

UNIVERSITY OF WINDSOR
SCHOOL OF PHYSICAL SCIENCES
CHEMISTRY AND BIOCHEMISTRY

Chemistry 59-331/333
Final Examination

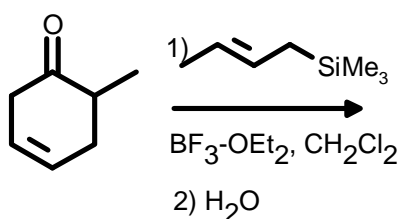
Apr. 20, 1998
Time: 3 hours

Answer all questions in the exam booklet.

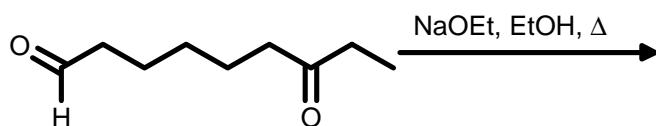
1. Do any eight (8)

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. Indicate product stereochemistry where it applies. (Total 40 marks)

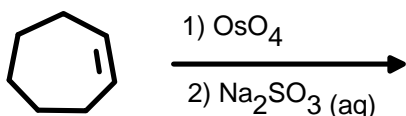
a)



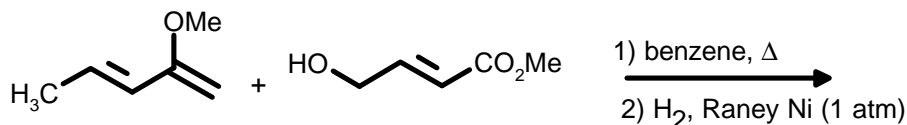
b)



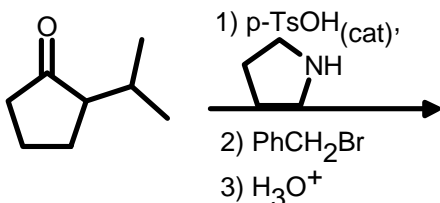
c)



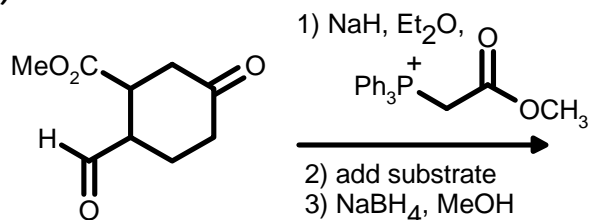
d)



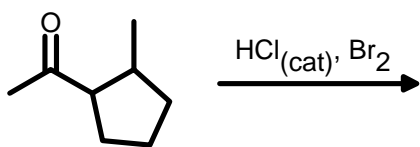
e)



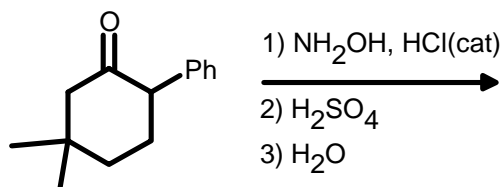
f)



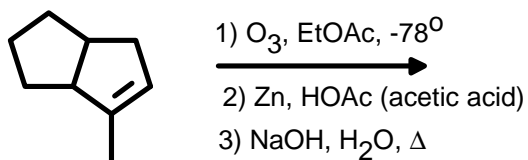
g)



h)

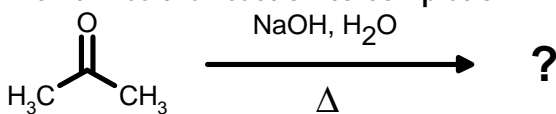


i)

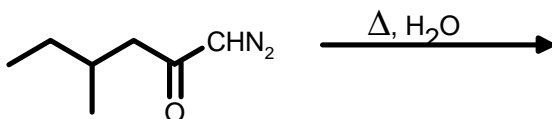


2. (Total 20 marks)

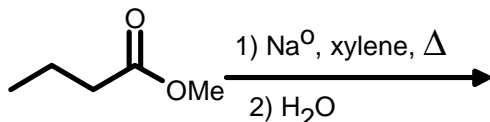
a) Draw the complete mechanism for the aldol condensation between two molecules of acetone. The complete answer will show any small molecules coming off, and indicate the step which drives the reaction to completion.

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

i) Draw the mechanism for the following Wolff rearrangement (part of the Baeyer-Villiger). The complete answer will show the two resonance forms of the diazo ketone (rather than just CHN_2).

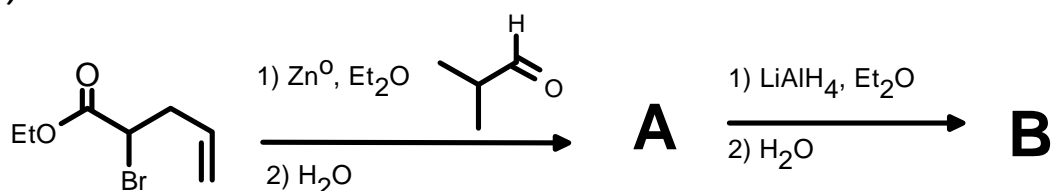


ii) Draw the mechanism for the acyloin condensation between two molecules of methyl butanoate.

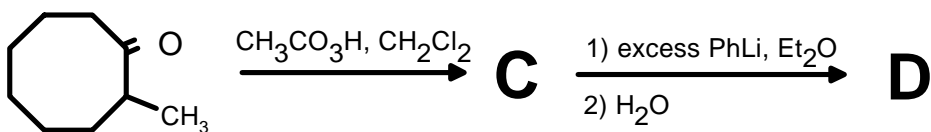


3. Do any 5 of the question parts, accounting for 10 compound letters. Give the expected compounds corresponding to the letters below. Indicate stereochemistry where it applies. Mechanisms are not necessary. (Total 50 marks)

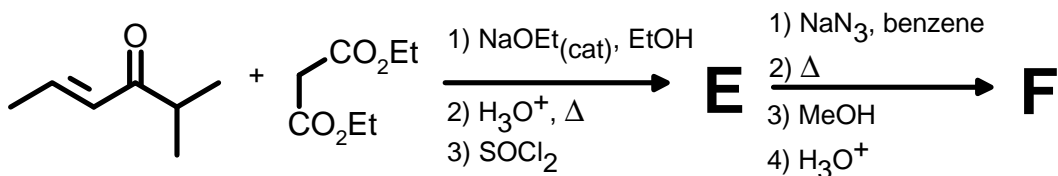
a)



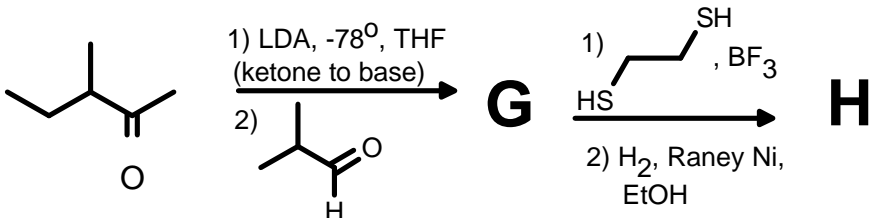
b)



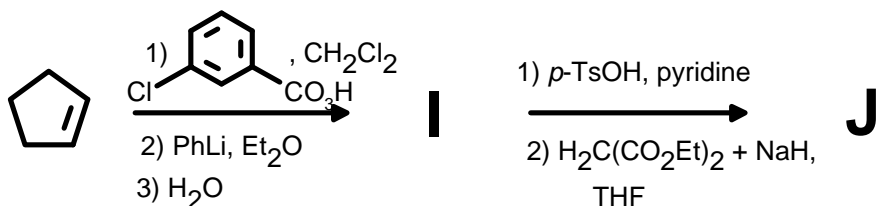
c)



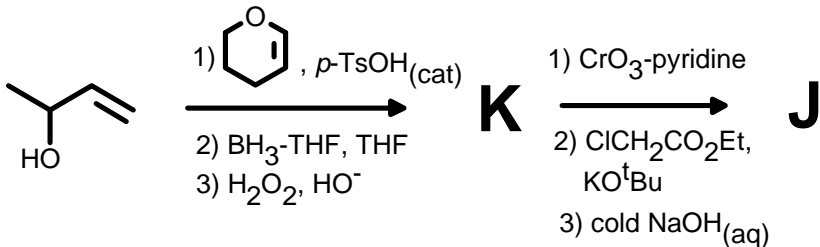
d)



e)



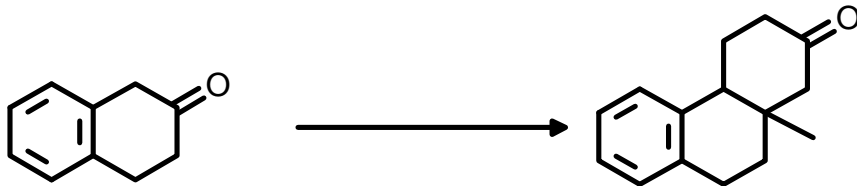
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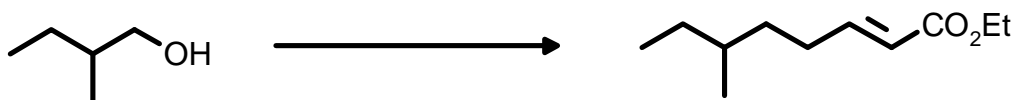
4. Do any seven (7) of the following

Show by equation how you would prepare the illustrated below from the given starting material. You may use any other reagents which you deem fit. Show all reagents, conditions, and isolable intermediates. Mechanisms are not necessary, but may be a help. (Total 70 marks)

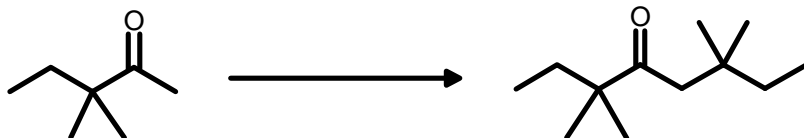
a)



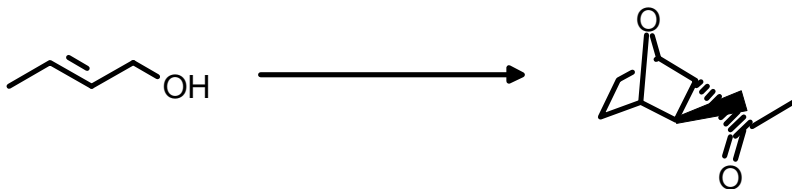
b)



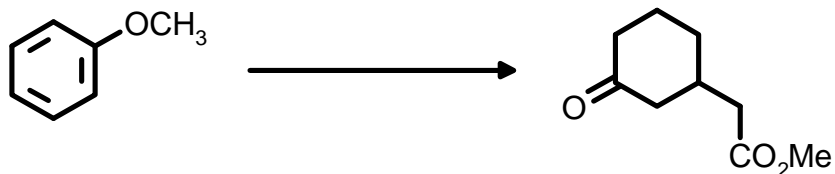
c)



d)



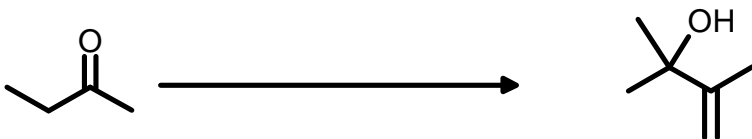
e)



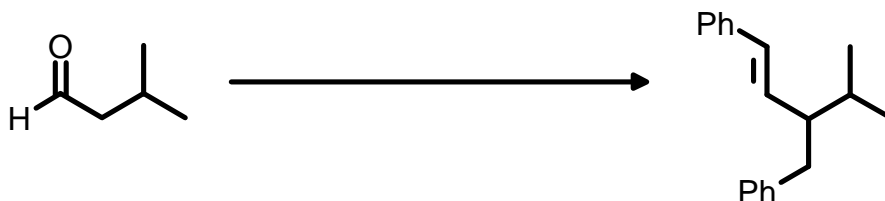
f)



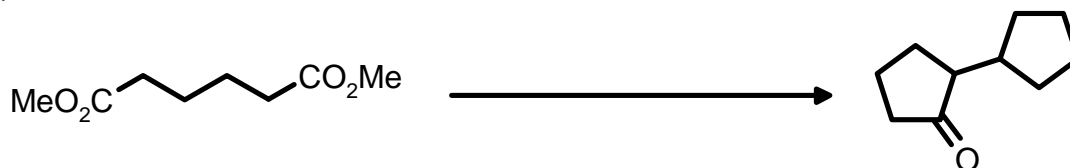
g)



h)

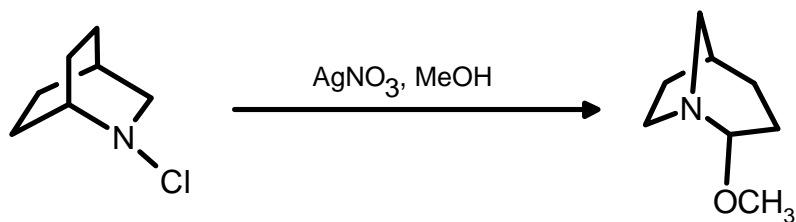


i)

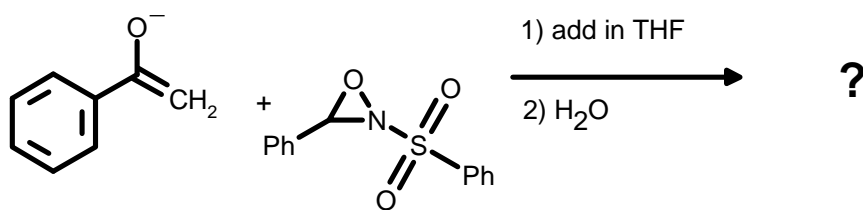


Bonus: (up to 10 marks):

a) Treatment of the many chloramines with silver cation give rearrangement of the carbon framework. An example is given below. Suggest a reasonable mechanisms for the Stieglitz rearrangement.



b) Incorporation of a hydroxyl function next to a ketone is not an easy process, because synthetic equivalents of " HO^+ " are not easily available. One of the best solutions are the 2-sulphonyloxaziridines, developed by Franklin Davis (Drexel University). Postulate how the reaction of an enolate with these reagents occurs.



Davis, Franklin A. ; Vishwakarma, L C.; Billmers, J. G. ; Finn, J. *J. Org. Chem.* **1984**, *49*, 3241.