



# THE PERIODIC TABLE

## Chapter

### A. Matching

Match each term in Column B with the correct description in Column A. Write the letter of the correct term on the line.

Column A	Column B
<u>C</u> 1. half the distance between the nuclei of two atoms of the same element when the atoms are joined	a. electronegativity
<u>F</u> 2. negatively charged ion	b. groups
<u>B</u> 3. the vertical columns of the periodic table	c. atomic radius
<u>G</u> 4. the nonmetallic elements of Group 7A	d. ionization energy
<u>H</u> 5. elements in which the highest occupied <i>s</i> and <i>p</i> sublevels are filled	e. periodic law
<u>A</u> 6. the tendency for the atoms of an element to attract electrons when the atoms are in a compound	f. alkali metals
<u>J</u> 7. positively charged ion	g. halogens
<u>D</u> 8. the energy required to remove an electron from an atom in the gaseous state	h. noble gases
<u>F</u> 9. the Group 1A elements	i. anion
<u>E</u> 10. When elements are arranged in order of increasing atomic number, there is a periodic repetition of their physical and chemical properties.	j. cation

### B. Multiple Choice

Choose the best answer and write its letter on the line.

- B 11. The modern periodic table is arranged in order of increasing
- |                   |                   |
|-------------------|-------------------|
| a. atomic mass.   | c. atomic size.   |
| b. atomic number. | d. atomic radius. |
- D 12. The elements in Groups 1A through 7A are
- |                           |                             |
|---------------------------|-----------------------------|
| a. alkali metals.         | c. transition metals.       |
| b. alkaline earth metals. | d. representative elements. |

- D 13. Which of the following is true concerning the noble gases?  
 a. Their highest occupied *s* and *p* sublevels are filled.  
 b. They belong to Group 8A.  
 c. They are sometimes referred to as the inert gases.  
 d. all of the above
- A 14. What is the number of electrons in the highest occupied energy level of an element in Group 5A?  
 a. 5  
 b. 3  
 c. 8  
 d. 18
- D 15. Among the groups of elements listed below, which have the same number of electrons in their highest occupied energy levels?  
 a. Li, B, C, F  
 b. Na, Mg, Al, S  
 c. K, Ca, Rb, Sr  
 d. N, P, As, Sb
- C 16. An element that contains an electron in a *d* sublevel is  
 a. Mg.  
 b. O.  
 c. Fe.  
 d. Ne.
- D 17. The elements that contain electrons in an *f* sublevel near the highest occupied energy level are referred to as  
 a. alkali metals.  
 b. alkaline earth metals.  
 c. transition metals.  
 d. inner transition metals.
- C 18. The electron configuration of the element chlorine ends in  
 a.  $3s^2$ .  
 b.  $3p^6$ .  
 c.  $3s^23p^5$ .  
 d.  $3s^23p^7$ .
- D 19. The element with 8 electrons in its *3d* sublevel is  
 a. O.  
 b. Ne.  
 c. Ar.  
 d. Ni.
- A 20. As you move down a group in the periodic table, atomic size generally  
 a. increases.  
 b. decreases.  
 c. remains the same.  
 d. varies randomly.
- D 21. The largest atom from among the following is  
 a. Li.  
 b. Na.  
 c. Rb.  
 d. Fr.
- D 22. The smallest atom from among the following is  
 a. Na.  
 b. Mg.  
 c. Si.  
 d. Cl.
- B 23. As the number of electrons added to the same principal energy level increases, atomic size generally  
 a. increases.  
 b. decreases.  
 c. remains the same.  
 d. varies randomly.
- A 24. Removing one electron from an atom results in the formation of an  
 a. ion with a 1+ charge.  
 b. ion with a 1- charge.  
 c. ion with a 7+ charge.  
 d. ion with a 7- charge.



32. Arrange the following elements as described below.

Li, C, K, F, Cs

a. In order of decreasing atomic size

Cs → K → Li → C → F

b. In order of increasing ionization energy

Cs → K → Li → C → F

c. In order of decreasing electronegativity

F → C → Li → K → Cs

33. Among the following pairs of atoms, identify the larger of the two, the one with the greater first ionization energy, and the one with the lower electronegativity.

Atom	Larger	Greater Ionization Energy	Lower Electronegativity
a. Li, K	K	Li	K
b. C, F	C	F	C
c. Mg, Ca	Ca	Mg	Ca
d. O, S	S	O	S

34. The outermost energy level configurations for the theoretical elements A–E are listed below. Use the symbols A through E to answer each of the questions that follow.

A =  $3s^2$

B =  $3s^1$

C =  $2s^2 2p^6$

D =  $2s^2 2p^5$

E =  $2s^2 2p^3$

a. Which has the lowest first ionization energy?

B

b. Which is a noble gas?

C

c. Which has the highest electronegativity?

D

d. Which has the highest second ionization energy?

B

e. Which is the largest atom?

B

## D. Essay

Write a short essay for the following statement.

35. Explain why elements with high first ionization energies typically also have high electronegativity values.

Both properties reflect an atom's ability to attract or retain electrons.