AP Chem Unit 2 – PreExam – FRQ

1) Answer the following questions using principles of chemical bonding and molecular structure.

(a) Consider the carbon dioxide molecule, CO_2 , and the carbonate ion, CO_3^{2-}.

(i) Draw the complete Lewis electron-dot structure for each species.

(ii) Account for the fact that the carbon-oxygen bond length in CO_3^{2-} is greater than the carbon-oxygen bond length in CO_2.

(b) Consider the molecules CF_4, and SF_4 .

(i) Draw the complete Lewis electron-dot structure for each molecule.

(ii) In terms of molecular geometry, account for the fact that the CF_4 molecule is nonpolar, whereas the SF_4 molecule is polar.

2) Consider the molecules PF3 and PF5.
   a) Draw the Lewis electron-dot structures for PF3 and PF5 and predict the molecular geometry of each.

   b) What is the formal charge on each atom in each molecule?

   c) Is each molecule polar, or is it nonpolar? Explain.