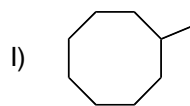
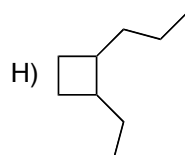
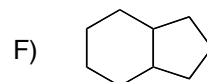
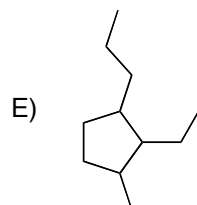
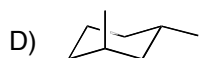
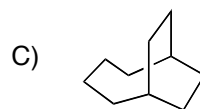
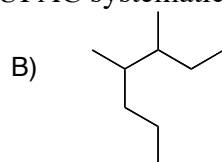
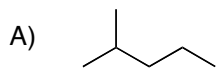


Problem Set 2

Name: _____
 SI: _____

1) (2 pts each) Give the IUPAC systematic name for each of the following molecules:



2) (2 pts each) Draw the molecules that correspond with the following systematic names:

A) 4-ethyl-2-methyl-1propyl-cyclohexane

B) 1,1,2-trimethylcyclopentane

C) 5-ethyl-2,3-dimethyloctane

D) 4-(1,1-dimethylethyl)nonane

E) 6-(1,2-dimethylpropyl)-4-propyldecane

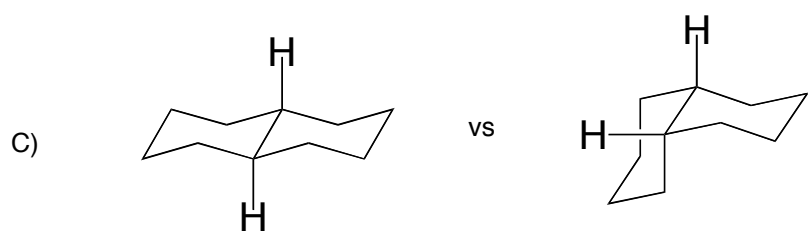
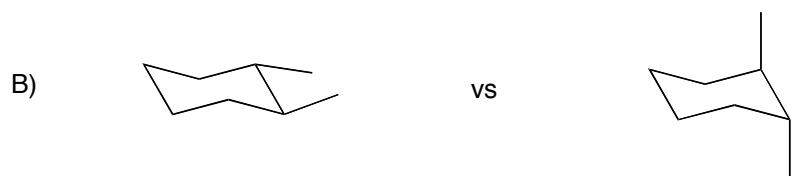
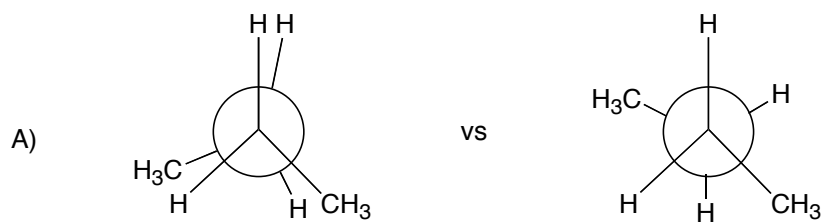
F) 3-ethyl-2-methylheptane

G) 5-ethyl-3-methyloctane

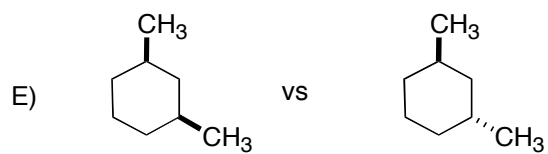
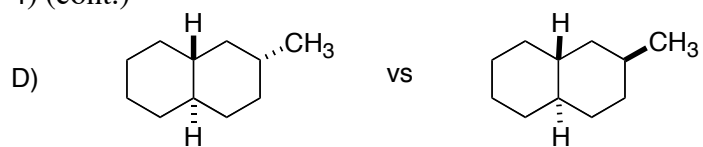
I) 8-methylbicyclo[4.3.0]nonane

3) (3 pts each) Draw all of the constitutional isomers for the following molecular formula C_7H_{16} . Hint: There are nine.

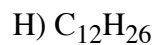
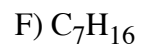
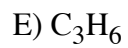
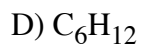
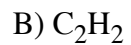
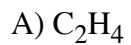
4) (3 pts each) For each of the following pairs of isomers/conformations, circle the more stable representation, and give a brief reason why you think it is more stable. If they are the same, indicate this.



4) (cont.)



5) (2 pts each) Provide balanced equations for the combustion of the following hydrocarbons.



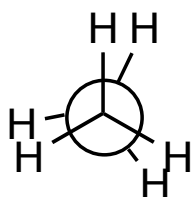
6) (5 pts each) Molecular Orbital Diagrams:

A) Draw a Molecular Orbital diagram for the bonding between carbon and chlorine in CH_3Cl . (Note: there is no formal charge on any of the atoms in this molecule, so your Lewis structure must have all neutral atoms.)

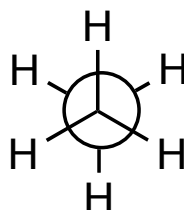
B) Draw a Molecular Orbital diagram for the bonding between carbon and nitrogen in CH_2NH . (Note: there is no formal charge on any of the atoms in this molecule, so your Lewis structure must have all neutral atoms.)

Extra Credit: Calculate the percentage of the two conformations at the given temperature in the following examples. (i.e. At any given time, how much does each conformation contribute to the total mixture?)

A) (3 pts) Ethane has two conformations: Staggered and Eclipsed. The eclipsed conformation is 12.6 kJ/mol (3 kcal/mol) higher in energy than the staggered conformation. Calculate the percentage of each conformation at 0° C.

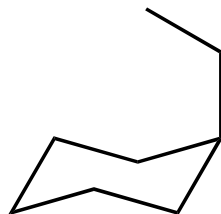


eclipsed



staggered

B) (3 pts) Ethylcyclohexane with the ethyl group in the axial conformation is 7.52 kJ/mole (1.8 kcal/mol) higher in energy than the equatorial conformation. Calculate the percentage of each conformation at 50° C.



Axial



equatorial

C) (4 pts) Calculate the percentage of axial ethylcyclohexane to equatorial ethylcyclohexane at -78 °C.