

FIRST HOUR EXAM

CHEMISTRY 3311

September 26, 1996

Please put your name on all 5 pages of the examination and the cover page.

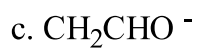
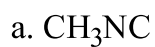
Be certain that you have all 6 questions.

Question	Score
1	
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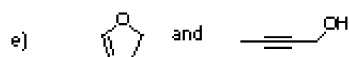
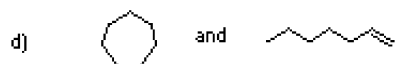
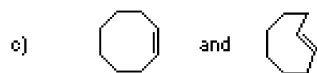
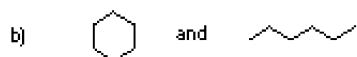
1. (10 points) Draw all of the isomers of C_3H_6 . Circle the one that has the highest heat of combustion and very briefly explain the principal sources of this higher energy.

2. (20 points) Draw the Lewis dot structure for the following compounds. You may use a line for each

bonding pair of electrons, but make certain to include lone pairs and any formal charges. Indicate the orbital hybridization on each of the non-hydrogen atoms.



3. (10 points) For each of the following pairs of compounds, indicate whether they are constitutional isomers, stereoisomers, the same compound, or none of the above.

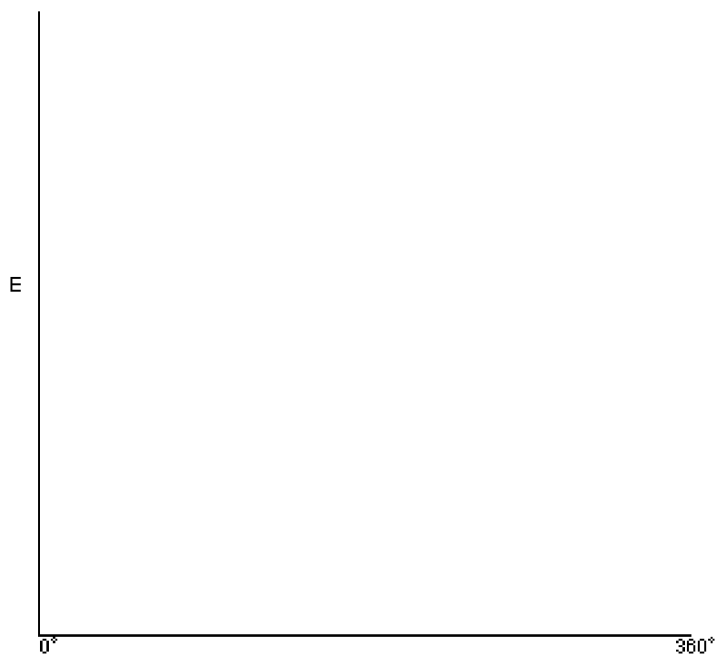


4. (20 points) Using the arrow formalism, draw the two other most stable resonance structures for the



following species.

5. (20 points) Draw the Newman projections for each 60° conformation between 0° and 360° and sketch an approximate potential energy diagram for rotations about the carbon-carbon bond in 2,3-dimethylbutane. Make the highest energy conformation the 0° conformation.



6. (20 points) Draw the chair and flip-chair conformations of all of the stereoisomers of 1,2,4-trimethylcyclohexane. On the basis of these structures and the fact that butane-gauche interactions destabilize by 0.9 kcal/mole and syn-pentane (1,3-diaxial methyl) interactions destabilize by 1.9 kcal/mol, circle the most stable of all of the conformations and put a square or rectangle around the least stable of the conformations.