



TOPPERS HUB
ACADEMY

CBSE BOARD BOOSTER

Class 12 Physics

Chapter-wise Formula Bank

A free study resource by **Toppers Hub Academy**

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Electrostatics & Capacitance

- Coulomb's law: $F = kq_1q_2/r^2$, $k = 9 \times 10^9 \text{ N m}^2/\text{C}^2$.
- Electric field: $E = F/q = kq/r^2$.
- Potential: $V = kq/r$; Potential energy $U = kq_1q_2/r$.
- Capacitance of parallel plate: $C = \epsilon_0 A/d$.
- Energy stored: $U = \frac{1}{2}CV^2 = \frac{1}{2}QV = Q^2/2C$.

Current Electricity

- Ohm's law: $V = IR$. Resistivity: $R = \rho L/A$.
- Drift velocity: $v_d = I/(nAe)$.
- Series: $R = R_1 + R_2$; Parallel: $1/R = 1/R_1 + 1/R_2$.
- Power: $P = VI = I^2R = V^2/R$.
- EMF: $\epsilon = V + Ir$ (internal resistance r).

Magnetism & EMI

- Force on charge: $F = qvB \sin\theta$. Force on wire: $F = BIL \sin\theta$.
- Biot-Savart and Ampere's law give B around currents.
- Induced EMF: $\epsilon = -d\phi/dt$ (Faraday). Lenz's law gives direction.
- Self-induced EMF: $\epsilon = -L di/dt$.
- Transformer: $V_s/V_p = N_s/N_p$.

Optics & Modern Physics

- Mirror/lens: $1/v - 1/u = 1/f$ (sign conventions apply).
- Lens maker: $1/f = (n-1)(1/R_1 - 1/R_2)$. Power $P = 1/f$.
- Young's double slit: fringe width $\beta = \lambda D/d$.
- Photoelectric: $h\nu = \phi + KE_{\max}$.
- de Broglie: $\lambda = h/p = h/(mv)$.
- Bohr: $E_n = -13.6/n^2 \text{ eV}$.

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