

Physics · Last-Hour Cram Sheet

CBSE Class 12 Physics (042) · 2026-27 · Theory

70 + Practical 30 · read this in the last hour,
nothing else

A. The Paper at a Glance

MARKS BY UNIT — straight from the official course structure

Marks	Units	Chapters
16	I Electrostatics + II Current Electricity	1, 2, 3
17	III Magnetic Effects + IV EMI and AC	4, 5, 6, 7
18	V EM Waves + VI Optics	8, 9, 10
12	VII Dual Nature + VIII Atoms and Nuclei	11, 12, 13
7	IX Electronic Devices	14

Optics is the single biggest block. If time is short, Ch 9 and 10 buy the most marks per hour.

B. Every Formula in One Place

ELECTROSTATICS

$$F = kq_1q_2/r^2 \cdot E = kq/r^2 \cdot V = kq/r \cdot E = -dV/dr$$

$$\text{Dipole: } E_{\text{axial}} = 2kp/r^3 \cdot E_{\text{eq}} = kp/r^3 \cdot \tau = pE \sin\theta \cdot U = -pE \cos\theta$$

Gauss: $\varphi = q/\epsilon_0$ · wire $\lambda/2\pi\epsilon_0 r$ · sheet $\sigma/2\epsilon_0$ · shell 0 inside

Capacitor: $C = \epsilon_0 A/d$ · $C' = KC$ · $U = \frac{1}{2}CV^2 = Q^2/2C$

CURRENT ELECTRICITY

$I = neAv_d$ · $v_d = eE\tau/m$ · $R = \rho L/A$ · $\rho = m/ne^2\tau$

$\epsilon = V + Ir$ · $I = \epsilon/(R+r)$ · $P = I^2R = V^2/R$ · Wheatstone
 $P/Q = R/S$

MAGNETISM, EMI AND AC

$B = \mu_0 I/2\pi r$ (wire) · $\mu_0 NI/2R$ (loop centre) · $\mu_0 nI$ (solenoid)

$F = qvB \sin\theta$ · $F = BIL \sin\theta$ · $r = mv/qB$ · $\tau = NIAB \sin\theta$

$\epsilon = -N d\varphi/dt$ · $\epsilon = Blv$ · $L = \mu_0 n^2 Al$ · $U = \frac{1}{2}LI^2$

$X_L = \omega L$ · $X_C = 1/\omega C$ · $Z = \sqrt{R^2 + (X_L - X_C)^2}$ · $\omega_0 = 1/\sqrt{LC}$

$P = V_{rms} I_{rms} \cos\varphi$ · $V_s/V_p = N_s/N_p = I_p/I_s$

OPTICS

$1/v + 1/u = 1/f$ (mirror, $m = -v/u$) · $1/v - 1/u = 1/f$ (lens, $m = v/u$)

$1/f = (\mu - 1)(1/R_1 - 1/R_2)$ · $P = 1/f$ · $\mu = 1/\sin C$

$$\mu = \sin[(A+D_m)/2]/\sin(A/2) \cdot m_{\text{telescope}} = f_o/f_e$$

$$\beta = D\lambda/d \cdot \text{bright } n\lambda \cdot \text{dark } (2n-1)\lambda/2$$

MODERN PHYSICS

$$h\nu = \varphi_0 + K_{\max} \cdot K_{\max} = eV_0 \cdot \lambda = h/\sqrt{2mqV} \cdot \lambda = 12.27/\sqrt{V} \text{ \AA}$$

$$r_n \propto n^2 \cdot v_n \propto 1/n \cdot E_n = -13.6/n^2 \text{ eV} \cdot 1/\lambda = R(1/n_f^2 - 1/n_i^2)$$

$$R = R_0 A^{1/3} \cdot BE = \Delta m \times 931.5 \text{ MeV}$$

C. Constants Worth Memorising

THE NUMBERS THAT SAVE TIME

k = 1/4πε₀	9×10 ⁹ N m ² C ⁻²
ε₀	8.854×10 ⁻¹² C ² N ⁻¹ m ⁻²
μ₀	4π×10 ⁻⁷ T m A ⁻¹
e	1.6×10 ⁻¹⁹ C
h	6.63×10 ⁻³⁴ J s
hc	1240 eV nm — the single most useful shortcut
c	3×10 ⁸ m s ⁻¹
1 u	931.5 MeV
Bohr radius	0.53 Å

D. Rules You Must Not Get Wrong

THE TEN THAT COST MOST MARKS

1. Axial dipole field is **TWICE** equatorial, and opposite in direction.
2. On the equatorial line $V = 0$ but $E \neq 0$.
3. Capacitors: series adds **reciprocals** — the opposite of resistors.
4. Dielectric with battery **connected** $\rightarrow V$ fixed. **Disconnected** $\rightarrow Q$ fixed.
5. Metals: ρ **rises** with T . Semiconductors: ρ **falls**.
6. Magnetic force does **no work**; speed never changes.
7. Parallel currents in the **same** direction **attract**.
8. Lenz's minus sign **is** conservation of energy.
9. Photoelectric: **intensity** $\rightarrow$ number, **frequency** $\rightarrow$ energy.
10. An n-type semiconductor is **electrically neutral**.

E. What the Syllabus Cut — do not waste time

Energy stored in a capacitor	Formulae only , no derivation
Straight solenoid	Qualitative only
Bar magnet as equivalent solenoid; dipole field; torque	Qualitative only
Transverse nature of EM waves	Qualitative only
YDSE fringe width	Final expression only , no derivation
Single-slit central maximum width	Qualitative only
Hydrogen line spectra	Qualitative only
Energy bands	Qualitative only
Transistors, logic gates, Zener, LED	Not listed — confirm with your teacher

F. How to Write for Marks

- 1. Derivations:** state the starting principle in words first (Gauss's theorem, Coulomb = centripetal, Faraday's law). That sentence is usually worth its own mark.
- 2. Diagrams:** ray diagrams, phasor triangles, circuit diagrams and the BE curve all carry marks on their own. Draw them even when not explicitly asked.
- 3. Signs:** write u , v and f with their signs on a separate line before substituting.
- 4. Units:** every final answer needs one. A correct number without a unit is not a correct answer.
- 5. Direction:** if a question asks for a force, field or current,

state the direction as well as the magnitude.

6. Graphs: label both axes and mark the intercept or slope the question asks about.