PHY1024

# Electric current, resistance, and Ohm’s law

**Electric current**

$I=\frac{△Q}{△t}$,

I is electric current (SI unit is A), △Q is electric charge, △t is time.

**Ohm’s law**

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

I is electric current, V is voltage, R is resistance.

**Electric power**

$$P=IV$$

$$P=\frac{V^{2}}{R}$$

$$P=I^{2}R$$

P is power, I is electric current, V is voltage, R is resistance.

# Resistors in Series

Definition:

Resistors are in series whenever the flow of charge, called the **current**, must flow through devices sequentially.

If two resistors are connected in series; index 1 is related to resistor 1 and index 2 is related to resistor 2:

Total Voltage

$$V= V\_{1}+V\_{2}$$

Total Resistance

$$R= R\_{1}+R\_{2}$$

Current

$$I\_{1}=I\_{2}$$

# Resistors in Parallel

Definition:

Resistors are in series whenever the flow of charge, called the **current**, must flow through devices sequentially.

If two resistors are connected in parallel; index 1 is related to resistor 1 and index 2 is related to resistor 2:

Voltage

$$V\_{1}=V\_{2}$$

Total Resistance $R$

$$\frac{1}{R}=\frac{1}{R\_{1}}+\frac{1}{R\_{2}}$$

Total Current

$$I=I\_{1}+I\_{2}$$