

CHEM 3311 Spring 2006

Exam 2

March 16, 2006

Professor Rebecca Hoenigman

Average Score = 55

High Score = 98

Low Score = 7

I pledge to uphold the CU Honor Code:

Signature _____

Name (printed) _____

Last four digits of your student ID number _____

Recitation TA _____

Recitation number, day, and time _____

You have 1 hour and 15 minutes to complete this exam.
No model kits or calculators allowed; periodic table and scratch paper are attached.

DO NOT TURN PAGE UNTIL INSTRUCTED TO DO SO.

Put your name on ALL pages of the exam

Recitation Sections:

Number	Day	Time	TA
121	Tuesday	8 am	Andrew
131	Tuesday	1 pm	Heather
141	Wednesday	8 am	Chris
151	Wednesday	12 pm	Andrew
153	Wednesday	12 pm	Nicole
152	Wednesday	5 pm	Chris
171	Thursday	12 pm	Heather

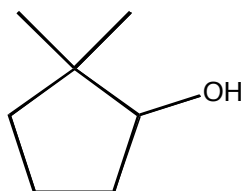
Score:	
Page 1	_____/15
Page 2	_____/20
Page 3	_____/21
Page 4	_____/8
Page 5	_____/24
Page 6	_____/12
Total	_____/100

Name: _____

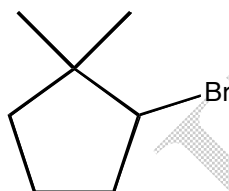
1. (3 pts) Give the molecular formula for three stable inorganic radicals.
(1 point each)



2. (12 pts) You have available 2,2-dimethylcyclopentanol (A) and 2-bromo-1,1-dimethylcyclopentane (B) and wish to prepare 3,3-dimethylcyclopentene (C). Which would you choose as the more suitable reactant, A or B, and with what would you treat it? Give an explanation for your choice.



A



B



C

Book Problem 5.43

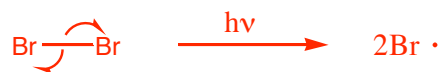
(2 points for choosing correct reagent, 4 points for giving an example of a strong base, 6 points for the explanation)

B is the more suitable reactant because it can undergo an E2 reaction with a strong base (such as CH_3O^-) to give only compound C. Compound A will undergo an E1 reaction, and since the cation intermediate will rearrange, compound C will be a minor product.

Name: _____

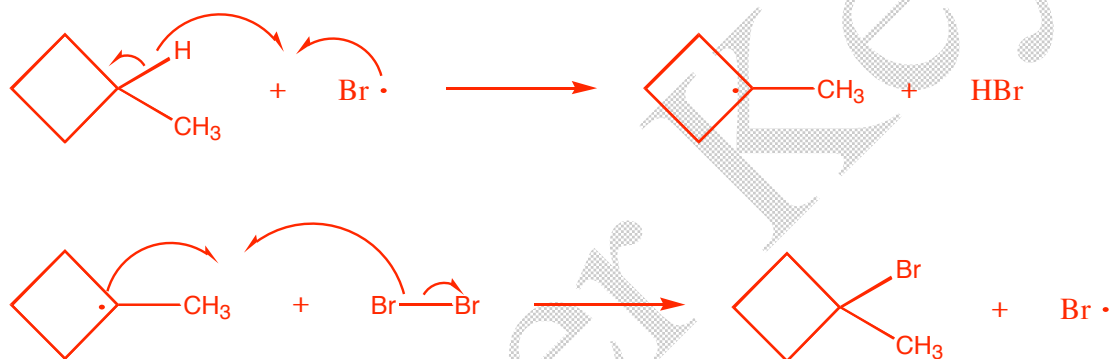
3. (20 pts) Write a complete stepwise mechanism for the bromination of methylcyclobutane. Label each step.

Initiation (5 points, -1 arrows, -1 no step label)



Propagation (-1 arrows, -1 no step label)

(5 points each for the two propagation steps)

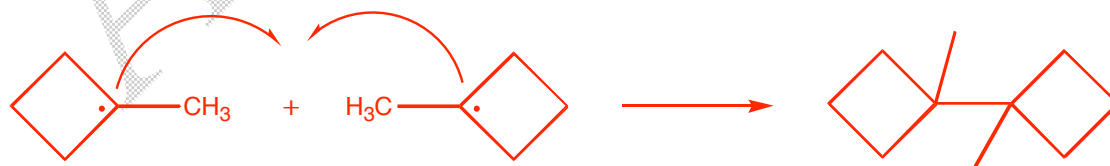


Termination (5 points, -1 arrows, -1 no step label)

(only one termination step is needed)



or



or



Name: _____

4. (15 pts) Circle the more stable compound in each of the following pairs and give the reason for your choice in the adjacent box.

(2 points each circle, 3 points each explanation)

A. 1-methylcyclohexene or 3-methylcyclohexene

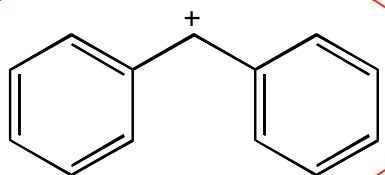
Book Problem 5.30a

1-methylcyclohexene has a more substituted double bond.

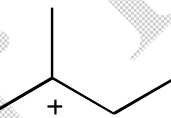
B. (Z)-cycloheptene or (E)-cycloheptene

Cis (Z) double bonds are more stable than trans (E) double bonds in cycloalkenes with fewer than 10 or 11 carbons.

C.



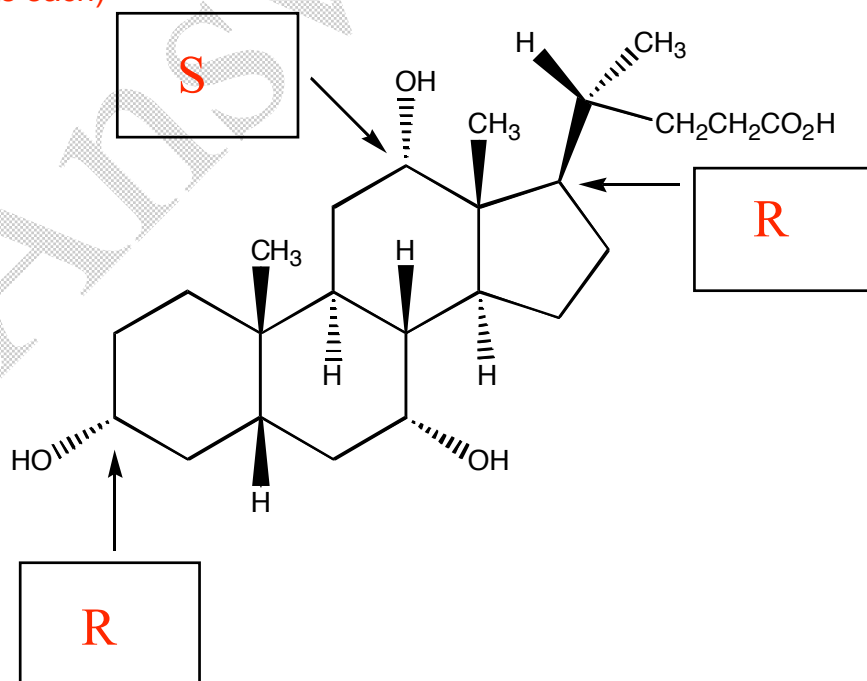
or



The first carbocation is stabilized by resonance.

5. (6 pts) There are 11 chiral centers in cholic acid. Give the stereochemical label for the indicated atoms.

(2 points each)

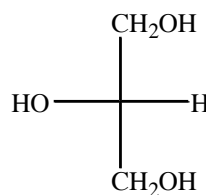
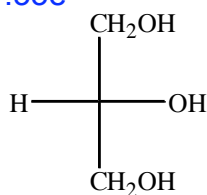


Name: _____

6. (8 pts) Circle the relationship between the following pairs of compounds.

(2 points each)

A. Book Problem 7.33e



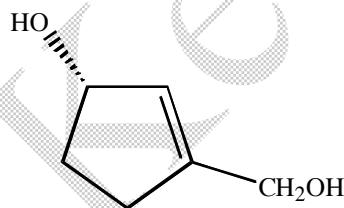
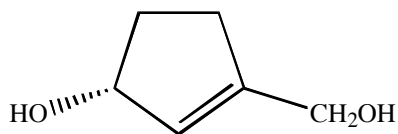
Identical

constitutional isomers

enantiomers

diastereomers

B. Book Problem 7.33j



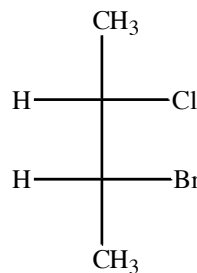
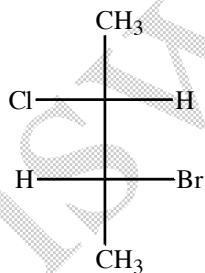
Identical

constitutional isomers

enantiomers

diastereomers

C.



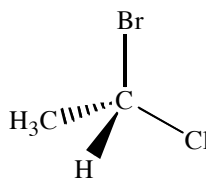
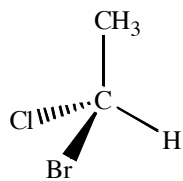
Identical

constitutional isomers

enantiomers

diastereomers

D.



Identical

constitutional isomers

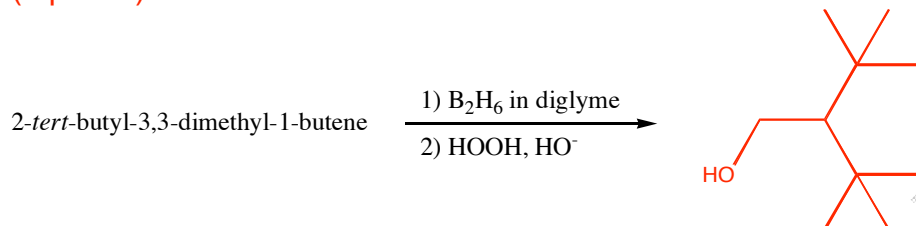
enantiomers

diastereomers

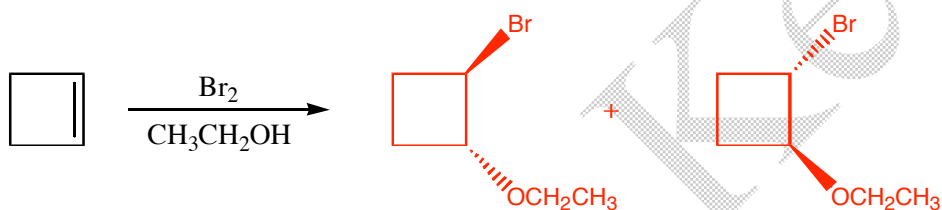
Name: _____

7. (24 pts) Give the organic products for the following reactions. Be sure to clearly label the stereochemistry of the products. If possible, label the major and minor products.

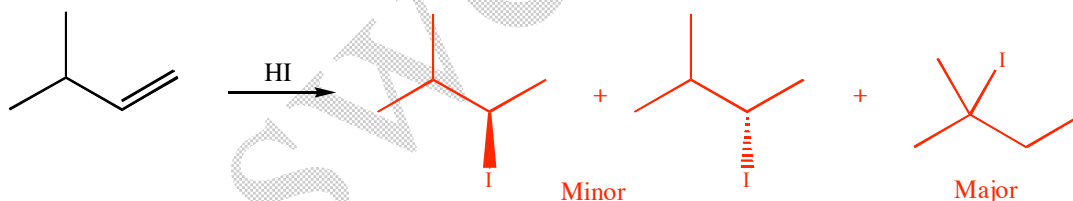
A. (3 points) Book Problem 6.34c



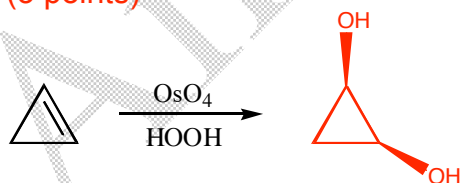
B. (3 points each enantiomer, no stereochemistry = no credit)



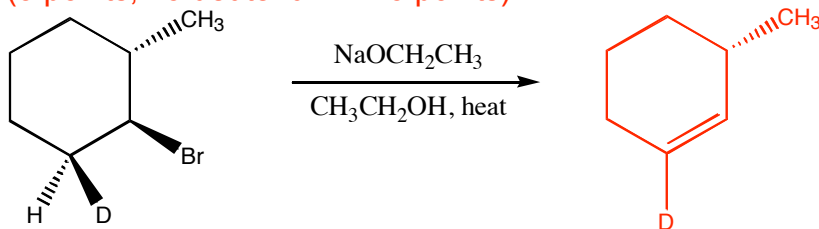
C. (3 points for major product, 3 points for minor product, 1 point for enantiomer, 2 points for major and minor product labels)



D. (3 points)



E. (3 points, no deuterium = no points)

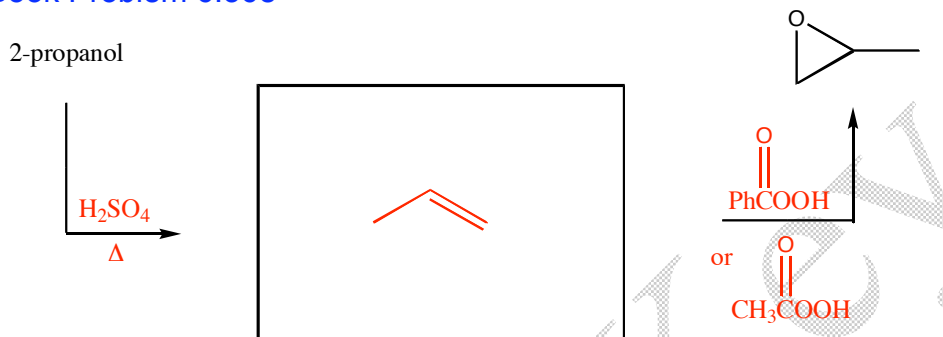


Name: _____

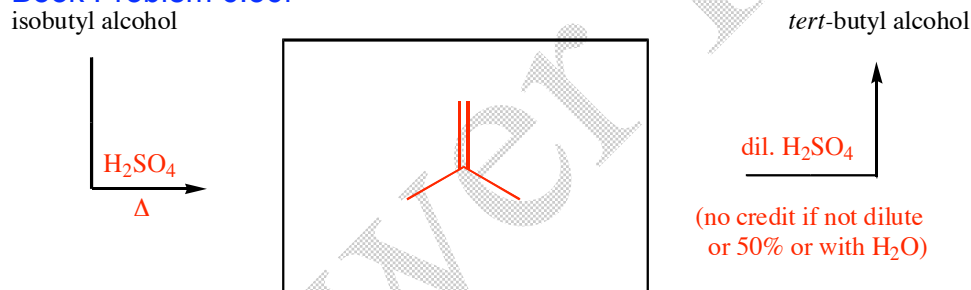
8. (12 pts) Each of the following transformations can be carried out in two or three steps. For each transformation show above and/or below the arrows the necessary reagents and between the arrows show the organic intermediate that is formed in the first reaction and serves as the starting material for the second reaction.

(1 point each reagent, 1 point each intermediate)

A. Book Problem 6.36e



B. Book Problem 6.36f



C.

