Teacher's Tools® Chemistry
Atomic Structure: Periodic Trends: Worksheet 3

1. Which of the following atoms would have the highest electron affinity?

   (A) Ge (B) As (C) Se (D) Sn (E) Sb

2. Which series is ranked in order of increasing electronegativity?

   (A) O, S, Se, Te

   (B) Cl, S, P, Si

   (C) In, Sn, N, O

   (D) C, Si, P, Se

3. In any one period of the periodic table, the element in Group I, as compared to the element in Group VII, has a

   (A) larger number of valence electrons.

   (B) lower electron affinity.

   (C) smaller radius.

   (D) higher ionization energy.

   (E) none of the above.

4. Which of the following would have the largest second ionization energy?

   (A) K (B) Ne (C) Cl (D) Na

5. Nitrogen has a higher first ionization energy than oxygen. This is principally the result of

   (A) a nuclear charge effect.

   (B) greater penetration of the nitrogen p-orbitals.

   (C) a crowding effect of the electrons.

   (D) the extra neutrons of oxygen.

   (E) the half-filled subshell of nitrogen.

6. Which of the following ions is largest in size?

   (A) O^{2-} (B) Al^{3+} (C) Na^{+} (D) F^{-} (E) Mg^{2+}

7. Which of the following is least metallic?

   (A) I (B) O (C) Cs (D) K (E) Te

8. The elements in which of the following have most nearly the same atomic radius?

(A) Be, B, C, N (B) Ne, Ar, Kr, Xe (C) Mg, Ca, Sr, Ba

(D) C, P, Se, I (E) Cr, Mn, Fe, Co

9. In the periodic chart, where would you look for the most electronegative elements?

(A) upper left side

(B) lower left side

(C) upper right side

(D) lower right side

(E) the bottom period

10. Atoms generally become smaller with increasing atomic number within a period because

(A) of additional electron repulsion.

(B) of increased effective nuclear charge.

(C) smaller electrons are used later in a period.

(D) the nucleus absorbs some of the electrons.

(E) of the additional neutrons required for nuclear stability.

11. Which of the following elements would have the smallest first ionization energy?

(A) Mg (B) F (C) O (D) Ca (E) Si

12. Which of the following electronic configurations would represent an atom with the smallest electron affinity (smallest negative energy)?

(A) ns^2np^1 (B) ns^2np^2 (C) ns^2 (D) ns^2np^4 (E) ns^2np^5

13. Assume that an element has the following ionization energies:

1st IE = 600 kJ/mol 2nd IE = 1,800 kJ/mol

3rd IE = 2,750 kJ/mol 4th IE = 11,600 kJ/mol

5th IE = 15,000 kJ/mol

Which of the following is the most probable electron configuration for this element?

(A) $1s^2 2s^2 2p^6$

(B) $1s^2 2s^2 2p^6 3s^2$

(C) $1s^2 2s^2 2p^6 3s^1$

(D) $1s^2 2s^2 2p^6 3s^2 3p^1$

(E) $1s^2 2s^2 2p^6 3s^2 3p^3$