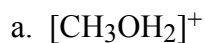


JASPERSE CHEM 350 TEST 1 VERSION 4 Organic Chemistry I - Jasperse  
 Intro and Review  
 Structure and Properties of Organic Molecules  
 Structure, Nomenclature, and Conformation/Stereochemistry of Alkanes

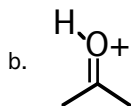
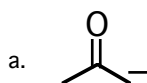
1. Order the following according to increasing electronegativity, 1 being highest, 4 lowest. (2pts)

N \_\_\_\_\_ F \_\_\_\_\_ O \_\_\_\_\_ C \_\_\_\_\_

2. Write Lewis structures and assign any non-zero formal charges. (3pts each)

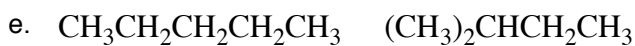
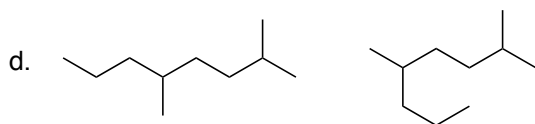
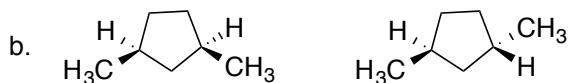
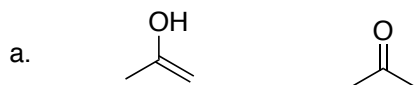


3. For each of the following, a) draw its resonance structure, and for each pair b) circle the structure that would make the greater contribution to the resonance hybrid. (2 pts each)

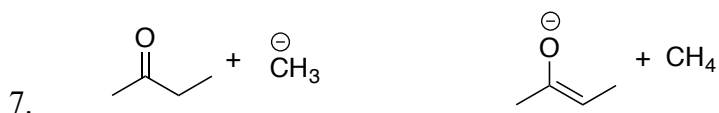
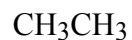
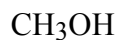


4. Draw line-angle structures for 7 of the 9 structural isomers of  $\text{C}_7\text{H}_{16}$ . (5 pts)

5. For the following pairs of structures, identify them as either: Resonance Structures, Structural Isomers, Stereoisomers, or Same. (2 pts each)

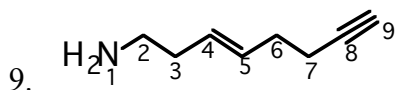


6. Rank the acidity of the following molecules, 1 being most acidic, 4 being least acidic. (3 pts)



- Put a box around the weakest base in the above reaction. (1pt)
- Put a circle around the weakest acid in the above reaction. (1pt)
- Draw an arrow to show whether at equilibrium the reaction will go left-to-right or right-to-left. (2pt)

8. Draw the line-angle structure for the following condensed structural formula:  $(\text{CH}_3\text{CH}_2)_2\text{CO}$  (3pt)



- a. For the above structure, what is the hybridization, electron-pair geometry, and approximate bond angles (109, 120, or 180) about: (6pt)

N-1

C-3

C-5

C-8

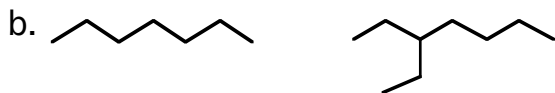
- b. Rank the length of the following bonds, 1 being shortest, 3 being longest. (2pt)

C2-C3

C4-C5

C8-C9

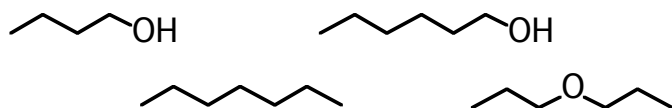
10. For each of the pairs listed, circle the one with the higher boiling point. (4pt)



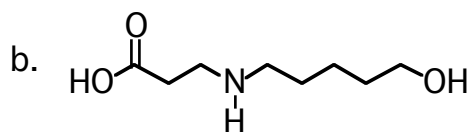
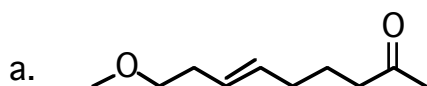
11. Draw a 3-dimensional picture for all of the atoms (hydrogens included) in the molecule  $\text{CH}_3\text{CHCHCOCH}_2\text{CH}_2\text{NHCH}_3$ . Your picture should use the hash-wedge convention to illustrate atoms that are not in the plane of the paper, and should reflect approximate bond angles. (5pt)

12. Draw a 3-D picture of  $\text{CH}_2\text{O}$  showing the  $\pi$  bond as well as the four atoms. (3pt)

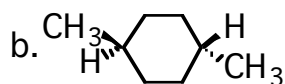
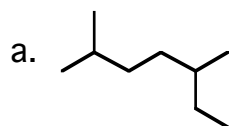
13. For the following set, rank the solubility in water, from 1 (most soluble) to 4 (least soluble). (3pt)



14. Identify the functional groups in the following molecules. (8pt)



15. Give the IUPAC name for the following compounds. (6pt)



16. Draw the Newman projections for the best and worst conformations of butane, and give the names for these conformations. Briefly explain what “strain factors” make the worst conformation worse than the best conformation. (6pt)

17. a.) Draw both chair conformations of cis-1-methyl-2-isopropylcyclohexane. Draw the substituents and H-atoms attached to carbons 1 and 2. (You don't need to show the H's on the other carbons). (4pt)

b.) **Circle the more stable conformation.** (1pt)

18. Draw the best chair conformation for 1,3-diethylcyclohexane, and identify whether it is “cis” or “trans”. (3pt)

19. Use the arrow-pushing convention to show the electron-movement mechanisms for the following two reactions. (5pt)

