

UNIVERSITY OF WINDSOR
CHEMISTRY AND BIOCHEMISTRY

Chemistry 59-331/333
Final Examination

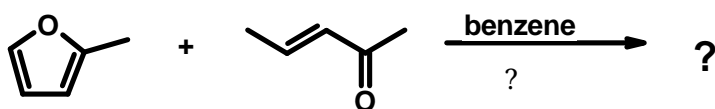
Apr. 22, 2002
Time: 3 hours

Answer all questions in the exam booklet

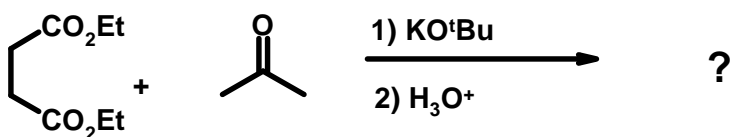
1. Do any eight (8). Total 40 marks

Indicate the structure of the expected major product from each of the following transformations. Mechanisms are not necessary, but showing your work may be a help. Include product stereochemistry where it applies.

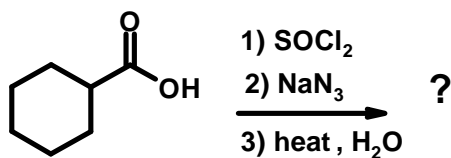
a)



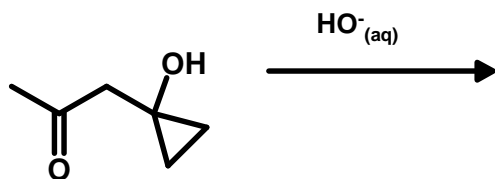
b)



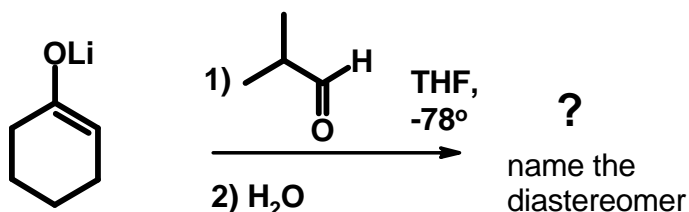
c)



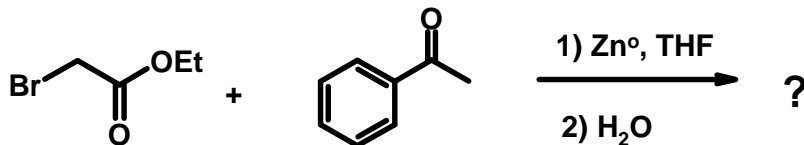
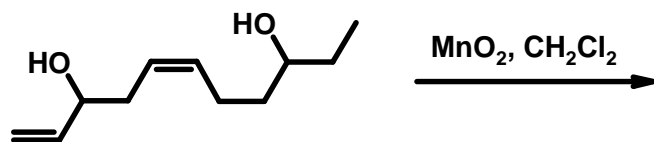
d)



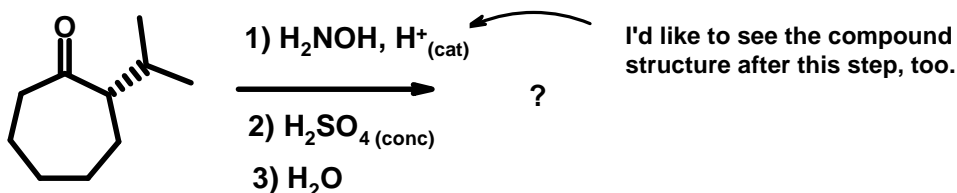
e)



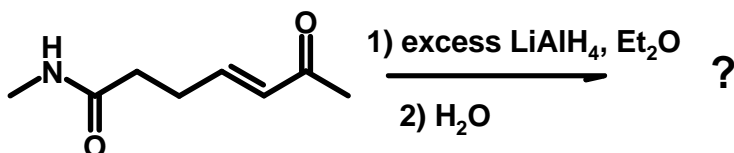
f)



h)

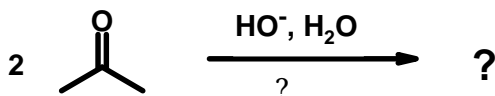


i)



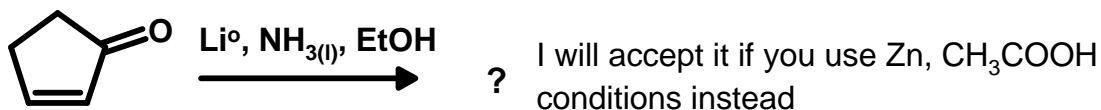
2. Total 20 marks

a) Draw the complete mechanism for the aldol condensation between two molecules of acetone. The complete answer will show any small molecules which 'come off' during the reaction, the appropriate intermediates and final product, and whether each step is reversible or irreversible.

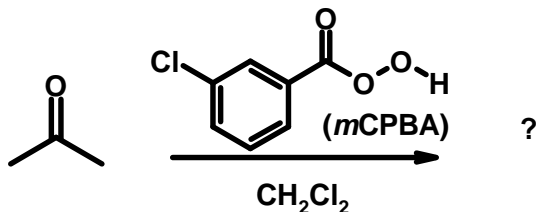


b) Do i) or ii), but not both

i) Show the complete mechanism for the dissolving metal reduction of cyclopentenone. The stoichiometry of reaction is not implied by what is shown below; it should be apparent from your answer.

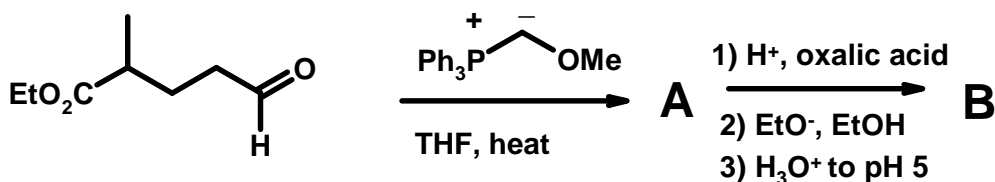


ii) Show the complete mechanism for the Baeyer-Villiger rearrangement of acetone.

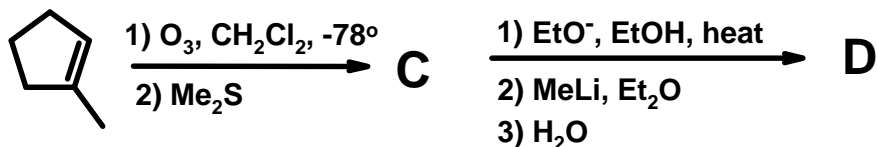


3. Do any five (5) of the questions (a-f).

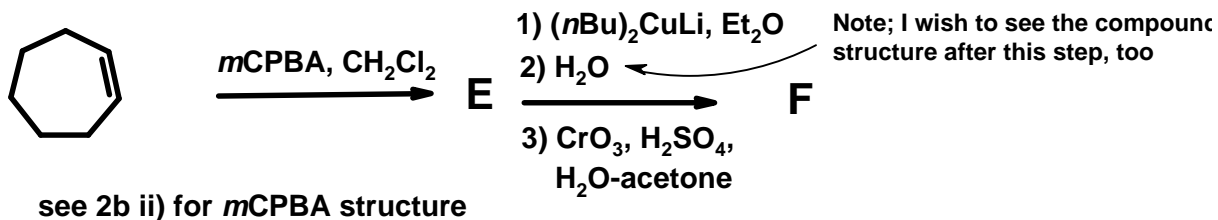
a)



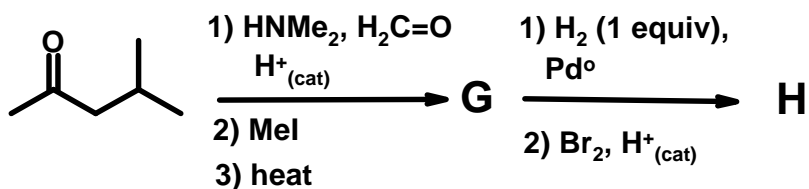
b)



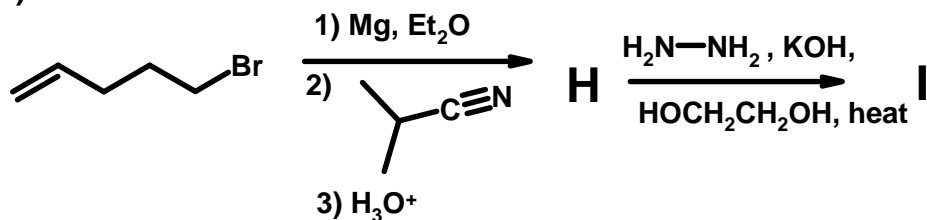
c)



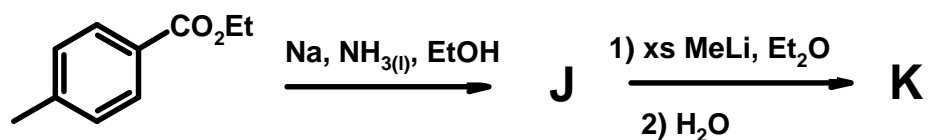
d)



e)



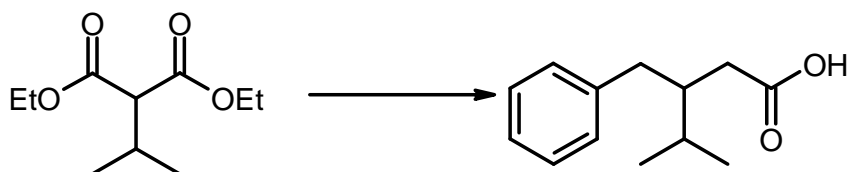
f)



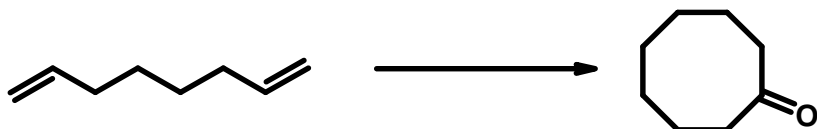
4. Do any seven (7). Total 70 marks

Show by equation how you would prepare the illustrated compounds 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 showing your work may be a help.

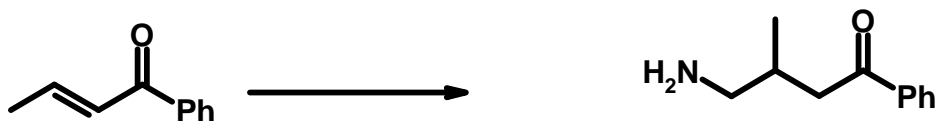
a)



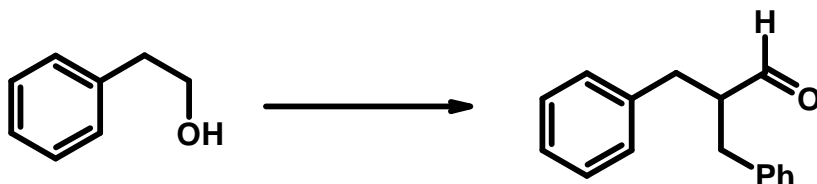
b)



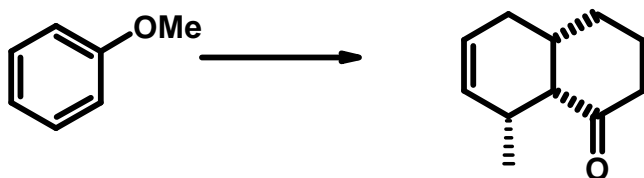
c)



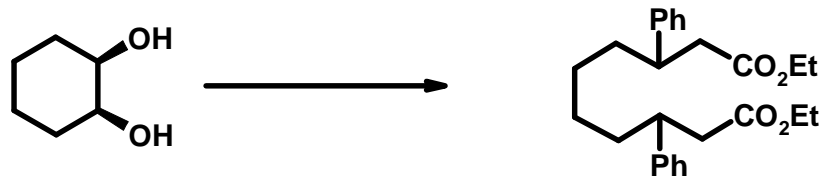
d)



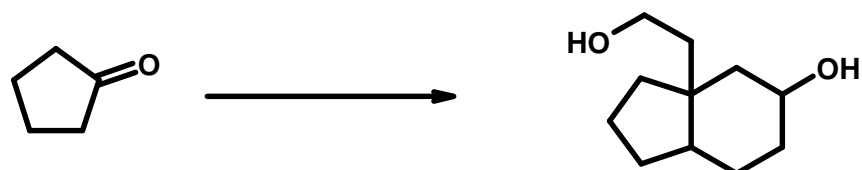
e)



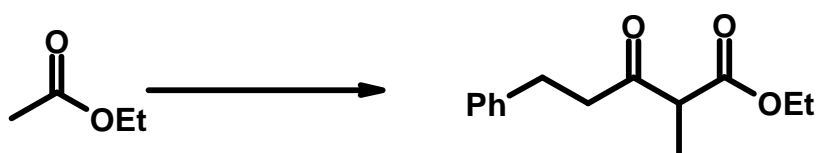
f)



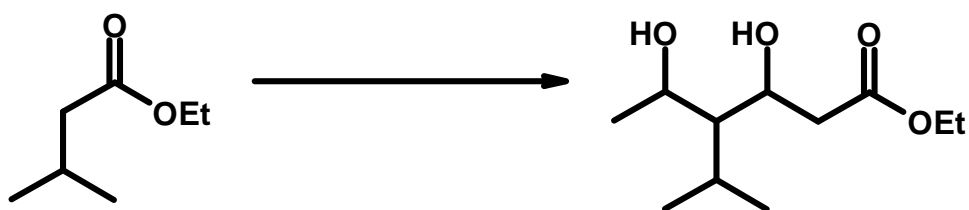
g)



h)

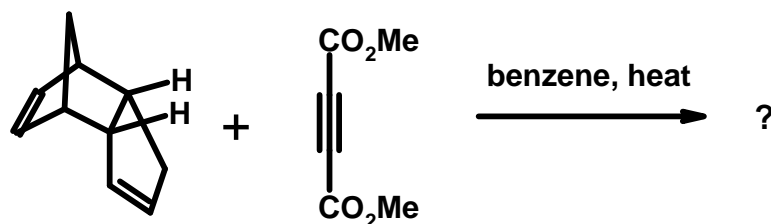


i)



Bonus:

i) Predict the outcome of the following reaction.



ii) You have just seen the tip of the chemistry of diazoalkanes. Another very heavily used reaction is to esterify carboxylic acids. Looks simple overall, but what's the mechanism???

