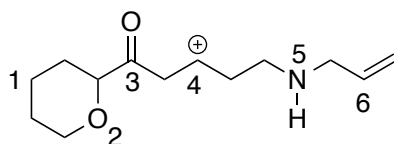


JASPERSE CHEM 350 TEST 1 VERSION 2 Organic Chemistry I - Jasperse  
Intro and Review  
Structure and Properties of Organic Molecules  
Structure, Nomenclature, and Conformation/Stereochemistry of Alkanes

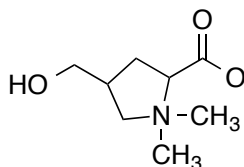
1. Draw the correct Lewis structure of  $\text{CH}_3\text{CO}_2\text{CH}_2\text{COCH}_3$ . (Needn't show 3-D geometry) (3pt)
2. Draw a 3-dimensional picture for the atoms in  $\text{CH}_3\text{CH}_2\text{CHCHCH}_2\text{NHCH}_2\text{CHO}$ , using the hash-wedge convention. (You needn't specify lone pairs, and orbitals need not be shown). (5pt)

3. For the structure shown, what is the hybridization, electron-pair geometry, and approximate bond angle (90, 109, 120, or 180) relative to: (7pt, 2 points off for each error)

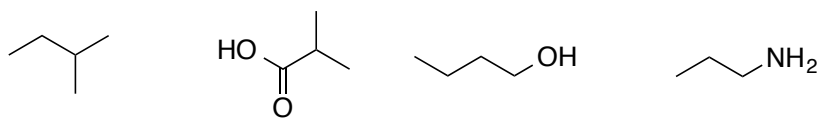


hybridization	electron-pair geometry	bond angle	hybridization	electron-pair geometry	bond angle
C-1			C-4		
O-2			N-5		
C-3			C-6		

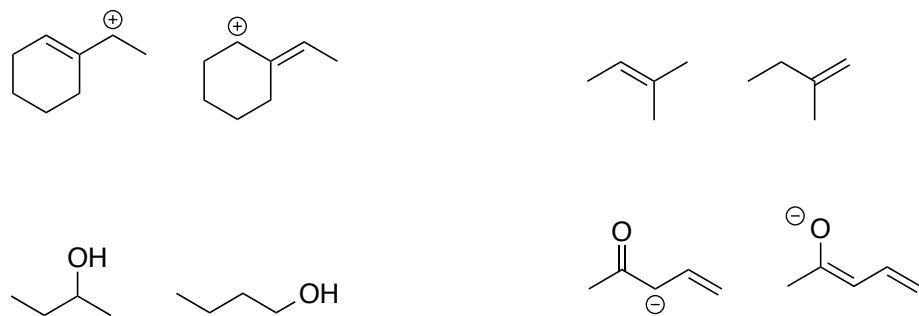
4. Assign any formal charges to any appropriate atoms for the structure shown below. (4pt)



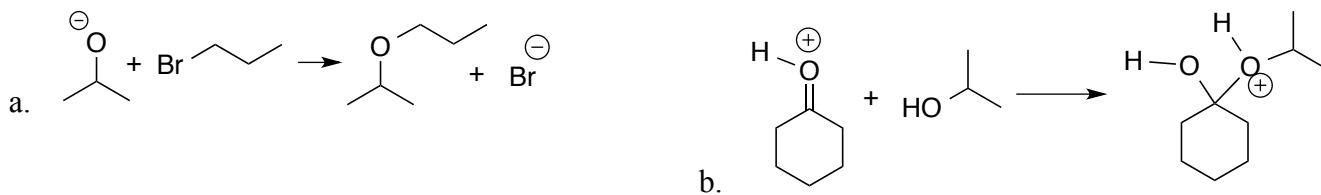
5. Rank the acidity of the following, from 1 (most) to 4 (least). (4pt)



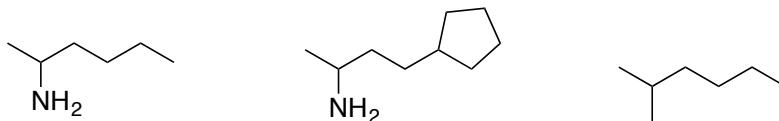
6. For the following pairs, identify as “isomers” (“I”) or “resonance structures” (“R”). (6pt)



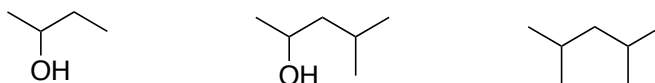
7. Draw arrows to show electron-movement in the following reactions. (These are reactions, not resonance.) (5pt)



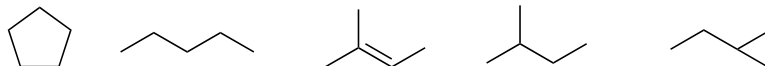
8. Rank the series on the basis of boiling point, 1 having highest boiling point, 3 having lowest. (3pt)



9. Rank the series on the basis of water solubility, 1 having highest solubility, 3 having lowest. (3pt)



10. Circle whichever of the following could fit the formula  $C_5H_{10}$ ? (3pt)

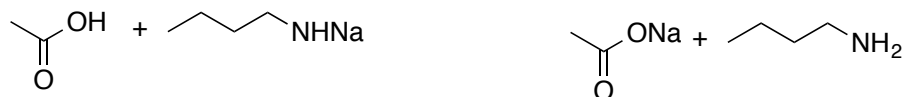


11. For the following acid-base reaction,

a. put a box around the weakest base in the reaction

b. put a circle around the weakest acid

c. draw an arrow to show whether the equilibrium goes to the right or left. (4pt)



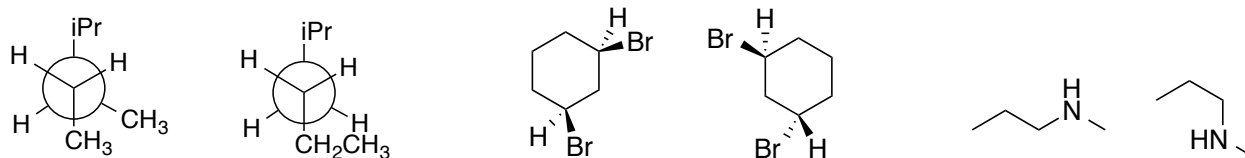
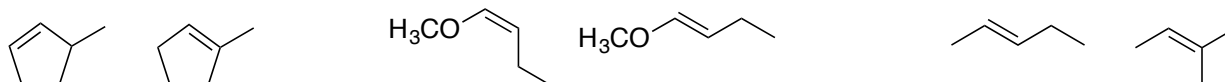
12. Classify the relationship between each pair of molecules as either: (10 pt)

same compound

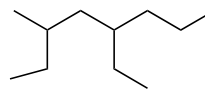
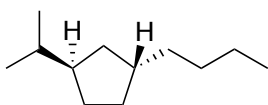
structural isomers

resonance structures

stereoisomers

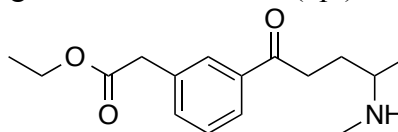
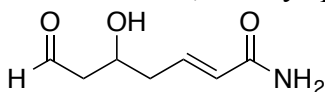


14. Give the name for the following. (7pt)

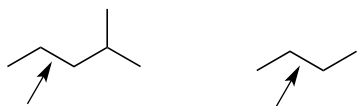


15.

16. Identify and write down the names for each of the functional groups in each of the following molecules. (Do not include “alkane”, since that isn’t “functional”.) For each molecule, try to write the names in order, as they appear from left-to-right in the molecules. (8pt)

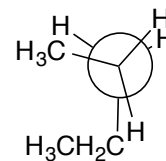
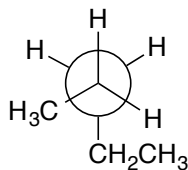
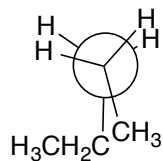
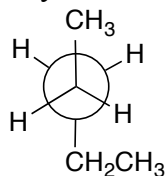


17. Circle which of the following pair will have the larger rotation barrier, relative to the bonds indicated? (2pt) Identify which reason explains why: steric strain, torsional strain, or angle strain?



18. For the following Newman projections: (6pt total)

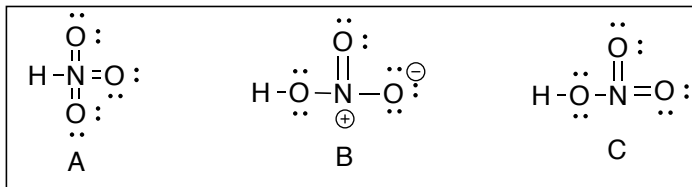
- rank them in stability from 1 to 4, 1 being most stable
- identify the “anti”, “gauche”, and the “totally eclipsed” conformations.



- Is the energy difference between the gauche and the anti conformation based on steric strain, torsional strain, or angle strain?
- In the case of ethane (not shown), staggered conformations are better than eclipsed conformations. Is the difference based on steric strain, torsional strain, or angle strain?

19. Draw both the most stable and the least stable Newman projections for 1-bromopropane,  $\text{BrCH}_2\text{CH}_2\text{CH}_3$ , relative to C1-C2 bond. - (3pt)

20. Which of the following are correct Lewis structures, including formal charges, for nitric acid,  $\text{HNO}_3$ . (3 pts)



21.

- a. A only
- b. B only
- c. C only
- d. Both A and C
- e. All of the above

22. Draw the **two chair conformations** of cis-1-isopropyl-4-methylcyclohexane. (You don't have to draw all the hydrogens). (5pt) (Use "iPr" as abbreviation).

23. Draw the best chair conformation of the more stable isomer. Which is more stable, cis- or trans-1-butyl-2-methylcyclohexane? (4pt)

24. Draw any 6 of the 9 possible structural isomers for **alkanes** with formula  $\text{C}_7\text{H}_{16}$ . When deciding whether to draw cyclic or acyclic alkanes, make sure that you fit the formula! Be careful not to draw the same isomer twice! I will take off points for duplicating! (You can try to show off by getting more than 6, but if you do still be sure you don't duplicate!) (6pt)