

CHEM 3331-100 Spring 2008

Exam 2

Professor R. Hoenigman

High = 102

Low = 21

Average = 77

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:

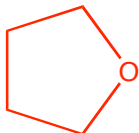
#	Day	Time	TA	SCORE:
122	Monday	5 pm	Ashley	
121	Tuesday	8 am	Noel	Page 1 _____/10 Page 3 _____/27
131	Tuesday	12 pm	Jin	
132	Tuesday	12 pm	Ashley	Page 2 _____/20 Page 4 _____/23
161	Thursday	8 am	Morin	
171	Thursday	12 pm	Jin	Page 5 _____/20
				TOTAL _____/100

Extra Credit (5 pts)

A. What does the abbreviation THF stand for?

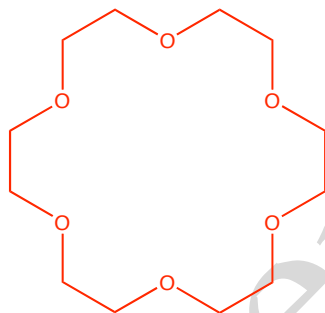
Tetrahydrofuran

B. Draw THF



1. (5 pts) Crown ethers are polycyclic ethers with many uses.

A. Draw 18-crown-6

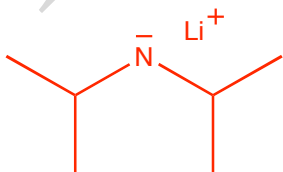


B. Give one use of 18-crown-6.

Crown ethers solvate cations well. For example, if 18-crown-6 is mixed with KF, the K^+ associates with the ether oxygens and the F^- becomes more nucleophilic

2. (5 pts) Methyllithium and LDA are two strong bases with many uses in organic synthesis.

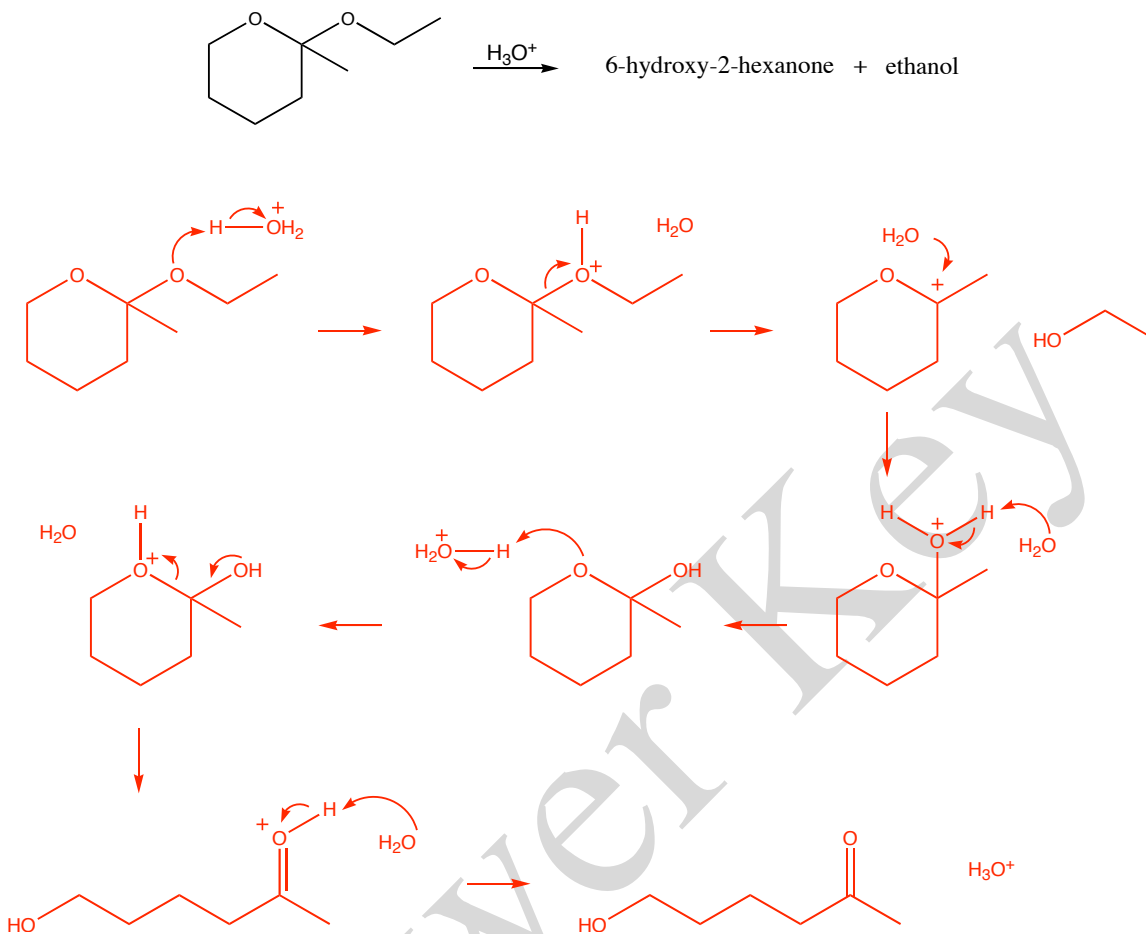
A. Draw LDA and methyllithium



B. Explain why methyllithium is not as good choice as LDA for converting a ketone to its enolate. [Book Problem 18.3](#)

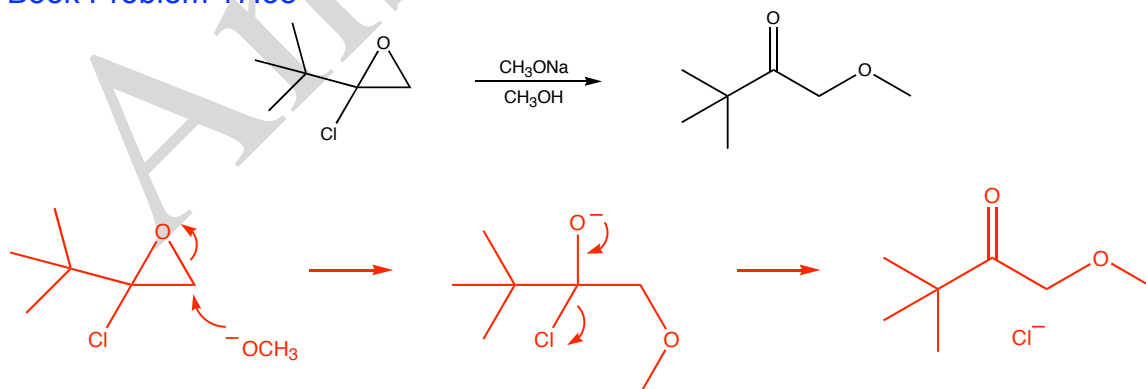
Unlike LDA, methyllithium is an unhindered base, so it is an excellent nucleophile. Methyllithium reacts with ketones or aldehydes by nucleophilic attack at the carbonyl.

3. (10 pts) Using arrows to show the flow of electrons, propose a mechanism for the following transformation.



4. (10 pts) Using arrows to show the flow of electrons, propose a mechanism for the following transformation.

Book Problem 17.38



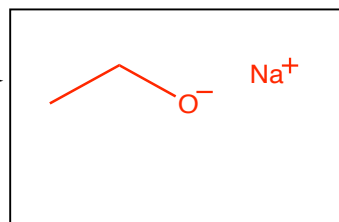
5. (27 pts) For each of the following sets of reactions, fill in the missing product(s) in the given box.

(3 points each box)

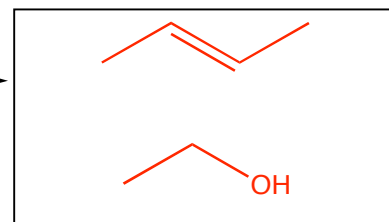
A. Homework 5

ethanol

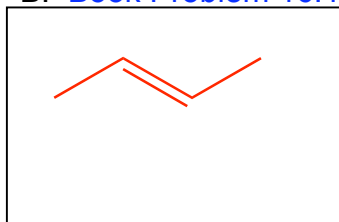
$\xrightarrow{\text{NaH}}$



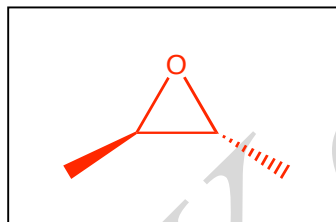
$\xrightarrow{\text{sec-butyl iodide}}$



B. Book Problem 16.16



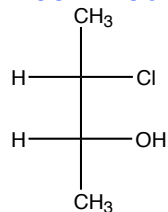
$\xrightarrow{\text{MCPBA}}$



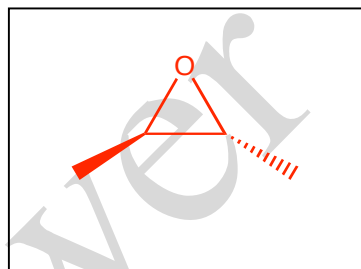
$\xrightarrow{\text{H}_3\text{O}^+}$

meso-2,3-butanediol

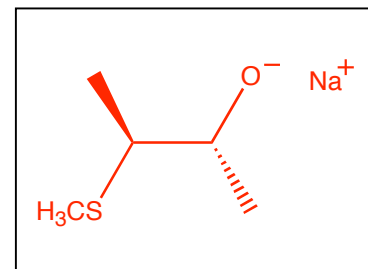
C. Book Problem 16.34c



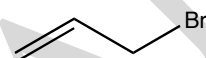
$\xrightarrow{\text{NaOH}}$



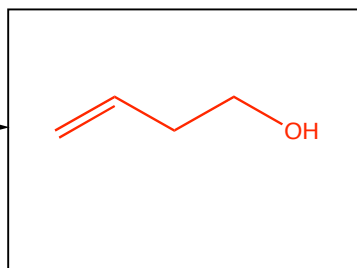
$\xrightarrow{\text{NaSCH}_3}$



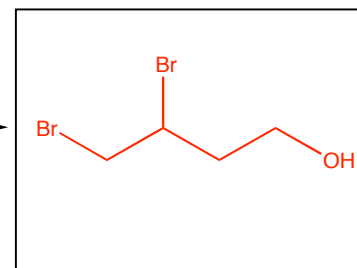
D. Book Problem 16.34a



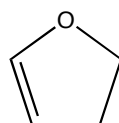
1) Mg
2) formaldehyde
3) H_3O^+



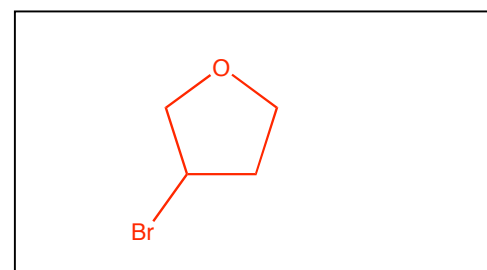
$\xrightarrow{\text{Br}_2}$



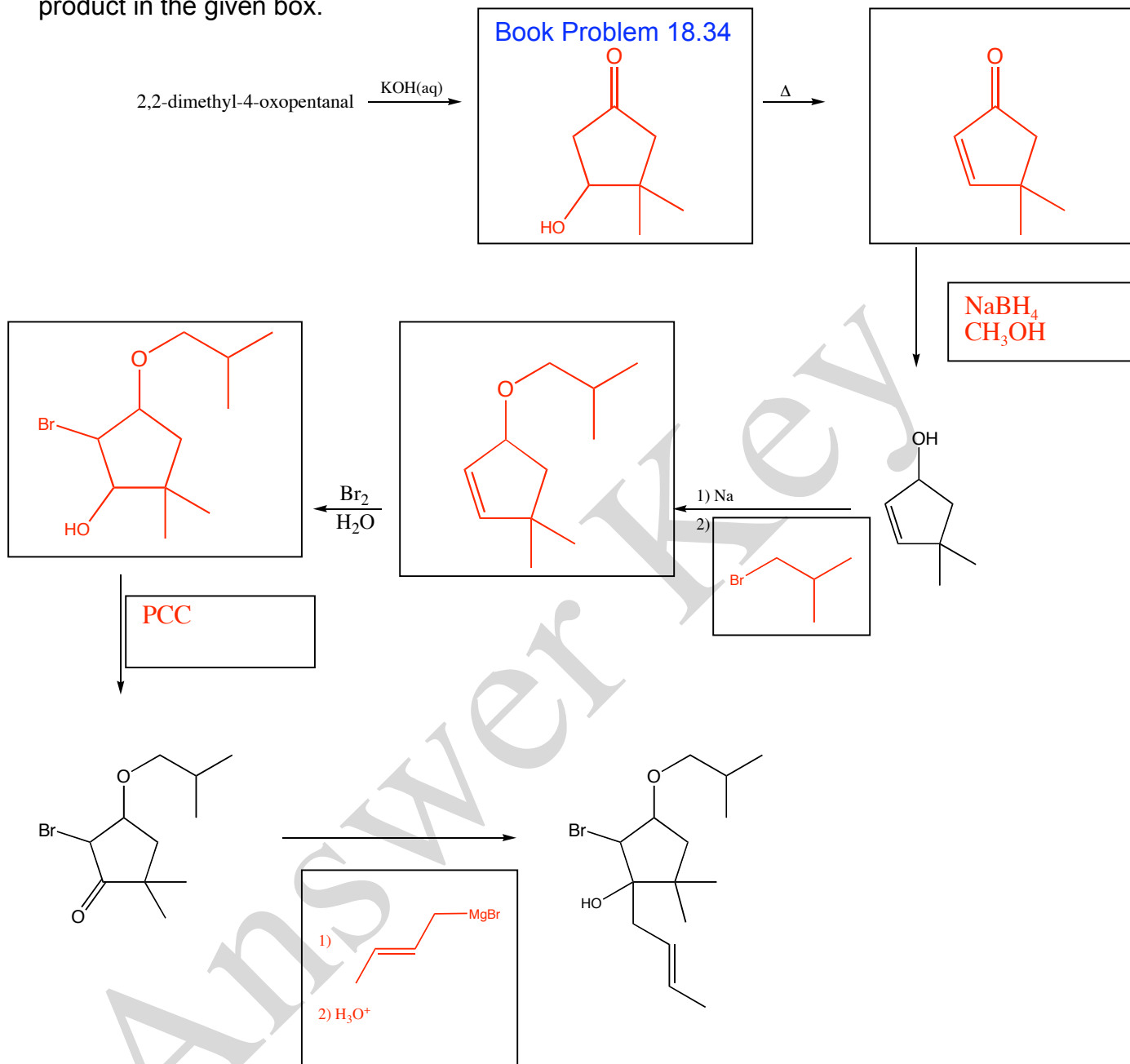
$\xrightarrow{\text{KOH}}$
25 °C



$\xleftarrow{\text{KOH}}$
 Δ

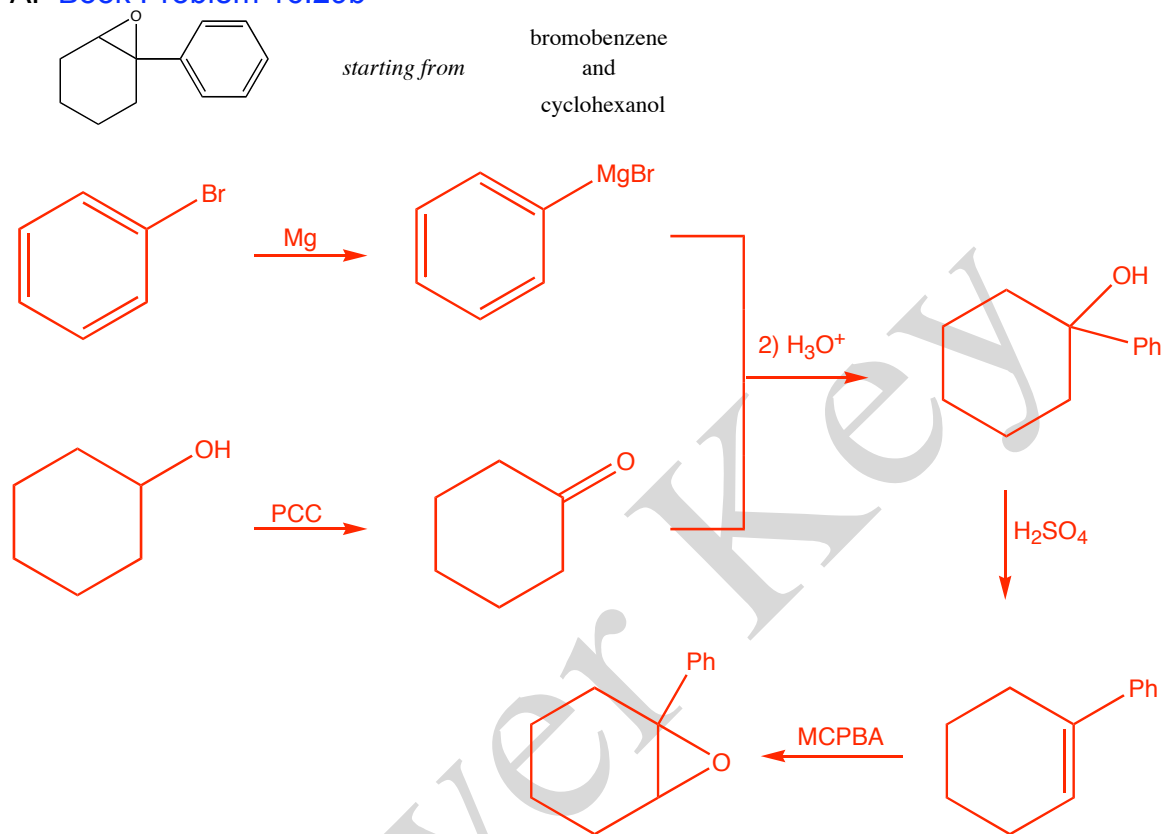


6. (23 pts) For the following transformation, provide the missing reagent or product in the given box.



7. (20 pts) Propose an efficient synthesis for the following transformations. You may use any reagents you like, but must use the given starting material. (10 points each)

A. Book Problem 16.29b



B. 2-butanone all carbons must come from acetic acid ($\text{CH}_3\text{CO}_2\text{H}$)
Book Problem 17.5

