



Class 10

Science Notes



CHAPTER 11 — ELECTRICITY



Electric Current • Ohm's Law • Resistance •
Heating Effect • Electric Power



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Electricity has an
important place in
modern society. ♥

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Quick
Revision

Important
Formulae

Numericals
Included

Current



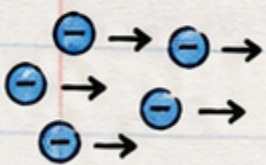
Circuit



Resistance



Power



Flow of
electrons



Path for
electric current



Opposition to
the flow



Rate of doing
electric work

Important Formulae

Ohm's Law

$$V = IR$$

V = Potential difference (V)
I = Current (A)
R = Resistance (Ω)

Resistance

$$R = \frac{V}{I}$$

Electric Power

$$P = VI$$

P = Power (W)
V = Potential difference (V)
I = Current (A)

Also,

$$P = I^2R = \frac{V^2}{R}$$



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11.1

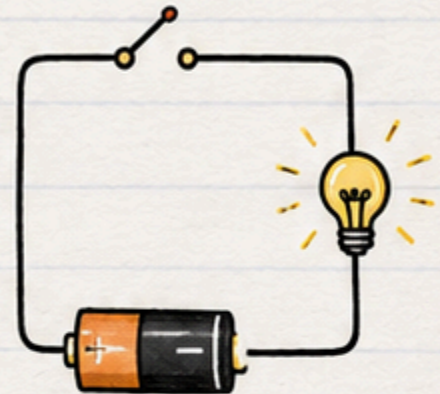
Electric Current and Circuit



1. DEFINITION

If electric charge flows through a conductor, there is electric current. ❤️

- Electric current = rate of flow of electric charges.
- Continuous and closed path of conductors = electric circuit.
- Switch connects cell and bulb in a circuit.



2. DIRECTION OF CURRENT

Conventional current direction is opposite to the flow of electrons.

Electron Flow ← ← ← ⊖ ⊖ ⊖
Current Flow → → → ⊕ ⊕ ⊕

4. FORMULA

$$I = \frac{Q}{t}$$

I = Current (A)

Q = Charge (Coulomb)

t = Time (s)

3. SI UNIT

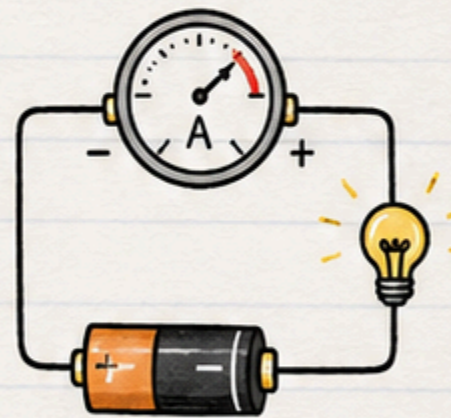
- Charge → Coulomb (C)
- Current → Ampere (A)
- $1 \text{ A} = \frac{1 \text{ C}}{1 \text{ s}}$
- $1 \text{ mA} = 10^{-3} \text{ A}$
- $1 \mu\text{A} = 10^{-6} \text{ A}$



Unit of current is Ampere (A).

5. AMMETER

- An ammeter is used to measure electric current.
- It is always connected in series in a circuit.



6. EXAMPLE

Given: Current (I) = 0.5 A

Time (t) = 10 min = 600 s

Charge (Q) = I t
= 0.5 × 600
= 300 C

Q = 300 C

7. QUICK REVISION

Current
= flow of
charge

Closed
path =
circuit

Ammeter
in
series

Keep practising, keep shining! ★

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11.2

Electric Potential & Potential Difference



1. INTRO

Electrons move only if there is a difference of electric pressure. 

- Potential difference is produced by battery/cells.
- Chemical action inside the cell generates potential difference.



2. DEFINITION

Potential difference = work done to move unit charge from one point to another in an electric field. 

3. FORMULA

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

V = Potential difference (V)

W = Work done (J)

Q = Charge (C)

4. SI UNIT

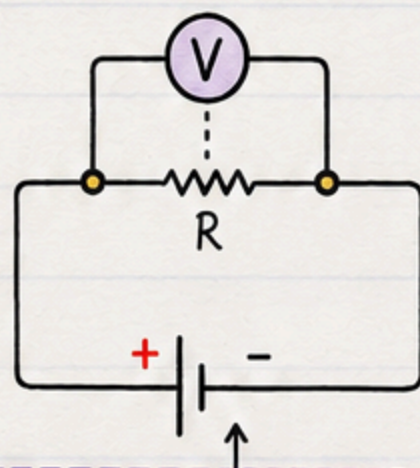
- Unit = Volt (V)
- $1 \text{ V} = \frac{1 \text{ J}}{\text{C}}$ 



Volt is the SI unit of potential difference.

5. VOLTMETER

- A voltmeter is used to measure potential difference.
- It is always connected in parallel between the two points.



Voltmeter in parallel

6. SOLVED EXAMPLE

Given:

$$V = 12 \text{ V}$$

$$Q = 2 \text{ C}$$

Solution:

$$W = VQ$$

$$= 12 \times 2$$

$$W = 24 \text{ J}$$

7. QUICK RECALL

Battery maintains potential difference in a circuit. 

1 volt means 1 joule of work done to move 1 coulomb charge. 

More potential difference → more push to charges!



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