

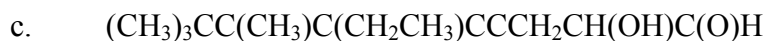
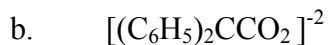
Name: _____

Organic Chemistry - CHEM 231A

Test #1

September 24, 2001

1. Consider the following condensed molecular structures (15 Points):

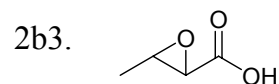
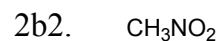
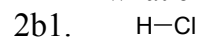


For each structure, convert the condensed structure into a bond-line structure. Pay close attention to the correct structure of the molecule.

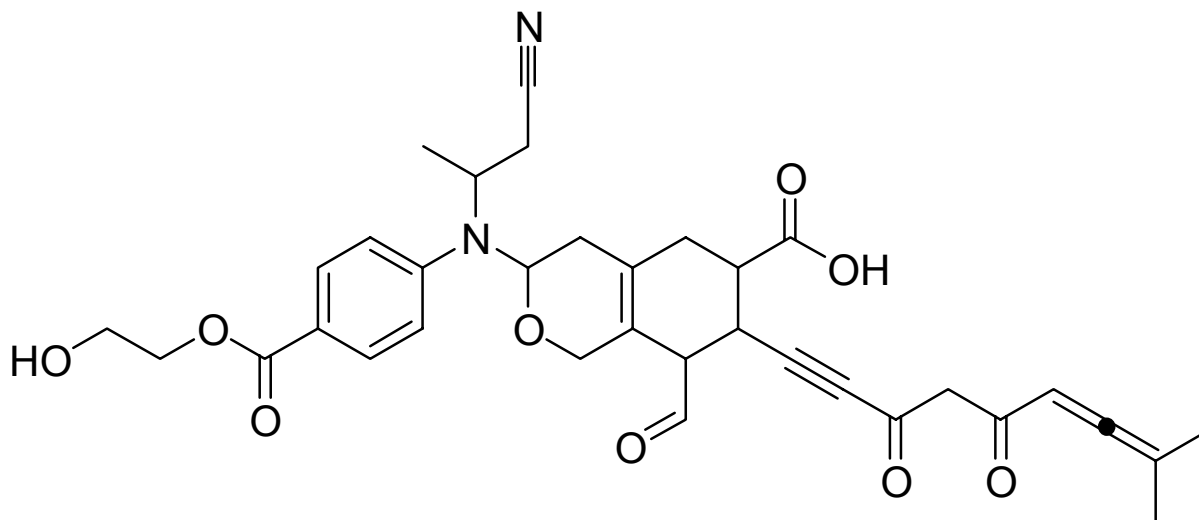
2 Consider the following questions: (17 points)

2a. What is a dipole moment? Explain why it exists.

2b. Redraw each molecule and draw dipole moments for each of the following molecules and show what effect the dipole moment has on the polarity of the molecule. Explain briefly.



3. Consider the following molecule: (36 Points)



3a. Label the hybridization for at least 10 non-hydrogen atoms.

3b. Circle and label all functional groups.

4. Consider the molecule methane, CH₄. (29 Points)

4a. What is the hybridization of each atom in methane?

4b. What is hybridization and why do we use it?

4c. Explain where hybridized orbitals come from.

4d. What is the shape of CH₄? Explain why it is this shape. Draw a picture that represents this shape.

4e. Consider the following two molecules:



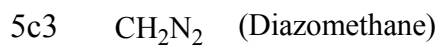
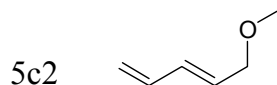
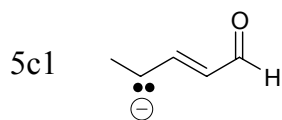
What is the hybridization of each? Provide a rational explanation for your answer.

5. Consider the following questions and molecules: (33 points)

5a. What are resonance structures?

5b. Why do we care about resonance structures?

5c. Draw the resonance structures for each of the following molecules. Use the curved arrow formalism to show the relationships between structures. Include a depiction of all non-zero formal charges.



5d. If diazomethane (5c3) lost molecular nitrogen in a reaction, what product would result? Show an arrow pushing formalism which depicts the reaction. (Hint: What is the structure of molecular nitrogen and what electron arrows would need to be drawn in order to yield molecular nitrogen from the reaction? The product is what is left over?)