

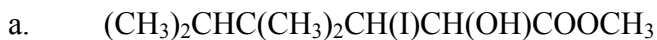
# Organic Chemistry - CHEM 231A

Problem Set #1

Due September 18, 2003

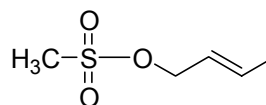
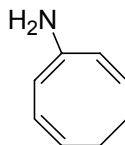
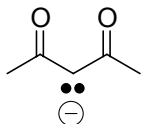
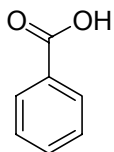
40 pts total

1. Consider the following condensed molecular structures (6 pts = 2 pts each):



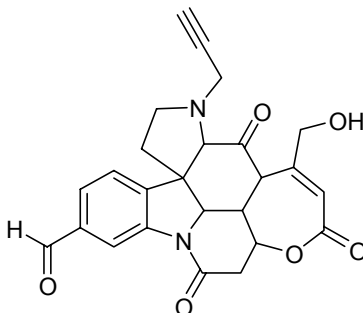
For each structure, convert the condensed structure into a kekulé structure, a bond-line structure, a 3-D structure using dashes and wedges, and use a computer program to draw the molecule. I would encourage you to practice drawing first, before you use the computer program.

2. Consider the following molecules (16 pts = 4 pts each):



For each structure, draw all possible resonance structures (if there are any). Use the electron arrow formalism to show the movement of electrons between each resonance structure. For each resonance structure, including the original, mark formal charges on all non-hydrogen atoms. Choose the two most predominant resonance structures for each structure and state why they are the most predominant.

3. Consider the following molecule, a derivative of strychnine, a biotoxin found in *Strychnos ignatii* from the Loganiaceae family of trees (9 pts):



- Redraw the structure on your paper (take your time and practice, you will not be graded for your artistic abilities, but practice makes perfect) (1pt)
- Label the hybridization for at least 20 non-hydrogen atoms. Ensure that you label identify at least one atom from each type of hybridization. (4 pts)
- Circle and label all functional groups. (4 pts)

4. Redraw each of the following molecules and draw bond dipole moments for each. Include any appropriate charges or partial charges, as necessary. Resonance structures are NOT required. Explain briefly what the dipole means in regards to the reactivity of the molecule. What is the shape of the molecule (think about it as a combination of the shapes of each major atom)? Explain briefly. (9 pts = 3 pts each).

