

Electricity

$$F_e = \frac{kq_1q_2}{r^2}$$

$$E = \frac{F_e}{q}$$

$$V = \frac{W}{q}$$

$$I = \frac{\Delta q}{t}$$

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

$$R = \frac{\rho L}{A}$$

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

$$W = Pt = Vit = I^2Rt = \frac{V^2t}{R}$$

A = cross-sectional area

E = electric field strength

F_e = electrostatic force

I = current

k = electrostatic constant

L = length of conductor

P = electrical power

q = charge

R = resistance

R_{eq} = equivalent resistance

r = distance between centers

t = time

V = potential difference

W = work (electrical energy)

Δ = change

ρ = resistivity

Series Circuits

$$I = I_1 = I_2 = I_3 = \dots$$

$$V = V_1 + V_2 + V_3 + \dots$$

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

Parallel Circuits


$$I = I_1 + I_2 + I_3 + \dots$$

$$V = V_1 = V_2 = V_3 = \dots$$


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


Circuit Symbols


 cell


 battery


 switch

 voltmeter

 ammeter

 resistor

 variable resistor

 lamp

Resistivities at 20°C	
Material	Resistivity ($\Omega \cdot \text{m}$)
Aluminum	2.82×10^{-8}
Copper	1.72×10^{-8}
Gold	2.44×10^{-8}
Nichrome	$150. \times 10^{-8}$
Silver	1.59×10^{-8}
Tungsten	5.60×10^{-8}