

List of Important Formulae for Electricity Numericals:

Formulae:

Charge: $Q = n \times e$

Current:

- $I = \frac{Q}{t}$
- $I = \frac{ne}{t}$
- $I = \frac{\varepsilon}{R + r}$
- $I = \frac{P}{V}$

Potential:

- $V = \frac{W}{Q}$
- $V = IR$

Resistance:

- $R = \rho \frac{l}{a}$
- $R = \frac{V^2}{P}$

E.M.F:

- $\varepsilon = \frac{W}{q}$
- $\varepsilon = V + v$
- $\varepsilon = I (R+r)$

Internal Resistance: $r = \left(\frac{\varepsilon}{V} - 1\right)R$

Series of Resistors: $R_s = R_1 + R_2 + R_3 \dots + R_n$

- If n equal resistances of value R in series: $R_s = nR$

Parallel Resistors: $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots + \frac{1}{R_n}$

- If n equal resistances of value R are in parallel combination: $R_p = \frac{R}{n}$

- Two resistances in parallel: $R_p = \frac{R_1 R_2}{R_1 + R_2}$

- Current in the individual resistors in parallel combination:

$$I_1 = \frac{V}{R_1} = \frac{IR_2}{R_1 + R_2}$$

$$I_2 = \frac{V}{R_2} = \frac{IR_1}{R_1 + R_2}$$

Work to move a charge through a potential difference/electrical energy:

- $W = QV$
- $W = VIt$
- $W = I^2Rt$
- $W = \frac{V^2t}{R}$

Electrical Power:

- $P = \frac{W}{t}$
- $P = VI$
- $P = \frac{V^2}{R}$
- $P = I^2R$

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