### Assessment

#### Chapter 5 Pre-Test

**Chapter: The Periodic Law**

Use the periodic table below to answer the questions in this Chapter Test.

<table>
<thead>
<tr>
<th>Period</th>
<th>Group</th>
<th>Element</th>
<th>Atomic Number</th>
<th>Atomic Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>H</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Be</td>
<td>4</td>
<td>9.01</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Mg</td>
<td>12</td>
<td>24.31</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Na</td>
<td>11</td>
<td>22.99</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>P</td>
<td>15</td>
<td>30.97</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Kr</td>
<td>36</td>
<td>83.80</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Ra</td>
<td>98</td>
<td>226.02</td>
</tr>
</tbody>
</table>

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In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

1. Mendeleev organized the chemical elements based on their
   a. symbols.
   b. properties.
   c. atomic numbers.
   d. charges.

2. A horizontal row in the periodic table is called a(n)
   a. family.
   b. group.
   c. octet.
   d. period.
Chapter 5 Pre-Test, continued

3. The periodic law states that
   a. no two electrons with the same spin can be found in the same place in an atom.
   b. the physical and chemical properties of the elements are functions of their atomic number.
   c. wave patterns repeat at regular intervals.
   d. the chemical properties of elements can be grouped according to periodicity.

4. An element with the general electron configuration $ns^2 np^1$ for its outermost electrons would be in Group
   a. 2.
   b. 13.
   c. 14.
   d. 15.

5. When a carbon atom is in its ground state, how many electrons does it have in its outermost shell?
   a. 1
   b. 2
   c. 3
   d. 4

6. Which of the following elements is most similar in behavior to calcium?
   a. magnesium
   b. sodium
   c. sulfur
   d. chlorine

7. Which periodic group or family of elements is *not* correctly matched with its common family name?
   a. Group 2: alkaline-earth metals
   b. Group 3: alkali metals
   c. Group 17: halogens
   d. Group 18: noble gases

8. The electron configurations of main-group elements end in
   a. $d$ and $f$ orbitals.
   b. $s$ and $p$ orbitals.
   c. $s$ and $d$ orbitals.
   d. $p$ and $d$ orbitals.
Chapter 5 Pre-Test, continued

9. Which of the following elements is a transition metal?
   a. calcium
   b. iron
   c. sodium
   d. sulfur

10. All the alkali metal elements are found on the periodic table in
    a. Group 1.
    b. Group 2.
    c. Period 1.
    d. Period 2.

11. A measure of the ability of an atom in a chemical compound to attract electrons from another atom in the compound is called
    a. electron affinity.
    b. electron configuration.
    c. electronegativity.
    d. ionization potential.

12. Which of the following elements has the greatest atomic radius?
    a. Al
    b. S
    c. Si
    d. C

13. Which of the following elements has the lowest electronegativity?
    a. C
    b. F
    c. Li
    d. O

14. Which of the following elements has the greatest ionization energy?
    a. Ga
    b. K
    c. Bi
    d. As

15. Which of the following elements has an electron affinity of 0 kJ/m?
    a. Br
    b. As
    c. Ar
    d. I
16. Which of the following elements have full outer energy levels when they are in the ground state?
   a. alkali metals
   b. noble gases
   c. halogens
   d. transition metals

17. In which period is an element that has the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^10 4s^2 4p^1$ when it is in its ground state?
   a. Period 1
   b. Period 2
   c. Period 3
   d. Period 4

18. Which of the following elements is not a metal?
   a. H
   b. K
   c. Na
   d. Fr

19. For atoms of $p$-block elements, the total number of electrons in the highest occupied level is equal to the
   a. period number.
   b. group number.
   c. period number minus 10.
   d. group number minus 10.

20. As electrons add to $s$ and $p$ sublevels in the same main energy level, they are pulled closer to the more highly charged nucleus, causing
   a. the electron cloud around the nucleus to expand.
   b. atoms to lose electrons more easily.
   c. atomic radii to decrease in size.
   d. a noble gas configuration.

21. Which electron configuration would result in the largest negative electron affinity?
   a. [He]$2s^1$
   b. [He]$2s^2 2p^2$
   c. [He]$2s^2 2p^3$
   d. [He]$2s^2 2p^5$
Chapter 5 Pre-Test, continued

22. In forming an ion, from which sublevel would an atom of nickel lose electrons first?
   a. 4s  
   b. 3d  
   c. 3p  
   d. 3s

23. Which one of the following groups contains atoms that, in compounds, have the lowest attraction for electrons?
   a. Group 1  
   b. Group 2  
   c. Group 16  
   d. Group 17

24. Which ionization energy is generally the largest?
   a. first ionization energy  
   b. second ionization energy  
   c. third ionization energy  
   d. fourth ionization energy

25. The metalloids are located on the periodic table between
   a. halogens and noble gases.  
   b. nonmetals and metals.  
   c. alkaline-earth metals and other metals.  
   d. alkali metals and transition metals.