

Last Name _____

Seat No. _____

First Name _____

(Please print your name)

Circle your recitation number and time:

(1) Fri. 12:10 PM, (2) Fri. 2:10 PM, (3) Fri. 3:10 PM,

(4) Mon. 12:10 PM, (5) Mon. 1:10 PM (6) Mon. 4:10 PM

(7) Tues. 9:00 AM (8) Tues. 12:10 PM (9) Tues. 1:10 PM

(10) Fri. 9:00 AM (11) Fri. 11:00 AM (12) Mon. 11:00 AM

(13) Mon. 2:10 PM (14) Tues. 10:00 AM

There are 6 pages to this exam. Check to make sure you have a complete exam.

CHEMISTRY 331

EXAM II

Tuesday, October 2, 2007

I. (30 points) _____

II. (26 points) _____

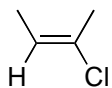
III. (18 points) _____

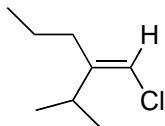
IV. (14 points) _____

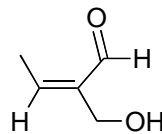
V. (12 points) _____

TOTAL (100 points) _____

IIa. Designate the following compounds as E or Z. It is not necessary to write out the complete name. (6pts)



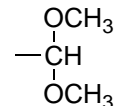
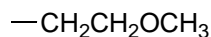
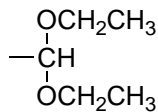
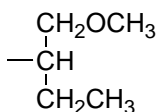




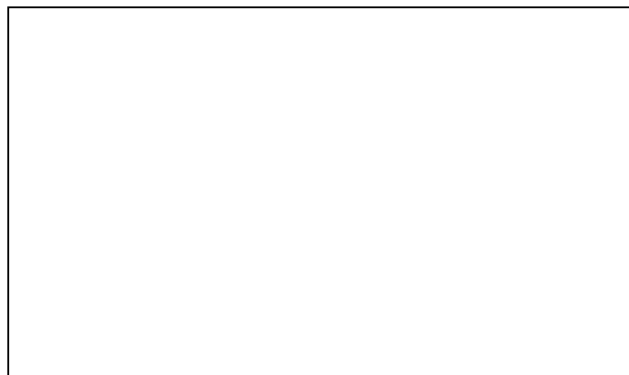
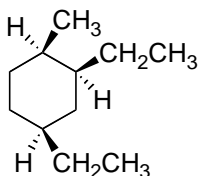
b. Calculate the number of degrees of unsaturation for each molecular formula. (8 pts)



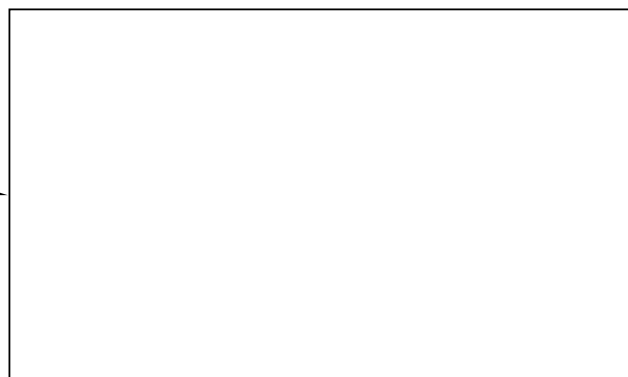
c. Circle the group with the highest priority according to the Cahn-Ingold-Prelog rules? (3pts)



d. Draw the two chair conformations of the following molecules and circle the more stable one. (9pts)



flip



III. (18pts)

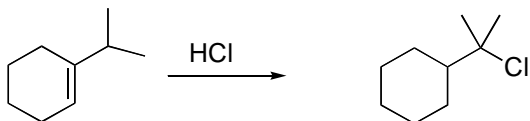
a. Draw all of the constitutional isomers with the molecular formula C_5H_{10} which contain a carbon-carbon double bond. There are no more than 6 constitutional isomers and there may be fewer. Cross out any boxes that are not used. Points will be deducted for duplicate or incorrect structures.

b. Circle all isomers that can exist as a pair of cis-trans isomers.

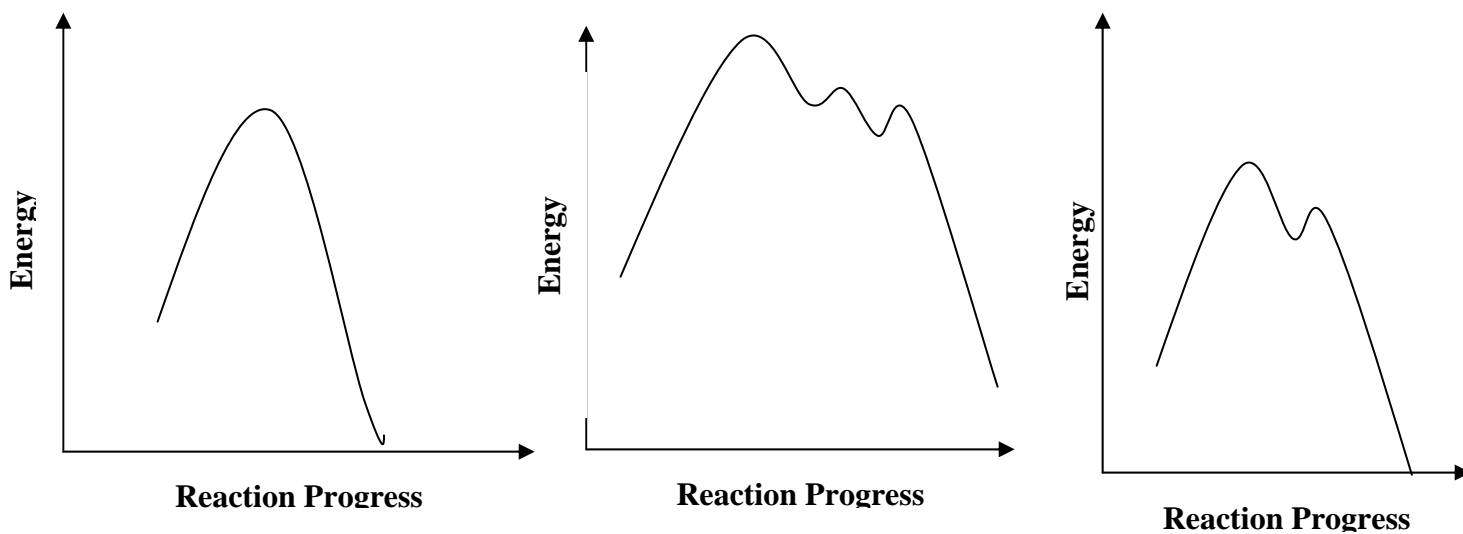
IVa. Circle the alkene which should give two constitutionally isomeric products when allowed to react with HBr? (3pts)



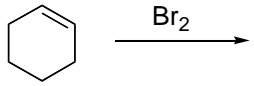
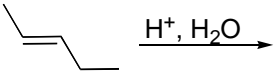
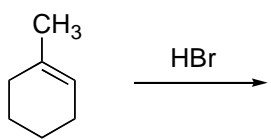
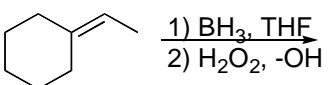
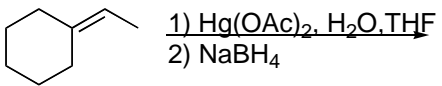
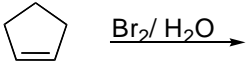
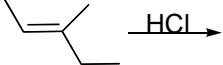
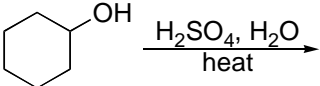
b. The addition of HCl to 1-isopropylcyclohexene yields a rearranged product. Propose a mechanism, showing the structures of the intermediates and using curved arrows to indicate electron flow in each step. (8pts)



c. Circle the appropriate reaction energy diagram for the above reaction. (3pts).



V. Write the product(s) for any 4 of the following 8 reactions. Mark an X in the box of any omitted questions. Show the stereochemistry where required. If you answer all questions only the first 4 will be graded. (12 pts)

 <p>Cyclohexene $\xrightarrow{\text{Br}_2}$</p>	
 <p>trans-2-Pentene $\xrightarrow{\text{H}^+, \text{H}_2\text{O}}$</p>	
 <p>1-Methylcyclohexene $\xrightarrow{\text{HBr}}$</p>	
 <p>Cyclohexene $\xrightarrow[2) \text{H}_2\text{O}_2, -\text{OH}]{1) \text{BH}_3, \text{THF}}$</p>	
 <p>Cyclohexene $\xrightarrow[2) \text{NaBH}_4]{1) \text{Hg}(\text{OAc})_2, \text{H}_2\text{O}, \text{THF}}$</p>	
 <p>Cyclopentene $\xrightarrow{\text{Br}_2 / \text{H}_2\text{O}}$</p>	
 <p>2-Methyl-2-butene $\xrightarrow{\text{HCl}}$</p>	
 <p>Cyclohexanol $\xrightarrow[\text{heat}]{\text{H}_2\text{SO}_4, \text{H}_2\text{O}}$</p>	