

- _____ 15. In general, as electron affinity increases ionization energy ____.
- a. increases b. decreases c. remains constant d. varies at random
- _____ 16. As you move down through a column or group electron affinity ____.
- a. increases c. remains constant
b. decreases d. increases then decreases
- _____ 17. If two elements have similar chemical properties you would expect them to have ____.
- a. similar atomic radii c. the same number of outer electrons
b. the same number of energy levels d. similar atomic masses
- _____ 18. Which of the following has the greatest impact on the atomic radius as you move down through a group?
- a. increased size of the principal quantum number
b. increased nuclear charge
c. increased atomic mass
d. increased electron shielding effect
- _____ 19. Which of the following describes the size of the ions of the elements as you move from left to right across a period in the periodic table?
- a. increases c. remains constant
b. decreases d. decreases, then increases
- _____ 20. In which of the following pairs of particles does the second particle listed have the larger radius?
- a. Rb, Y b. Br, F c. S^{2-} , S d. Ga^{3+} , As^{3-}
- _____ 21. Elements in the same group or family in the periodic table have which of the following characteristics in common?
- a. the principal quantum number of the outer energy level
b. the number of isotopes that exist for that element
c. the size of the atomic radius
d. the number of electrons in the outer energy level
- _____ 22. Which of the following occurs when an element in Group 2 attains a stable electron configuration?
- a. gain 2 electrons b. lose 2 electrons c. gain 6 electrons d. gain 8 electrons
- _____ 23. What is the oxidation number of an element in Period 4 and Group 13?
- a. 3+ b. 3- c. 4+ d. 1-
- _____ 24. The first ionization energy of calcium is 589.9 kilojoules per mole. Which of the following elements has a first ionization energy greater than that of calcium?
- a. K b. Rb c. Sr d. Mg
- _____ 25. The electron configuration of boron is $1s^2 2s^2 2p^1$. As electrons are removed consecutively from boron the greatest jump in ionization energy would occur between which of the following two electrons?
- a. first and second b. second and third c. third and fourth d. fourth and fifth
- _____ 26. If an element has a high ionization energy its electron affinity would be ____.
- a. high b. low c. zero d. unpredictable
- _____ 27. The electron configuration of K^+ is most similar to ____.
- a. K b. Na^+ c. Ar d. Ca^{+2}
- _____ 28. The radii of the atoms become smaller from sodium to chlorine across Period 3. This decrease is primarily a result of ____.
- a. the shielding effect c. the increased number of electrons
b. increased nuclear charge d. decreased metallic character.

REVIEW**CHAPTER 10****PROBLEMS**

1. Refer to a table of atomic and ionic radii, if necessary.

- _____ a. Within a period, does the size of the atom increase or decrease with increasing atomic number?
- _____ b. Within a family, does the size of the atom increase or decrease with increasing atomic number?
- _____ c. When metallic atoms lose electrons do they form smaller or larger ions?
- _____ d. When nonmetallic atoms gain electrons do they form smaller or larger ions?

2. From each of the following pairs, circle the larger particle.

Na Li
 Br I
 F F⁻
 Cs Ba
 K K⁺
 Ne Ar

3. Predict the oxidation number, given the electron configurations for the following neutral atoms.

Oxidation Number	Element	Configuration
_____	A	$1s^2 2s^2 2p^6 3s^2$
_____	B	$1s^2 2s^2 2p^6 3s^1$
_____	C	$1s^2 2s^2 2p^6$
_____	D	$1s^2 2s^2 2p^5$
_____	E	$1s^2 2s^2 2p^1$

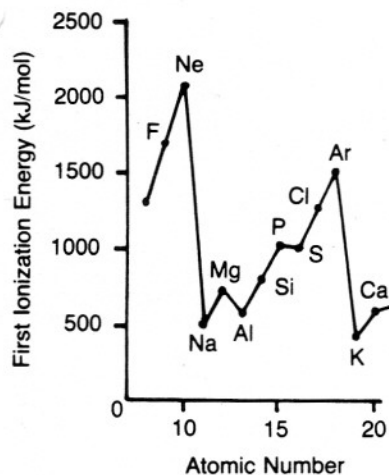
4. Write the correct empirical formula for each of the following combinations of elements from Question 3. (If no reaction, write none.)

- _____ a. B and D
- _____ b. E and D
- _____ c. A and D
- _____ d. A and C

5. Complete each of the following statements.

- _____ a. The _____ of an element is determined experimentally by bombardment of atoms in the vapor phase with a stream of electrons.
- _____ b. The energy necessary to completely remove the most loosely held electron from an atom is called the _____ ionization energy.
- _____ c. A low ionization energy is characteristic of a _____.
- _____ d. As a trend on the periodic table, ionization energies _____ across rows or periods.
- _____ e. As a trend on the periodic table, ionization energies _____ down columns or groups.
- _____ f. An element with a high ionization energy is classified as a _____.
- _____ g. The attraction an atom has for its outer electrons is called _____.
- _____ h. An element having a low electron affinity is classified as a _____.
- _____ i. Nonmetals have _____ electron affinities.

6. Factors affecting ionization energy include nuclear charge, the shielding effect, the atomic radius, and the electron arrangement in a sublevel. Use the appropriate factors to explain the peaks in the graph between sodium, Na, and argon, Ar.



7. Underline the atom in each of the following pairs that has the lower first ionization energy.

- a. Li Na b. Kr Rb c. Cs Ba d. Cl Br e. F Ne f. S Cl