

JASPERSE

CHEM 341 TEST 1

VERSION 4

Ch. 1 Structure and Bonding

Ch. 2 Polar Covalent Bonds; Acids and Bases

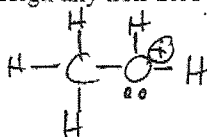
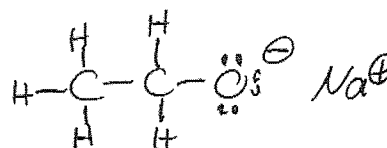
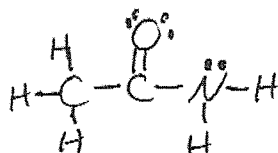
Ch. 3 Organic Compounds: Alkanes and Cycloalkanes

Ch. 4 Stereochemistry of Alkanes and Cycloalkanes

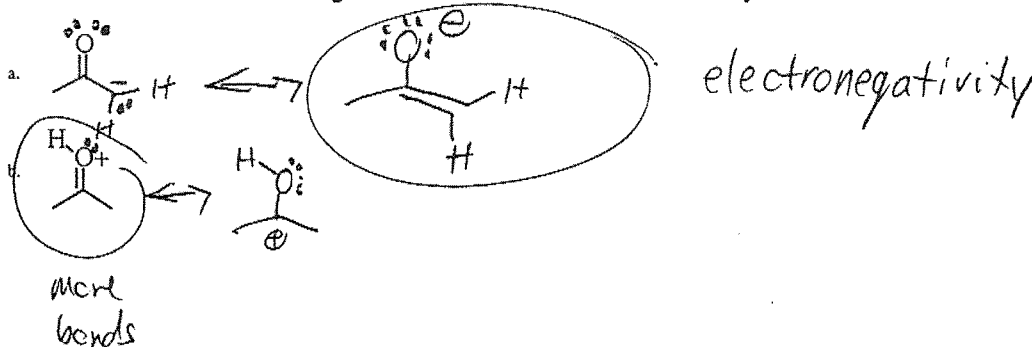
1. Order the following according to increasing electronegativity, 1 being lowest, 4 highest.

N 2 F 4 O 3 C 1

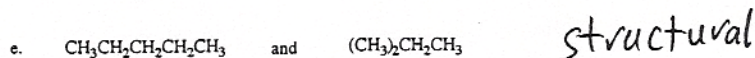
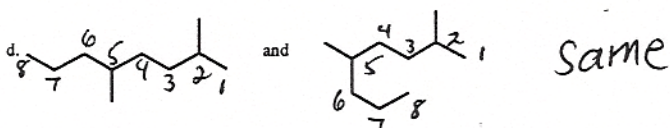
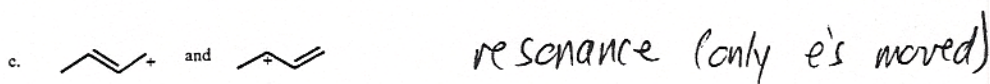
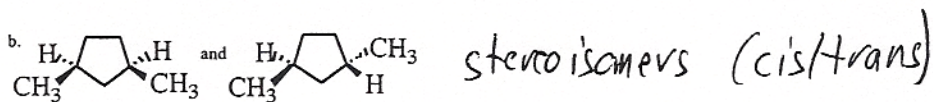
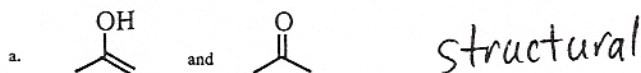
2. Write Lewis structures and assign any non-zero formal charges.

a. $[\text{CH}_3\text{OH}_2]^+$ b. $\text{CH}_3\text{CH}_2\text{ONa}$ c. CH_3CONH_2 

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.

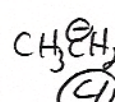
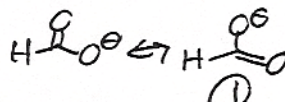
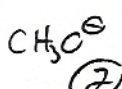
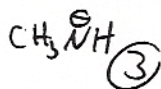
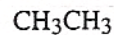
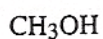
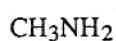


4. For the following pairs of structures, identify them as either: Resonance Structures, Structural Isomers, Geometric Isomers, Same Compounds, or Not Isomers or Resonance Structures (different molecular formulas).

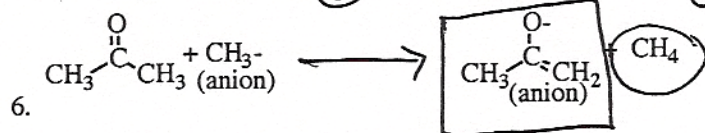


Oops! These aren't structural, they aren't really isomers at all. 5 carbons vs 4 carbons!

5. Rank the acidity of the following molecules, 1 being most acidic, 4 being least acidic.

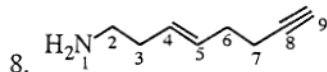
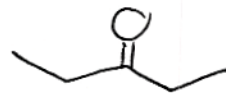
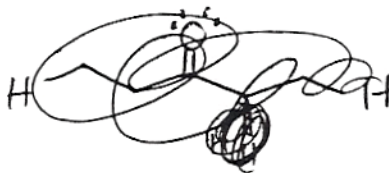


Think Anion Stability!



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

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



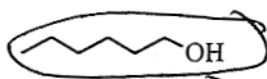
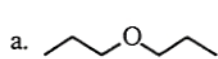
a. For the above structure, what is the hybridization, electron-pair geometry, and approximate bond angles (109, 120, or 180) about:

N-1	sp^3	tet	109
C-3	sp^3	tet	109
C-5	sp^2	trigonal	120
C-8	sp	linear	180

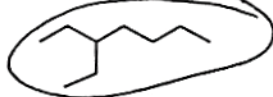
b. Rank the length of the following bonds, 1 being shortest, 3 being longest.

C2-C3	C4-C5	C8-C9
3	2	1

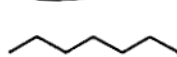
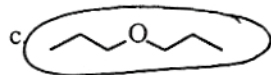
9. For each of the pairs listed, circle the one with the higher boiling point.



H-bonding

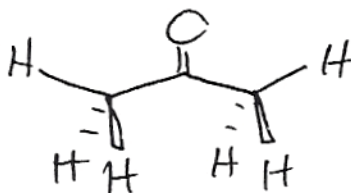


London

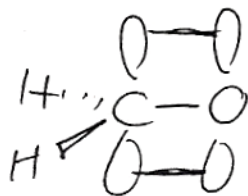


dipole

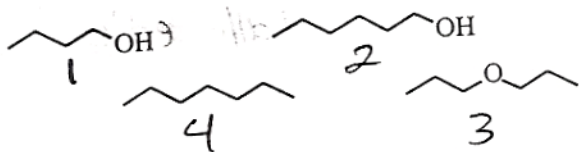
10. Draw a 3-dimensional picture for all of the atoms in the molecule $(\text{CH}_3)_2\text{CO}$ (orbitals need not be shown).



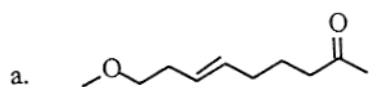
11. Draw a 3-D picture of CH_2O showing the π bond as well as the four atoms.



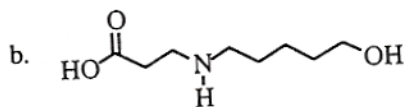
12. For the following set, rank the solubility in water, from 1 (most soluble) to 4 (least soluble).



13. Identify the functional groups in the following molecules.

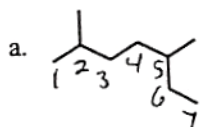


ether alkene ketone

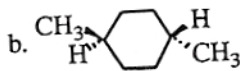


acid amine alcohol

14. Give the IUPAC name for the following compounds.



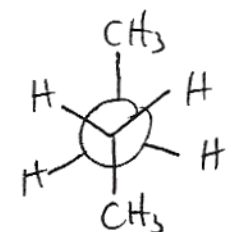
2,5-dimethylheptane



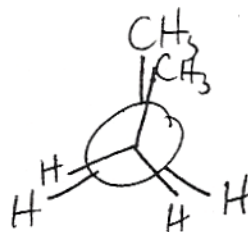
trans-1,4-dimethylcyclopentane

Oops! ...cyclohexane, not
cyclopentane.

15. Draw the Newman projections for the best and worst conformations of butane, and give the names for these conformations.

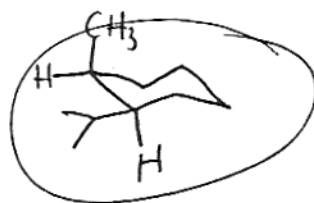
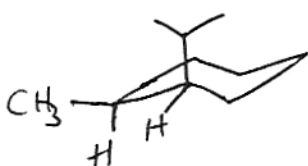


best: anti



worst: totally eclipsed

16. 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).
b.) Circle the more stable conformation.



better: bulkier
isopropyl is
equatorial

17. Draw line-angle structures for 5 of the 9 structural isomers of C_7H_{16} . $\Rightarrow C_nH_{2n+2}$

so acyclic

