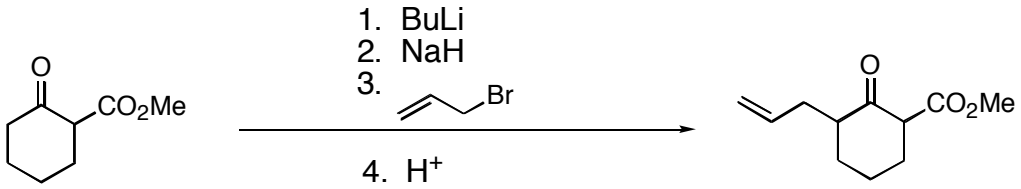
Chem 634
Professor Fox
Exam 1
Fall 2007
3 hours

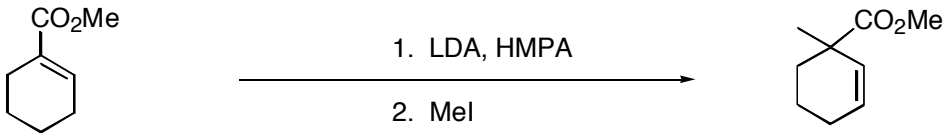
Your Name_____

1. Provide conditions for the following transformations.
Mechanistic details are not required. 4 points each)

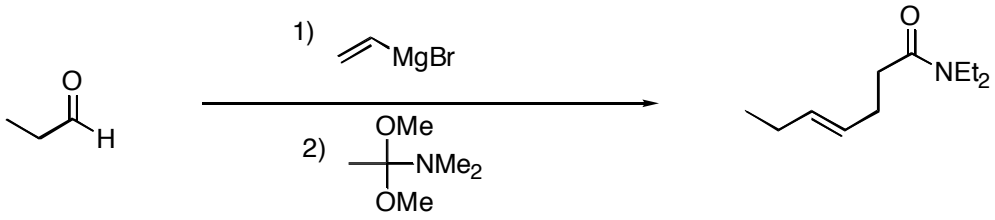
a



b

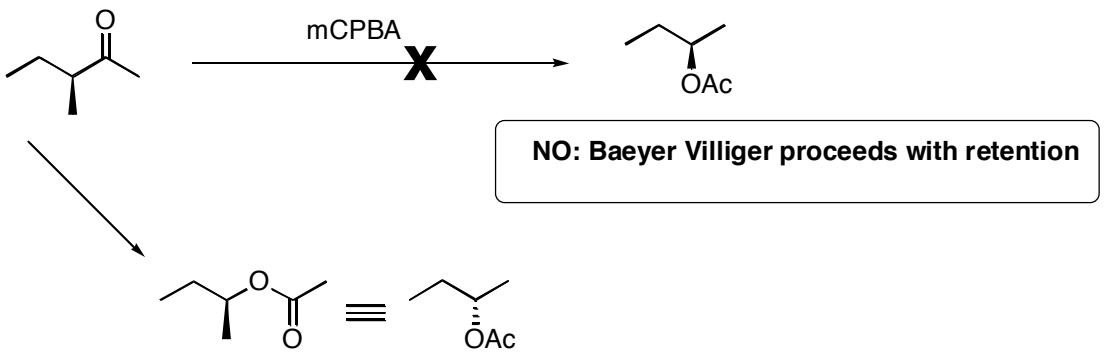


c



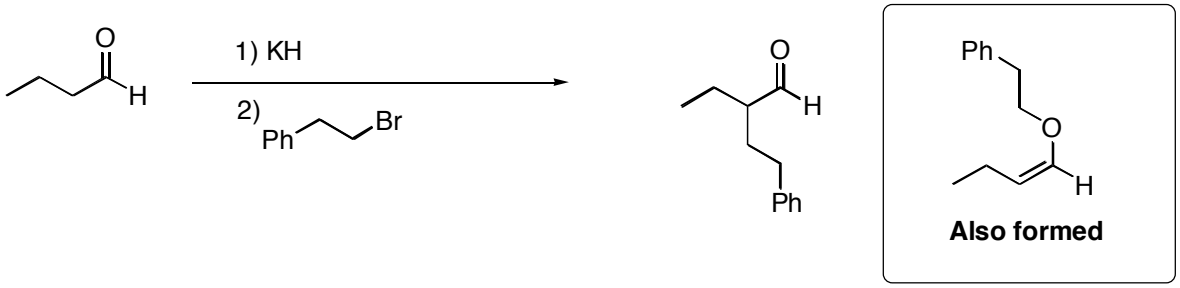
2. Indicate whether the reactions below would proceed as indicated. Provide a brief but detailed explanation. If the product does not proceed as shown, indicate the structure of the product(s) that would be formed instead of (or in addition to) the product that is drawn (4 points each).

a



NO: Baeyer Villiger proceeds with retention

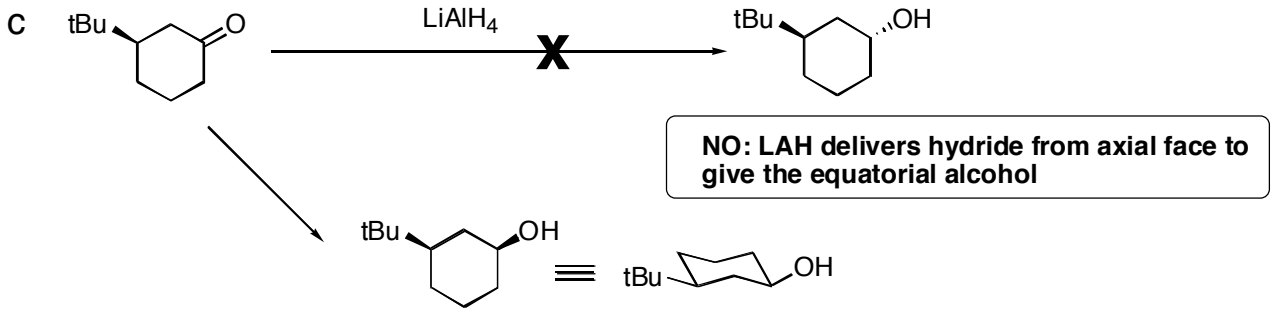
b



Also formed

NO: would give a mixture of C and O alkylation

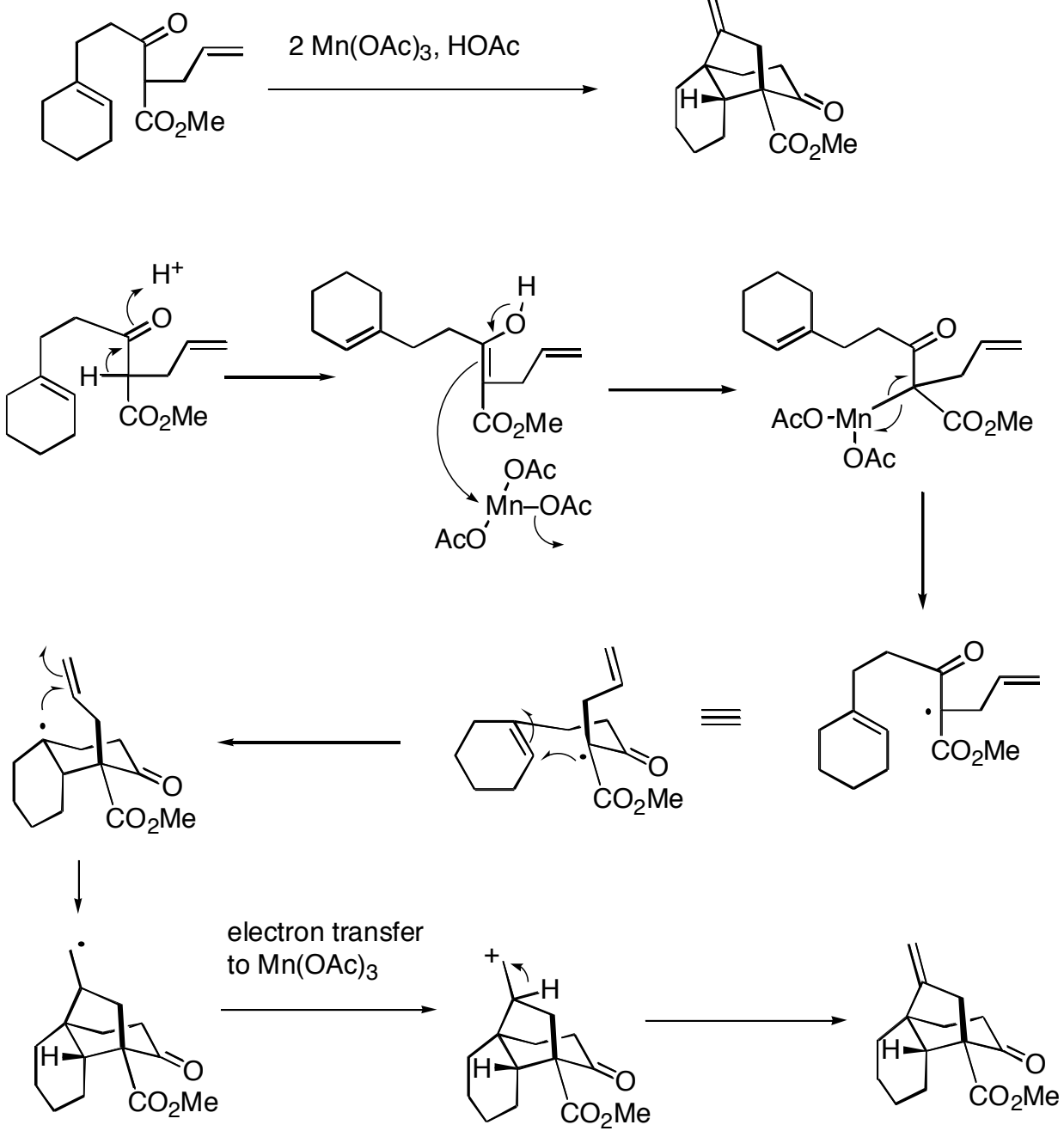
c



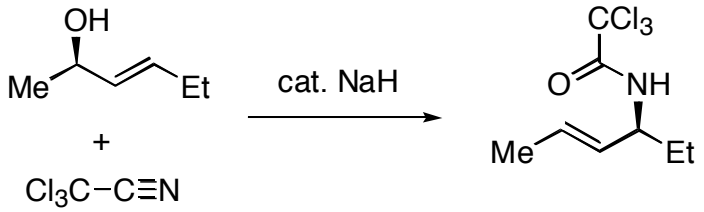
NO: LAH delivers hydride from axial face to give the equatorial alcohol

3. Provide a detailed arrow pushing mechanism

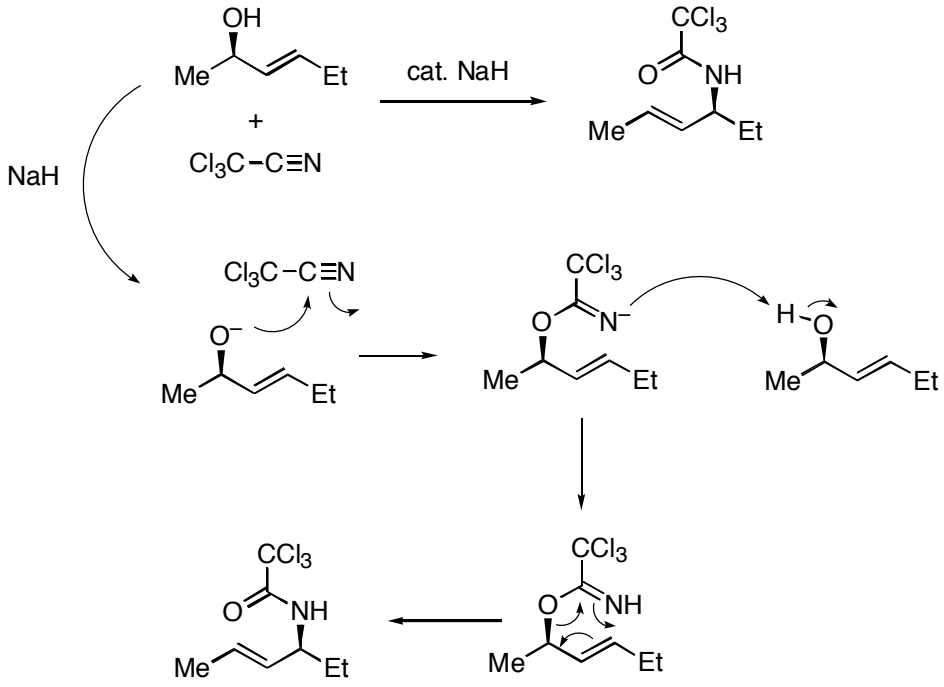
15 points



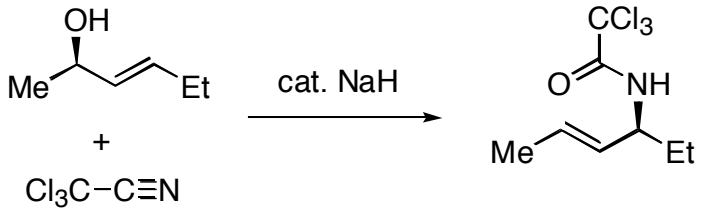
4. This question has two parts, both of which deal with the reaction below:



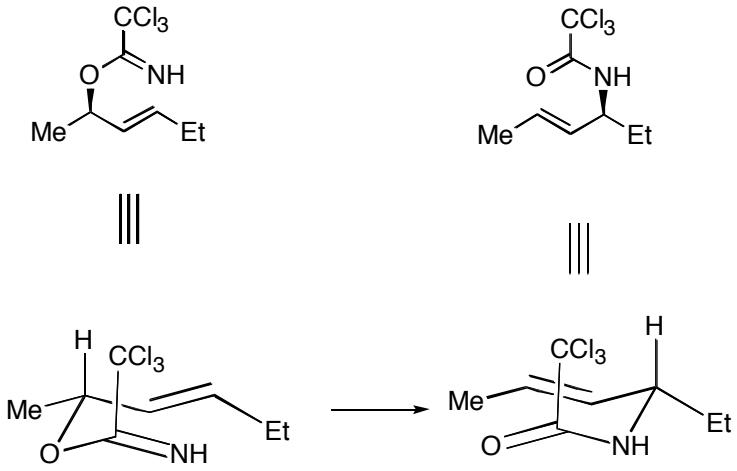
a. Provide an arrow pushing mechanism for the reaction above. For this part of the problem, it is not necessary to explain the stereochemical aspects of the reaction. Just push the arrows and show how the final product is formed. (10 points)



4. This question has two parts, both of which deal with the reaction below:



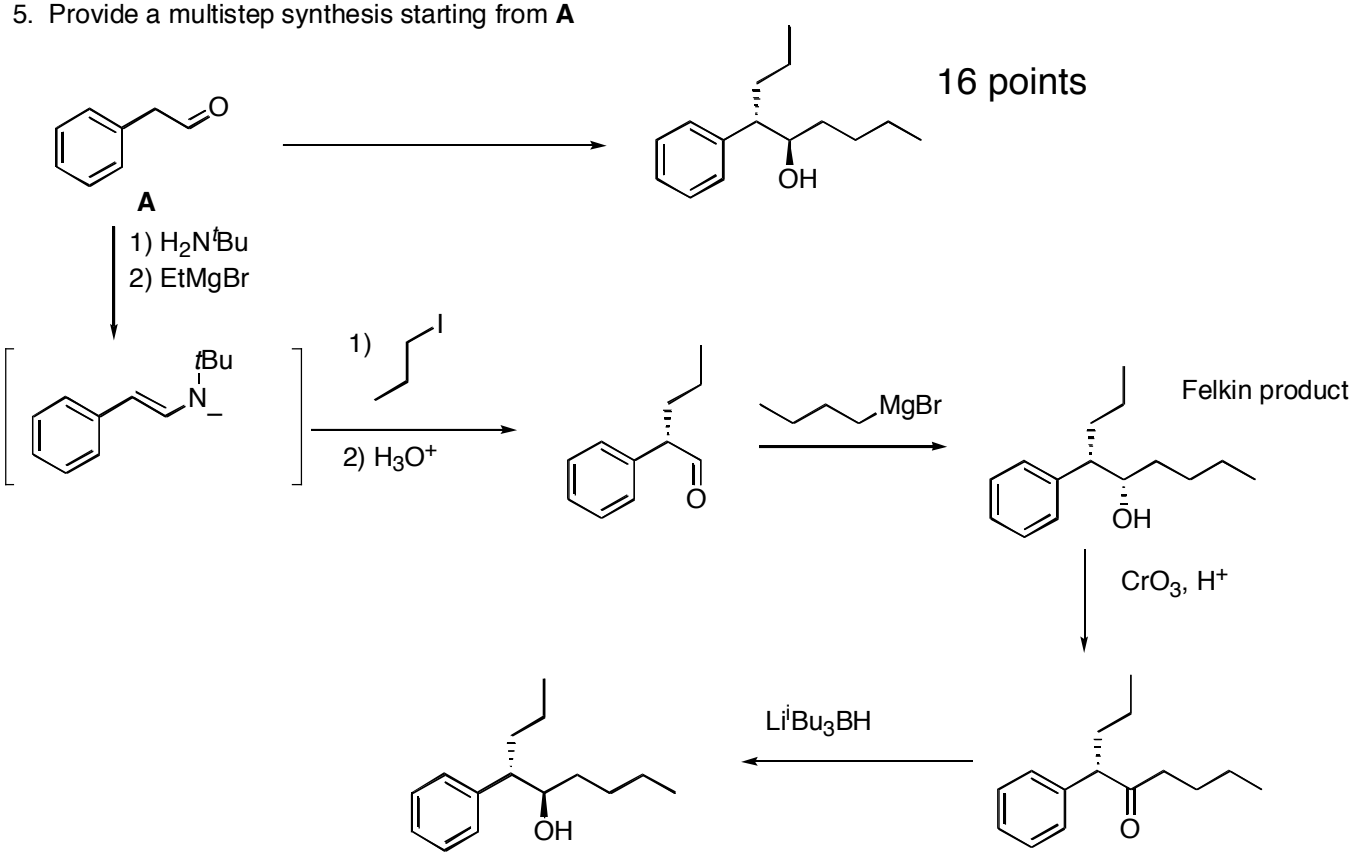
b. Provide a detailed model with explains all of the stereochemical aspects (stereocenters and alkene stereochemistry). (10 points)



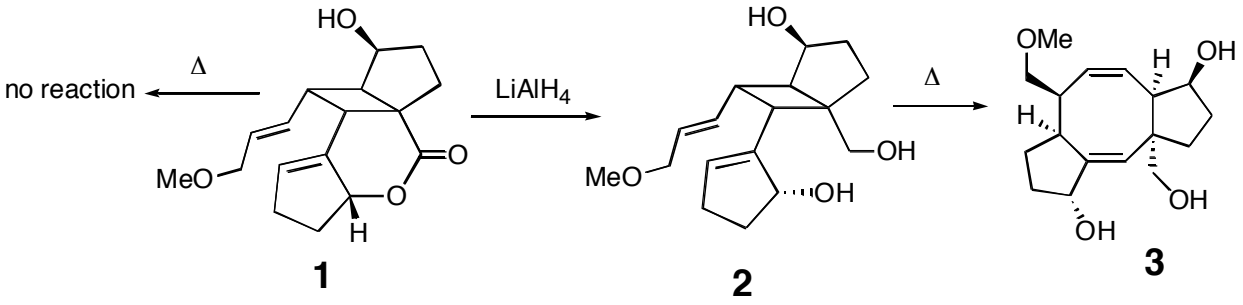
Claisen via Chair TS

5. Provide a multistep synthesis starting from **A**

16 points

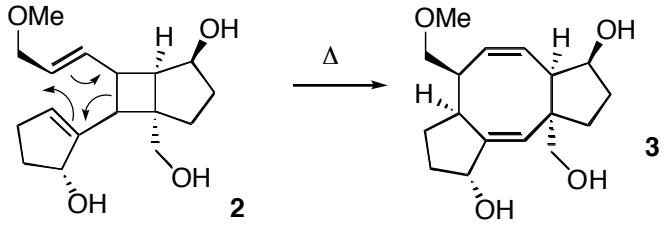


6. Compound **1** does not react when heated. However, reduction of the lactone gives **2**, which rearranges to **3** upon heating.



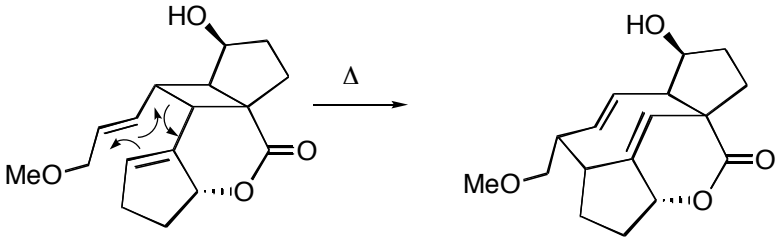
1 **2** **3**

a) provide an arrow pushing mechanism



2 **3**

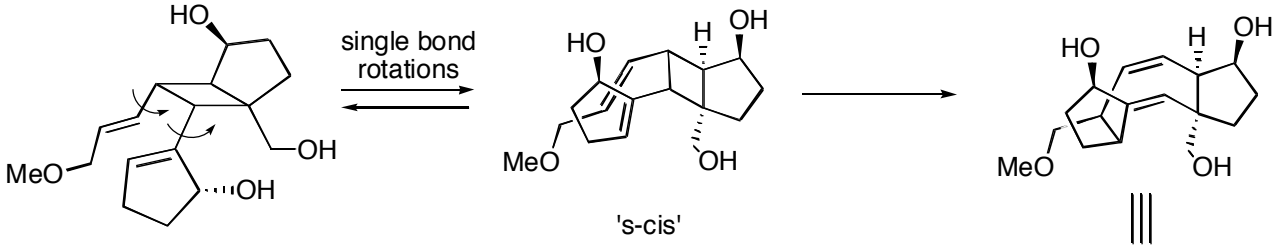
b) provide a stereochemical model that explains why **1** does NOT undergo a Cope rearrangment.



1

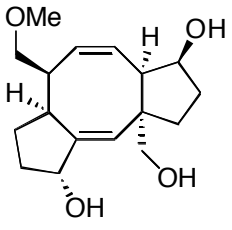
Cope rearrangement of **1** would produce a cyclic molecule with two trans-bonds. The product would be excessively strained. Because of the lactone constraint, **1** cannot adopt a conformation that would lead to cis double bonds

c) provide a model that explains the stereospecificity in the formation of **3**.



2

Compound **2** can rotate single bonds to adopt a 'single bond cis' conformation, which can undergo the Cope rearrangement to produce cis-single bonds.



3