

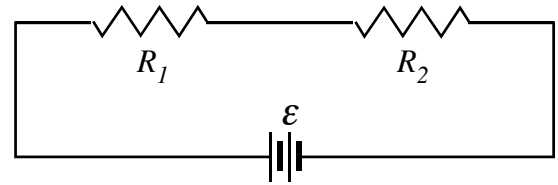
PhyzJob: Series Circuits NUMBER PUZZLES



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

Ex. If $\mathcal{E} = 12 \text{ V}$, $R_1 = 3.0 \ \Omega$ 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 voltage across R_2 ?



- $R_{\text{EQ}} = R_1 + R_2$ (for series circuit)
 $R_{\text{EQ}} = 3.0 \ \Omega + 6.0 \ \Omega$
 $R_{\text{EQ}} = 9.0 \ \Omega$

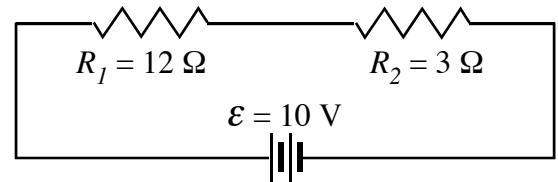
- $I = \mathcal{E}/R_{\text{EQ}}$
 $I = 12 \text{ V} / 9.0 \ \Omega$
 $I = 1.3 \text{ A}$

- $P_1 = I^2 R_1$
 $P_1 = (1.3 \text{ A})^2 \cdot 3.0 \ \Omega$
 $P_1 = 5.1 \text{ W}$

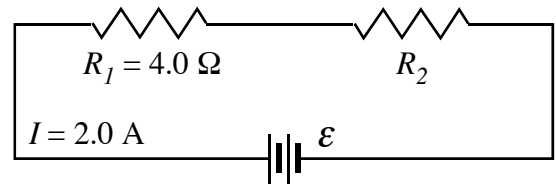
- $V_2 = IR_2$
 $V_2 = 1.3 \text{ A} \cdot 6.0 \ \Omega$
 $V_2 = 8.0 \text{ V}$

1. If $\mathcal{E} = 10 \text{ V}$, $R_1 = 12 \ \Omega$ and $R_2 = 3.0 \ \Omega$, what is

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



2. If $I = 2.0 \text{ A}$, $R_1 = 4.0 \ \Omega$, and $V_2 = 5.0 \text{ V}$, what is
- the voltage across R_1 ?
 - the resistance of R_2 ?
 - the power dissipated in the circuit?
 - the voltage of the battery?



3. If $\epsilon = 24 \text{ V}$, $R_1 = 8.0 \ \Omega$, and $R_2 = 6.0 \ \Omega$, what is the current through R_2 ?

4. If $\epsilon = 9.0 \text{ V}$, $R_1 = 5.0 \ \Omega$, and $R_2 = 13 \ \Omega$, what is the power dissipated in the circuit?

5. If $I = 0.75 \text{ A}$, $R_1 = 6 \ \Omega$, and $R_2 = 15 \ \Omega$, what is the voltage
- across R_1 ?
 - across R_2 ?
 - of the battery?