

## Ohm's Law II

**AIM:** To verify the laws of combination of Resistances.

**APPARATUS:** Cells, Ammeter, Voltmeter, Rheostat, Key, Resistances, Bread Board, Connecting wires etc

**THEORY:** At constant temperature, the current passing through the conductor is directly proportional to the potential difference across the conductor.

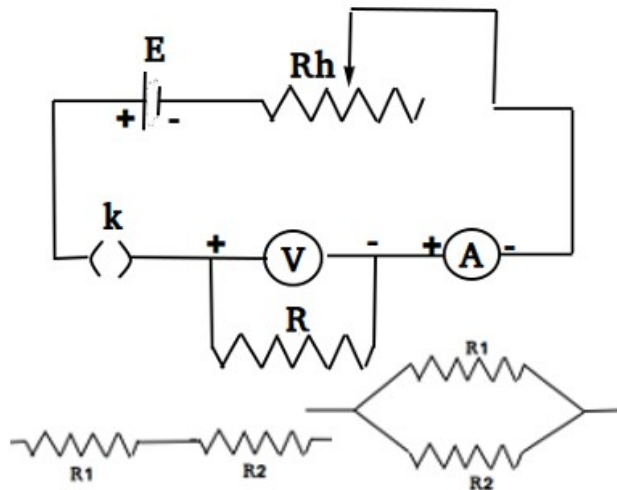
That is  $V \propto I$  or  $\frac{V}{I} = R$  the resistance of the conductor.

When two resistances  $R_1$  and  $R_2$  connected in series, the effective resistance  $R_s = R_1 + R_2$ .

When they are connected in parallel, the effective resistance is given by

$$\frac{1}{R_s} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\text{or } R_p = \frac{R_1 R_2}{R_1 + R_2}$$



**OBSERVATIONS:**

Least Count of the ammeter =                      A

Least Count of the voltmeter =                      V

| Resistance                  | Trial No | Ammeter Reading (I) Ampere | Voltmeter Reading (V) Volts | $R = \frac{V}{I}$ $\Omega$ | Mean R $\Omega$ |
|-----------------------------|----------|----------------------------|-----------------------------|----------------------------|-----------------|
| $R_1$                       | 1        |                            |                             |                            | $R_1 =$         |
|                             | 2        |                            |                             |                            |                 |
|                             | 3        |                            |                             |                            |                 |
|                             | 4        |                            |                             |                            |                 |
| $R_2$                       | 1        |                            |                             |                            | $R_2 =$         |
|                             | 2        |                            |                             |                            |                 |
|                             | 3        |                            |                             |                            |                 |
|                             | 4        |                            |                             |                            |                 |
| $R_1$ and $R_2$ in Series   | 1        |                            |                             |                            | $R_s =$         |
|                             | 2        |                            |                             |                            |                 |
|                             | 3        |                            |                             |                            |                 |
|                             | 4        |                            |                             |                            |                 |
| $R_1$ and $R_2$ in Parallel | 1        |                            |                             |                            | $R_p =$         |
|                             | 2        |                            |                             |                            |                 |
|                             | 3        |                            |                             |                            |                 |
|                             | 4        |                            |                             |                            |                 |

**CALCULATIONS:**

$$R_1 = \quad \quad \quad \Omega$$

$$R_2 = \quad \quad \quad \Omega$$

$$R_s =$$

$$R_s = R_1 + R_2 = \quad \quad \quad = \quad \quad \quad \Omega$$

$$R_p = \quad \quad \quad \Omega$$

$$R_p = \frac{R_1 R_2}{R_1 + R_2} = \quad \quad \quad = \quad \quad \quad \Omega$$

**RESULT:**

The laws of combination of Resistances in Series and Parallel are verified.