PHYSICS | Electricity

Measurement of Ohmic Resistances Using Ammeter and Voltmeter

General Aim

- Verify the Ohm's law.
- Determination of unknown resistance.
- Determination of total resistance of resistances connected in parallel and in series.

Method

General method using Ohmic resistance circuits

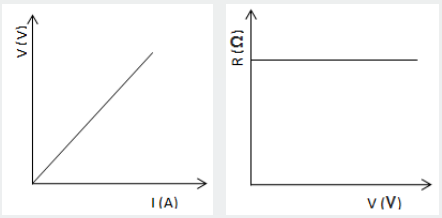
Learning Objectives (ILOs)

- Understand the relation between current and voltage in a circuit with Ohmic resistance.
- Set up an experiment to determine the equivalent resistance when many resistors are connected in series or in parallel.

Theoretical Background/Context

According to Ohm's law, potential difference between two points of a resistor is directly proportional to the current flowing through this resistor at constant temperature. The proportionality constant is called ***resistance.***

$$V = I R$$



When a number of resistances are connected on series, the total resistance will be;

$$R_T = R_1 + R_2 + R_3 + \cdots$$

But, If they are connected on parallel , their total resistance will be;

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots$$

Principle of Work

If we measure the potential difference across the resistor and current passing through it, and plot a graph between them, a straight line passes through the origin is obtained whose slope is related to the resistance of the resistor. The same procedure is repeated to verify the series and parallel connection formulae for resistors.