Chapter: Electricity

Key Definitions

- **Electric Current (I)** : The flow of electric charge in a conductor. It is measured in Amperes (A).

- **Voltage (V)** : The electric potential difference between two points. It is measured in Volts (V).

- **Resistance (R)** : The opposition to the flow of electric current. It is measured in Ohms (Ohm).

- **Ohm's Law** : The relationship between voltage, current, and resistance in a circuit, given by the formula:
$$
V = I \times R
$$

- **Power (P)** : The rate at which electrical energy is consumed or converted. It is measured in Watts (W) and can be calculated using:
$$
P = V \times I
$$

Important Formulas

1. **Ohm's Law** :
$$
V = I \times R
$$

2. **Power in terms of resistance** :
$$
P = I^2 \times R
$$
or
$$
P = V^2/R
$$

3. **Total Resistance in Series** :
$$
R_{total} = R_1 + R_2 + R_3 + \ldots
$$

4. **Total Resistance in Parallel** :

$$
1/R_{total} = 1/R_1 + 1/R_2 + 1/R_3 + \ldots
$$

Diagrams

1. **Series Circuit** :
 - Components are connected end-to-end.
 - Current is the same through all components.
 - Voltage is divided among components.

2. **Parallel Circuit** :
 - Components are connected across the same two points.
 - Voltage is the same across all components.
 - Current is divided among the branches.

Summary Table

Quantity	Symbol	Unit
Electric Current	I	Amperes (A)
Voltage	V	Volts (V)
Resistance	R	Ohms (Ohm)
Power	P	Watts (W)

Key Takeaways

 - Electric current is the flow of charge, and it requires a potential difference (voltage) to flow.
 - Resistance affects how much current will flow for a given voltage.
 - Ohm's Law is fundamental for understanding the relationship between voltage, current, and resistance.
 - Power can be calculated in multiple ways depending on the known quantities.
 - Understanding series and parallel circuits is crucial for analyzing complex electrical systems.