Class12-Physics-CBSE-Exam-Formulas

October 18, 2025

Chapter	Concept	Formula / Key Point
Electric Charges and Fields	Coulomb's Law	$F = k\frac{q_1 q_2}{r^2}$ $k = \frac{1}{4\pi\varepsilon_0}$
	—	—
	Electric Field	$\vec{E} = \frac{\vec{F}}{q} = \frac{kQ}{r^2}$
	—	—
	Electric Dipole	$E_{\text{axial}} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{2p}{r^3}$
	—	—
Electrostatic Potential and Capacitance	Potential Due to Point Charge	$V = \frac{kQ}{r}$
	—	—
	Capacitance	$C = \frac{Q}{V}$ $C_{\text{parallel plate}} = \varepsilon_0 \frac{A}{d}$
	—	—
	Series & Parallel	$C_{\text{series}}^{-1} = C_1^{-1} + C_2^{-1} + ...$ $C_{\text{parallel}} = C_1 + C_2 + ...$
	—	—
Current Electricity	Ohm's Law	$V = IR$
	—	—
	Resistance & Resistivity	$R = \rho\frac{l}{A}$
	—	—
	Series & Parallel	$R_{\text{series}} = R_1 + R_2 + ...$ $R_{\text{parallel}}^{-1} = R_1^{-1} + R_2^{-1} + ...$
	—	—
	Power	$P = VI = I^2R = \frac{V^2}{R}$
	—	—
Moving Charges and Magnetism	Magnetic Force	$F = qvB\sin\theta$ $F = IlB\sin\theta$
	—	—
	Magnetic Field (Wire, Loop)	Straight wire: $B = \frac{\mu_0 I}{2\pi r}$ Loop: $B = \frac{\mu_0 I}{2R}$
	—	—
	Ampere's Law	$\oint \vec{B} \cdot d\vec{l} = \mu_0 I$
	—	—

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Magnetism and Matter	Magnetic Dipole Moment	$M = m \times 2l$ $U = -\vec{M} \cdot \vec{B}$
	—	—
	Gauss's Law for Magnetism	$\vec{\nabla} \cdot \vec{B} = 0$ (No magnetic monopoles)
	—	—
Electromagnetic Induction	Faraday's Law	$e = -\frac{d\Phi}{dt}$
	—	—
	Lenz's Law	Direction of induced current opposes cause
	—	—
	Self Inductance	$e = -L\frac{di}{dt}$ Energy: $U = \frac{1}{2}LI^2$
	—	—
Alternating Current	AC Voltage	$V = V_0 \sin \omega t$ RMS: $V_{\text{rms}} = \frac{V_0}{\sqrt{2}}$
	—	—
	Reactance & Impedance	$X_L = \omega L$, $X_C = \frac{1}{\omega C}$ $Z = \sqrt{R^2 + (X_L - X_C)^2}$
	—	—
	Power in AC	$P = VI \cos \phi$ (cos = power factor)
	—	—
Electromagnetic Waves	Speed of EM Waves	$c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$ $c = 3 \times 10^8$ m/s
	—	—
	EM Spectrum	Radio < Microwave < Infrared < Visible < UV < X-rays < Gamma rays
	—	—
Ray Optics and Optical Instruments	Mirror Formula	$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $m = \frac{h'}{h} = \frac{-v}{u}$
	—	—
	Lens Formula	$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ $m = \frac{v}{u}$
	—	—
	Power of Lens	$P = \frac{100}{f(\text{cm})}$
	—	—
Wave Optics	Young's Double Slit Experiment	Fringe width: $\beta = \frac{\lambda D}{d}$
	—	—
	Diffraction	Central maximum width $\frac{\lambda}{a}$
	—	—
	Polarization	Only transverse waves show polarization
Dual Nature of Radiation and Matter	De Broglie Wavelength	$\lambda = \frac{h}{mv}$
	—	—

Chapter	Concept	Formula / Key Point
	Photoelectric Equation	$E_k = h\nu - \phi$
	—	—
Atoms	Radius (Bohr Model)	$r_n = n^2 \cdot a_0$, $a_0 = 0.529$ Å
	—	—
	Energy Levels	$E_n = -13.6\frac{Z^2}{n^2}$ eV
	—	—
Nuclei	Binding Energy	$BE = [Zm_p + (A-Z)m_n - m_{\text{nucleus}}]c^2$
	—	—
	Radioactive Decay	$N = N_0 e^{-\lambda t}$ $t_{1/2} = \frac{0.693}{\lambda}$
	—	—
Semiconductors	Diode Current	$I = I_0(e^{\frac{eV}{kT}} - 1)$
	—	—
	Logic Gates	AND, OR, NOT, NAND, NOR — Truth tables