

UNIVERSITY OF WINDSOR
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

Chemistry 59-331/333
Final Examination

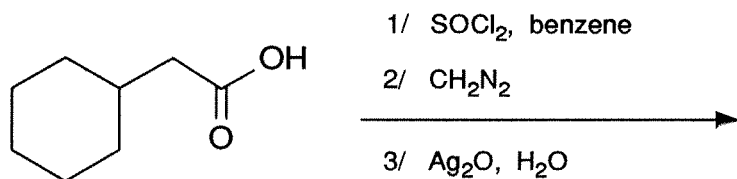
Apr. 24, 1991
Time: 3 hours

Answer all questions in the exam booklet

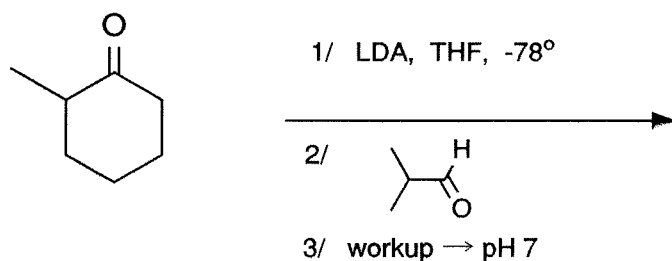
1. Do any ten (10)

Indicate the structure of the expected major product from each of the following reactions. Mechanisms are not necessary, but showing your work is likely to be a help. Include product stereochemistry where it applies (Total 30 marks).

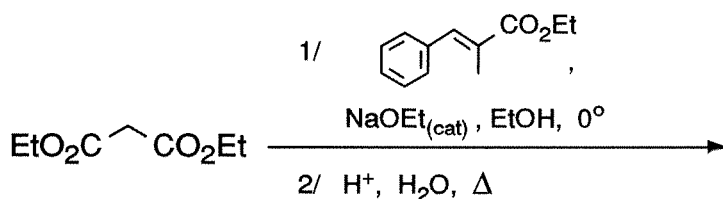
a)



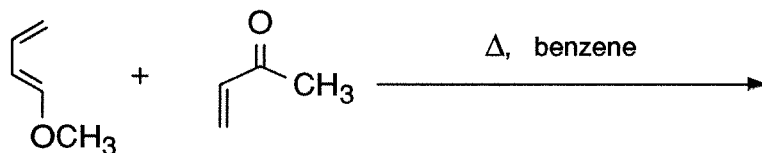
b)



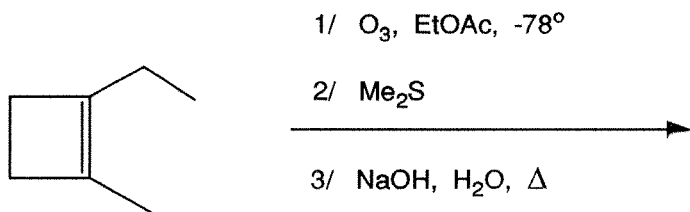
c)



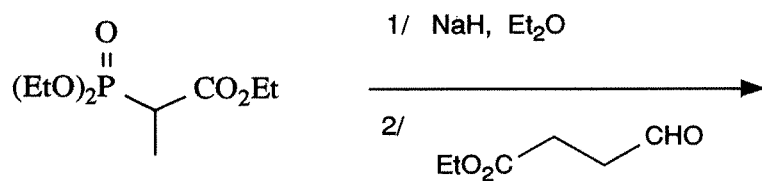
d)



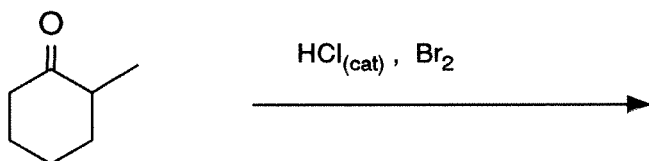
e)



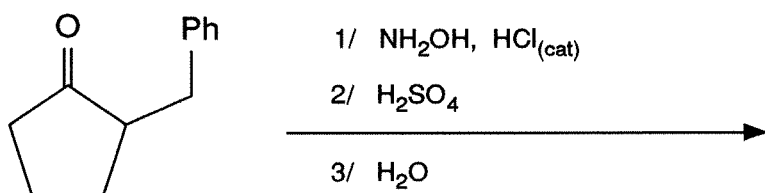
f)



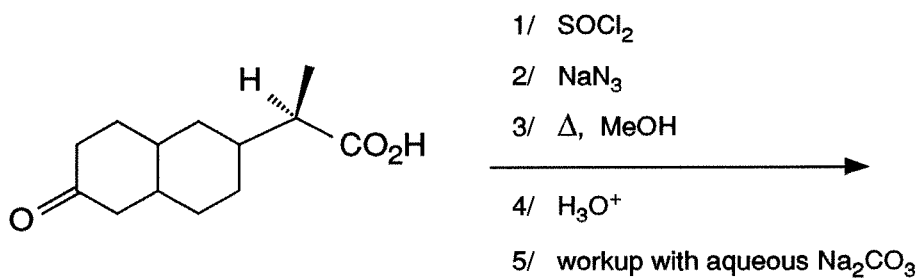
g)



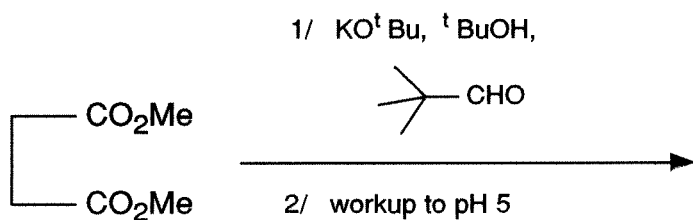
h)



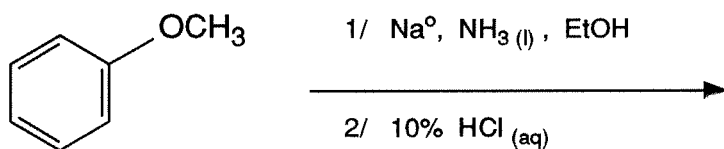
i)



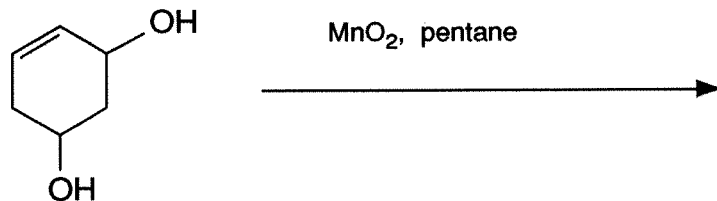
j)



k)

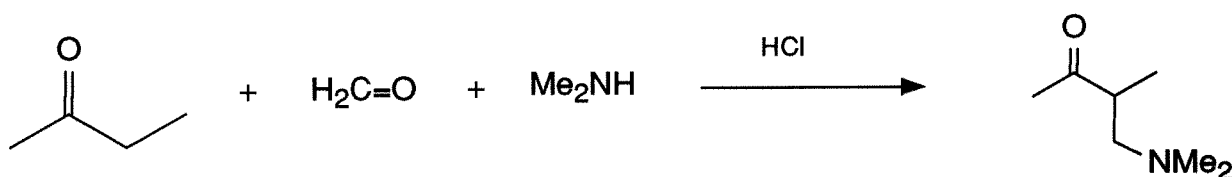


1)



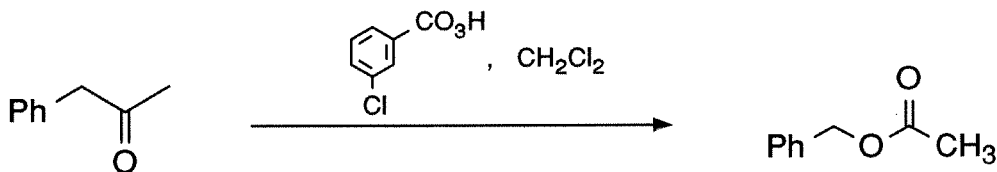
2. (Total 20 marks)

a) Draw the complete mechanism for the acid catalyzed Mannich reaction between 2-butanone, formaldehyde, and dimethylamine. The answer should also indicate why the drawn regioisomer is the major one.

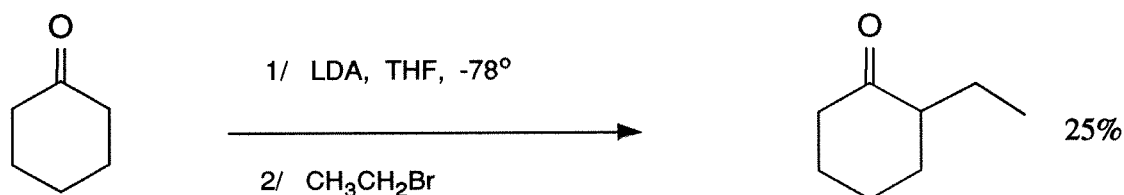


b) Do i) or ii), but not both

i) Draw a plausible mechanism for the following Baeyer Villager oxidation:



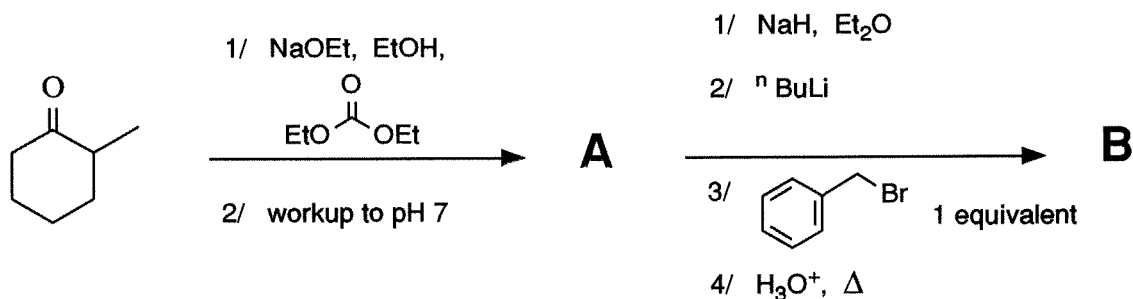
ii) The following alkylation reaction yielded the intended product in disappointingly low yield. Also isolated from the reaction mixture was a molecule with the molecular formula $\text{C}_6\text{H}_{10}\text{O}$, two compounds with $\text{C}_{10}\text{H}_{18}\text{O}$, and one each with $\text{C}_{12}\text{H}_{22}\text{O}$ and $\text{C}_{14}\text{H}_{26}\text{O}$. Show by "mechanism" exactly what went wrong with the alkylation.



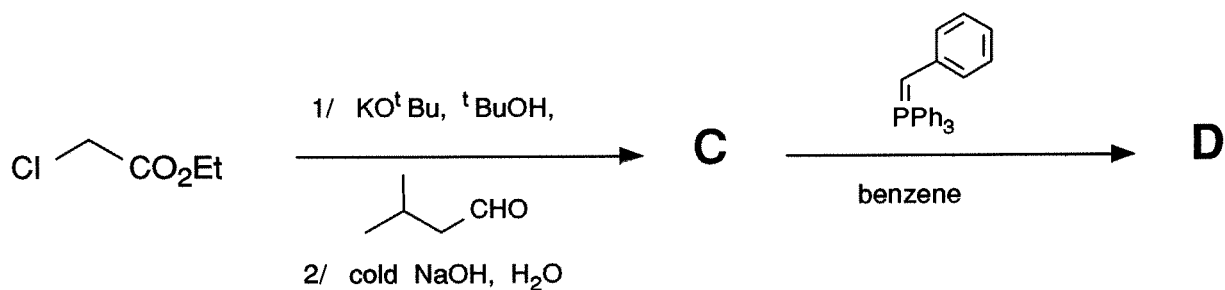
3. Do any 8 (eight) of the letter compounds

Give the expected compounds corresponding to the letters below. Include any stereochemistry where it applies. (Total 32 marks)

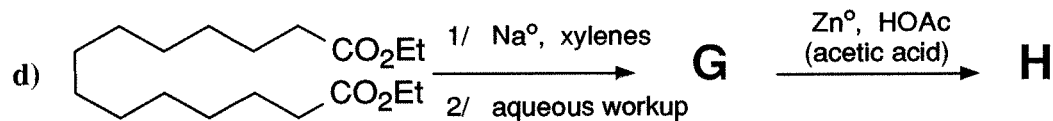
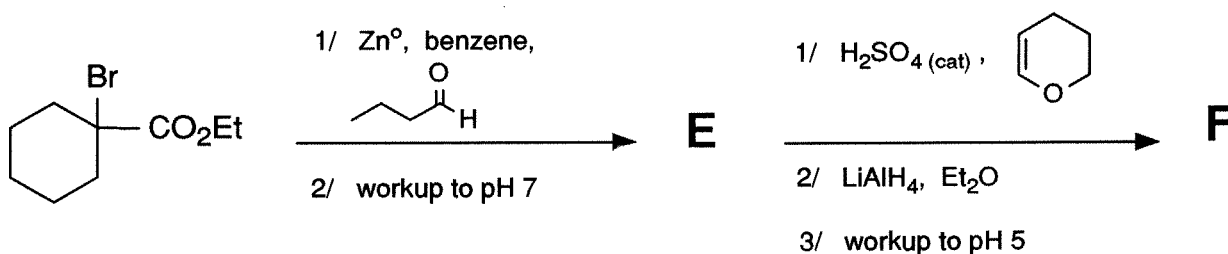
a)



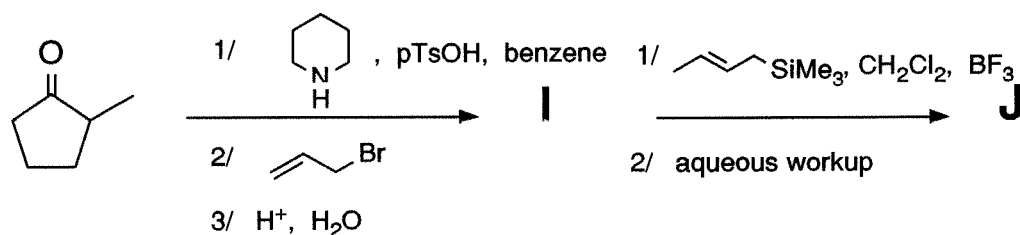
b)



c)

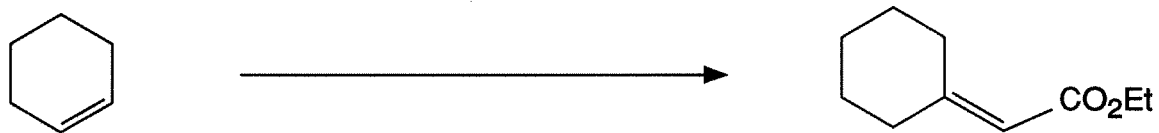


e)

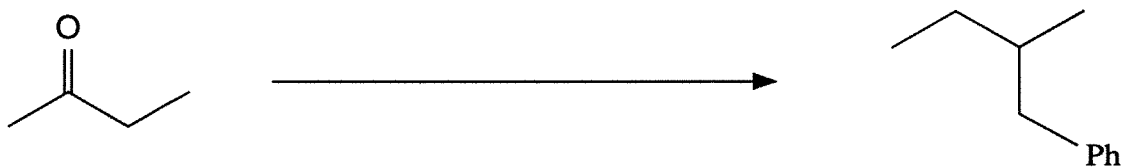


4. Show by equation how you could prepare the products illustrated below from the given starting material. You may use any other reagents you deem fit. Show all reagents, conditions, and isolable intermediates. Mechanisms are not necessary, but may be a help. (Total 48 marks)
Do any eight (8)

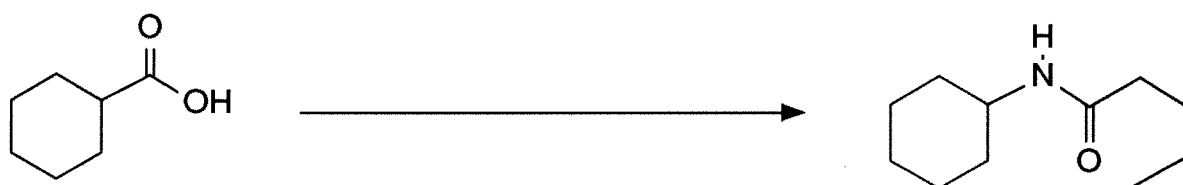
a)



b)



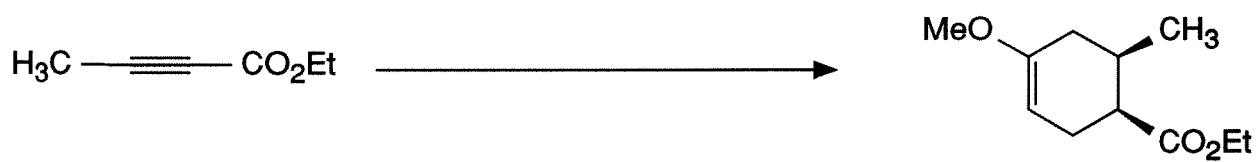
c)



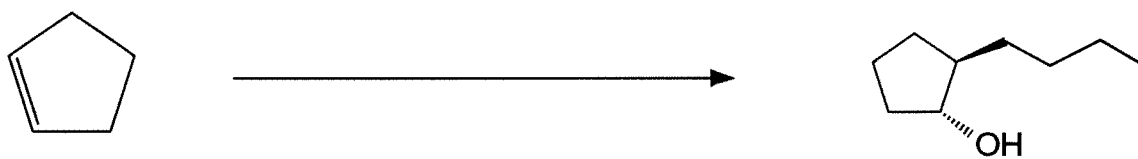
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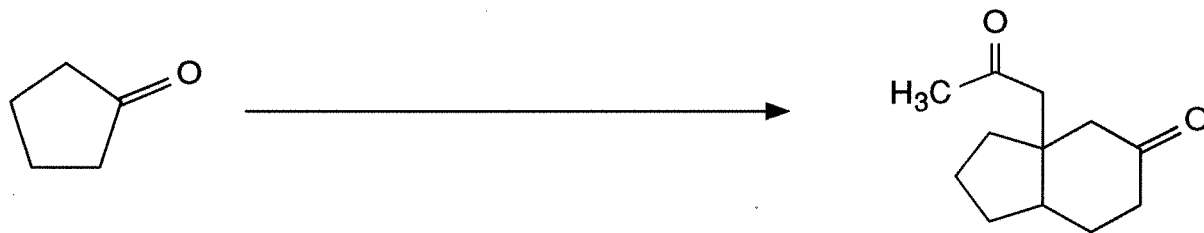
e)



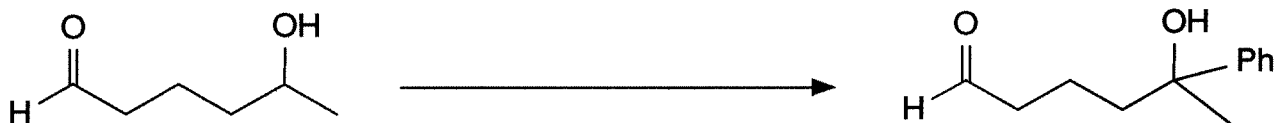
f)



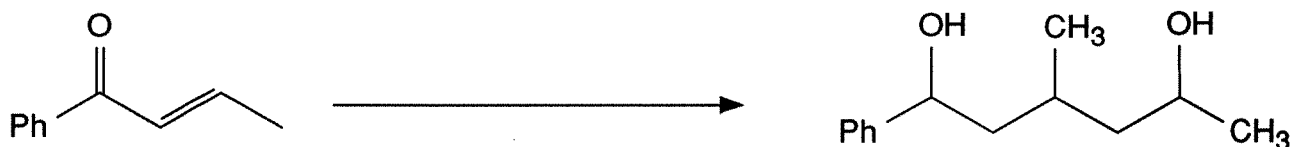
g)



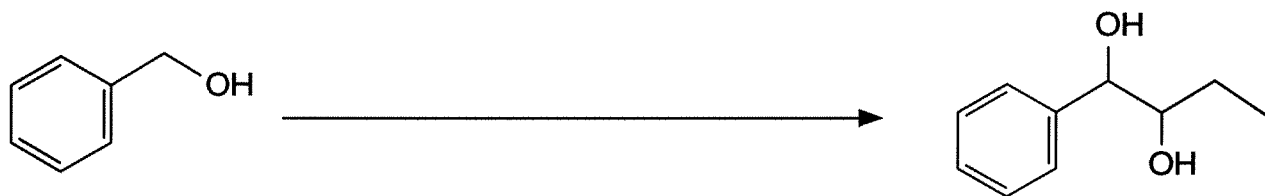
h)



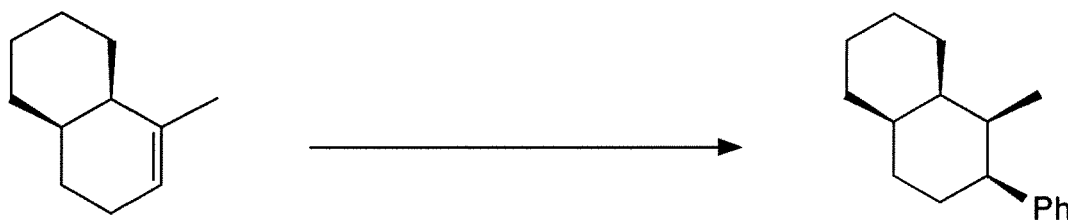
i)



j)

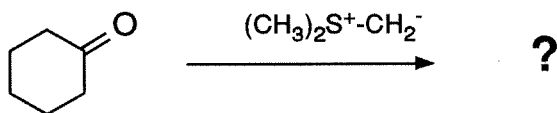


k)



Bonus (up to 10 marks):

i) Sulphur ylides are very closely related to phosphorus ylides. Like phosphorus ylides, they react with carbonyl compounds; unlike phosphorus ylides, the product of such a reaction is not an alkene, but rather another functional group with which you have dealt in this course. Keeping in mind that the reactivity of sulphur ylides is somewhat like those of phosphorus, predict the product of...



ii) You have seen only the tip of the iceberg with respect to the chemistry of carbenes. Based on what you have been taught about them, speculate on the product of the following reaction.

