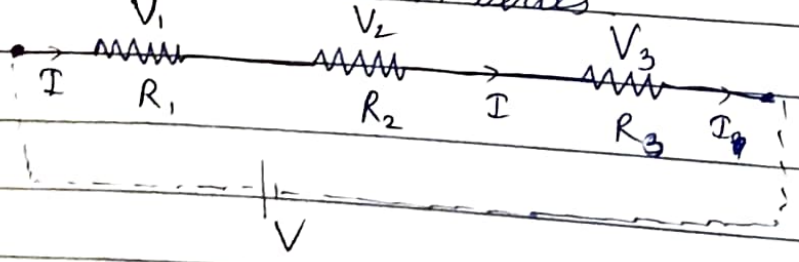
# Lecture 6- Series and parallel Combination

## ✱ Series

Two resistors are said to be in series if only one of their end points is joined. If a 3rd resistor is joined ~~together~~ with the series combination of 2, then all 3 are said to be in series.




$V = V_1 + V_2 + V_3$

$I R_{eq} = I R_1 + I R_2 + I R_3$

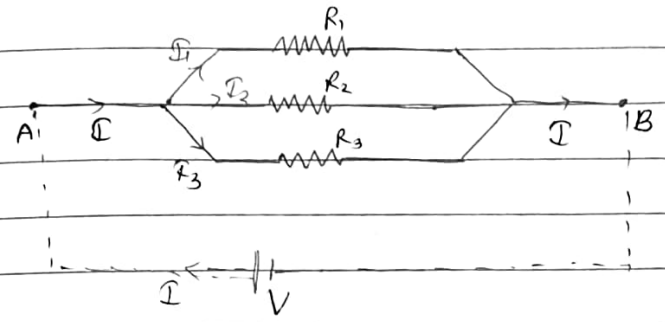
$I R_{eq} = I (R_1 + R_2 + R_3)$

$R_{eq} = R_1 + R_2 + R_3$

∴ Equivalent Resistance of n resistors in series

$$R_{eq} = R_1 + R_2 + \cdots + R_n$$

* Parallel




$$I = I_1 + I_2 + I_3$$

$$I = \frac{V}{R}$$

$$I = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3}$$

$$\frac{V}{R_{eq}} = V\left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right)$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

∴ Equivalent Resistance of n resistors in parallel

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots + \frac{1}{R_n}$$

Two or more resistors are said to be in parallel if one end of all the resistors is joined together and similarly the other ends joined together.