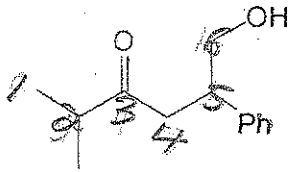


1. What is the IUPAC name of the molecule shown below? (6 points, 7 minutes)

Ch. 2



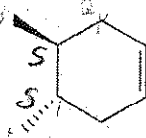
6-hydroxy-2-methyl-5-phenyl-  
3-hexanone

2a. How many chiral centers are present in the molecule shown below? 2 (6 points, 8 minutes)

2b. Label each chiral center as R or S.

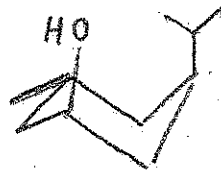
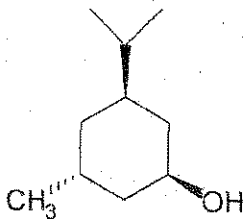
2c. Is the overall molecule chiral? yes

Ch. 3



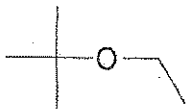
3. Draw the *least* stable chair conformation of the molecule shown below. (6 points, 8 minutes)

Ch. 2

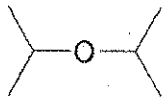


4. How could mass spectrometry be used to distinguish between the following two compounds both of which have a molecular weight of 102 grams/mole. (6 points, 6 minutes)

Ch. 14

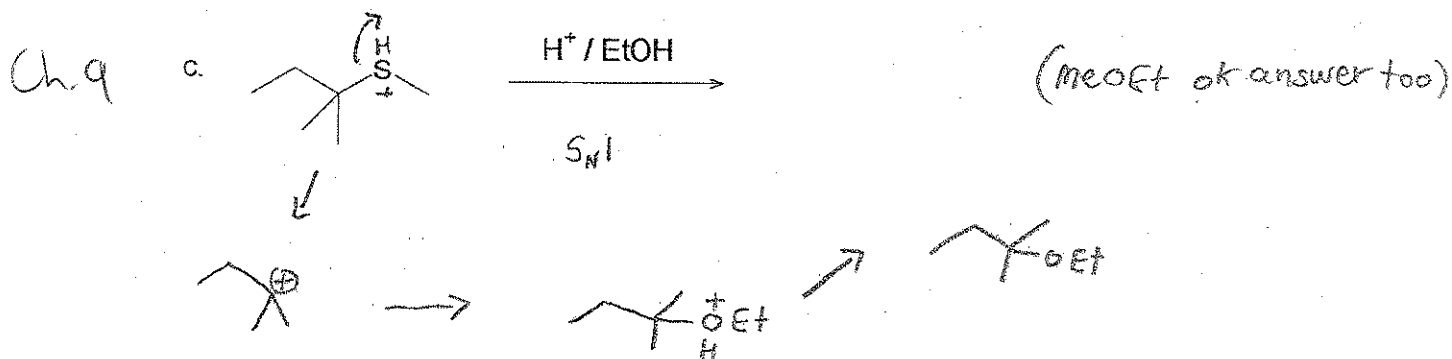
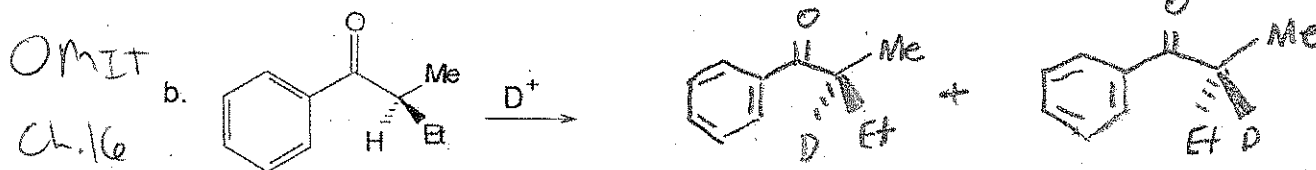
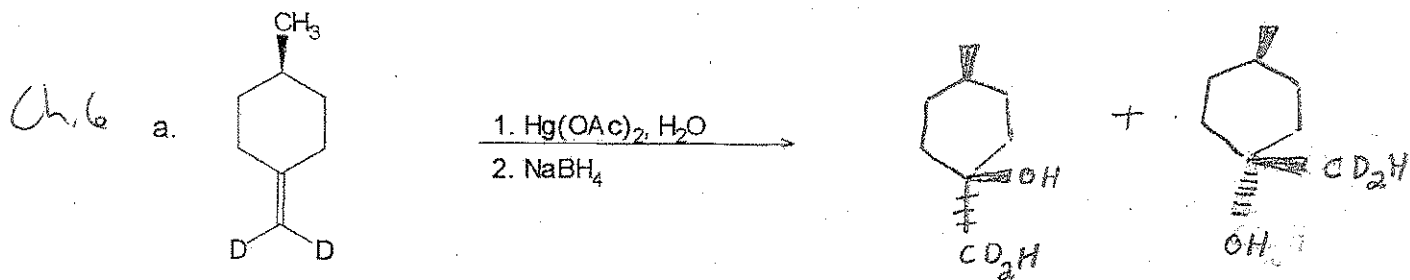


tBu fragment  
with mass 57



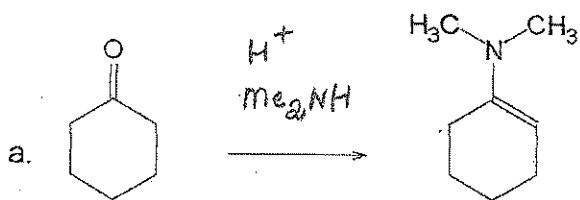
iPr fragment  
with mass 43

5. \* Show the **major** product or products of each of the following reactions. Do not show **minor** products. Be sure to show proper stereochemistry. (5 points each, 6 minutes each)

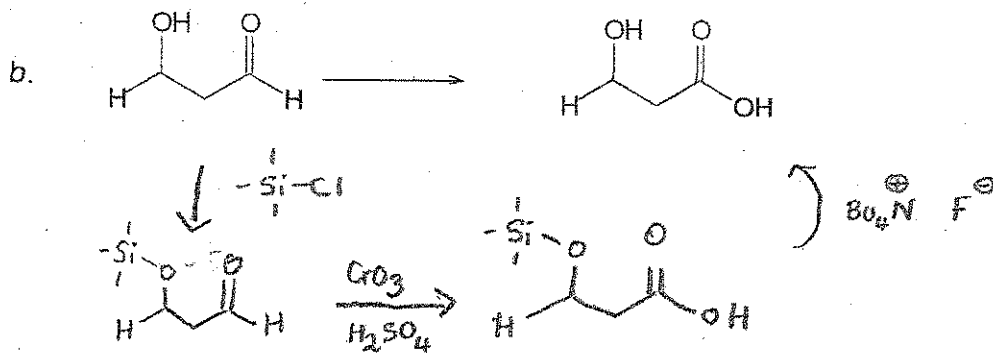


- c. ✗ Give the reagent or reagents necessary to accomplish each of the following transformations. Number each step so it is clear when reagents must be added **together** or **separately**. Do not show **intermediates**. (5 points each, 6 minutes each)

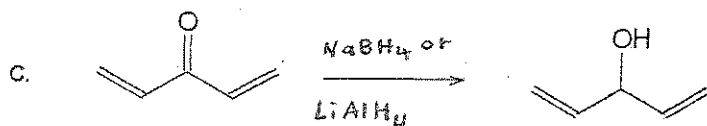
OMIT  
Ch. 16



OMIT  
Ch. 10

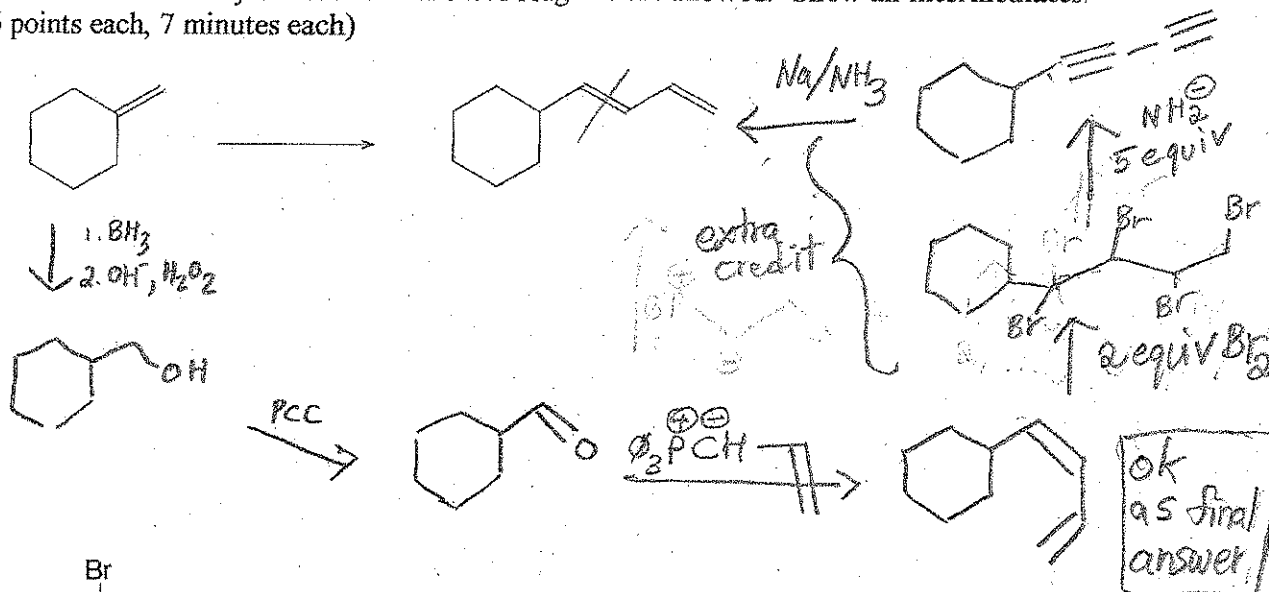


OMIT  
Ch. 16



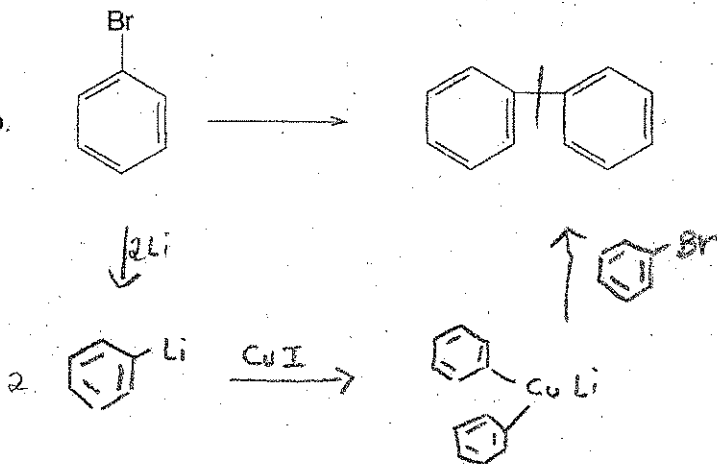
7. Give the reagent or reagents necessary to accomplish each of the following synthetic transformations. Any needed carbon based reagents are allowed. Show all intermediates. (6 points each, 7 minutes each)

Omit a.  
Ch. 10/16



Ch. 15

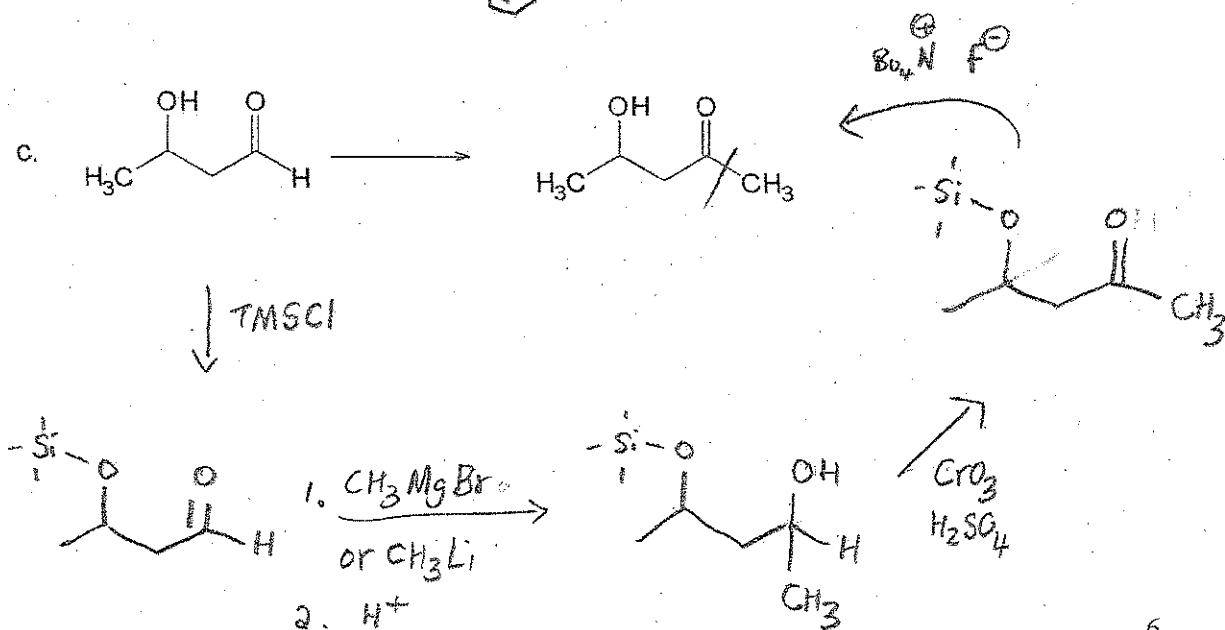
b.



Omit

Ch. 10/16

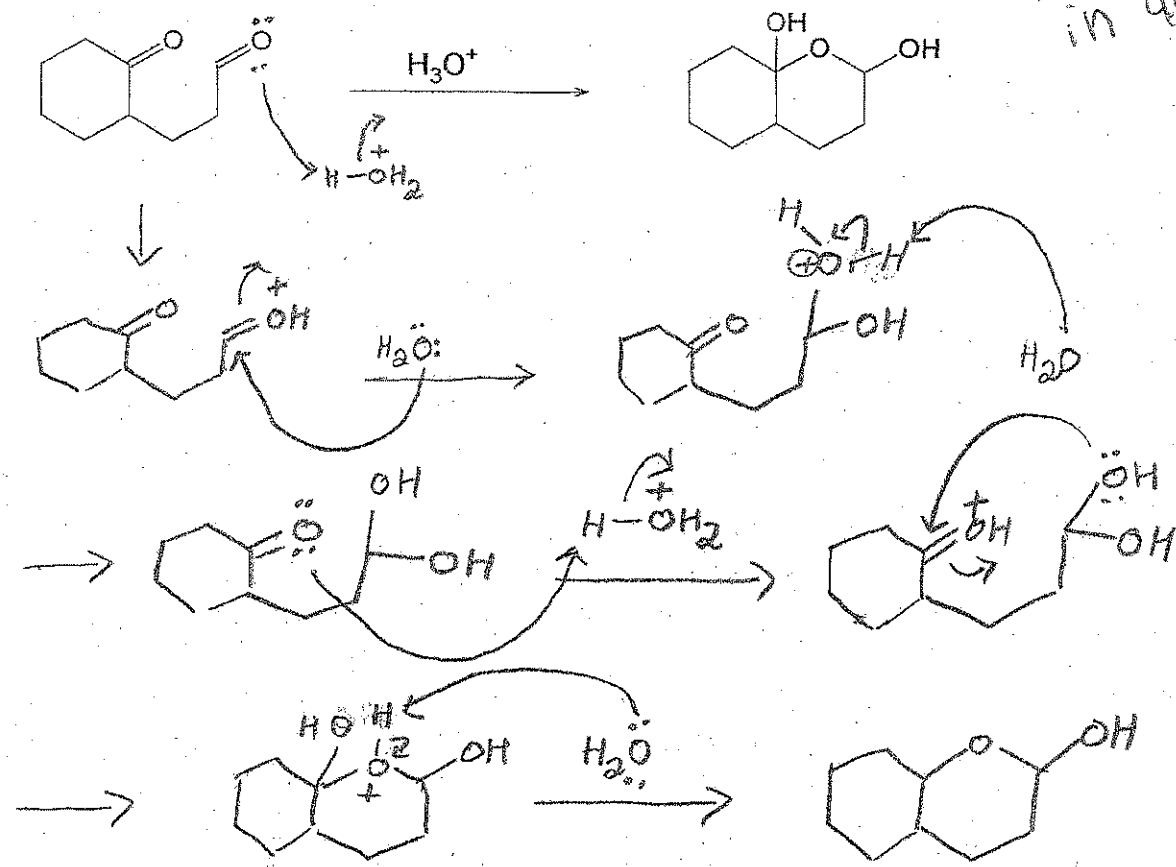
c.



8. Show the mechanism for the following reaction. (12 points, 14 minutes)

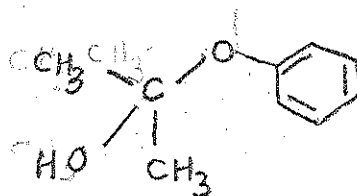
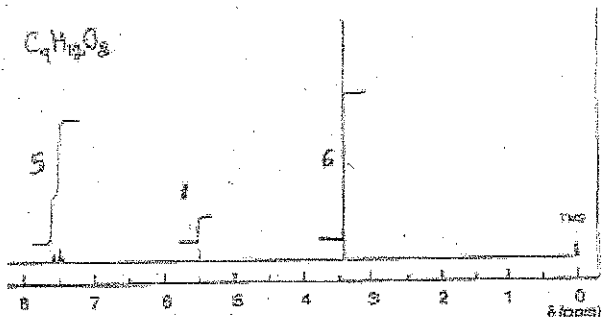
no  $O^-$  in acid

Omit  
Ch. 16

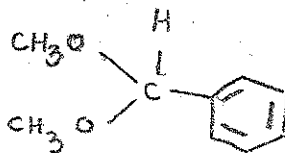


a. Determine the structure of the compound whose  $^1\text{H NMR}$  spectrum is shown below. You must show your work in order to receive credit for your answer. (8 points, 10 minutes)

Ch. 13



acceptable answer



correct answer

10. Determine the structure of the compound whose  $^1\text{H}$  NMR spectrum is shown below. You must show your work in order to receive credit for your answer. (8 points, 10 minutes)

Ch. 13

