Chapter- 11 Electricity

1. Electric Current

- **Definition:** Flow of electric charge through a conductor.
- **Formula:** I=Q t Where *I* = current (ampere), *Q* = charge (coulomb), *t* = time (seconds)
- **Unit:** Ampere (A) 1 A = 1 C/s

🔋 2. Electric Potential and Potential Difference

- **Electric Potential:** Work done to bring a unit positive charge from infinity to a point.
- **Potential Difference (V):** Work done to move a unit charge between two points. V=WQ
- **Unit:** Volt (V) 1 V = 1 J/C

🔌 3. Ohm's Law

- **Statement:** Current through a conductor is directly proportional to the potential difference across it, provided temperature remains constant.
- **Formula:** V=IR Where *V* = voltage, *I* = current, *R* = resistance
- **Graph:** A straight line passing through the origin (V-I graph)

🧲 4. Resistance

- **Definition:** Opposition offered by a conductor to the flow of current.
- **Unit:** Ohm (Ω)
- **Factors Affecting Resistance:**
  - Length (R ∝ L)
  - Area of cross-section (R ∝ 1/A)
  - Material of conductor
  - Temperature

🧲 5. Resistivity

- **Definition:** Resistance of a material per unit length and unit area.
- **Formula:** R=ρ L A
- **Unit:** Ohm meter (Ω·m)

🔁 6. Combination of Resistors

- **Series:**
  - R total=R1+R2+R3+…
  - Same current flows through all
- **Parallel:**
  - 1/R total=1/R1+1/R2+… Voltage remains the same across all

🔥 7. Heating Effect of Electric Current

- **Joule's Law:** $H=I_2Rt$ Where H = heat (Joules), I = current, R = resistance, t = time
- **Applications:** Electric heaters, toasters, fuses

💡 8. Electric Power and Energy

- **Power (P):** Rate of doing electrical work $P=VI=I_2R=V_2R$
- **Unit:** Watt (W), 1 kW = 1000 W
- **Energy:** $E=P\times t$ Unit: kilowatt-hour (kWh)

□ 9. Devices and Symbols

- **Ammeter:** Measures current (connected in series)
- **Voltmeter:** Measures potential difference (connected in parallel)
- **Resistor, Cell, Battery, Switch:** Represented with standard circuit symbols

Electricity

1. Electric Current

Defines current as flow of electric charge through a conductor.

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

I = Current (A)
Q = Charge (Colomb (C)
t = time (s)

2. Electric Potential and Potential Difference

Electric Potential: the work done to bring a unit positive charge from infinity to a point.

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

V = Volt (V)
W = Work (J)
Q = Charge (Colomb (C)
1 = 1 V = 1 J/C

5. Resistivity

Reśistívity: as resistance of a material per unit length and unit area.

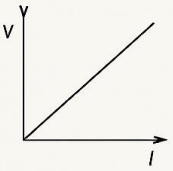
$R = \rho l = \frac{L}{A}$

Unit Ω = oh·m meter

3. Ohm's Law

Current through a conductor is directly proportional to the potential difference across it, provided temperature remains constant.

$V = IR$



4. Resistance

Resistance: The opposition obternod by a conducrtor to flow of current.

Unit ohm (Ω)

R ≒ ρ l/.L

where ρ = řeśísitiv in ohm meter)

L = Length of conductor

A = Area of cross-section

6. Combination of Resistors

• Seřies

$R_{total} = R_1 + R_2 + \cdots$

• Parallel

$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots$