ increases as capacitance decreases.

Numerical Questions

Q1. A parallel plate capacitor has plates of area 200 cm² separated by 2 mm in air. Find its capacitance.

Given: $A = 200 \times 10^{-4}$ m², $d = 2 \times 10^{-3}$ m, $\varepsilon_0 = 8.85 \times 10^{-12}$ F/m
Formula: $C = \varepsilon_0 A/d$
Calculation: $C = (8.85\times10^{-12} \times 200\times10^{-4}) / (2\times10^{-3})$
Answer: $C \approx 88.5$ pF

Q2. Three capacitors of 2 μF, 3 μF and 6 μF are connected in series. Find the equivalent capacitance.

Given: $C_1 = 2$ μF, $C_2 = 3$ μF, $C_3 = 6$ μF
Formula: $1/C = 1/C_1 + 1/C_2 + 1/C_3$
Calculation: $1/C = 1/2 + 1/3 + 1/6 = 1$
Answer: $C = 1$ μF

Important Formulas

- Potential: $V = kq/r$
- Capacitance: $C = Q/V$
- Series: $1/C = 1/C_1 + 1/C_2 + \ldots$ | Parallel: $C = C_1 + C_2 + \ldots$
- Energy: $U = \frac{1}{2}CV^2 = \frac{1}{2}QV = Q^2/2C$

CHAPTER 03

Current Electricity

Conceptual Questions

1. Why does the resistance of most metallic conductors increase with temperature?

Increased thermal vibration of ions increases electron collision frequency, reducing relaxation time and increasing resistivity.

2. Why are cells connected in series for high voltage and in parallel for high current?

Series connection adds up EMFs (useful for voltage). Parallel connection reduces effective internal resistance, allowing higher current delivery.

3. State Kirchhoff's junction rule and loop rule.

Junction rule: sum of currents entering a junction equals sum leaving it (charge conservation). Loop rule: algebraic sum of potential differences around any closed loop is zero (energy conservation).

Numerical Questions

Q1. A wire of resistance 10 Ω is stretched to double its length (volume constant). Find its new resistance.

Given: $R_1 = 10\ \Omega$, length doubled, volume constant
Formula: $R \propto l^2/V$ (since $R = \rho l/A = \rho l^2/V$)
Calculation: $R_2 = 10 \times (2)^2$
Answer: $R_2 = 40\ \Omega$

Q2. In a balanced Wheatstone bridge, three arms have 4 Ω, 6 Ω and 8 Ω. Find the fourth resistance S.

Given: $P = 4\ \Omega$, $Q = 6\ \Omega$, $R = 8\ \Omega$
Formula: Balance condition: $P/Q = R/S$
Calculation: $S = (Q \times R)/P = (6 \times 8)/4$
Answer: $S = 12\ \Omega$

Important Formulas

- Ohm's law: $V = IR$
- Resistance: $R = \rho l/A$
- Series: $R = R_1+R_2+\ldots$ | Parallel: $1/R = 1/R_1+1/R_2+\ldots$
- Power: $P = VI = I^2R = V^2/R$
- EMF equation: $\varepsilon = I(R + r)$

CHAPTER 04

Moving Charges and Magnetism

Conceptual Questions

1. Why does a charged particle moving parallel to a magnetic field feel no force?

Magnetic force $F = qv \times B$ depends on $\sin\theta$ between v and B; when they are parallel, $\sin\theta = 0$.

2. Why is a moving-coil galvanometer more sensitive with more turns?

Torque on the coil (and hence deflection) is directly proportional to the number of turns N for a given current.

3. State the Biot–Savart law and how it differs from Ampere's circuital law in use.

Biot–Savart law gives the field due to a small current element and works for any geometry; Ampere's law is more convenient for highly symmetric current distributions.

Numerical Questions

Q1. A straight wire carries 5 A. Find the magnetic field at a point 10 cm away.

Given: $I = 5$ A, $r = 0.1$ m, $\mu_0 = 4\pi \times 10^{-7}$ T·m/A
Formula: $B = \mu_0 I / (2\pi r)$
Calculation: $B = (4\pi\times10^{-7} \times 5) / (2\pi \times 0.1)$
Answer: $B = 1 \times 10^{-5}$ T

Q2. An electron moves at 2×10^6 m/s perpendicular to a field of 0.5 T. Find the force on it.

Given: $v = 2\times10^6$ m/s, $B = 0.5$ T, $q = 1.6\times10^{-19}$ C, $\theta = 90°$
Formula: $F = qvB \sin\theta$
Calculation: $F = 1.6\times10^{-19} \times 2\times10^6 \times 0.5 \times 1$
Answer: $F = 1.6 \times 10^{-13}$ N

Important Formulas

- $F = qvB \sin\theta$ | $F = BIL \sin\theta$
- B (straight wire) = $\mu_0 I/2\pi r$
- B (centre of circular loop) = $\mu_0 I/2R$
- Torque on a current loop: $\tau = NIAB \sin\theta$

CHAPTER 05

Magnetism and Matter

Conceptual Questions

1. Why does a freely suspended bar magnet align along the north-south direction?

It experiences a torque due to Earth's magnetic field that aligns its magnetic moment with the field direction.

2. What is magnetic susceptibility? How does it differ across material types?

It is the ratio of magnetisation to applied field intensity (M/H). It is small and negative for diamagnetic materials, small and positive for paramagnetic materials, and large and positive for ferromagnetic materials.

Numerical Questions

Q1. A bar magnet of moment 2 A·m² is placed in a 0.2 T field at 30° to the field. Find the torque.

Given: $M = 2\ A\cdot m^2$, $B = 0.2\ T$, $\theta = 30°$
Formula: $\tau = MB \sin\theta$
Calculation: $\tau = 2 \times 0.2 \times \sin30° = 2 \times 0.2 \times 0.5$
Answer: $\tau = 0.2\ N\cdot m$

Important Formulas

- $\tau = M \times B$
- Magnetic moment of a current loop: $M = NIA$
- Susceptibility: $\chi = M/H$ | Relative permeability: $\mu_r = 1 + \chi$

CHAPTER 06

Electromagnetic Induction

Conceptual Questions

1. State Lenz's law and connect it to energy conservation.

The induced current always opposes the change in flux that produced it. This is a direct consequence of energy conservation — an induced effect helping the change would create energy from nothing.

2. Why does an aluminium ring jump when current is switched on in a nearby coil?

The sudden rise in flux induces an opposing current in the ring (Lenz's law), producing a repulsive force between the coil and the ring.

Numerical Questions

Q1. A coil of 100 turns, area 0.02 m², sits in a field changing from 0.1 T to 0.5 T in 2 s. Find the induced EMF.

Given: $N = 100$, $A = 0.02\ m^2$, $\Delta B = 0.4$ T, $\Delta t = 2$ s
Formula: $\varepsilon = N \times A \times (\Delta B/\Delta t)$
Calculation: $\varepsilon = 100 \times 0.02 \times (0.4/2)$
Answer: $\varepsilon = 0.4$ V

Important Formulas

- $\varphi = BA\cos\theta$
- $\varepsilon = -N(d\varphi/dt)$
- Motional EMF = Bvl
- Self-induction: $\varepsilon = -L(dI/dt)$ | Mutual induction: $\varepsilon_2 = -M(dI_1/dt)$

CHAPTER 07

Alternating Current

Conceptual Questions

1. Why is the average value of AC over a full cycle zero, but the RMS value is not?

Positive and negative halves cancel over a full cycle, but RMS squares the values first, so the negative parts also contribute positively to the average.

2. What is resonance in an LCR circuit, and when does it occur?

Resonance occurs when inductive reactance equals capacitive reactance ($X_L = X_C$), making impedance purely resistive and current maximum.

3. Why does a transformer work only on AC, not DC?

A transformer relies on mutual induction, which needs a changing flux; DC produces a constant flux, so no EMF is induced in the secondary coil.

Numerical Questions

Q1. An AC source has peak voltage 220 V. Find its RMS value.

Given: $V_0 = 220$ V
Formula: $V_{rms} = V_0/\sqrt{2}$
Calculation: $V_{rms} = 220 / 1.414$
Answer: $V_{rms} \approx 155.6$ V

Q2. A series LCR circuit has $X_L = 30\ \Omega$, $X_C = 10\ \Omega$, $R = 20\ \Omega$. Find the impedance.

Given: $R = 20\ \Omega$, $X_L = 30\ \Omega$, $X_C = 10\ \Omega$
Formula: $Z = \sqrt{[R^2 + (X_L - X_C)^2]}$
Calculation: $Z = \sqrt{[20^2 + (30-10)^2]} = \sqrt{800}$
Answer: $Z \approx 28.3\ \Omega$

Important Formulas

- $V_{rms} = V_0/\sqrt{2}$ | $I_{rms} = I_0/\sqrt{2}$
- $X_L = \omega L$ | $X_C = 1/\omega C$
- $Z = \sqrt{[R^2+(X_L-X_C)^2]}$
- Resonant frequency: $\omega_0 = 1/\sqrt{(LC)}$ | Power: $P = V_{rms} I_{rms} \cos\varphi$

CHAPTER 08

Electromagnetic Waves

Conceptual Questions

1. What is displacement current and why did Maxwell introduce it?

It is a current-like term ($\varepsilon_0\, d\varphi_E/dt$) added to Ampere's law to keep it consistent with charge conservation, especially where the electric field is changing, such as in a charging capacitor.

2. Arrange the EM spectrum in increasing frequency and give one use each of microwaves and X-rays.

Radio waves < microwaves < infrared < visible light < ultraviolet < X-rays < gamma rays. Microwaves: radar and communication. X-rays: medical imaging.

3. Why don't electromagnetic waves need a medium to travel?

They consist of oscillating electric and magnetic fields that regenerate each other, unlike mechanical waves that need particles of a medium.

Important Formulas

- Speed of light: $c = 1/\sqrt{(\mu_0\varepsilon_0)}$
- $c = E_0/B_0$

CHAPTER 09

Ray Optics and Optical Instruments

Conceptual Questions

1. Why does a convex lens converge light while a concave lens diverges it?

A convex lens is thicker at the centre, bending rays inward more toward the edges; a concave lens is thinner at the centre and does the opposite.

2. What is total internal reflection? State its two conditions.

Complete reflection of light back into a denser medium at a boundary with a rarer medium. Conditions: (1) light travels from denser to rarer medium, (2) angle of incidence exceeds the critical angle.

3. Why does a microscope use two convex lenses instead of one?

Two lenses (objective + eyepiece) give two-stage magnification, producing much higher overall magnifying power than a single lens.

Numerical Questions

Q1. An object is placed 20 cm from a convex lens of focal length 10 cm. Find the image position and magnification.

Given: $u = -20$ cm, $f = +10$ cm
Formula: $1/v - 1/u = 1/f$
Calculation: $1/v = 1/f + 1/u = 1/10 - 1/20 = 1/20 \Rightarrow v = 20$ cm; $m = v/u = -1$
Answer: Real, inverted image at 20 cm; same size ($m = -1$)

Q2. Light travels from water (n = 1.33) to air. Find the critical angle.

Given: $n = 1.33$
Formula: $\sin C = 1/n$
Calculation: $\sin C = 1/1.33 = 0.75$
Answer: $C \approx 48.6°$

Important Formulas

- Mirror formula: $1/v + 1/u = 1/f$
- Lens formula: $1/v - 1/u = 1/f$
- Refractive index: $n = \sin i / \sin r$
- Power of lens: $P = 1/f$ (f in metres)

CHAPTER 10
Wave Optics

Conceptual Questions

1. State Huygens' principle.

Every point on a wavefront acts as a source of secondary wavelets; the new wavefront is the envelope of these wavelets at a later instant.

2. Why is the central fringe bright in Young's double-slit experiment?

At the centre, path difference from both slits is zero, so waves arrive in phase and interfere constructively.

3. How does diffraction differ from interference?

Interference is superposition of waves from two (or more) coherent sources; diffraction is bending of waves from different parts of the same wavefront around obstacles or through a slit.

Numerical Questions

Q1. In YDSE, slit separation = 0.5 mm, screen distance = 1 m, fringe width observed = 1.2 mm. Find the wavelength.

Given: $d = 0.5\times10^{-3}$ m, $D = 1$ m, $\beta = 1.2\times10^{-3}$ m
Formula: $\beta = \lambda D/d$
Calculation: $\lambda = \beta d/D = (1.2\times10^{-3} \times 0.5\times10^{-3}) / 1$
Answer: $\lambda = 6 \times 10^{-7}$ m = 600 nm

Important Formulas

- Fringe width: $\beta = \lambda D/d$
- Constructive interference: path diff. = $n\lambda$ | Destructive: $(n+½)\lambda$
- Brewster's angle: $\tan \theta_B = n$

CHAPTER 11

Dual Nature of Radiation and Matter

Conceptual Questions

1. Why does the photoelectric effect support the particle nature of light?

Emission of electrons happens instantaneously above a threshold frequency, regardless of intensity — only explainable if light behaves as discrete photons, not continuous waves.

2. What is the role of work function in the photoelectric effect?

It is the minimum energy needed to eject an electron from a metal surface; if photon energy is less than the work function, no photoelectrons are emitted, however intense the light.

3. Why doesn't increasing light intensity raise the kinetic energy of photoelectrons?

Kinetic energy depends only on photon energy (frequency); intensity affects only the number of photons, and hence the number of photoelectrons.

Numerical Questions

Q1. The work function of a metal is 2 eV. Find the threshold frequency.

Given: $W_0 = 2$ eV $= 3.2\times10^{-19}$ J, $h = 6.63\times10^{-34}$ J·s
Formula: $W_0 = h\nu_0$
Calculation: $\nu_0 = W_0/h = 3.2\times10^{-19} / 6.63\times10^{-34}$
Answer: $\nu_0 \approx 4.83 \times 10^{14}$ Hz

Q2. Find the de Broglie wavelength of an electron accelerated through 100 V.

Given: $m = 9.1\times10^{-31}$ kg, $e = 1.6\times10^{-19}$ C, $V = 100$ V
Formula: $\lambda = h/\sqrt{(2meV)}$
Calculation: $\lambda = 6.63\times10^{-34} / \sqrt{(2 \times 9.1\times10^{-31} \times 1.6\times10^{-19} \times 100)}$
Answer: $\lambda \approx 1.23 \times 10^{-10}$ m (1.23 Å)

Important Formulas

- Einstein's equation: $KE_{max} = h\nu - W_0$
- de Broglie wavelength: $\lambda = h/p = h/mv$
- Stopping potential: $eV_0 = h\nu - W_0$

CHAPTER 12

Atoms

Conceptual Questions

1. What was the major limitation of Rutherford's atomic model?

It could not explain why orbiting electrons don't spiral inward and collapse due to continuous radiation, as classical electromagnetism would predict.

2. State Bohr's postulate about the stability of electron orbits.

Electrons revolve only in fixed orbits where angular momentum is an integral multiple of $h/2\pi$, and they do not radiate energy while in these orbits.

3. Why does the hydrogen spectrum show distinct lines rather than a continuous band?

Electrons jump only between fixed, quantised energy levels, so only specific photon energies (and hence specific wavelengths) are emitted or absorbed.

Numerical Questions

Q1. Find the radius of the first Bohr orbit of hydrogen (n = 1).

Given: $n = 1$
Formula: $r_n = 0.529 \times n^2$ Å
Calculation: $r_1 = 0.529 \times 1^2$
Answer: $r_1 = 0.529$ Å

Q2. Find the energy released when an electron in hydrogen jumps from n = 3 to n = 2.

Given: $E_n = -13.6/n^2$ eV
Formula: $E_3 = -13.6/9 = -1.51$ eV; $E_2 = -13.6/4 = -3.4$ eV
Calculation: $\Delta E = E_2 - E_3 = -3.4 - (-1.51)$
Answer: Energy released = 1.89 eV (a line in the Balmer series)

Important Formulas

- Orbit radius: $r_n = n^2h^2\varepsilon_0/\pi me^2$
- Energy: $E_n = -13.6/n^2$ eV
- Rydberg formula: $1/\lambda = R(1/n_1^2 - 1/n_2^2)$

CHAPTER 13

Nuclei

Conceptual Questions

1. What is mass defect and why does it occur?

It is the difference between the sum of masses of individual nucleons and the actual mass of the nucleus; it occurs because some mass converts into binding energy (per $E = mc^2$).

2. Why is binding energy per nucleon important for fission and fusion?

Nuclei near iron (mass number ~56) have the highest binding energy per nucleon; both fission of heavy nuclei and fusion of light nuclei move toward this more stable region, releasing energy.

3. What is half-life, and how does it differ from mean life?

Half-life is the time for half the radioactive nuclei to decay; mean life is the average lifetime of a nucleus and equals about 1.44 times the half-life.

Numerical Questions

Q1. Calculate the binding energy of a nucleus with mass defect 0.03 u (1 u = 931.5 MeV).

Given: $\Delta m = 0.03$ u
Formula: $BE = \Delta m \times 931.5$ MeV
Calculation: $BE = 0.03 \times 931.5$
Answer: $BE \approx 27.9$ MeV

Q2. A radioactive sample has a half-life of 20 days. How much of a 100 g sample remains after 60 days?

Given: $T_{1/2} = 20$ days, $t = 60$ days = 3 half-lives
Formula: Remaining = Initial × $(½)^n$
Calculation: Remaining = 100 × $(½)^3$ = 100/8
Answer: Remaining = 12.5 g

Important Formulas

- Binding energy: $BE = \Delta mc^2$ (in MeV, 1 u = 931.5 MeV)
- Decay law: $N = N_0 e^{-\lambda t}$
- Half-life: $T_{1/2} = 0.693/\lambda$ | Activity: $A = \lambda N$

CHAPTER 14

Semiconductor Electronics

Conceptual Questions

1. What is the difference between intrinsic and extrinsic semiconductors?

An intrinsic semiconductor is pure, with equal electrons and holes; an extrinsic semiconductor is doped to increase either electrons (n-type) or holes (p-type).

2. How does a p-n junction diode allow current in only one direction?

In forward bias, the depletion region narrows, letting majority carriers flow easily; in reverse bias, it widens, blocking current (except a tiny reverse saturation current).

3. What is the function of a Zener diode in voltage regulation?

It operates in reverse breakdown at a fixed voltage, maintaining a constant output voltage across a load even when input voltage or load current varies.

Important Formulas

- Diode: conducts in forward bias, blocks in reverse bias (except leakage current)
- Logic gates: AND → output 1 only if all inputs are 1; OR → output 1 if any input is 1

CHAPTER 15

Most Important Numerical Questions

A focused set of extra numericals from the most calculation-heavy chapters, in the same Given → Formula → Calculation → Answer format.

Current Electricity

Two resistors of 4 Ω and 6 Ω in parallel → equivalent resistance.

$1/R = 1/4 + 1/6 = 5/12 \rightarrow R = 12/5 = 2.4\ \Omega$

Electrostatics

Potential at 5 cm from a 4 μC charge.

$V = kq/r = (9\times10^9 \times 4\times10^{-6})/0.05 \rightarrow V = 7.2 \times 10^5$ V

Moving Charges and Magnetism

Circular coil, radius 5 cm, 50 turns, current 2 A → field at centre.

$B = \mu_0 NI/2R = (4\pi\times10^{-7} \times 50 \times 2)/(2 \times 0.05) \rightarrow B \approx 1.26 \times 10^{-3}$ T

Electromagnetic Induction

Rod of 1 m moves at 5 m/s, perpendicular to a 0.4 T field → motional EMF.

$\varepsilon = Bvl = 0.4 \times 5 \times 1 \rightarrow \varepsilon = 2$ V

Alternating Current

Pure inductor of 2 H on a 50 Hz supply → reactance.

$X_L = 2\pi fL = 2\pi \times 50 \times 2 \rightarrow X_L \approx 628\ \Omega$

Ray Optics

Concave mirror, f = 15 cm, object at 30 cm → image position.

$1/v + 1/u = 1/f \Rightarrow 1/v = -1/15 - (-1/30) = -1/30 \rightarrow v = -30$ cm (real image, at centre of curvature)

Wave Optics

Two coherent sources with path difference 3λ/2 → type of fringe.

Odd multiple of λ/2 → Destructive interference (dark fringe)

Dual Nature of Radiation

Light of $\nu = 8\times10^2$ Hz on a metal with $W_0 = 1.5$ eV → max KE.

$KE = h\nu - W_0 \approx 3.32\text{ eV} - 1.5\text{ eV} \rightarrow KE \approx 1.82$ eV

Nuclei

Decay constant λ = 0.0231 per day → half-life.

$T_{1/2} = 0.693/\lambda = 0.693/0.0231 \rightarrow T_{1/2} \approx 30$ days

CHAPTER 16

Important Derivations

Revise these until you can reproduce the logic without looking — don't just memorise textbook wording.

Derivation	Chapter	Final Result
Electric field due to a dipole (axial line)	Electric Charges & Fields	$E = 2kp/r^3$
Electric field due to an infinite sheet	Electric Charges & Fields	$E = \sigma/2\varepsilon_0$
Energy stored in a charged capacitor	Electrostatic Potential & Capacitance	$U = \frac{1}{2}CV^2$
Drift velocity & current relation	Current Electricity	$I = neAv_e$
Force between two parallel current wires	Moving Charges & Magnetism	$F/l = \mu_0 I_1 I_2/2\pi d$
Torque on a current loop	Moving Charges & Magnetism	$\tau = NIAB \sin\theta$
Motional EMF	Electromagnetic Induction	$\varepsilon = Bvl$
Self-inductance of a solenoid	Electromagnetic Induction	$L = \mu_0 N^2 A/l$
Impedance of a series LCR circuit	Alternating Current	$Z = \sqrt{[R^2+(X_l-Xc)^2]}$
Lens maker's formula	Ray Optics	$1/f = (n-1)(1/R_1-1/R_2)$
Fringe width in YDSE	Wave Optics	$\beta = \lambda D/d$
Bohr's radius of nth orbit	Atoms	$r_n = n^2h^2\varepsilon_0/\pi me^2$
Einstein's photoelectric equation	Dual Nature of Radiation	$KE = h\nu - W_0$
Radioactive decay law	Nuclei	$N = N_0e^{-\lambda t}$

Note: most derivations assume ideal conditions — vacuum/air as medium (unless stated), point charges, thin lenses, and non-relativistic speeds. Always check whether the question changes these assumptions before applying a memorised result.

CHAPTER 17

Frequently Asked Questions

What are the most important chapters in Class 12 Physics?

Current Electricity, Ray Optics, Electromagnetic Induction, Moving Charges and Magnetism, and Nuclei are generally high-weightage chapters because they combine strong conceptual and numerical value. That said, don’t skip the smaller chapters like Electromagnetic Waves or Magnetism and Matter — they’re quick to revise and often carry easy, guaranteed marks.

How should I prepare Class 12 Physics for the board exam?

Start with NCERT to build concepts, then move to important questions and previous year papers for practice. Focus on writing full, labelled solutions for numericals and derivations, since the CBSE marking scheme rewards correct method and presentation, not just the final answer.

How many Physics questions should I practise every day?

This depends on the time left before the exam. Over several months, 8–10 focused questions a day across concepts and numericals builds steady progress. Closer to exams, prioritise high-weightage chapters and previous year questions over sheer quantity.

Are Class 12 Physics numerical questions important?

Yes — numericals typically make up a large share of board exam marks and are essential for competitive exams like JEE and NEET. They also test whether you truly understand a formula, not just remember it.
