

CH301H – Principles of Chemistry I: Honors
Fall 2017, Unique 50135
Homework, Week 11

1. Draw all orbitals (both atomic and hybrid) surrounding a carbon atom with steric numbers of 2, 3, and 4. Be sure all orbitals are properly labeled and correct phases are noted.
2. For each of the following molecules, draw the Lewis dot structure, determine the hybridization of the central atom, and predict the molecular geometry.
 - a) CCl_4
 - b) CO_2
 - c) OF_2
 - d) CH_3^-
 - e) BeH_2
 - f) H_3O^+
3. Draw the Lewis dot structure of the molecule NCCl . Determine the hybridization on all three atoms, draw the hybrid orbitals on each atom, and draw the three dimensional structure of the molecule.
4. Construct the MO diagram of CF_4 . Identify all bonding electrons and lone pair electrons.
5. The molecule N_4H_4 is a chain of four nitrogen atoms with each of the terminal nitrogen atoms bonded to two hydrogen atoms. Determine the hybridization of each nitrogen atom and predict the overall geometry of the molecule.