NCERT – GRADE 10 CHEAT SHEET

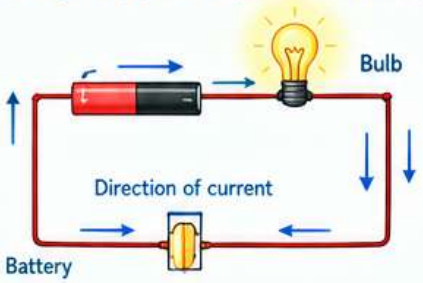
# ELECTRICITY

## Part A – Electric Current, Potential, Circuits and Resistance

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### Electric Current and Circuit

- Electric current is the flow of electric charge through a conductor.
- It is measured in ampere (A).
- The direction of current is from positive (+) to negative (–) terminal (conventional current).



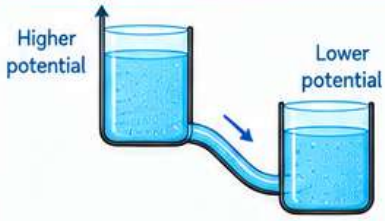

**Key terms:**

- Source of current – Battery / Cell
- Conductor – Metallic wire
- Load – Device (e.g. bulb, resistor)

### Electric Potential and Potential Difference

- Electric potential is the amount of energy per unit charge at a point.
- Potential difference (voltage) is the difference in electric potential between two points.
- It is measured in volt (V).

$$\text{Potential difference (V)} = \frac{\text{Work done (J)}}{\text{Charge (C)}}$$




Like water flows from higher to lower level, electric charge flows from higher to lower potential.

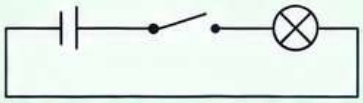
### Circuit Diagram

- A circuit diagram uses standard symbols to represent electrical components.
- It is a simple and neat way to show the connections in a circuit.

**Common Symbols:**

| | | |
|---|---|---|
| Cell / Battery | Closed switch | Open switch |
| Bulb / Lamp | Resistor | Variable resistor |
| Connecting wire | | Junction |

**Example Circuit Diagram:**



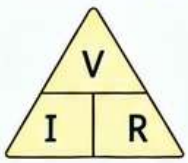
Cell — Switch → Bulb (in series)

### Ohm's Law

- At constant temperature, the current (I) through a conductor is directly proportional to the potential difference (V) across it.
- It is mathematically expressed as:

$$V = IR$$

Where,
V = potential difference (volt, V)
I = current (ampere, A)
R = resistance (ohm, Ω)




**Example:**
If V = 6 V and R = 3 Ω,
then I = V/R = 6/3 = 2 A.

The unit of resistance is ohm (Ω).

### Factors on which the Resistance of a Conductor Depends

Resistance (R) of a conductor depends on:

**1 Length (l)**

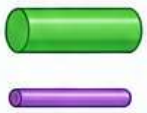
- Longer the length, higher the resistance.



Shorter wire → Lower R
Longer wire → Higher R

**2 Cross-sectional area (A)**

- Greater the area, lower the resistance.



Thicker wire → Lower R
Thinner wire → Higher R

**3 Material (resistivity, ρ)**

- Different materials have different resistivities.



Copper (low ρ) → Low R
Nichrome (high ρ) → High R
Iron (medium ρ) → Medium R

**4 Temperature (T)**

- For metals, resistance increases with temperature.

Higher temperature → Higher R



### Common Mistakes

- ✗ Thinking current is a flow of matter (instead of charge).
- ✗ Mixing up potential and potential difference.
- ✗ Using wrong units (e.g. V instead of J/C).
- ✗ Confusing series and parallel circuits during diagram writing.
- ✗ Forgetting that resistance depends on length, area, material and temperature.

### KEY TAKEAWAY

- ✓ Electric current is the flow of charge (ampere).
- ✓ Potential difference is the work done per unit charge (volt).
- ✓ Circuit diagrams use standard symbols.
- ✓ Ohm's Law: V = I R.
- ✓ Resistance depends on length, area, material and temperature.

More Potential, More Possibilities!

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Understand electricity... light up your future!

Observe • Connect • Grow