Answer on Question #78382 Physics / Electric Circuits

Two resistances R1 and R2, when connected in series give a resistance of 10amp and a resistance of 2.4 Ω when connected in parallel. Find the value of R1 and R2

Solution:

$$\begin{cases} R_1 + R_2 = 10 \\ \dfrac{1}{R_1} + \dfrac{1}{R_2} = \dfrac{1}{2.4} \end{cases}$$

$$\begin{cases} R_1 + R_2 = 10 \\ \dfrac{R_1 R_2}{R_1 + R_2} = 2.4 \end{cases}$$

$$\begin{cases} R_1 = 10 - R_2 \\ \dfrac{(10 - R_2)R_2}{10} = 2.4 \end{cases}$$

$$10R_2 - R_2^2 = 24$$

$$R_2^2 - 10R_2 + 24 = 0$$

$$R_2 = 4\,\Omega \text{ or } R_2 = 6\,\Omega$$

So

$$R_1 = 6\,\Omega \text{ or } R_1 = 4\,\Omega$$

Answer: $R_1 = 6\,\Omega, R_2 = 4\,\Omega$ or $R_1 = 4\,\Omega, R_2 = 6\,\Omega$