Assignment #3 **Name**_____

Gen Chem 1 Section 43 **Score**_____

1. Which of the following elements has the highest first ionization energy?
   a. Be
   b. B
   c. C
   d. Na
   e. Ba
2. Which of the following properties, in general, increase as we move left to right across a period in the periodic table?
   1. atomic radius
   2. ionization energy
   3. electron affinity

   a. 1 only
   b. 2 only
   c. 3 only
   d. 1 and 2 only
   e. 2 and 3 only
3. Which of the following diatomic molecules has the greatest bond strength?
   a. Cl_2
   b. HCl
   c. CO
   d. H_2
   e. HF
4. The shape of ammonium ion, NH_4^+, is most similar to the shape of:
   a. NH_2^-
   b. NH_3
   c. N_2H_4
   d. CH_3
   e. CH_4
5. When a carbon atom has sp^3 hybridization, it has
   a. Four π bonds
   b. Three π bonds one σ bond
   c. Two π bonds and two σ bond
   d. One π bond three σ bond
   e. four σ bonds

6. Which of the following statements concerning equal volumes of gases N_2O, and propane, C_3H_8, at the same temperature and pressure, is (are) true?
    1. They have the same number of atoms
    2. They have the same number of molecules
    3. They have the same density
        a. 1 only
        b. 2 only
        c. 1 and 2 only
        d. 2 and 3 only
        e. 1, 2 and 3
7. Draw two possible structures for $SOCl_2$. Assign formal charges to each atom and specify which is correct and why.

8. What is the density of oxygen, N_2, in g/L at 35°C and 745mmHg?

9. Automobiles are being equipped with air bags that inflate on collision to protect the occupants from injury. Many such air bags are inflated with N_2 using the rapid reaction of sodium azide, NaN_3, and Iron (III) oxide, Fe_2O_3 which is initiated by a spark.

$$NaN_3(s) + Fe_2O_3(s) \longrightarrow Na_2O(s) + Fe(s) + N_2(g)$$

How many grams of NaN_3 would be required to provide 75.0 L of N_2 at 25°C and 748 mm Hg?

10. Do the following problems in Brown Lemay Bursten:
8.34, 8.64, 9.14, 9.26