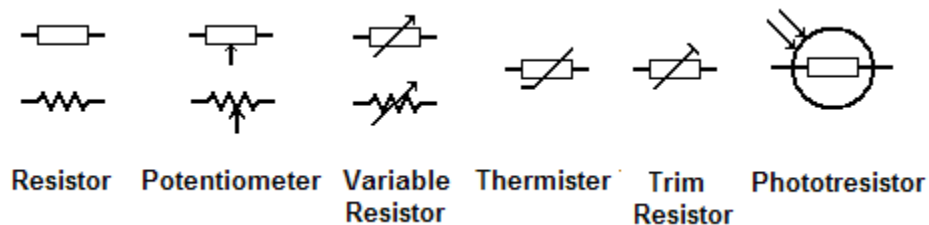


Resistor

A **Resistor** is a passive component that resists current flow. The measurement of resistance is in Ohms. There are a variety of resistance components, fixed, variable, or dependent on electrical or mechanical influences.

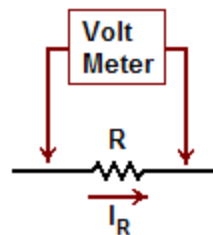
Resistor Symbols



Ohms Law

Ohms Law states that the voltage across the resistor is proportional to the current through the resistor

$$V_R = I_R \times R$$



When current is applied to a resistor, the resistor will dissipate the resistance energy in the form of heat.

$$P_R = V_R \times I_R$$

$$P_R = R \times I_R^2$$

$$P_R = \frac{V_R^2}{R}$$

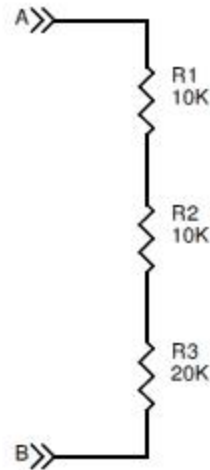
Resistor Circuits

Resistors in series

$$R_{Total} = R_1 + R_2 + \dots R_N$$

$$R_{Total} = 10K + 10K + 20K$$

$$R_{Total} = 40K$$



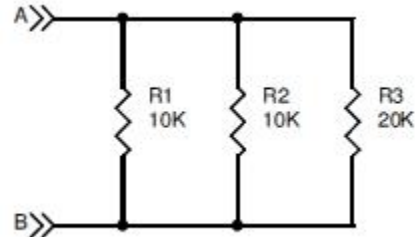
Resistors in Parallel

$$\frac{1}{R_{Total}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots \frac{1}{R_N}$$

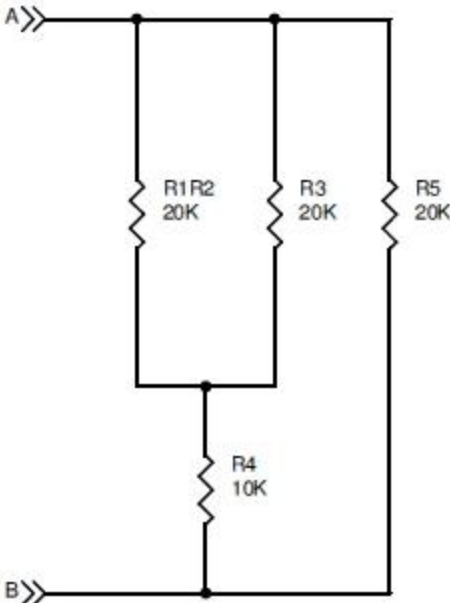
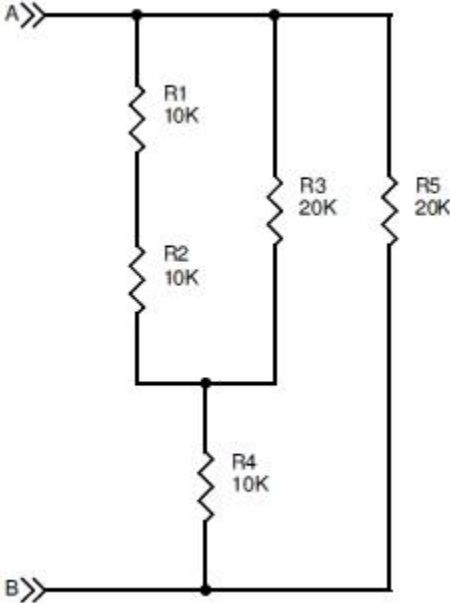
$$\frac{1}{R_{Total}} = \frac{1}{10K} + \frac{1}{10K} + \frac{1}{20K}$$

$$R_{Total} = \frac{1}{\frac{1}{10K} + \frac{1}{10K} + \frac{1}{20K}}$$

$$R_{Total} = 4K$$



Mixed Series and Parallel Resistors



First complete series resistors, then parallel. Here, R1 and R2 are added together, then with R3

