1. Consider this diagram:

What is the potential difference across the 40.Ω resistor in the circuit above?

A \(7.5 \times 10^{-3} \text{ V}\)
B 12 V
C 120 V
D 130 V

2. Consider this diagram:

What voltage will be recorded by the voltmeter in the circuit above?

A 50 V
B 100 V
C 200 V
D 400 V
3. A simple series circuit consists of a battery and resistor. Which battery and resistor combination will give the greatest current in the circuit?

A

\[ \text{3 V} \quad \text{5 \Omega} \]

B

\[ \text{5 V} \quad \text{3 \Omega} \]

C

\[ \text{10 V} \quad \text{8 \Omega} \]

D

\[ \text{8 V} \quad \text{10 \Omega} \]

4. A 40.-Ω resistor is attached to a 12-volt battery as shown below.

\[ \text{12 V} \quad \text{40. \Omega} \]

How many coulombs of charge pass through the resistor in 5.0 minutes?

A 0.30 C

B 1.5 C

C 60. C

D 90. C

5. A circuit has 3 identical resistors in series attached to a battery. When one of the resistors is removed and the circuit is reconnected, which of the following will occur?

A The total resistance and the total current decrease.

B The total resistance decreases, and the total current increases.

C The total resistance increases, and the total current decreases.

D The total resistance and the total current increase.
6. Consider this diagram:

What resistance, $R$, will result in the current and voltage measurements shown?

A 0.33 $\Omega$
B 3.0 $\Omega$
C 6.0 $\Omega$
D 12 $\Omega$

7. Three different resistors are connected in parallel in a circuit containing a battery. Which statement is true for each resistor?

A The current through each is the same.
B The power used in each is the same.
C The voltage across each is the same.
D The capacitance of each is the same.
8. The circuit in which of the following diagrams would have the \textit{greatest} current?

A

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{imageA}
\end{figure}

B

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{imageB}
\end{figure}

C

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{imageC}
\end{figure}

D

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{imageD}
\end{figure}
9. A light bulb is connected across a 6.0-V potential difference. The current in the circuit is measured at 0.75 A. What is the power rating of the light bulb?

A  1.3 W  
B  4.5 W  
C  6.8 W  
D  8.0 W  

10. A 120-V heater draws 12.0 A of current. What is the power rating of the heater?

A  10.0 W  
B  132 W  
C  1,440 W  
D  17,300 W  

11. Ten volts are applied across a 100-Ω resistor. How many watts are dissipated by the resistor?

A  1 W  
B  10 W  
C  100 W  
D  1,000 W  

End of Goal 10 Sample Items

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1. **Objective 10.01**  
Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit.  
**Thinking Skill:** Analyzing  
**Correct Answer:** B

2. **Objective 10.01**  
Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit.  
**Thinking Skill:** Analyzing  
**Correct Answer:** C

3. **Objective 10.01**  
Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit.  
**Thinking Skill:** Generating  
**Correct Answer:** B

4. **Objective 10.01**  
Analyze and measure the relationship among potential difference, current, and resistance in a direct current circuit.  
**Thinking Skill:** Analyzing  
**Correct Answer:** D

5. **Objective 10.02**  
Analyze and measure the relationship among current, voltage, and resistance in series and parallel circuits.  
**Thinking Skill:** Generating  
**Correct Answer:** B

6. **Objective 10.02**  
Analyze and measure the relationship among current, voltage, and resistance in series and parallel circuits.  
**Thinking Skill:** Analyzing  
**Correct Answer:** B

7. **Objective 10.02**  
Analyze and measure the relationship among current, voltage, and resistance in series and parallel circuits.  
**Thinking Skill:** Integrating  
**Correct Answer:** C

8. **Objective 10.02**  
Analyze and measure the relationship among current, voltage, and resistance in series and parallel circuits.  
**Thinking Skill:** Generating  
**Correct Answer:** D
9. **Objective 10.03**
Analyze and measure the nature of power in an electrical circuit.

*Thinking Skill:* Applying  
*Correct Answer:* B

10. **Objective 10.03**
Analyze and measure the nature of power in an electrical circuit.

*Thinking Skill:* Applying  
*Correct Answer:* C

11. **Objective 10.03**
Analyze and measure the nature of power in an electrical circuit.

*Thinking Skill:* Applying  
*Correct Answer:* A