UNIVERSITY OF WINDSOR
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

Chemistry 59-331/333
Final Examination

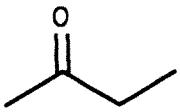
May 2, 1990
Time: 3 hours

Answer all questions in the exam booklet

1. <u>Do any ten (10)</u>

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).

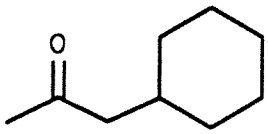
a)

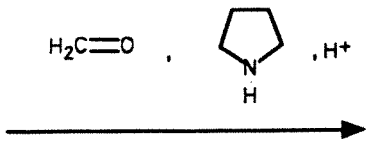


1. 1.1 eq LDA, −78°C, THF
   (add ketone to LDA)
2. $(CH_3)_3SiCl$

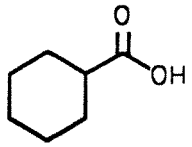
3. PhCHO, BF_3–OEt_2, CH_2Cl_2
4. workup to pH7

b)





c)

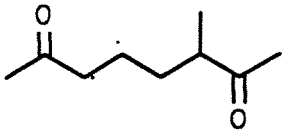


1. $SOCl_2$, benzene

2. CH_2N_2

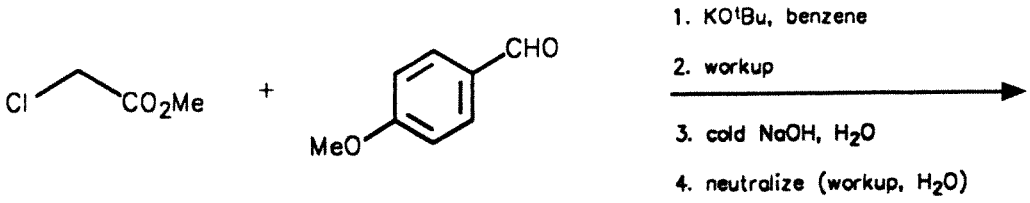
3. Ag_2O, H_2O

d)

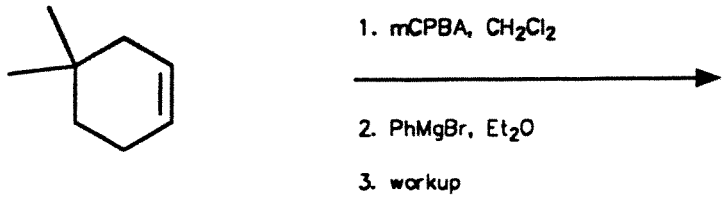


NaOEt, EtOH, reflux

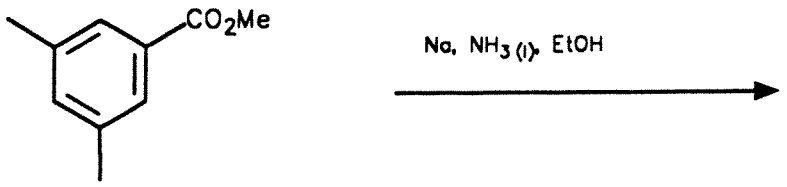
e)


Cl
CO2Me
+
CHO
MeO
1. KOtBu, benzene
2. workup
3. cold NaOH, H2O
4. neutralize (workup, H2O)

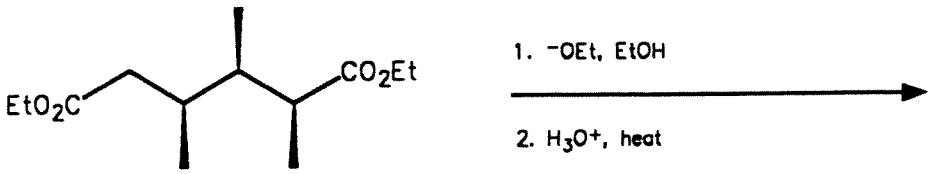
f)


1. mCPBA, CH2Cl2
2. PhMgBr, Et2O
3. workup

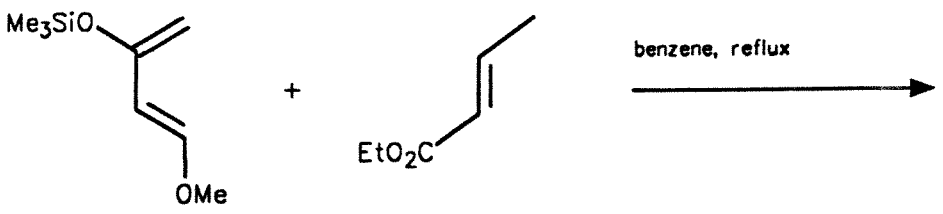
g)


CO2Me
Na, NH3 (l), EtOH

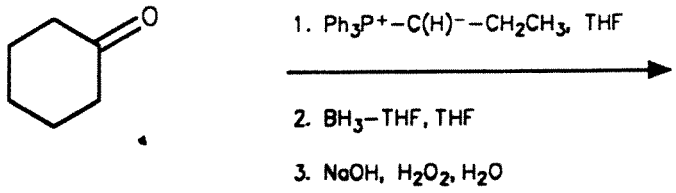
h)


EtO2C
CO2Et
1. −OEt, EtOH
2. H3O+, heat

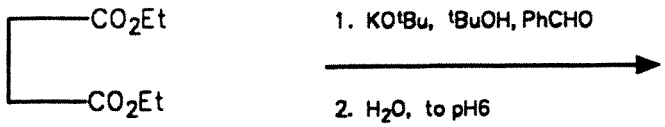
i)


Me3SiO
OMe
+
EtO2C
benzene, reflux

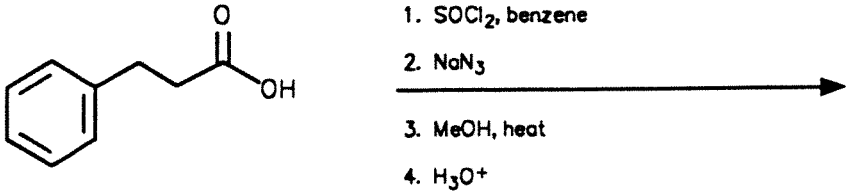
j)



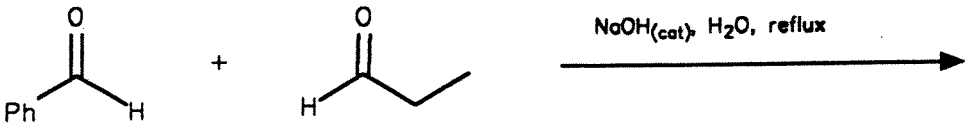
k)



l)

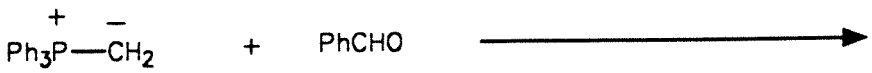


2.
a) Draw the complete mechanism for the base catalyzed aldol condensation of benzaldehyde and propanal. Indicate which steps are (practically speaking) irreversible. (Total 20 marks)

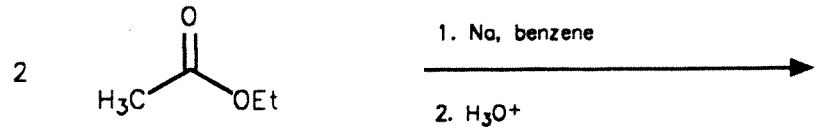


b) <u>Do i) or ii), but not both</u>

i) Draw a <u>plausible</u> mechanism for the following reaction.



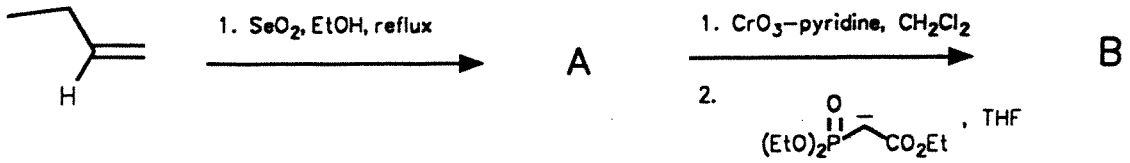
ii) Draw the mechanism of the acyloin condensation between two molecules of ethyl acetate.



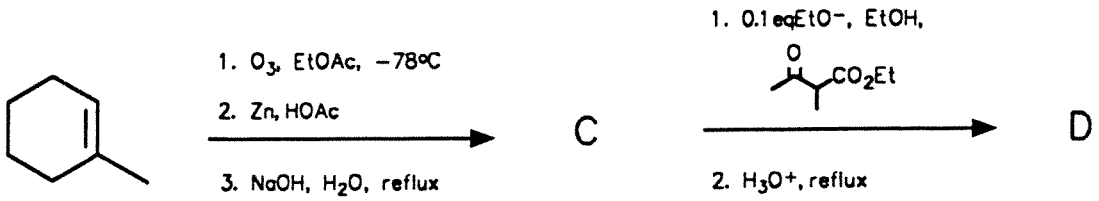
3. Do any 4 (four) of a) - e)

Give the expected compounds corresponding to the letters below. Include any stereochemistry where it applies. (Total 40 marks)

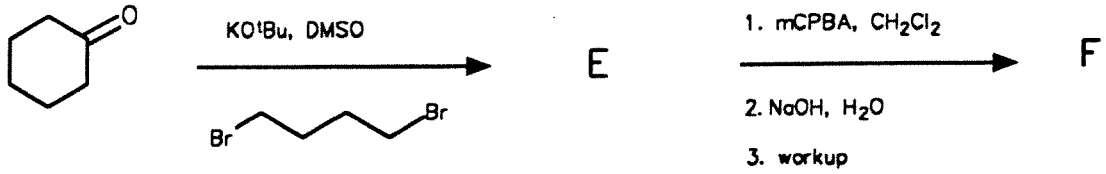
a)



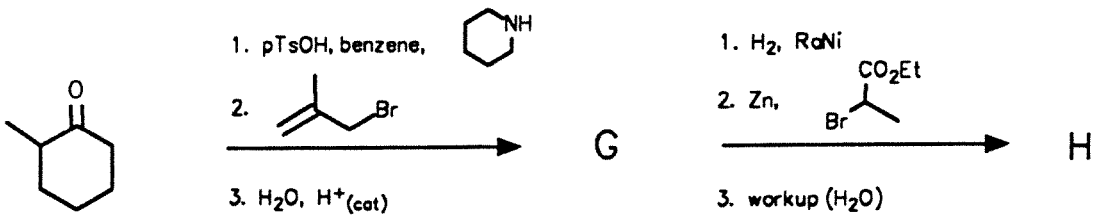
b)



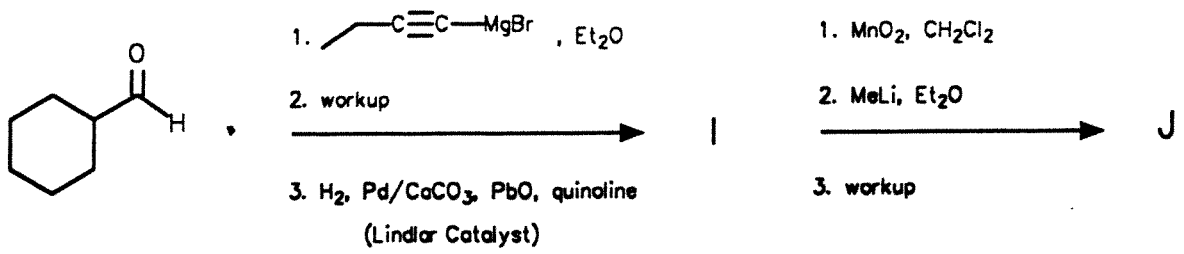
c)



d)

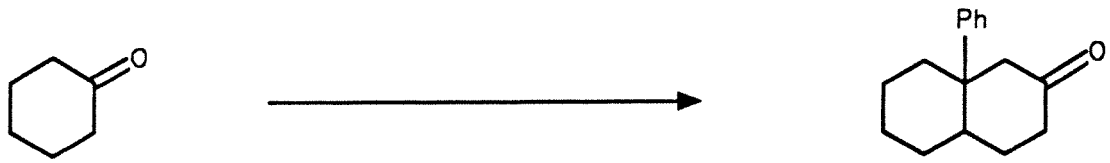


e)



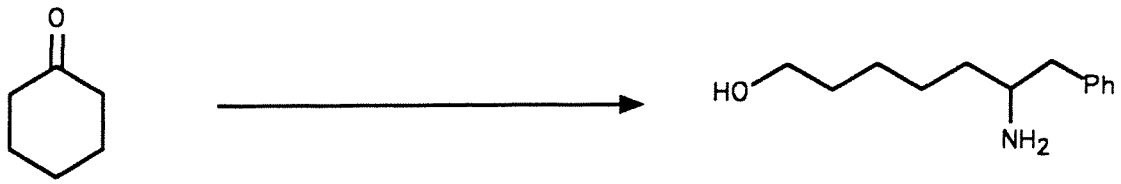
4. Show by equation how you could prepare the products illustrated below from the given starting material. You may use any other reagents you deem fit. Show all reagents, conditions, and isolable intermediates. Mechanisms are not necessary, but may be a help.(Total 50 marks) <u>Do any ten (10)</u>

a)

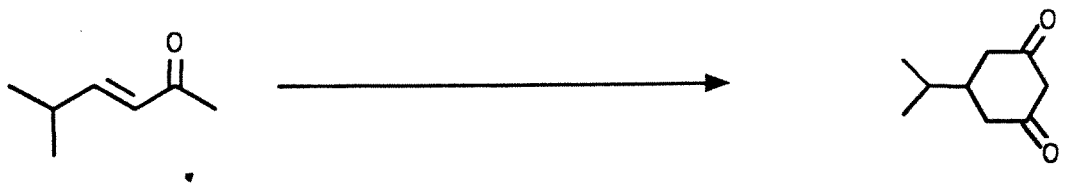


b)

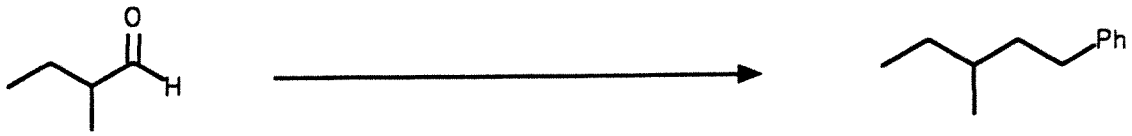
c)



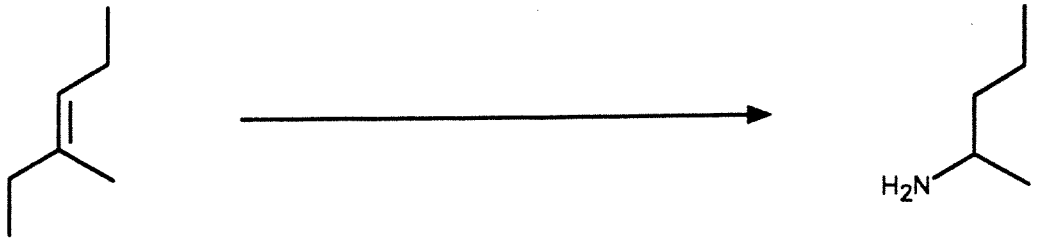
d)



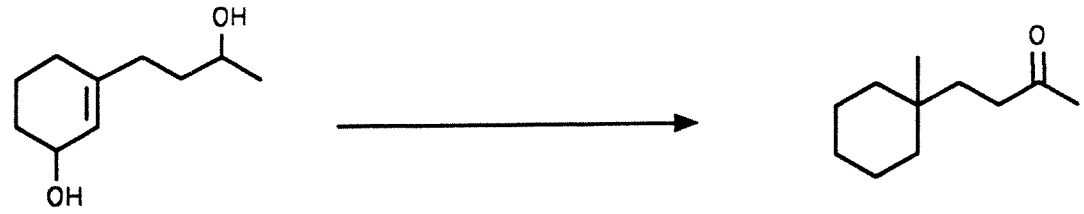
e)



f)



g)



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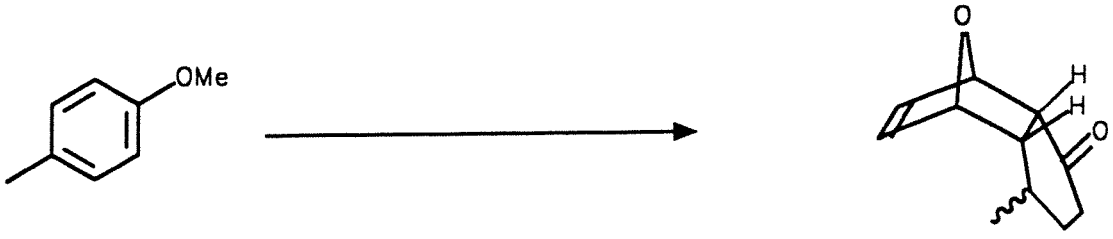
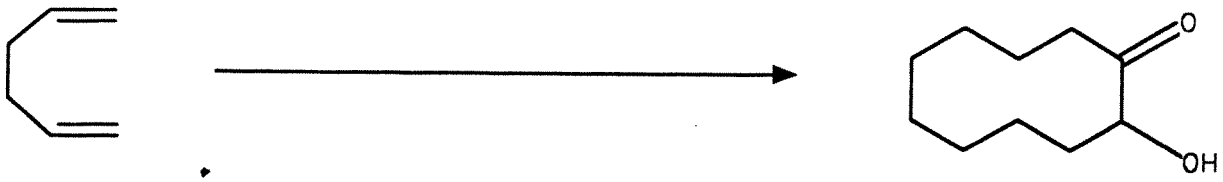


i)



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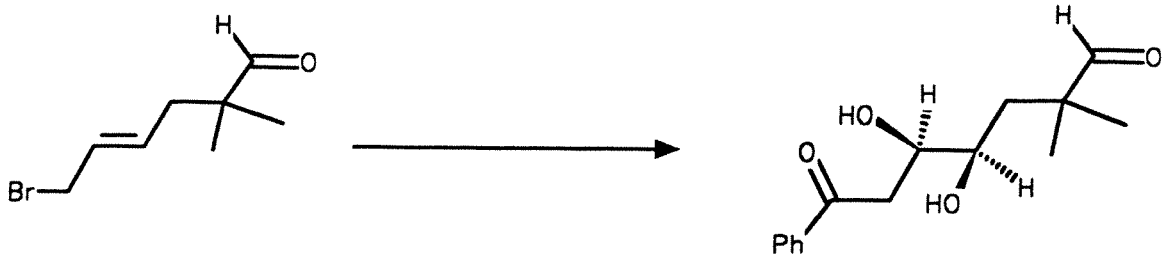
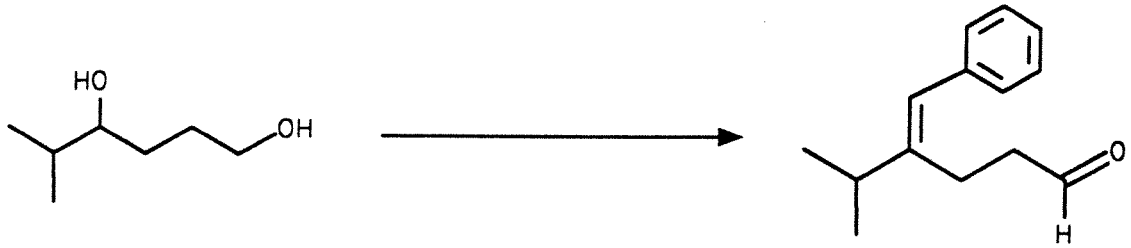


k)



l)