Name:_____ April 4, 2011

PEERS Workshop
Chemistry 30A
Worksheet 1

1. Write a Lewis structures for the following compounds:
   a) C_2H_4 c) CH_3OH

   b) CH_3COCH_3 d) CH_3NO_2

2. Calculate the formal charges on each non-hydrogen atom of these molecules and determine the formal charges:

3. Silver cyanide is composed of a silver cation (Ag^+) and a cyanide anion (CN-). Show a Lewis structure for the cyanide anion. Which atom has the negative formal charge in your structure? What is the shape of the ion? Show a resonance structure for this ion.

4. Draw a Lewis structure for the sulfate anion SO_4^{2-}. Calculate the formal charge on each atom. What is the shape of this species? Experimental evidence shows that all of the oxygens are identical. Explain.

5. Draw a reaction coordinate diagram for the following reaction in which A is the most stable and C the least stable of the three species and the transition state going from A to B is more stable than the transition state going from B to C:

    a. How many intermediates are there?
    b. How many transition states are there?
    c. Which step has the greater rate constant in the forward direction?
    d. Which step has the greater rate constant in the reverse direction?
    e. Of the four steps, which is the fastest?
    f. Which is the rate-determining step in the forward direction?
    g. Which is the rate-determining step in the reverse direction?

6. Draw in the bonds and lone pair electrons for the following structures so that each atom's electronic state is equal to that of a noble gas. ii) Find and label the formal charges on each structure.

7. Draw six Lewis structures with the molecular formula $C_5H_{10}O$.

8. For each bonded pair of atoms, calculate the difference in their electronegativities. Arrange these in order of polarity from lowest to highest. iii) Label each bond as nonpolar covalent, polar covalent, or ionic.
    a. H-C, H-Na, H-O, H-F

    b. S-O, C-N, C-C, C-I, Li-C

9. Determine whether the reactant in each of the following reactions is oxidized or reduced.

10. Identify whether the following molecules have a carbocation, carbanion, or radical present. Assign formal charge to atoms in molecules that have a carbocation or carbanion.

11. Draw a single or barbed arrow(s) to describe the mechanism for the following reactions.