july 2016

8. Calculate EACH of the following for a 100 W, 250 V electric filament lamp:

(a) The operating resistance; (4)

(b) The operating current. (3)

Q7 July 2015

An electric fire operated from a 240V supply has a heating element comprising two 30Ω coils. The coils may be wired in series to give a low setting or in parallel to give a high setting. Calculate EACH of the following:

(a) The power output of the low setting. (5)

(b) The power output of the high setting. (5)

dec 2014

7. A 6 ohm resistor is connected in parallel with a 3 ohm resistor, and this combination is connected in series with a 4 ohm resistor. The applied voltage is 12 volts.

Calculate EACH of the following:

(a) the total current in the circuit; (4)

(b) the power dissipated by EACH component. (6)

Q7 July 2015

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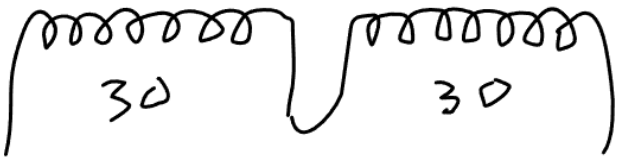
a)



$R_T = R_1 + R_2$

$R_T = 30 + 30 = 60\Omega$

$P = IV$

$V = 240$

I

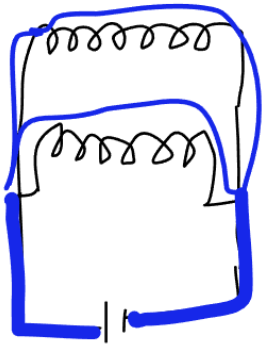
$R = 60$

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

$I = \frac{240}{60} = 4$

$P = 4 \times 240 = 960\,W$

b)



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

$$\frac{1}{R_T} = \frac{1}{30} + \frac{1}{30}$$

$$\frac{2}{30}$$

$$\frac{1}{R_T} = \frac{1}{15}$$

$$R_T = 15\Omega$$

$V = 240$

$R = 15$

V

I R

$$I = \frac{V}{R} = \frac{240}{15} = 16 \text{ Amps}$$

$P = IV$

$P = 16 \times 240 = 3.84 kW$

july 2016

8. Calculate EACH of the following for a 100 W, 250 V electric filament lamp:

(a) The operating resistance; (4)

(b) The operating current. (3)

$P = I\ V$

$100 = 250\ I$

$I = \frac{100}{250}$

$I = 0.4\ A$

$R = \frac{250}{0.4} = 625\ \Omega$

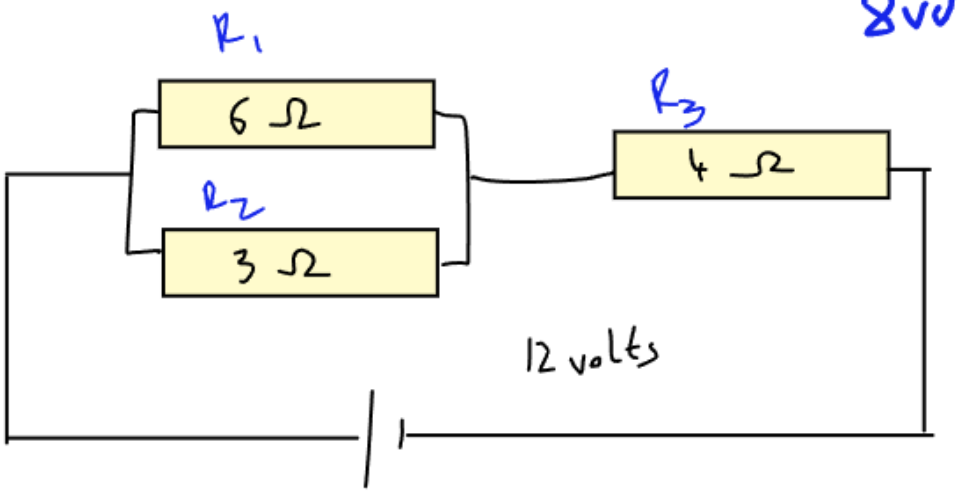
dec 2014

7. A 6 ohm resistor is connected in parallel with a 3 ohm resistor, and this combination is connected in series with a 4 ohm resistor. The applied voltage is 12 volts.

Calculate EACH of the following:

(a) the total current in the circuit; (4)

(b) the power dissipated by EACH component. (6)



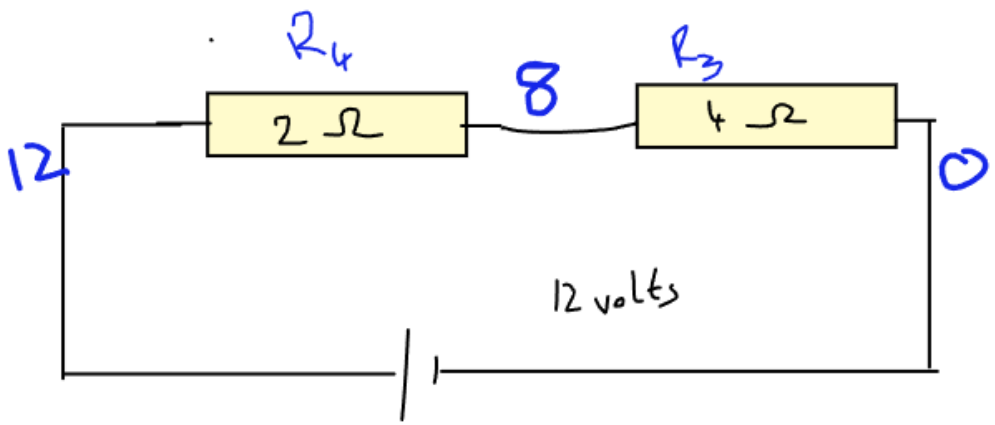
8 volts Parallel Resistors

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

$$\frac{1}{R_T} = \frac{1}{6} + \frac{1}{3}$$

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

$$R_T = 2\Omega$$

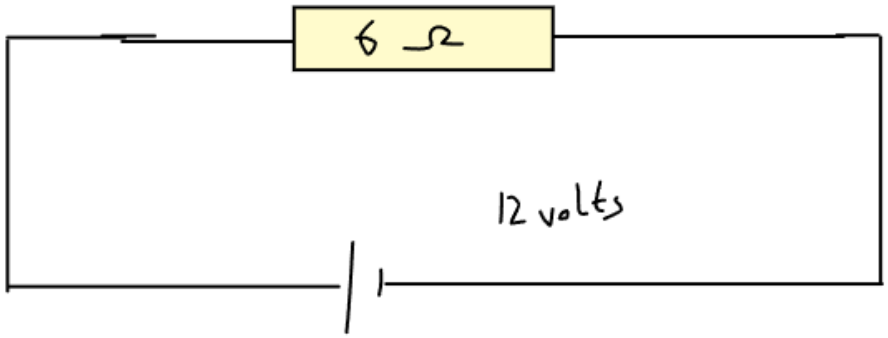


Series Resistors

$R_T = R_4 + R_3$

$6 = 2 + 4$

$R_T = 6\ \Omega$



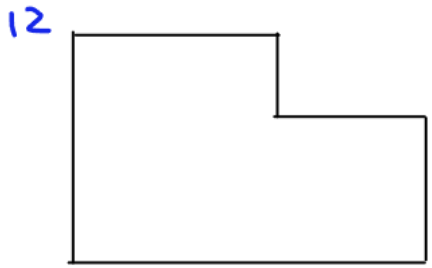
Circuit

$V = 12$

$I = 2$ Amp

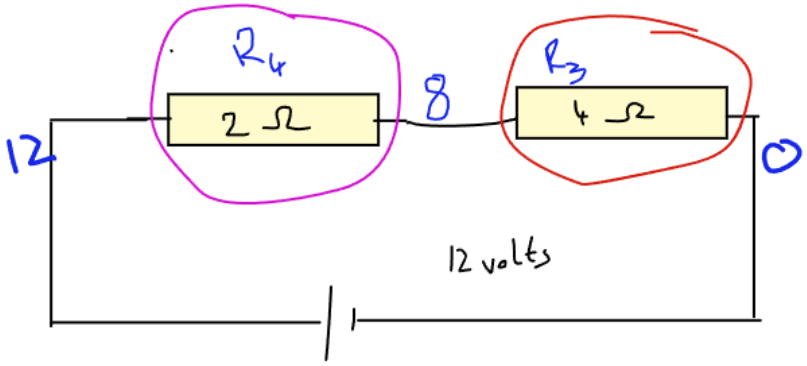
$R = 6$

$$I = \frac{12}{6} = 2 \text{ Amps}$$



$P = IV$

$I = 2$



Voltage drop over R_4

V

$I = 2$

$R = 2$

$V = 2 \times 2 = 4$ Volts

Voltage drop over R_3

$V = 8$

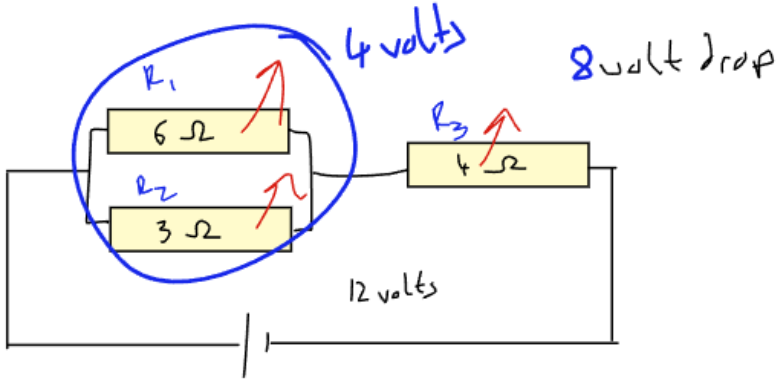
$I = 2$

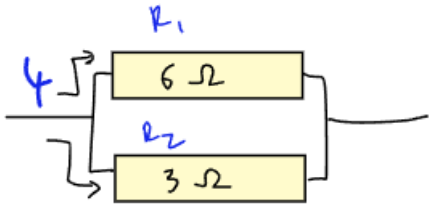
$R = 4$

$V = 2 \times 4 = 8$ volt

$P = IV$

$P_3 = 2 \times 8 = 16$ watts





Supply Voltage = 4 V

$V = 4$

R_1

$V = 4$

$R = 6$

I

$I = \frac{V}{R} = \frac{4}{6} = \frac{2}{3}$ Amp

$P = IV$

$P = \frac{2}{3} \times 4$

$P_1 = 2.6667$ Watts

R_2

$V = 4$

$R = 3$

I

$I = \frac{V}{R} = \frac{4}{3}$ Amp

$P = IV$

$P = \frac{4}{3} \times 4$

$P_2 = 5.3333$ Watts