

## Exam 1

Professor R. Hoenigman

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:

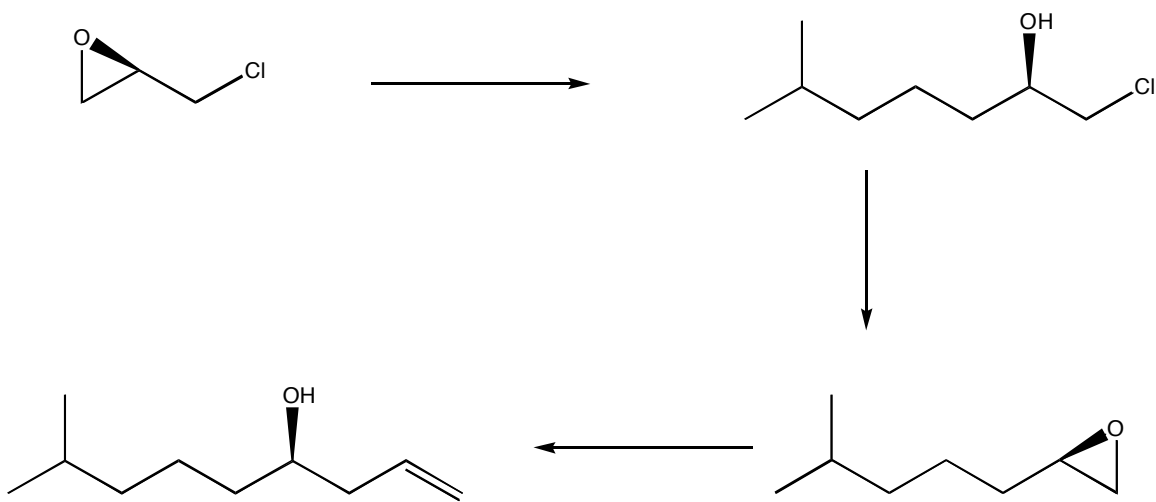
#	Day	Time	TA	SCORE:	
122	Monday	5 pm	Tom		
121	Tuesday	8 am	Tom	Page 1 _____/15	Page 3 _____/20
131	Tuesday	12 pm	Tom		
132	Tuesday	12 pm	Lee	Page 2 _____/30	Page 4 _____/35
161	Thursday	8 am	Tom		
171	Thursday	12 pm	Lee		TOTAL _____/100

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

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

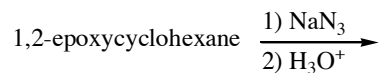
3. (3 pts) Draw 12-crown-4.

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.

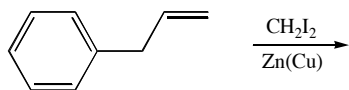


5. (30 pts) Give the major organic product(s) of the following reactions. Write NR if no reaction occurs.

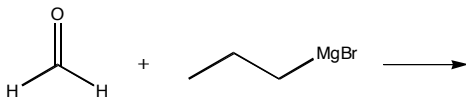
A.



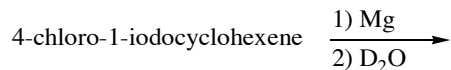
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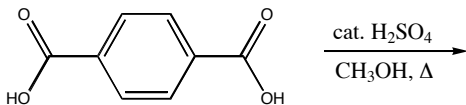
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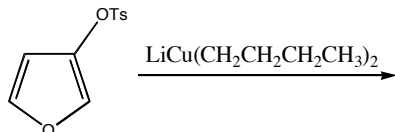
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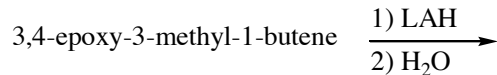
E.



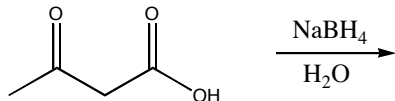
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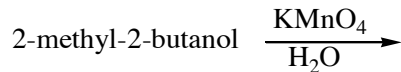
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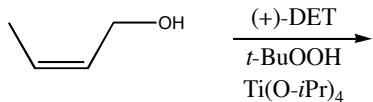
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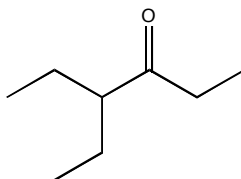
I.



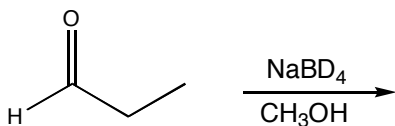
J.



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.



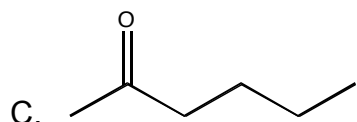
7. (10 pts) Fill in the organic product of the reaction below and draw a mechanism to account for its formation. In your mechanism be sure to show all inorganic products.



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

A. cyclopentyl ethyl ether from any alcohols and inorganic reagents

B. 3-methyl-3-hexanol from 1,2-epoxyethane and any reagents containing 3 or fewer carbons



from any reagents containing 4 or fewer carbons