

CHEM 3331-100 Spring 2007

Exam 1

Professor R. Hoenigman

High = 100

Low = 17

Average = 71

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 30 minutes to complete this exam.

No model kits or calculators allowed.

Periodic table and scratch paper are attached.

DO NOT TURN THIS PAGE UNTIL INSTRUCTED TO DO SO.

Recitation Sections:

#	Day	Time	TA
122	Monday	5 pm	Tom
121	Tuesday	8 am	Tom
131	Tuesday	12 pm	Tom
132	Tuesday	12 pm	Lee
161	Thursday	8 am	Tom
171	Thursday	12 pm	Lee

SCORE:

Page 1 _____/15 Page 3 _____/20

Page 2 _____/30 Page 4 _____/35

TOTAL _____/100

1. (3 pts) Why is lithium aluminum hydride more reactive than sodium borohydride?

Aluminum is less electronegative than boron, so the hydrogen attached to aluminum has more negative character.

2. (3 pts) Why must solvents be anhydrous (*i.e.* "dry") when used with organolithium reagents?

An organolithium reagent will undergo an acid-base reaction with water to form an alkane and water.

For example:



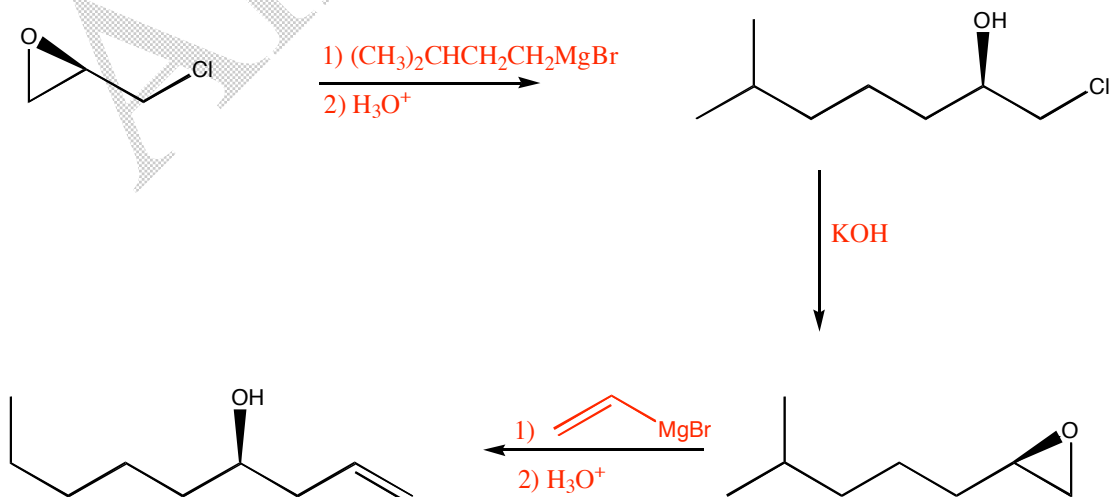
3. (3 pts) Draw 12-crown-4.



4. (6 pts) The following sequence of reactions are the beginning steps of a recently published total synthesis of a natural product isolated from *Lafuentea rotundifolia*. Fill in the missing reagents.

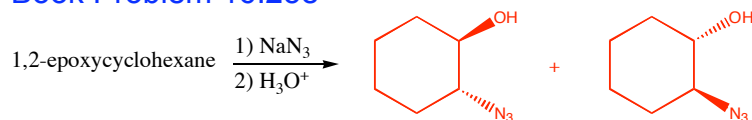
(2 pts each)

(S. K. Pandey and P. Kumar, *Eur. J. Org. Chem.* **2007**, 369-373)

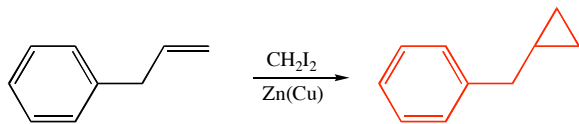


5. (30 pts) Give the major organic product(s) of the following reactions. Write NR if no reaction occurs. (3 pts each)

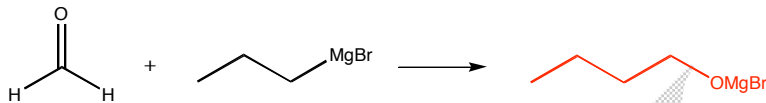
A. Book Problem 16.25e



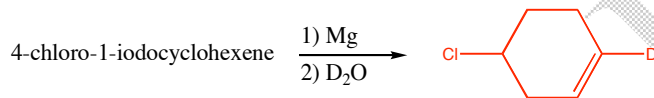
B. Book Problem 14.26d



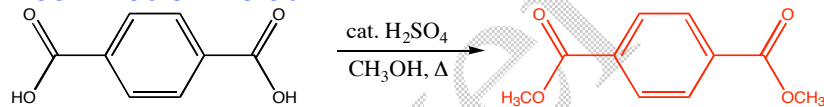
C. Book Problem 14.6a



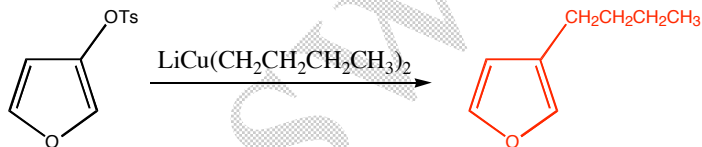
D.



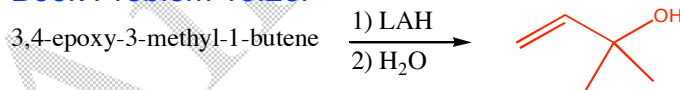
E. Book Problem 15.9b



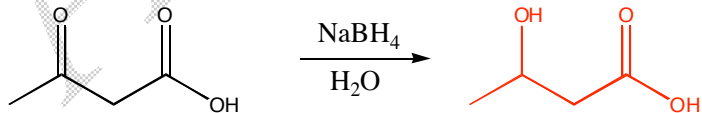
F.



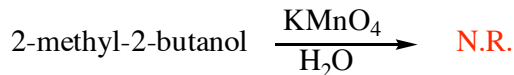
G. Book Problem 16.25i



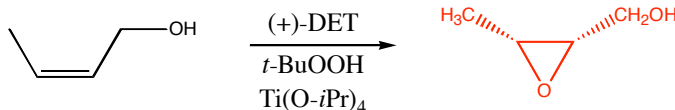
H.



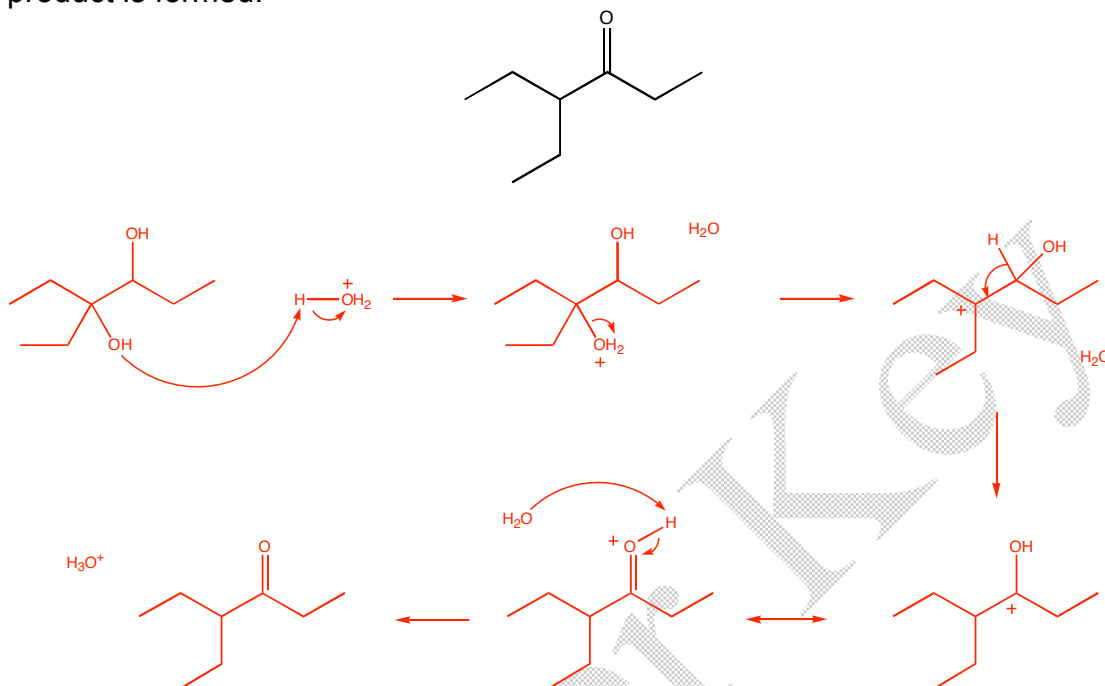
I.



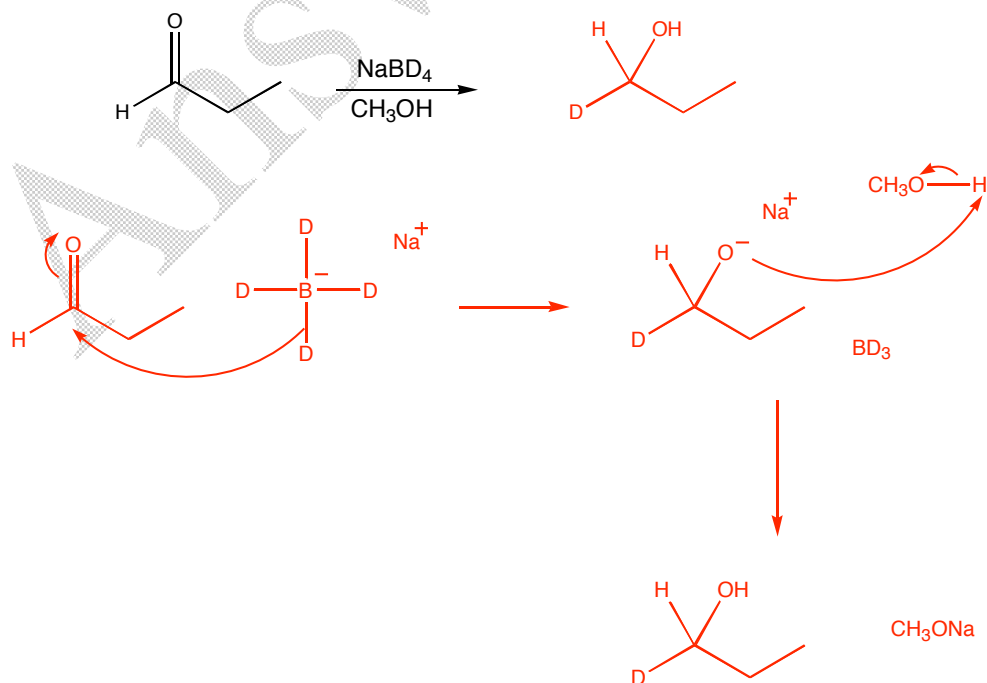
J.



6. (10 pts) On homework 3, you learned that the acid catalyzed dehydration of 3-ethyl-3,4-hexanediol led to the formation of only one product (shown below). Using arrows to show the flow of electrons, draw a mechanism to show how this product is formed.

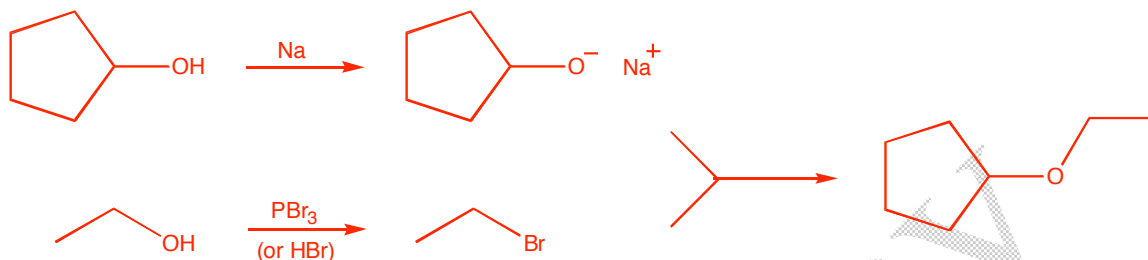


7. (10 pts) Fill in the organic product of the reaction below and draw a mechanism to account for its formation. In your mechanism be sure to show all inorganic products.

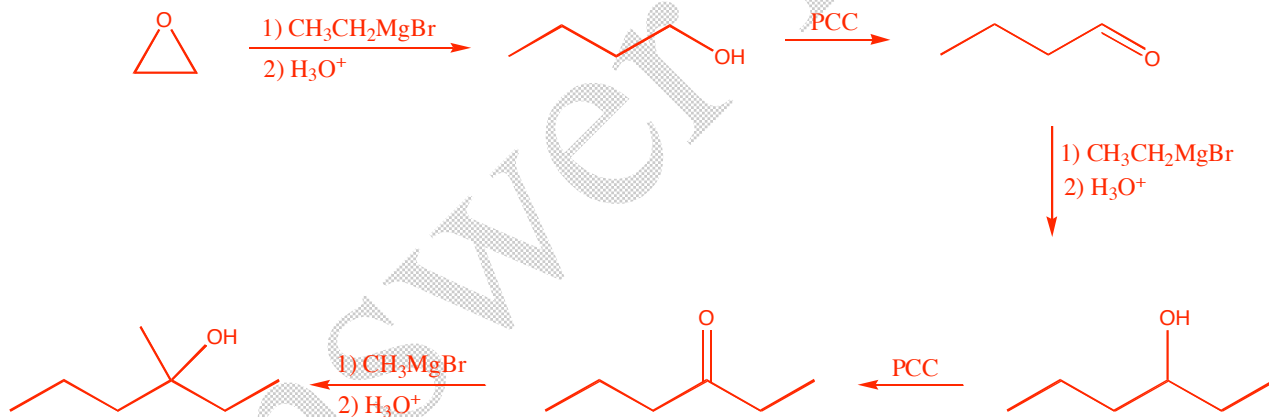


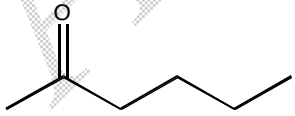
8. (35 pts) Propose an efficient synthesis for the following transformations.

A. cyclopentyl ethyl ether from any alcohols and inorganic reagents
(10 pts) [Book Problem 16.7a](#)



B. 3-methyl-3-hexanol from 1,2-epoxyethane and any reagents containing 3 or fewer carbons (more than one way to solve this problem)
(15 pts)



C.  from any reagents containing 4 or fewer carbons
(10 pts) [Book Problem 15.26e](#)

