CLASS 12 PHYSICS

SYLLABUS 2026–27

CBSE Board Exam — Subject Code 042

Complete unit-wise theory syllabus, practical scheme, marks distribution and question-paper design for the CBSE Class 12 Physics board examination — based on the official syllabus released by CBSE for the 2026-27 academic session.

Prepared by Physics Point

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1. Exam Snapshot & Important Notes

Parameter	Details
Board	Central Board of Secondary Education (CBSE)
Subject Code	042
Academic Session	2026–27 (for the 2027 board examination)
Theory Exam Duration & Marks	3 hours, 70 marks
Practical / Internal Assessment	30 marks
Total Marks	100
Number of Theory Units	9 units across 14 chapters
Curriculum Basis	NCERT Class 11 & 12 Physics textbooks

Important: CBSE periodically excludes certain topics from the NCERT textbook for a given academic session — content marked as excluded for 2026-27 is not to be tested and is not included in this document. Always cross-check the latest CBSE circular and the official syllabus PDF at **cbse.gov.in** before finalising your preparation.

2. Unit-Wise Marks Distribution

The theory paper (70 marks) is organised into 9 units. Where a unit spans more than one chapter, the marks shown apply to the unit as a whole.

Unit	Title	Chapters Covered	Marks
I	**Electrostatics**	1. Electric Charges & Fields | 2. Electrostatic Potential & Capacitance	**16**
II	**Current Electricity**	3. Current Electricity	—
III	**Magnetic Effects of Current & Magnetism**	4. Moving Charges & Magnetism | 5. Magnetism & Matter	**17**
IV	**EM Induction & Alternating Currents**	6. Electromagnetic Induction | 7. Alternating Current	—
V	**Electromagnetic Waves**	8. Electromagnetic Waves	**18**
VI	**Optics**	9. Ray Optics & Optical Instruments | 10. Wave Optics	—
VII	**Dual Nature of Radiation & Matter**	11. Dual Nature of Radiation & Matter	**12**
VIII	**Atoms & Nuclei**	12. Atoms | 13. Nuclei	—
IX	**Electronic Devices**	14. Semiconductor Electronics: Materials, Devices & Simple Circuits	**7**

Electromagnetic Waves & Optics (Units V–VI) carry the highest combined weightage (18 marks), followed by Magnetic Effects & EM Induction (Units III–IV, 17 marks) and Electrostatics (Unit I, 16 marks).

3. Detailed Theory Syllabus

Unit I — Electrostatics

Chapter 1: Electric Charges and Fields

- Electric charge and conservation of charge; Coulomb's law for point charges and the superposition principle for multiple charges and continuous charge distributions.
- Electric field due to a point charge, field lines, electric dipole and the field due to a dipole, torque on a dipole placed in a uniform field.
- Electric flux and Gauss's theorem, with applications to a long straight wire, an infinite charged plane sheet, and a uniformly charged spherical shell (inside and outside).

Chapter 2: Electrostatic Potential and Capacitance

- Electric potential and potential difference; potential due to a point charge, a dipole and a system of charges; equipotential surfaces; potential energy of a system of charges and of a dipole in an external field.
- Conductors and insulators, free and bound charges inside a conductor, dielectrics and polarisation.
- Capacitors and capacitance; series and parallel combinations; capacitance of a parallel-plate capacitor with and without a dielectric; energy stored in a capacitor (formula only).

Unit II — Current Electricity

Chapter 3: Current Electricity

- Electric current, flow of charge in a conductor, drift velocity and mobility and their relation to current; Ohm's law and V–I characteristics (linear and non-linear).
- Electrical energy, power, resistivity, conductivity and the temperature dependence of resistance.
- Internal resistance, EMF and terminal potential difference of a cell; series and parallel combinations of cells; Kirchhoff's rules and the Wheatstone bridge.

Unit III — Magnetic Effects of Current & Magnetism

Chapter 4: Moving Charges and Magnetism

- Concept of the magnetic field and Oersted's experiment; the Biot–Savart law and its application to a current-carrying circular loop.
- Ampere's law and its application to a long straight wire and a solenoid (qualitative); force on a moving charge in magnetic and electric fields; force on a current-carrying conductor and between two parallel conductors.
- Torque on a current loop in a uniform field; the current loop as a magnetic dipole; the moving-coil galvanometer, its current sensitivity, and its conversion into an ammeter or voltmeter.

Chapter 5: Magnetism and Matter

- The bar magnet as an equivalent solenoid (qualitative); magnetic field of a dipole along its axis and perpendicular to it; torque on a dipole in a uniform field (qualitative); magnetic field lines.
- Magnetic properties of materials — dia-, para- and ferro-magnetic substances with examples; magnetisation and the effect of temperature on magnetic properties.

Unit IV — EM Induction & Alternating Currents

Chapter 6: Electromagnetic Induction

- Electromagnetic induction, Faraday's laws, induced EMF and current, Lenz's law, and self- and mutual induction.

Chapter 7: Alternating Current

- Alternating current and voltage — peak and RMS values; reactance and impedance; the series LCR circuit (phasor treatment), resonance, power in AC circuits, power factor and wattless current.
- The AC generator and the transformer.

Unit V — Electromagnetic Waves

Chapter 8: Electromagnetic Waves

- Basic idea of displacement current; characteristics of electromagnetic waves and their transverse nature (qualitative).
- The electromagnetic spectrum — radio waves, microwaves, infrared, visible, ultraviolet, X-rays and gamma rays — and elementary facts about their applications.

Unit VI — Optics

Chapter 9: Ray Optics and Optical Instruments

- Reflection at spherical mirrors and the mirror formula; refraction of light, total internal reflection and optical fibres; refraction at spherical surfaces; lenses, the thin-lens and lens-maker's formulae, magnification and power; combinations of thin lenses; refraction through a prism.
- Optical instruments — the compound microscope and the astronomical telescope (refracting and reflecting) and their magnifying powers.

Chapter 10: Wave Optics

- Wavefronts and Huygens's principle; reflection and refraction of a plane wave at a plane surface, with proofs of the laws of reflection and refraction using Huygens's construction.
- Interference — Young's double-slit experiment and the expression for fringe width (final result only); coherent sources and sustained interference; diffraction at a single slit and the width of the central maximum (qualitative).

Unit VII — Dual Nature of Radiation & Matter

Chapter 11: Dual Nature of Radiation and Matter

- Dual nature of radiation; the photoelectric effect, and the observations of Hertz and Lenard; Einstein's photoelectric equation and the particle nature of light; a brief look at the experimental study of the photoelectric effect.
- Matter waves — the wave nature of particles and the de Broglie relation.

Unit VIII — Atoms & Nuclei

Chapter 12: Atoms

- The alpha-particle scattering experiment and Rutherford's model of the atom; the Bohr model of the hydrogen atom — radius, velocity and energy of an electron in the nth orbit; hydrogen line spectra (qualitative).

Chapter 13: Nuclei

- Composition and size of the nucleus; nuclear force; the mass–energy relation and mass defect; binding energy per nucleon and its variation with mass number; nuclear fission and nuclear fusion.

Unit IX — Electronic Devices

Chapter 14: Semiconductor Electronics

- Energy bands in conductors, semiconductors and insulators (qualitative); intrinsic and extrinsic (p-type and n-type) semiconductors.
- The p-n junction; the semiconductor diode and its I–V characteristics in forward and reverse bias; the junction diode as a rectifier.

4. Practical Syllabus & Evaluation Scheme

Practicals carry 30 marks (3-hour examination). The practical file submitted at the annual examination must include:

- At least 8 experiments (4 from each of Section A and Section B).
- At least 6 activities (3 from each section).
- A written report of one investigatory project carried out by the student.

Evaluation Scheme (30 Marks)

Component	Marks
Two experiments (one from each section)	7 + 7 marks
Practical record (experiments & activities)	5 marks
One activity (from either section)	3 marks
Investigatory project	3 marks
Viva (experiments, activities & project)	5 marks
Total	30 marks

Section A — Sample Experiments (Electricity & Magnetism)

- Determining the resistivity of two or three wires by plotting V vs I.
- Finding the resistance of a wire or a standard resistor using a metre bridge.
- Verifying the series (or parallel) combination law of resistances using a metre bridge.
- Determining the resistance of a galvanometer by the half-deflection method and finding its figure of merit.
- Converting a galvanometer into a voltmeter or an ammeter of a desired range, and verifying it.
- Finding the frequency of the AC mains using a sonometer.

Section B — Sample Experiments (Optics & Electronics)

- Finding v for different values of u with a concave mirror, and determining its focal length.
- Finding the focal length of a convex mirror using a convex lens.
- Finding the focal length of a convex lens by plotting u–v or 1/u–1/v graphs.
- Finding the focal length of a concave lens using a convex lens.
- Determining the angle of minimum deviation for a prism.
- Determining the refractive index of a glass slab using a travelling microscope.
- Finding the refractive index of a liquid using a convex lens and a plane mirror, or a concave mirror and a plane mirror.
- Plotting the I–V characteristics of a p-n junction diode in forward and reverse bias.

In addition to these experiments, students perform a set of short activities from each section and complete one investigatory project — for example, studying the factors affecting a cell's internal resistance, or investigating the turns ratio of a self-designed transformer.

5. Question Paper Design

Theory paper — 70 marks, 3 hours. Questions are distributed across three cognitive levels:

Typology	Description	Marks	%
Remembering & Understanding	Recalling facts, terms and concepts; organising, comparing and explaining ideas.	**27**	**38%**
Applying	Using acquired knowledge, facts and techniques to solve problems in new situations.	**22**	**32%**
Analysing, Evaluating & Creating	Breaking down information, forming judgements, and combining ideas into new solutions.	**21**	**30%**

Roughly 50% of the theory paper is competency-focused (MCQs, case-based and source-based integrated questions), 20% is direct MCQ-based, and the remaining 30% is made up of short- and long-answer constructed-response questions.

6. Prescribed Books

- Physics, Class XI, Parts I & II — NCERT
- Physics, Class XII, Parts I & II — NCERT
- Laboratory Manual of Physics for Class XII — NCERT
- Other related NCERT books, manuals and multimedia resources

7. Preparation Tips & Revision Checklist

● **Anchor everything in NCERT** — The CBSE question paper is drawn directly from the NCERT Class 11 & 12 Physics textbooks — read every in-text example and exercise carefully.

● **Prioritise the highest-weightage units** — Electromagnetic Waves & Optics (18 marks) and Magnetic Effects & EM Induction (17 marks) together make up nearly half the theory paper — master these first.

● **Practice derivations and numericals together** — Units like Electrostatics, Current Electricity and Ray Optics mix conceptual derivations with numerical problems — practice both, not just one.

● **Don't neglect practicals** — Practicals carry 30 of the 100 total marks. Keep a clean, well-labelled practical file and revise the viva questions for each experiment.

● **Use previous years' papers** — Solve at least 5 years of CBSE Class 12 Physics board papers to get used to the question paper design and difficulty level.

● **Track excluded topics** — CBSE periodically drops selected topics from the NCERT textbook for a given session — check the latest circular so you don't waste time on deleted content.
