

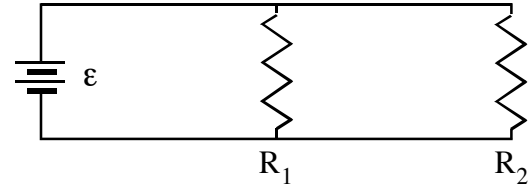
PhyzJob: Parallel Circuits NUMBER PUZZLES



Apply Ohm's law, Joule's law, and your understanding of the nature of parallel circuits to solve the numerical problems that follow.

Ex. If $\epsilon = 8 \text{ V}$, $R_1 = 12 \Omega$ and $R_2 = 6.0 \Omega$, what is

- the equivalent resistance of the circuit?
- the total current in the circuit?
- the power dissipated in R_1 ?
- the current through R_2 ?



$$\begin{aligned} \text{a. } R_{\text{EQ}} &= R_1 R_2 / (R_1 + R_2) \\ R_{\text{EQ}} &= 12 \cdot 6 / (12 + 6) \\ R_{\text{EQ}} &= 4 \end{aligned}$$

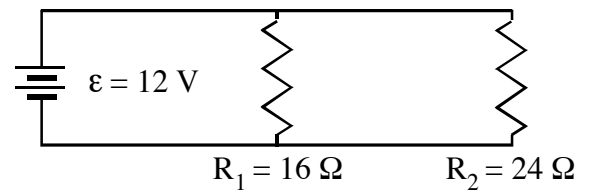
$$\begin{aligned} \text{b. } I_{\text{TOT}} &= \epsilon / R_{\text{EQ}} \\ I_{\text{TOT}} &= 8 \text{ V} / 4 \\ I_{\text{TOT}} &= 2 \text{ A} \end{aligned}$$

$$\begin{aligned} \text{c. } P_1 &= \epsilon^2 / R_1 \\ P_1 &= (8 \text{ V})^2 / 12 \\ P_1 &= 5.3 \text{ W} \end{aligned}$$

$$\begin{aligned} \text{d. } I_2 &= \epsilon / R_2 \\ I_2 &= 8 \text{ V} / 6 \\ I_2 &= 1.3 \text{ A} \end{aligned}$$

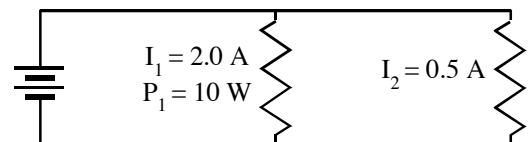
1. If $\epsilon = 12 \text{ V}$, $R_1 = 16 \Omega$ and $R_2 = 24 \Omega$, what is

- the equivalent resistance of the circuit?
- the total current in the circuit?
- the power dissipated in R_1 ?
- the current through R_2 ?



2. If $I_1 = 2.0 \text{ A}$, $P_1 = 10 \text{ W}$, and $I_2 = 0.5 \text{ A}$, what is

- the voltage across R_1 ?
- the resistance of R_2 ?
- the power dissipated in the circuit?
- the equivalent resistance of the circuit?



3. If $I_1 = 1.5 \text{ A}$, $R_1 = 8.0 \ \Omega$, and $R_2 = 6.0 \ \Omega$, what is the voltage across R_2 ?

4. If $\varepsilon = 9.0 \text{ V}$, $I_1 = 0.4 \text{ A}$, and $I_2 = 1.2 \text{ A}$, what is the power dissipated in the circuit?

5. If $\varepsilon = 32 \text{ V}$, $R_1 = 18 \ \Omega$, and $P_2 = 48 \text{ W}$, what is the current

a. through R_1 ?

b. through R_2 ?

c. through the battery (total current in the circuit)?