Practice Questions for Ch. 9

1. Which of these give(s) a correct trend in radius?

   I. $Na^+ > Mg^{2+} > Al^{3+} > Si^{4+}$
   II. Rb > Ca > Al > B
   III. Mg > Ca > Sr > Ba
   IV. Cs > Rb > Na > Li

   A) III
   B) I, II
   C) I, II, IV
   D) II, III
   E) none of them

2. Which of these give(s) a correct trend in radius?

   I. Be > Ca > Sr > Ba
   II. Be > Mg > Ca > Sr
   III. Ga > Si > O > Ne

   A) I, II
   B) III
   C) II
   D) II, III
   E) none of them

3. Arrange the elements K, P, Si, Ar in order of increasing ionization energy

   A) Ar, P, Si, K
   B) K, Si, P, Ar
   C) P, Ar, K, Si
   D) Si, P, Ar, K
   E) Ar, K, P, Si

4. Consider the 2*p* orbitals in Zn and Ga^+. Which of the following statements apply?

   A) The Ga^+ 2*p* orbital is smaller than the Zn 2*p* orbital because the nuclear charge of Ga^+ draws the electrons closer.
   B) The Ga^+ 2*p* orbital is larger than the Zn 2*p* orbital because Ga^+ is positively charged.
   C) The Ga^+ 2*p* orbital is smaller than the Zn 2*p* orbital because the *p* and *d* orbitals crowd the *s* orbitals in Ga^+ .
   D) The Ga^+ 2*p* orbital and Zn 2*p* orbital are the same size because both contain the same number of electrons.
   E) The Ga^+ 2*p* orbital is larger than the Zn 2*p* orbital because Ga^+ has a larger ionization energy, and the two quantities are correlated.

5. Which of the following statements is true?
   A) The argon 1*s* orbital is smaller than the helium 1*s* orbital because argon's nuclear charge draws the electrons closer.
   B) The argon 1*s* orbital is larger than the helium 1*s* orbital because argon contains more electrons.
   C) The argon 1*s* orbital is smaller than the helium 1*s* orbital because argon's *p* and *d* orbitals crowd the *s* orbitals.
   D) The argon 1*s* orbital and helium 1*s* orbital are the same size because both *s* orbitals can only have two electrons.
   E) The argon 1*s* orbital is larger than the helium 1*s* orbital because argon's ionization energy is lower, so it's easier to remove electrons.

6. Which of the following equations correctly represents the process involved in the electron affinity of X?
   A) $X^+(g) + e^- \rightarrow X(g)$
   B) $X^+(g) + Y^-(g) \rightarrow XY(g)$
   C) $X(g) + e^- \rightarrow X^-(g)$
   D) $X(g) \rightarrow X^+(g) + e^-$
   E) $X^+(g) \rightarrow X^+(aq)$

7. Which of the following lists of atoms are arranged in order of INCREASING first ionization energy?

   A) Li < O < N < F
   B) Li < N < O < F
   C) F < O < N < Li
   D) Na < Sr < O < F
   E) Ca > Cs > S > Se

8. Which of the following lists of atoms are arranged in order of DECREASING atomic radius?

   A) Li > O > N > F
   B) Li > N > O > F
   C) F > O > N > Li
   D) Na > Sr > O > F
   E) Ca < Cs < S < Se

9. Arrange the elements C, Ne, Sr, F in order of increasing atomic radius

   A) Ne, F, C, Sr
   B) Sr, C, F, Ne
   C) F, Ne, Sr, C
   D) C, F, Ne, Sr
   E) Ne, Sr, F, C

10. Arrange the elements K, P, Si, Ar in order of increasing ionization energy
    A) Ar, P, Si, K
    B) K, Si, P, Ar
    C) P, Ar, K, Si
    D) Si, P, Ar, K
    E) Ar, K, P, Si

Choose the atom or ion using a periodic table.

11. Larger first ionization energy, Li or Be

12. Larger first ionization energy, Na or Rb

13. Larger first ionization energy, Be or B

14. Larger first ionization energy, C or N

15. Larger second ionization energy, Na or Mg

16. Larger atomic radius, P or Sb

17. Larger atomic radius, N or O

18. Larger atomic or ionic radius, F or F^-

19. Larger atomic or ionic radius, Mg or Mg^{2+}

20. Larger atomic radius, Fe^{2+} or Fe^{3+}

Practice Questions for Ch. 9
Answer Section

1. C
2. B
3. B
4. A
5. A
6. C
7. A
8. B
9. A
10. B
11. Be
12. Na
13. Be
14. N
15. Na
16. Sb
17. N
18. F^-
19. Mg
20. Fe^{2+}