

P12 - 9.3 - Add R Bulb/Switch Circuits Notes

$$V = IR \quad P = IV$$

Series

$$I_T = I_1 = I_2 = I_3 \dots$$

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

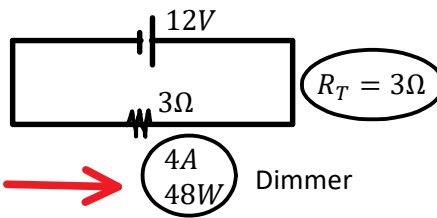
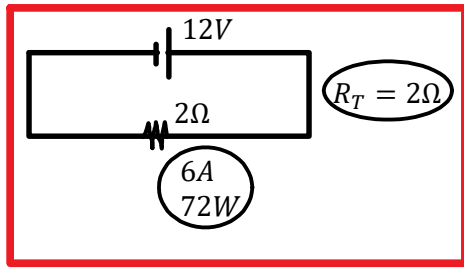
$$R_T = R_1 + R_2 + R_3 \dots$$

Parallel

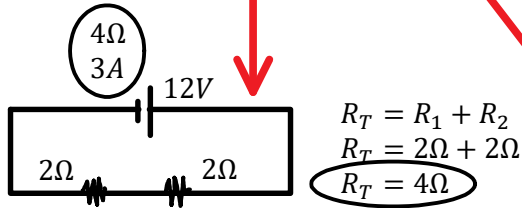
$$V_T = V_1 = V_2 = V_3 \dots$$

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

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



Inc R → I Dec, P Dec



$$R_T = R_1 + R_2$$

$$R_T = 2\Omega + 2\Omega$$

$$R_T = 4\Omega$$



$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

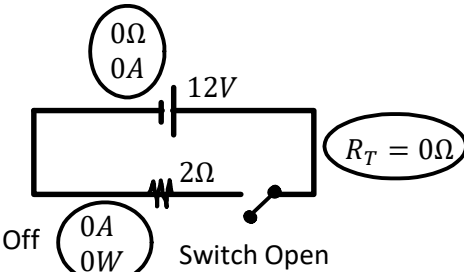
$$\frac{1}{R_T} = \frac{1}{2} + \frac{1}{2}$$

$$\frac{1}{R_T} = 1$$

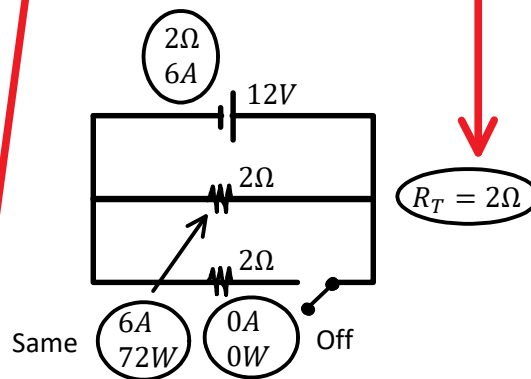
$$R_T = 1\Omega$$

Add resistors in Series
→ R_T increases

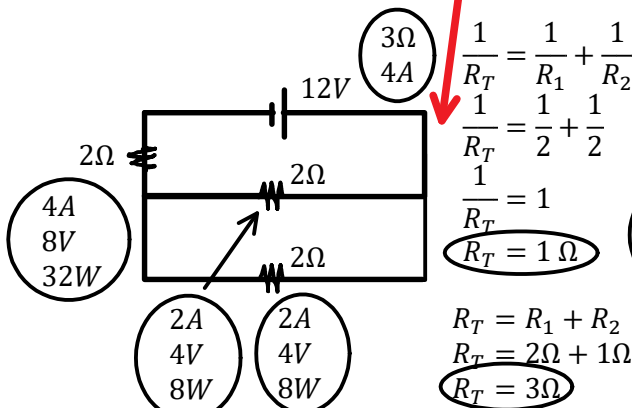
Add resistors in Parallel
→ R_T decreases



No Current!



$$R_T = 2\Omega$$



$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_T} = \frac{1}{2} + \frac{1}{2}$$

$$\frac{1}{R_T} = 1$$

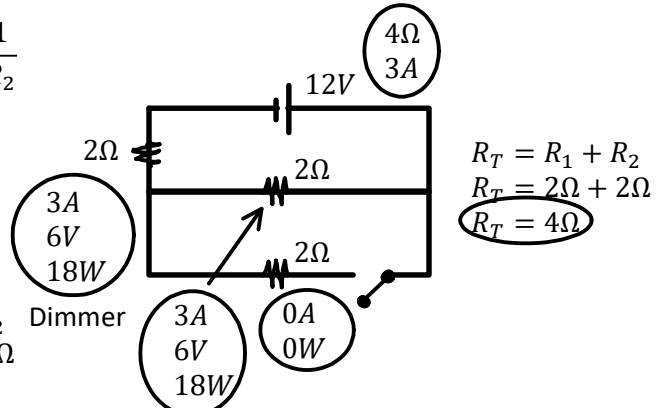
$$R_T = 1\Omega$$

$$R_T = R_1 + R_2$$

$$R_T = 2\Omega + 1\Omega$$

$$R_T = 3\Omega$$

Dimmer Dimmer



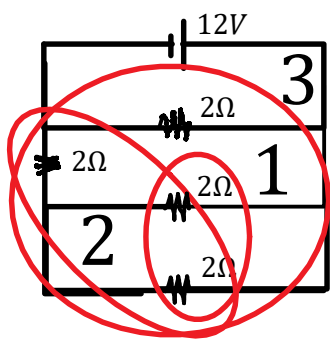
$$R_T = R_1 + R_2$$

$$R_T = 2\Omega + 2\Omega$$

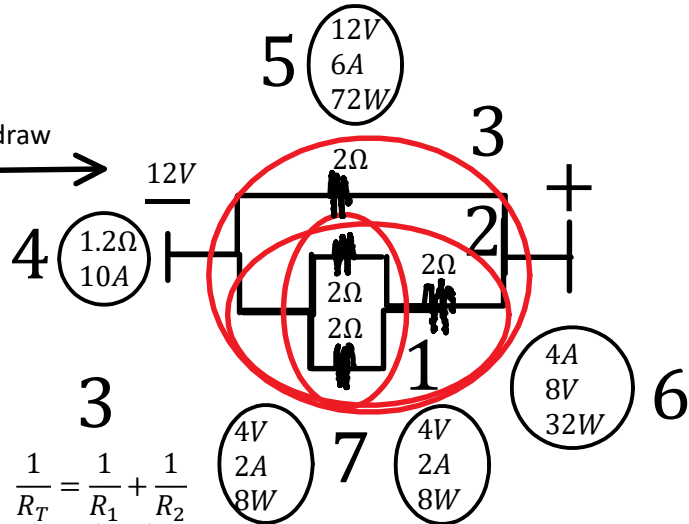
$$R_T = 4\Omega$$

Brighter

P12 - 9.3 - Add R Bulb/Switch Circuits Notes



Redraw →



1

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_T} = \frac{1}{2} + \frac{1}{2}$$

$$\frac{1}{R_T} = 1$$

$$R_T = 1\Omega$$

2

$$R_T = R_1 + R_2$$

$$R_T = 2\Omega + 1\Omega$$

$$R_T = 3\Omega$$

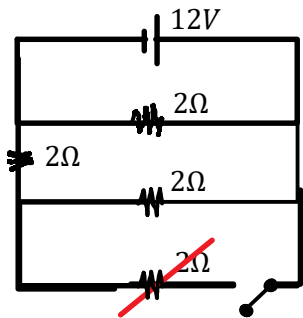
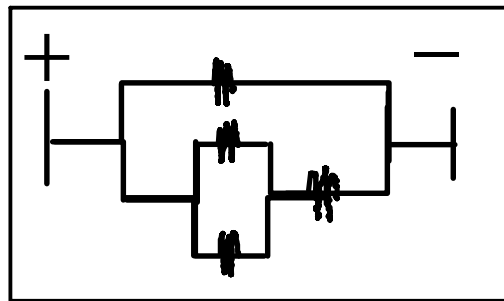
3

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_T} = \frac{1}{2} + \frac{1}{3}$$

$$\frac{1}{R_T} = \frac{5}{6}$$

$$R_T = 1.2\Omega$$



1

$$R_T = R_1 + R_2$$

$$R_T = 2\Omega + 2\Omega$$

$$R_T = 4\Omega$$

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_T} = \frac{1}{2} + \frac{1}{4}$$

$$\frac{1}{R_T} = \frac{3}{4}$$

$$R_T = 1.33\Omega$$

