

8. Three  $2.0\ \Omega$  resistors are connected in series to a  $12\ \text{V}$  battery. What is the potential difference across each resistor?

F.  $2.0\ \text{V}$   
G.  $4.0\ \text{V}$   
H.  $12\ \text{V}$   
J.  $36\ \text{V}$

*Use the following passage to answer questions 9–11.*

Six light bulbs are connected in parallel to a  $9.0\ \text{V}$  battery. Each bulb has a resistance of  $3.0\ \Omega$ .

9. What is the potential difference across each bulb?
- A.  $1.5\ \text{V}$   
B.  $3.0\ \text{V}$   
C.  $9.0\ \text{V}$   
D.  $27\ \text{V}$

10. What is the current in each bulb?

F.  $0.5\ \text{A}$   
G.  $3.0\ \text{A}$   
H.  $4.5\ \text{A}$   
J.  $18\ \text{A}$

11. What is the total current in the circuit?

A.  $0.5\ \text{A}$   
B.  $3.0\ \text{A}$   
C.  $4.5\ \text{A}$   
D.  $18\ \text{A}$

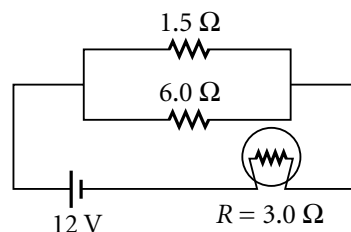
## SHORT RESPONSE

12. Which is greater, a battery's terminal voltage or the same battery's emf? Explain why these two quantities are not equal.
13. Describe how a short circuit could lead to a fire.
14. Explain the advantage of wiring the bulbs in a string of decorative lights in parallel rather than in series.

## EXTENDED RESPONSE

15. Using standard symbols for circuit elements, draw a diagram of a circuit that contains a battery, an open switch, and a light bulb in parallel with a resistor. Add an arrow to indicate the direction of current if the switch were closed.

*Use the diagram below to answer questions 16–17.*



16. For the circuit shown, calculate the following:
- the equivalent resistance of the circuit
  - the current in the light bulb.
- Show all your work for both calculations.
17. After a period of time, the  $6.0\ \Omega$  resistor fails and breaks. Describe what happens to the brightness of the bulb. Support your answer.
18. Find the current in and potential difference across each of the resistors in the following circuits:
- a  $4.0\ \Omega$  and a  $12.0\ \Omega$  resistor wired in series with a  $4.0\ \text{V}$  source.
  - a  $4.0\ \Omega$  and a  $12.0\ \Omega$  resistor wired in parallel with a  $4.0\ \text{V}$  source.
- Show all your work for each calculation.
19. Find the current in and potential difference across each of the resistors in the following circuits:
- a  $150\ \Omega$  and a  $180\ \Omega$  resistor wired in series with a  $12\ \text{V}$  source.
  - a  $150\ \Omega$  and a  $180\ \Omega$  resistor wired in parallel with a  $12\ \text{V}$  source.
- Show all your work for each calculation.

**Test TIP** Prepare yourself for taking an important test by getting plenty of sleep the night before and by eating a healthy breakfast on the day of the test.