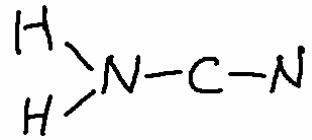
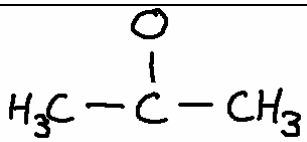
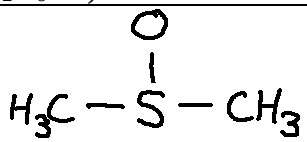
Chem 201, 2009
HW #1, due Th, Sept 10, 12 PM

Draw your answers on a separate sheet of paper. Write clearly.

#1. Draw legitimate Lewis structures for the following neutral molecules (the structural formulas show how the atoms are bonded)

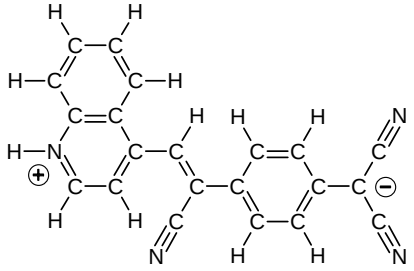
Cyanamide (CH_2N_2)	Acetone (C_3H_6O)	Dimethylsulfoxide (DMSO) (C_2H_6OS)
		
HNH NCN	CCC	CSC

#2. The bottom row of the table (above) lists one or two bond angles for each molecule. Use VSEPR to predict these bond angles.

#3. Make *two* drawings of cyanamide that show the geometry you predicted for it in #2. (*Tip* - you might find it helpful to use different points of view for your drawings).

a. Label one drawing "A" and add to it a cartoon drawing of the orbital occupied by the lone pair on the NH_2 nitrogen. What is the correct label for this orbital?
b. Label one drawing "B" and add to it a cartoon drawing of the MO occupied by one NH bond pair. What orbitals on H and N combine to make this sigma MO?

#4. Chemists are trying to develop organic molecules that can function as components in electrical circuits, e.g., as conductors, transistors, diodes, and so on. Molecule C has been investigated as a possible organic "rectifier" (allows current to flow in one direction only).



molecule C

a. Complete the Lewis structure of C by adding *lone pair* electrons as needed
b. Draw a resonance structure of C (call it "D") that rearranges some of the electrons in such a way that no atom in D carries a formal charge

#5. Loudon problems 33, 39, 45, 47