



THE PERIODIC TABLE

Chapter Test B

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
_____ 1. half the distance between the nuclei of two atoms of the same element when the atoms are joined	a. electronegativity
_____ 2. negatively charged ion	b. groups
_____ 3. the vertical columns of the periodic table	c. atomic radius
_____ 4. the nonmetallic elements of Group 7A	d. ionization energy
_____ 5. elements in which the highest occupied <i>s</i> and <i>p</i> sublevels are filled	e. periodic law
_____ 6. the tendency for the atoms of an element to attract electrons when the atoms are in a compound	f. alkali metals
_____ 7. positively charged ion	g. halogens
_____ 8. the energy required to remove an electron from an atom in the gaseous state	h. noble gases
_____ 9. the Group 1A elements	i. anion
_____ 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.

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

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

- ____ 25. Among the elements listed, which would show the largest increase between the second and third ionization energies?
- | | |
|------|-------|
| a. B | c. Ca |
| b. P | d. Zn |
- ____ 26. Among the following, which element has the lowest ionization energy?
- | | |
|-------|-------|
| a. Na | c. Cs |
| b. Cl | d. I |
- ____ 27. Among the following, which element has the highest second ionization energy?
- | | |
|-------|-------|
| a. Na | c. Cs |
| b. Cl | d. I |
- ____ 28. Which of the following are always larger than the neutral atoms from which they are formed?
- | | |
|------------------|----------------------|
| a. positive ions | c. cations |
| b. negative ions | d. none of the above |
- ____ 29. The smallest particle from among the following is
- | | |
|--------------------|-------------------|
| a. Li. | c. F |
| b. Li^+ . | d. F^- . |
- ____ 30. The least electronegative element from among the following is
- | | |
|--------|--------|
| a. Na. | c. Cs. |
| b. Cl. | d. S. |

C. Questions

Answer the following in the space provided.

31. Given the outermost energy level configurations below, complete the table by providing the period number, group number, group name (if appropriate), and symbol for each element identified.

Element	Period No.	Group No.	Group Name	Symbol
a. $2s^2$				
b. $3s^23p^3$				
c. $3s^23p^6$				
d. $4s^1$				
e. $3d^14s^2$				
f. $4s^24p^5$				

32. Arrange the following elements as described below.

Li, C, K, F, Cs

a. In order of decreasing atomic size

b. In order of increasing ionization energy

c. In order of decreasing electronegativity

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			
b. C, F			
c. Mg, Ca			
d. 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. Which is a noble gas?

c. Which has the highest electronegativity?

d. Which has the highest second ionization energy?

e. Which is the largest atom?

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.

