

CIRCUITS

• Variables	Symbol	Units
Resistance	R	Ω (Ohms)
Voltage (Electric Potential, Electric Potential Difference)	V	V
Current	I	A
Power	P	W

Equations

- Ohm's Law (only applicable for Ohmic materials)
$$V = IR$$

- Examples of non-Ohmic materials
 - Diodes (LEDs)
 - Semiconductors

- Power

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

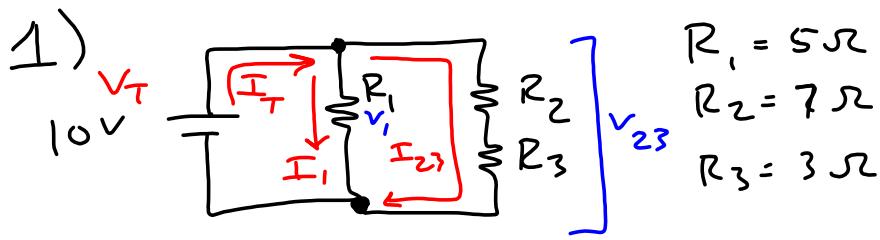
- Resistors in series

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

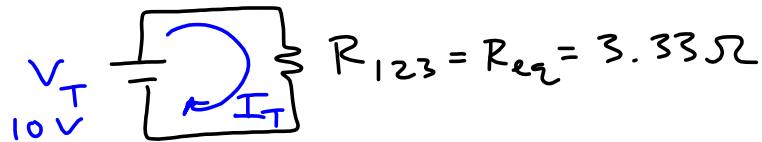
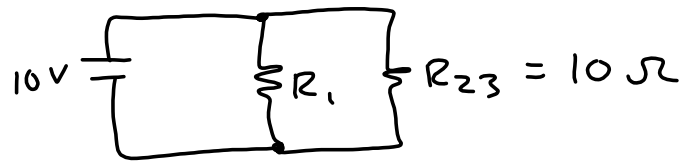
- Resistors in Parallel:

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

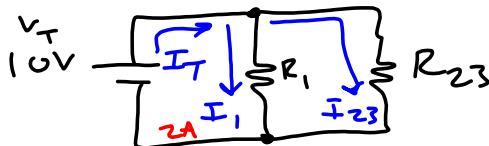
Circuit Practice



Find I_1 , I_2 , I_3 and V_1 , V_2 , V_3



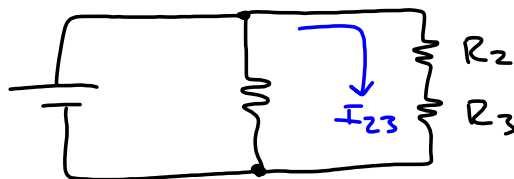
$$I_T = \frac{V_T}{R_{eq}} = \frac{10V}{3.33\Omega} = 3A$$



$$I_T = I_1 + I_{23}$$

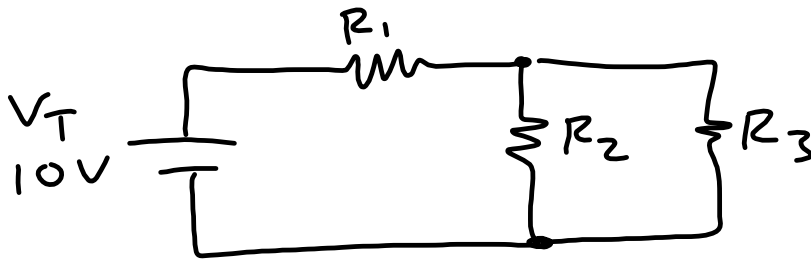
$$I_1 = \frac{V_T}{R_1} = 2A$$

$$I_{23} = I_T - I_1 = 3A - 2A = 1A$$



$$V_2 = I_{23} R_2 = 7V$$

$$V_3 = I_{23} R_3 = 3V$$

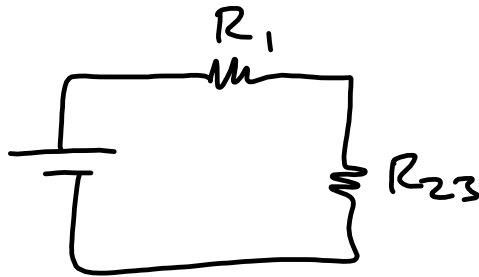


$$R_1 = 5 \Omega$$

$$R_2 = 7 \Omega$$

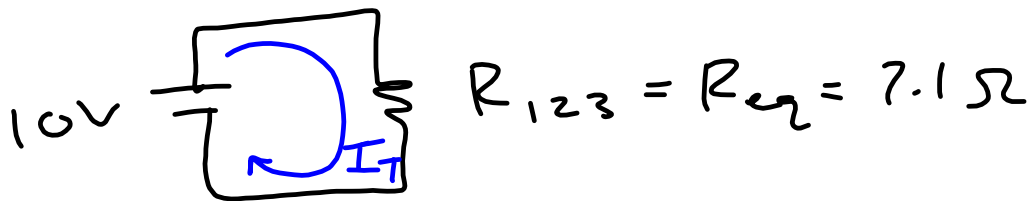
$$R_3 = 3 \Omega$$

Find I_1, I_2, I_3 and V_1, V_2, V_3

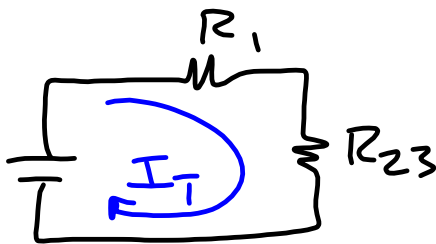


$$\frac{1}{R_{23}} = \frac{1}{R_2} + \frac{1}{R_3}$$

$$R_{23} = 2.1 \Omega$$



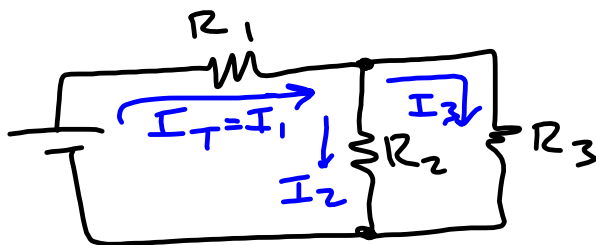
$$I_T = 1.411 \text{ A}$$



$$V_1 = I_T R_1 = 7.04 \text{ V}$$

$$V_{23} = I_T R_{23} = 2.95 \text{ V}$$

$$V_2 = V_3 = V_{23}$$

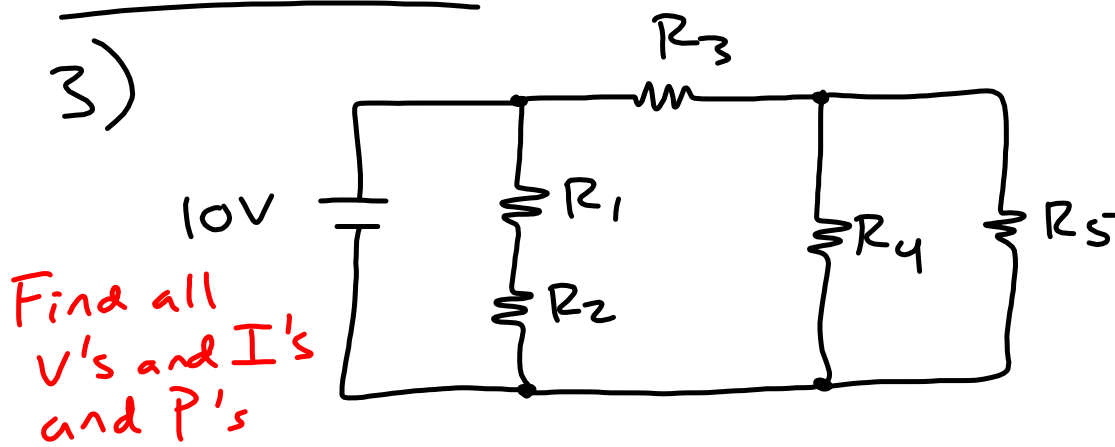


$$I_2 = \frac{V_{23}}{R_2} = 0.422 \text{ A}$$

$$I_3 = \frac{V_{23}}{R_3} = 0.987 \text{ A}$$

Practice

3)



$$R_1 = 5\Omega$$

$$R_2 = 3\Omega$$

$$R_3 = 3\Omega$$

$$R_4 = 7\Omega$$

$$R_5 = 6\Omega$$