Chem 331
Exam #1
Friday, September 26, 2007

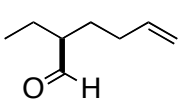
Name _____

Course #:

This is an open-book, open notes exam. Please show your work in detail.

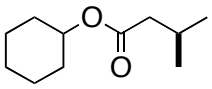
1. (10 points) Give the proper IUPAC name for each of the following:

a.



(2S)-2-ethyl-5-hexenal

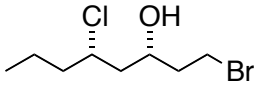
b.



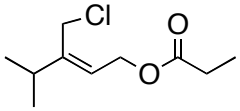
cyclohexyl 3-methylbutanoate

2. (10 points) Draw each of the following structures.

a. (3S, 5S)-1-bromo-5-chloro-3-octanol

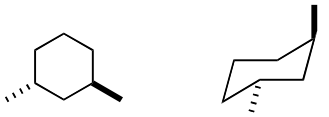


b. (2Z)-3-chloromethyl-4-methyl-2-pentenyl propanoate



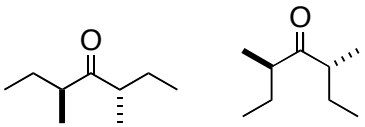
3. (20 points) For each pair of structures, indicate whether they are the same, enantiomers or diastereomers.

a.



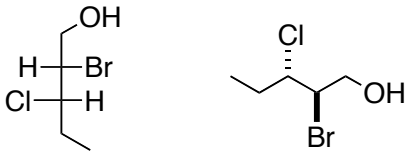
same

b.



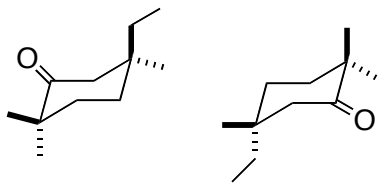
enantiomers

c.



diastereomers

d.

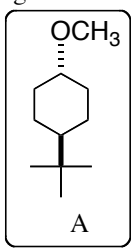


enantiomers

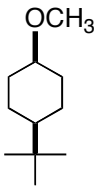
Course #:

4. (20 points) For each pair of cyclohexanes, indicate which is the more stable. For each, explain your reasoning in detail.

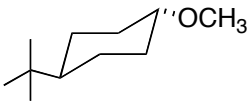
a.

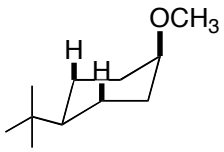


A



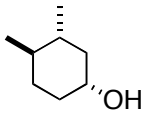
B



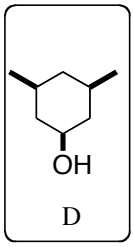


In the more stable chairs, the *t*-butyl group is equatorial. There is not energy cost to **A**, since the methoxy group is equatorial. There is an energy cost to **B**, since the methoxy is axial.

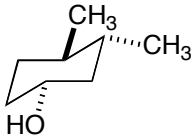
b.



C

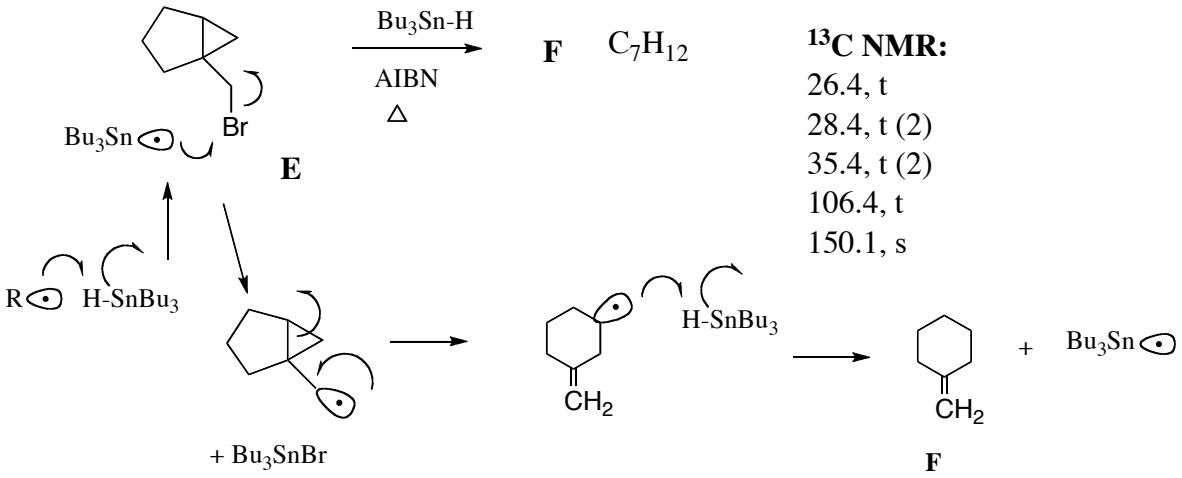


D



In the more stable chair of **D**, all three substituents are equatorial, and well removed from each other. In **C**, all three substituents are equatorial, but there is an energy cost to the two equatorial methyl groups bumping in to each other.

5. (20 points) Deduce the structure of **F**, and draw a detailed arrow-pushing mechanism for the transformation of **E** to **F**.



course #:

6. (20 points) Draw a detailed arrow-pushing mechanism for the transformation of **G** to **H**.