Chem 0130
Dennis P. Curran
March 4, 2005
Exam 2

Name:_____

Signature:_____

Answer all questions on this exam. If you need more space than that provided, use the back of any page.

1. _____ (20 points)

2. _____ (20 points)

3. _____ (20 points)

4. _____ (20 points)

5. _____ (20 points)

TOTAL _____

The test has **6** pages (including this cover page) and **5** questions
The exam ends at 10:55 am sharp.

Good Luck !!!

1) Names (20 points)

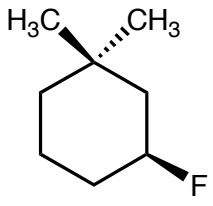
a, b, c) Provide clear three-dimensional structures for compounds with the following names.

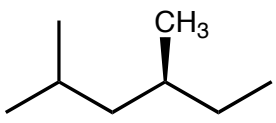
a) *cis*-1-*tert*-butyl-4-methylcyclohexane

b) meso-3,4-dichlorohexane

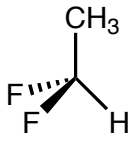
c) (3*R*,4*R*)-3,4-dimethyloctane

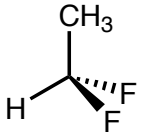
d, e) Provide IUPAC names for the following structures.
Be sure to include *R/S/meso/cis/trans* if needed.

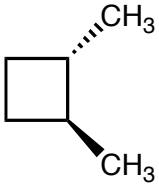
d) 

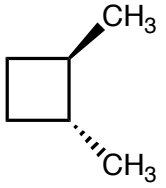
e) 

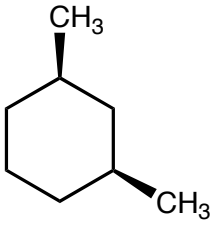
2) Structural comparisons (20 points)
Indicate whether the pairs of compounds in a-e are constitutional isomers, diastereoisomers (diastereomers), enantiomers, or identical molecules.

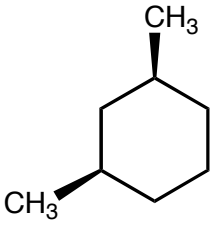
a) 

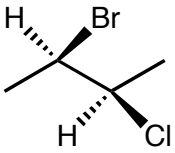
and 

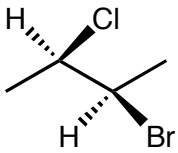
b) 

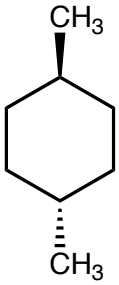
and 

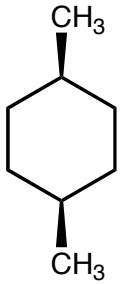
c) 

and 

d) 

and 

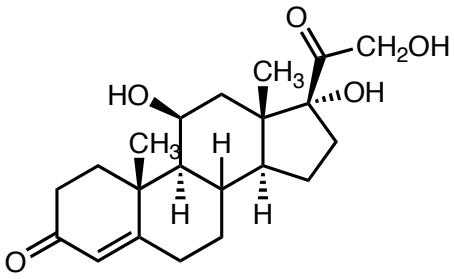
e) 

and 

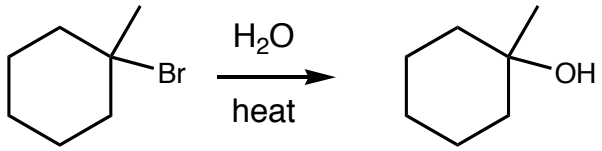
3) Short answer questions. (20 points)

a) Define "enantiomers".

b) How many stereocenters are there in cortisol? Mark each one.



c) Show a clear step-by-step mechanism for the following reaction. Use arrows to track electron flow.



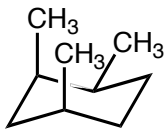
d) Place the following halides in order of increasing reactivity in an S_N2 reaction (that is, most reactive last).

$(CH_3)_3CCl$, $CH_3CH_2CH_2Cl$, $CH_3CH_2CH_2I$, $(CH_3)_2CHCl$

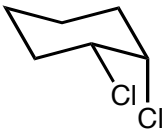
4) Conformations of Cyclohexanes (20 points)

a) For the indicated compounds **1** and **2**, indicate whether each non-hydrogen ring substitutent is in an axial orientation or an equatorial orientation.

a)

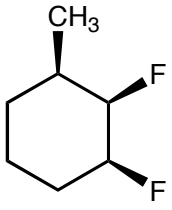


1



2

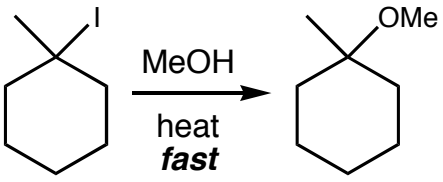
b) Draw both chair conformations of the following compound **3**.



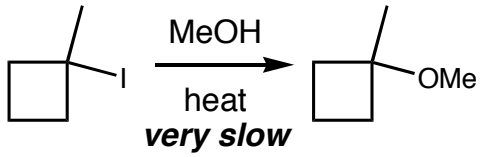
3

c) Use the table ΔG^0 values at the end of the exam to calculate which of your conformations is favored and by how much.

d) Compound **4** is vastly more reactive than compound **5** in a solvolysis reaction with methanol. Briefly explain why.



4

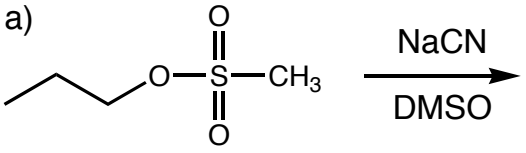


5

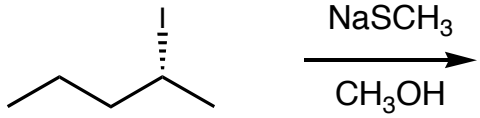
5) Substitution and elimination reactions. (20 points)

Provide the expected major product from the following reactions. Indicate whether your product forms from S_N1, S_N2, E_1, or E_2 reactions. Be sure to show stereochemistry, if relevant.

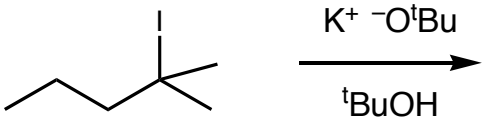
a)



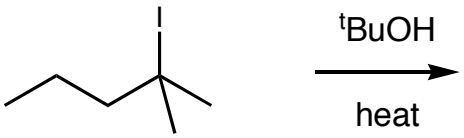
b)



c)



d)



e)