Use with textbook pages 248–254.

Static charge

Match each Term on the left with the corresponding Diagram label on the right. Each label may be used more than once.

<table>
<thead>
<tr>
<th>Term</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. proton</td>
<td>A</td>
</tr>
<tr>
<td>2. neutron</td>
<td>B</td>
</tr>
<tr>
<td>3. electron</td>
<td>C</td>
</tr>
<tr>
<td>4. has no charge</td>
<td></td>
</tr>
<tr>
<td>5. has a positive charge</td>
<td></td>
</tr>
<tr>
<td>6. has a negative charge</td>
<td></td>
</tr>
<tr>
<td>7. can move from one atom to another</td>
<td></td>
</tr>
<tr>
<td>8. and make up the nucleus (name 2 parts of the atom)</td>
<td></td>
</tr>
</tbody>
</table>

Circle the letter of the best answer.

9. A neutral object has exactly the same number of
   A. protons and neutrons
   B. protons and electrons
   C. neutrons and electrons
   D. protons, neutrons, and electrons

Use the following diagram to answer question 10.

```
+ - + - + - -
- - + - + - +
+ - + - + - -
```

10. What is the electric charge on the object shown above?
   A. neutral
   B. positive
   C. negative
   D. It is impossible to tell.

Use the following diagram to answer questions 11 and 12.

```
+ - - + - -
- - + + - -
+ - - + - -
```

11. What is the electric charge on the object shown above?
   A. neutral
   B. positive
   C. negative
   D. It is impossible to tell.

12. Which of the following describes the object shown above?
   A. It lost protons.
   B. It lost electrons.
   C. It gained protons.
   D. It gained electrons.

13. A vinyl rod is rubbed with a cotton cloth. The vinyl rod becomes negatively charged and the cotton cloth becomes positively charged. Which of the following describes the cotton cloth?
   A. It has gained electrons.
   B. It has more electrons than protons.
   C. It has more protons than electrons.
   D. It has the same number of protons as electrons.

14. Which of the following is a good conductor?
   A. glass
   B. wood
   C. copper
   D. fur
### Electric force

**Match each Diagram on the left with the best Descriptor on the right. Each Descriptor may be used more than once.**

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A. suspended spheres will move away from each other</td>
</tr>
<tr>
<td>2.</td>
<td>B. suspended spheres will move toward each other</td>
</tr>
<tr>
<td>3.</td>
<td>C. suspended spheres will not move</td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>

**Circle the letter of the best answer.**

5. Which of the following applies to a neutral object?

| I. | It is attracted to a positive surface. |
| II. | It is attracted to a negative surface. |
| III. | It has the same number of protons as electrons. |

A. I and II only  
B. I and III only  
C. II and III only  
D. I, II, and III

6. A negatively charged ruler is brought near a suspended ball. The ball is repelled by the ruler. What can you conclude from this observation?

A. The ball is neutral.  
B. The ball is positively charged.  
C. The ball is negatively charged.  
D. The ball is either neutral or positively charged.

7. Two suspended balloons repel each other when brought close together. What can you conclude about the balloons?

A. They have opposite charges.  
B. They both have the same charge.  
C. One balloon is neutral and the other balloon is positively charged.  
D. One balloon is neutral and the other balloon is negatively charged.

8. How does the electric force change as the amount of charge is increased?

A. It increases.  
B. It decreases.  
C. It stays the same.  
D. It increases and then decreases.

9. Which of the following statements is true about the relationship between distance and electric force?

A. If the distance between charged objects decreases, the electric force decreases.  
B. If the distance between charged objects decreases, the electric force stays the same.  
C. If the distance between charged objects increases, the electric force increases.  
D. If the distance between charged objects increases, the electric force decreases.
Electric potential energy and voltage

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

<table>
<thead>
<tr>
<th>Term</th>
<th>Descriptor</th>
</tr>
</thead>
</table>
| 1. ______ electrochemical cell | A. battery terminal  
B. conducts electricity  
C. converts chemical energy into electrical energy  
D. another name for voltage  
E. energy from motion  
F. stored energy |
| 2. ______ potential energy |                                                                                     |
| 3. ______ potential difference |                                                                                     |
| 4. ______ electrode |                                                                                     |
| 5. ______ electrolyte |                                                                                     |

Circle the letter of the best answer.

6. Which of the following could be used to measure the amount of potential difference in a circuit?
   A. electrode  
   B. voltmeter  
   C. electrolyte  
   D. electroscope

7. What is the unit for measuring potential difference?
   A. volt (V)  
   B. second (s)  
   C. metre (m)  
   D. coulomb (C)

8. What is shown in the diagram above?
   A. dry cell  
   B. wet cell  
   C. voltmeter  
   D. electroscope

9. Which of the following describes the electrolyte used in the object shown above?
   A. a fluid  
   B. a moist paste  
   C. an acid solution  
   D. a copper electrode

10. Which of the following are different names for the same thing?
    | I. battery  
   | II. electrochemical cell  
   | III. electric potential difference
    A. I and II only  
    B. I and III only  
    C. II and III only  
    D. I, II, and III

**Electric current**

Match each Term on the left with the letter on the Diagram on the right. Each letter on the Diagram may be used only once.

<table>
<thead>
<tr>
<th>Term</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______ cell</td>
<td>[Diagram A]</td>
</tr>
<tr>
<td>2. ______ bulb</td>
<td>[Diagram B]</td>
</tr>
<tr>
<td>3. ______ switch</td>
<td>[Diagram C]</td>
</tr>
<tr>
<td>4. ______ circuit diagram</td>
<td>[Diagram D]</td>
</tr>
<tr>
<td>5. ______ conducting wire</td>
<td>[Diagram E]</td>
</tr>
</tbody>
</table>

Circle the letter of the best answer.

6. What does the symbol ———A——— represent?
   - A. a load
   - B. a battery
   - C. a voltmeter
   - D. an ammeter

7. Which of the following are correctly defined?
   - I. ampere: unit for electric current
   - II. ammeter: device used to measure current
   - III. electric circuit: an incomplete pathway through which electrons can flow
   - A. I and II only
   - B. I and III only
   - C. II and III only
   - D. I, II, and III

8. Which of the following is not an example of an electric load?
   - A. a motor
   - B. a heater
   - C. a light bulb
   - D. a generator

9. Which circuit diagram represents the illustration shown above?
   - A. [Diagram A]
   - B. [Diagram B]
   - C. [Diagram C]
   - D. [Diagram D]
Use with textbook pages 290–297.

**Resistance and Ohm’s law**

Match the Formula or Unit on the left with the best Descriptor on the right. Each Descriptor may be used only once.

<table>
<thead>
<tr>
<th>Formula or Unit</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______ I = V ÷ R</td>
<td>A. unit for voltage</td>
</tr>
<tr>
<td>2. ______ R = V ÷ I</td>
<td>B. unit for current</td>
</tr>
<tr>
<td>3. ______ V = I × R</td>
<td>C. unit for resistance</td>
</tr>
<tr>
<td>4. ______ volts (V)</td>
<td>D. formula for voltage</td>
</tr>
<tr>
<td>5. ______ ohms (Ω)</td>
<td>E. formula for current</td>
</tr>
<tr>
<td>6. ______ amperes (A)</td>
<td>F. formula for resistance</td>
</tr>
</tbody>
</table>

Circle the letter of the best answer.

7. Which of the following correctly matches the devices with what they measure?

<table>
<thead>
<tr>
<th>Ammeter</th>
<th>Ohmmeter</th>
<th>Voltmeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>current</td>
<td>voltage</td>
</tr>
<tr>
<td>B.</td>
<td>resistance</td>
<td>current</td>
</tr>
<tr>
<td>C.</td>
<td>voltage</td>
<td>resistance</td>
</tr>
<tr>
<td>D.</td>
<td>current</td>
<td>resistance</td>
</tr>
</tbody>
</table>

8. What is the name of the law given to the mathematical relationship between voltage, current, and resistance?

A. Ohm’s law  
B. Voltage’s law  
C. Ampere’s law  
D. Electricity’s law

9. Which of the following describes resistance?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>It resists the flow of electrons.</td>
</tr>
<tr>
<td>II.</td>
<td>It speeds up the current flow in a circuit.</td>
</tr>
<tr>
<td>III.</td>
<td>It causes the electron’s electrical energy to be converted to heat and light energy.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A. I and II only  
B. I and III only  
C. II and III only  
D. I, II, and III

10. Which of the following occurs if resistance is increased in a circuit?

A. Both voltage and current will increase.  
B. Both voltage and current will decrease.  
C. Voltage will increase and current will decrease.  
D. Voltage will decrease and current will increase.

11. What does the symbol ——— represent?

A. a load  
B. a resistor  
C. a voltmeter  
D. an ammeter

12. A 6 V battery is connected to a 10 Ω resistor. What is the current flowing in the circuit?

A. 0.6 A  
B. 1.67 A  
C. 4 A  
D. 60 A
Series and parallel circuits

Match each Description on the left with the Circuit on the right. Each Circuit may be used more than once.

<table>
<thead>
<tr>
<th>Description</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Resistor decrease the total resistance of the circuit.</td>
<td>A. series circuit</td>
</tr>
<tr>
<td>2. Resistor increase the total resistance of the circuit.</td>
<td>B. parallel circuit</td>
</tr>
<tr>
<td>3. The voltages across each of the loads in the circuit add up to the voltage supplied by the source.</td>
<td></td>
</tr>
<tr>
<td>4. The voltages across each of the loads in the circuit are equal to each other and to the voltage supplied by the source.</td>
<td></td>
</tr>
<tr>
<td>5. The current through the whole circuit is the same throughout and is equal to the total current supplied by the source.</td>
<td></td>
</tr>
<tr>
<td>6. The current through each pathway of the circuit adds up to the total current supplied by the source.</td>
<td></td>
</tr>
</tbody>
</table>

Circle the letter of the best answer.

Use the following diagram to answer questions 7 and 8.

7. The light bulbs are connected in parallel.
   A. The statement is correct.
   B. The statement is incorrect.
   C. The diagram does not show whether the statement is correct or incorrect.

8. The current is the same throughout the entire circuit.
   A. The statement is correct.
   B. The statement is incorrect.
   C. The diagram does not show whether the statement is correct or incorrect.

9. Which of the following statements applies to a series circuit?
   I. There are junction points in the circuit.
   II. There is only one path for electrons to flow.
   III. The total resistance is equal to the sum of the individual resistances.
   A. I and II only
   B. I and III only
   C. II and III only
   D. I, II, and III

10. Which of the following applies to a parallel circuit?
    A. There is only one path for electrons to flow.
    B. Adding a resistor to the circuit increases the total resistance.
    C. The sum of the voltages lost on the resistors equals the total voltage supplied by the battery.
    D. The total current entering a junction point must equal the sum of the current leaving the junction point.