

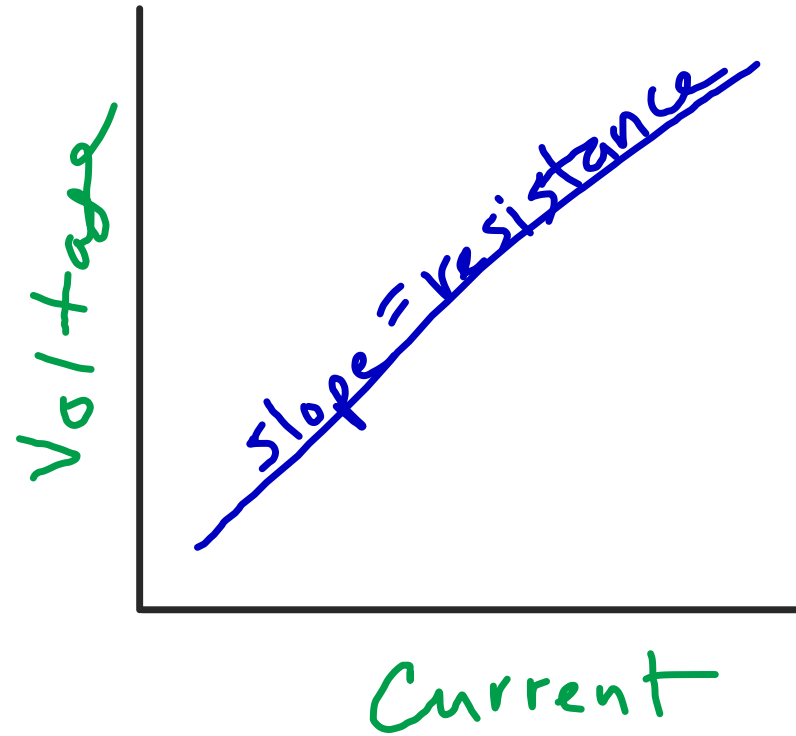
# Resistivity Basics

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

Summary :

Lower R  
SHORT  
FAT  
COLD

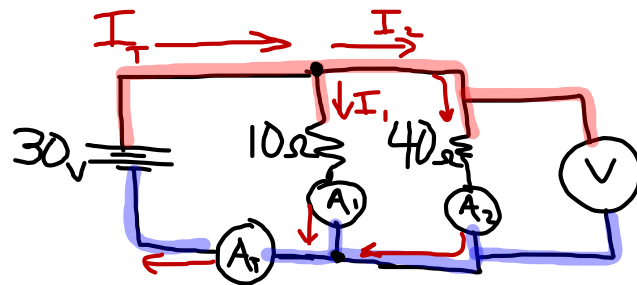
Higher R  
LONG  
THIN  
HOT



$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$$

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

Draw a circuit that contains a 30V DC source in parallel w/ :  $R_1 = 10\Omega$   
 $R_2 = 40\Omega$ . Find  $A_1$ ,  $A_2$  and  $A_T$   
as well as  $V_1$  and  $V_2$



$$A_1 = \frac{V}{R_1} = \frac{30V}{10\Omega} = 3A$$

$$A_2 = \frac{V}{R_2} = \frac{30V}{40\Omega} = .75A$$

$$P_T = ?$$

$$P_T = I_T V$$

$$= (3.75A)(30V)$$

$$P_T = 112.5W$$

$$P_1 = ?$$

$$P_1 = I_1 V$$

$$= 3A(30V)$$

$$P_1 = 90W$$

$$P_2 = ?$$

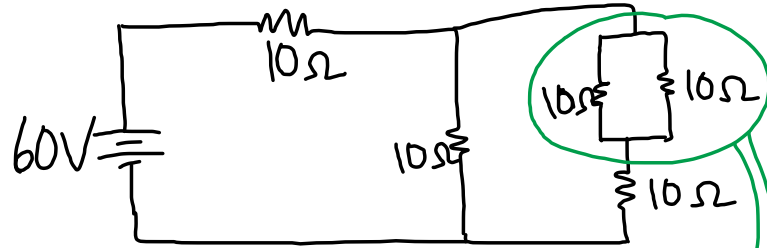
$$P_2 = I^2 R$$

$$= (.75A)^2 (40\Omega)$$

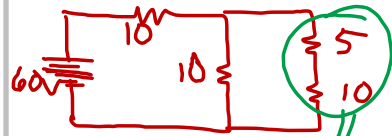
$$P_2 = 22.5W$$

$$\frac{1}{R_{EQ}} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{10\Omega} + \frac{1}{40\Omega} = \frac{5}{40\Omega}$$

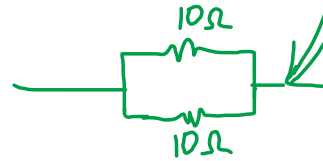
$$R_{EQ} = \frac{40}{5} \Omega = 8\Omega$$



Redraw Circuit

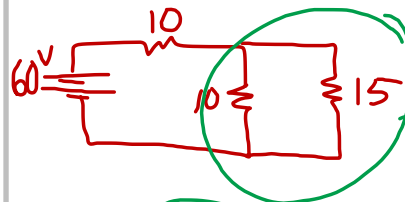


$$R_{EQ} = 5\Omega + 10\Omega = 15\Omega$$



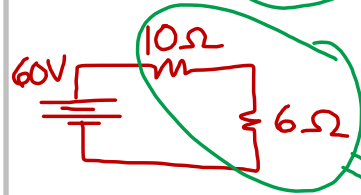
$$\frac{1}{R_{eq}} = \frac{1}{10\Omega} + \frac{1}{10\Omega} = \frac{2}{10\Omega}$$

$$R_{eq} = \frac{10\Omega}{2} = 5\Omega$$



$$\frac{1}{R_{EQ}} = \frac{1}{10\Omega} + \frac{1}{15\Omega}$$

$$R_{EQ} = \frac{\frac{3}{30\Omega} + \frac{2}{30\Omega}}{\frac{5}{30\Omega}} = \frac{5}{30\Omega}$$

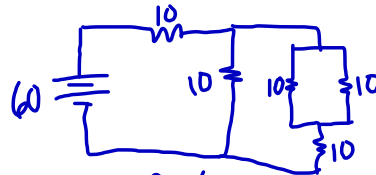


$$R_{EQ} = \frac{30\Omega}{5} = 6\Omega$$

$$R_{EQ} = 10\Omega + 6\Omega = 16\Omega$$



Simplified Circuit



ORIGINAL

