CH 310N
Fall 2006
Anslyn

December 13th, 2006
Final Exam

Please **PRINT** the first three letters of your last name in the three boxes.

PRINT Name_____ **UT-EID**_____

1) _____ (5 pts)

2) _____ (18 pts)

3) _____ (12 pts)

4) _____ (4 pts)

5) _____ (8 pts)

6) _____ (5 pts)

7) _____ (5 pts)

8) _____ (5 pts)

9) _____ (8 pts)

10) _____ (10 pts)

11) _____ (10 pts)

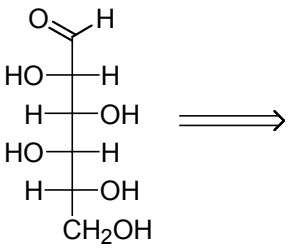
12) _____ (10 pts)

Total score _____ (100pts)

1)

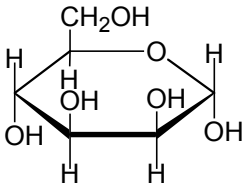
a)

Draw the Haworth projection of the sugar below in the box provided.



b)

Draw the Fischer Projection of the below structure in the box provided.



c)

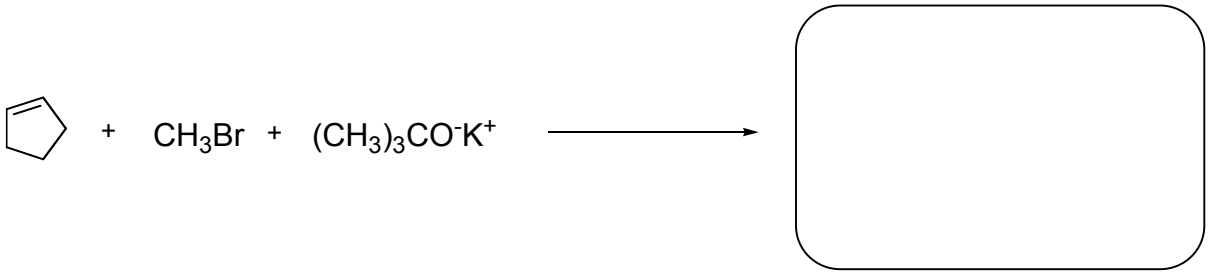
Draw the Fischer Projection of Glucose

Draw the alpha pyranose form of glucose

Draw the beta furanose form of glucose

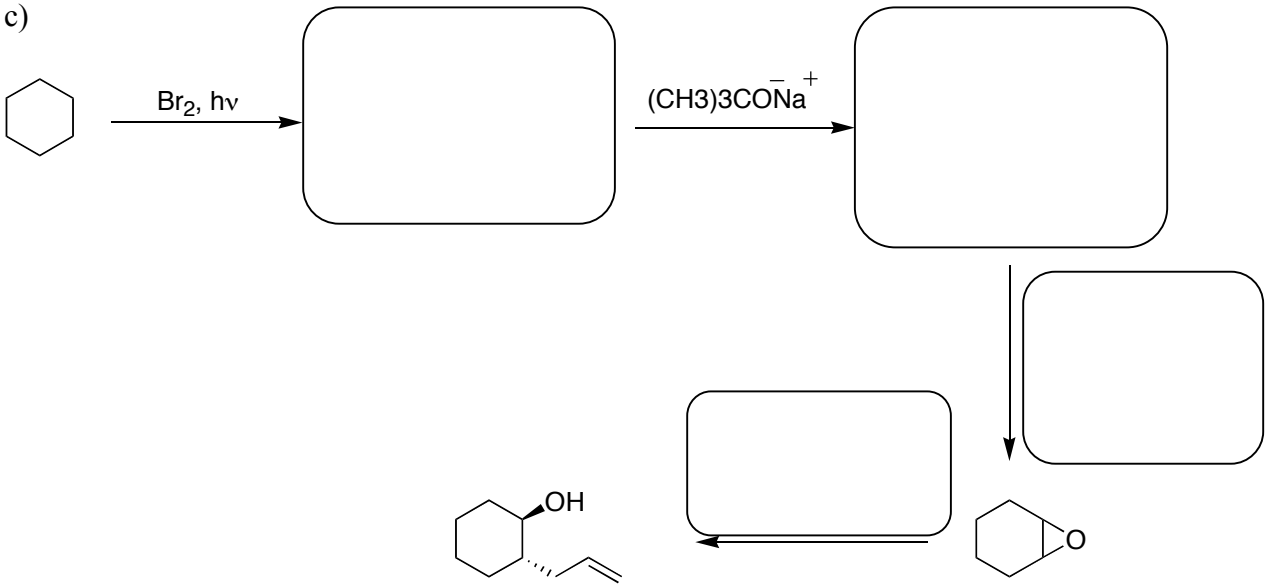
2) Fill in the geometric shapes with the correct reactants, products, or reagents necessary.

a) From homework, problem 15.12 c

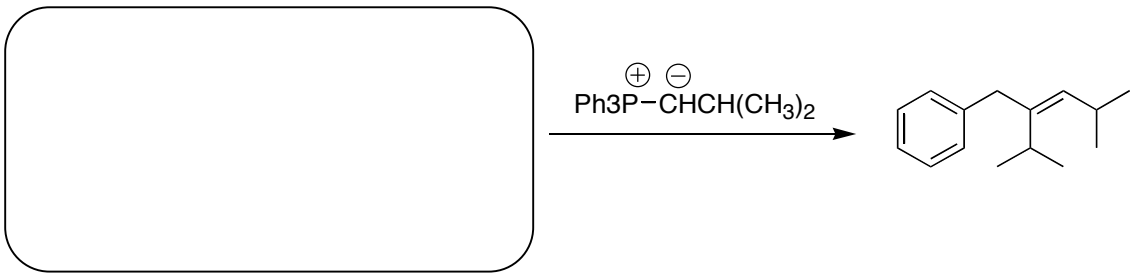


b) From homework, problem 15.17

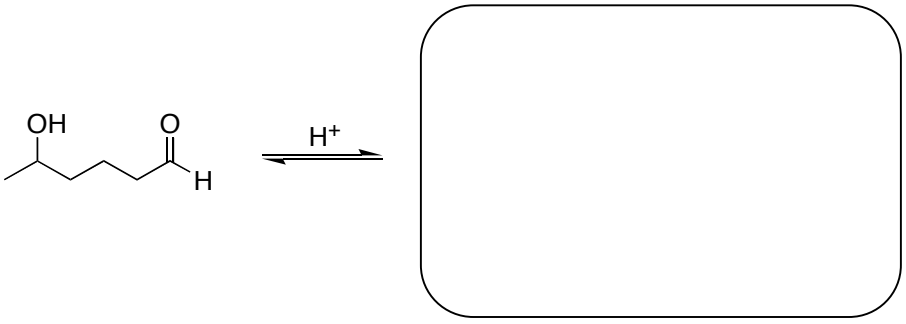
c)



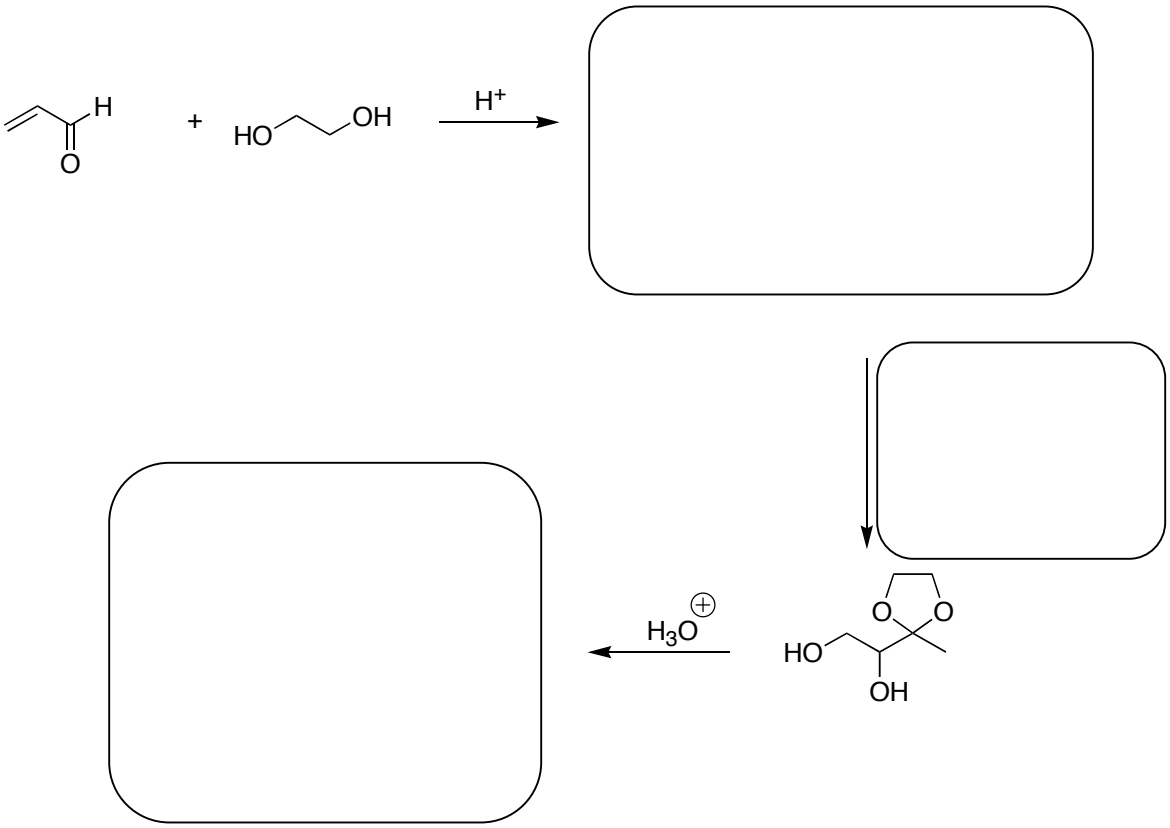
d)



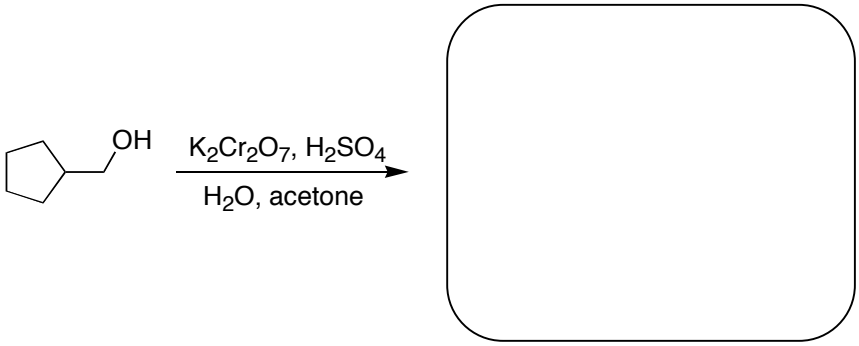
e) From homework, problem 16.29



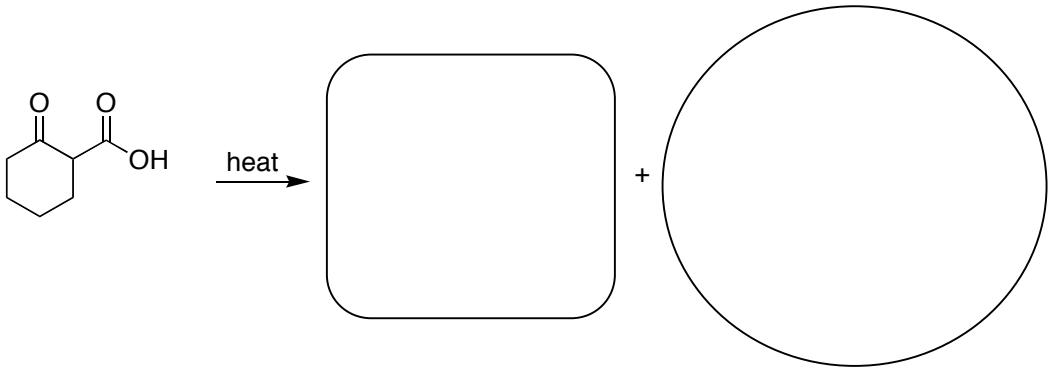
f) From homework, problem 16.35



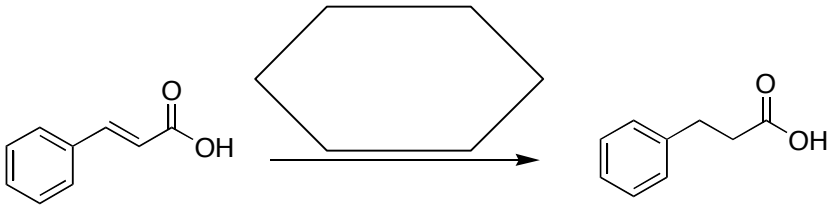
g) From homework, problem 17.18



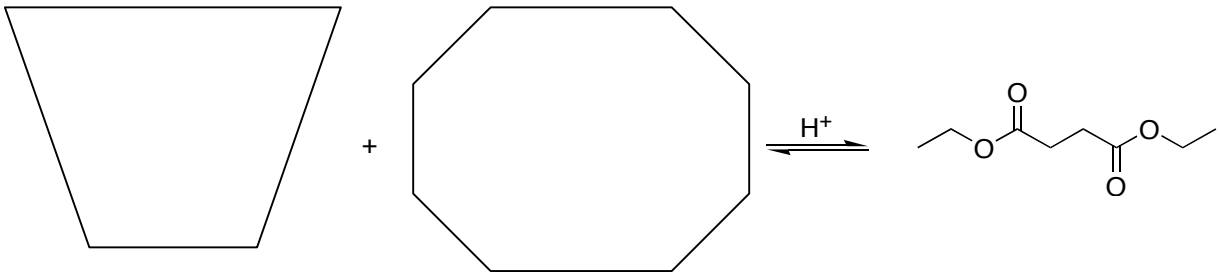
h)



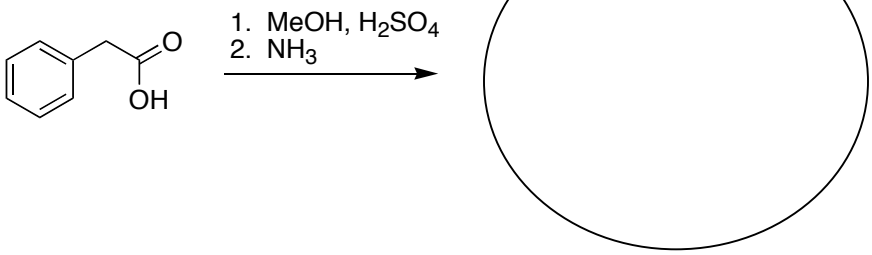
i) From homework, problem 17.33



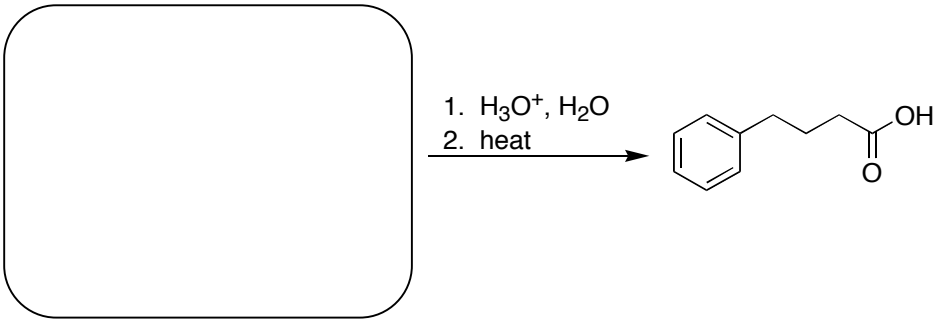
j) From homework, problem 17.35



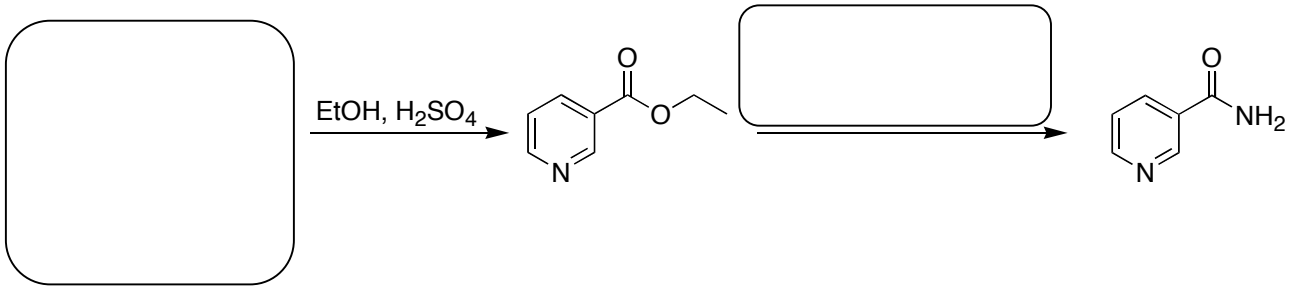
k)



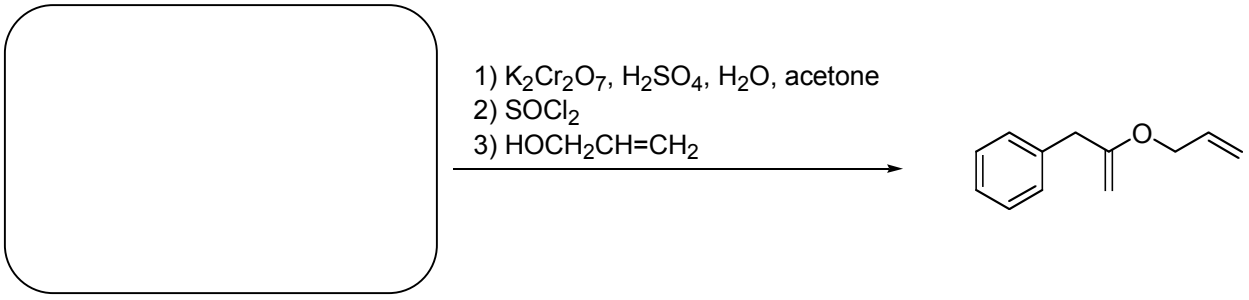
l)



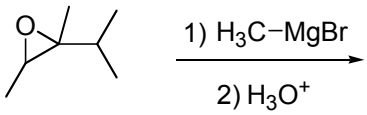
m) From homework, problem 18.30



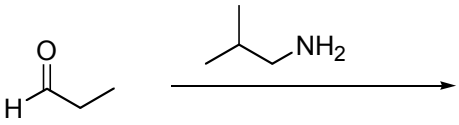
n) From homework, problem 18.37



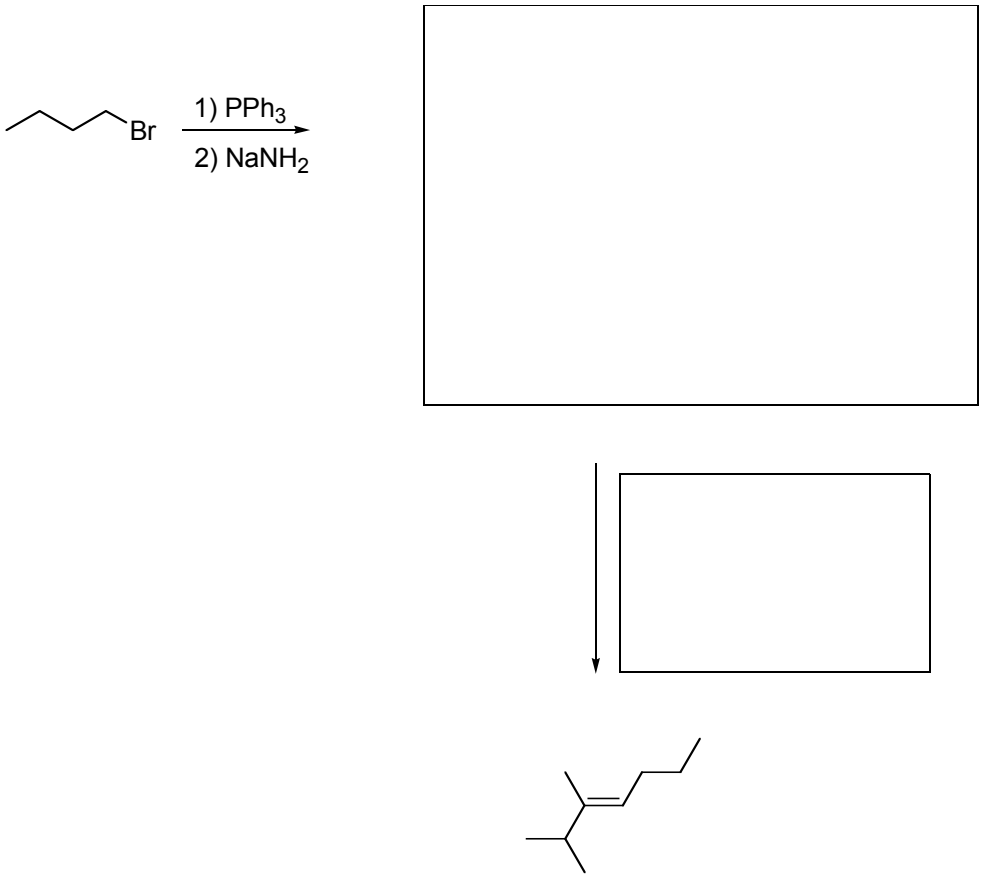
o) From the old exam



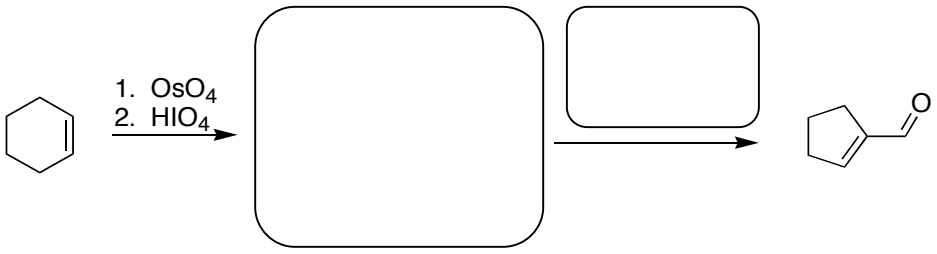
p) From the old exam



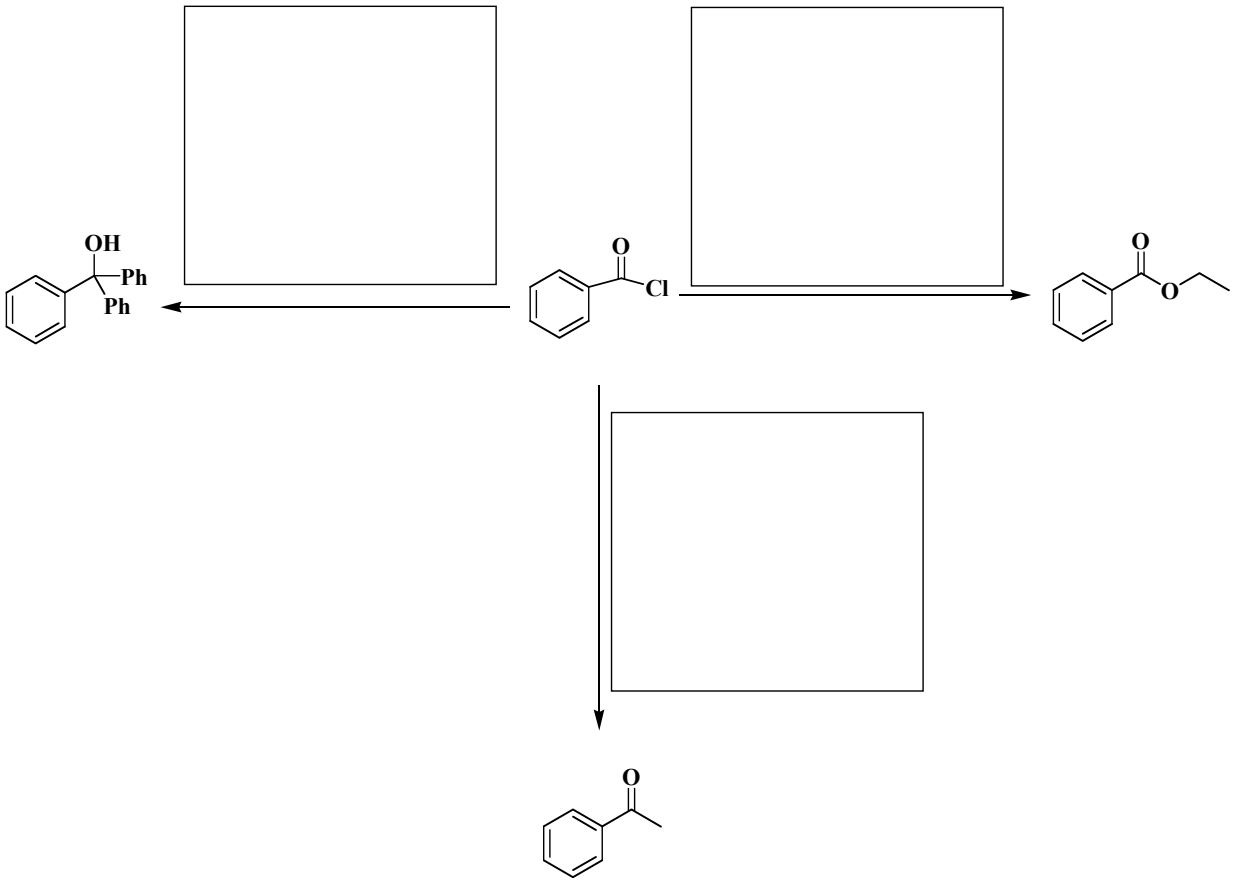
q) From the old exam



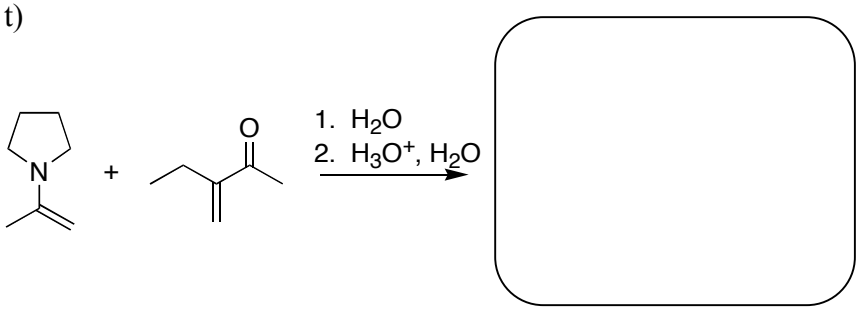
r) From homework, problem 19.23



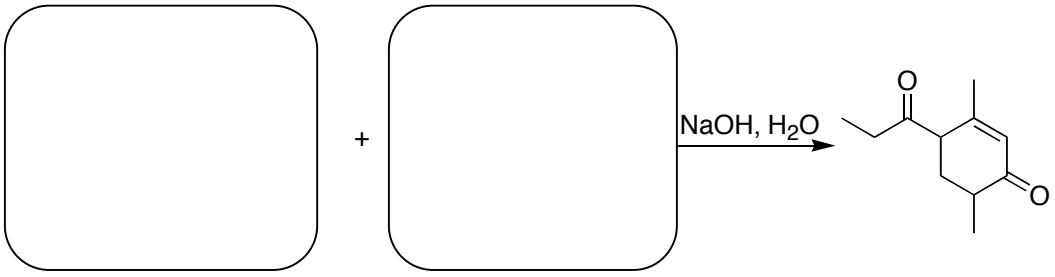
s) From homework, problem 18.19 and from old exam



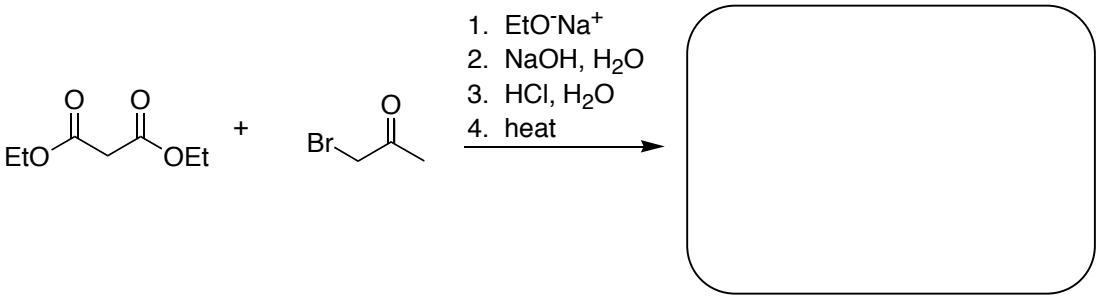
t)



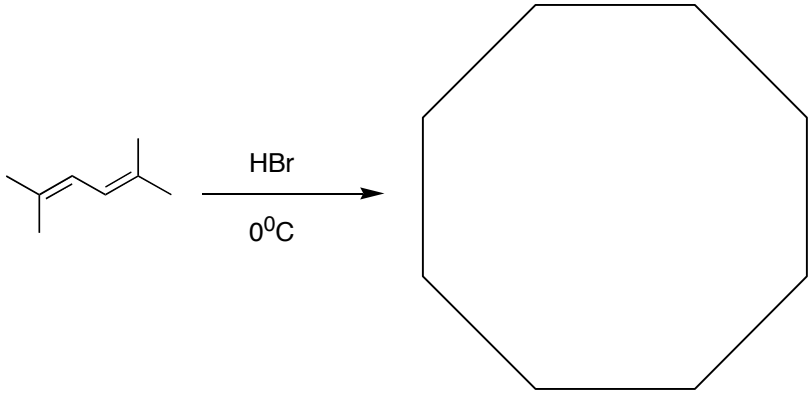
u)



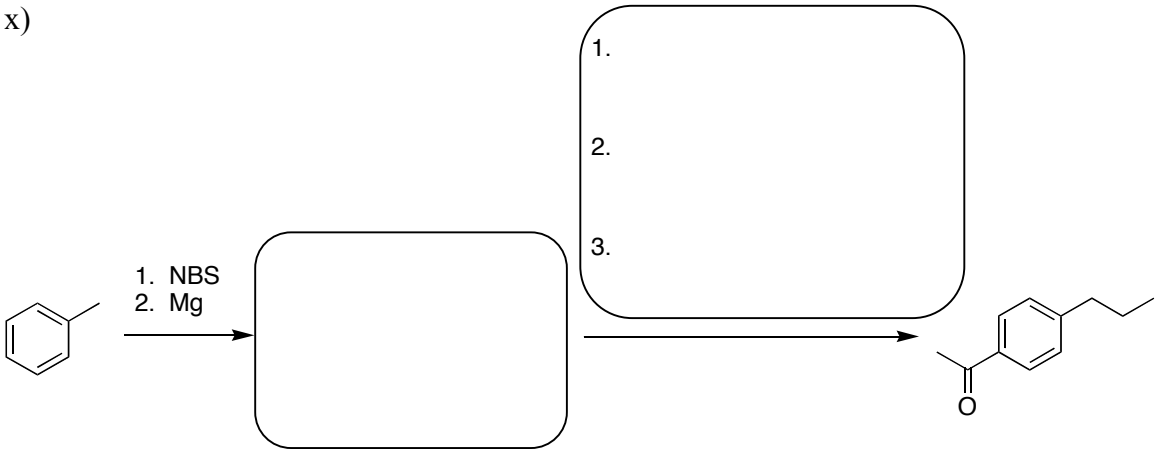
v)


1. EtO⁻Na⁺
2. NaOH, H2O
3. HCl, H2O
4. heat
EtO
OEt
Br
O
O
O

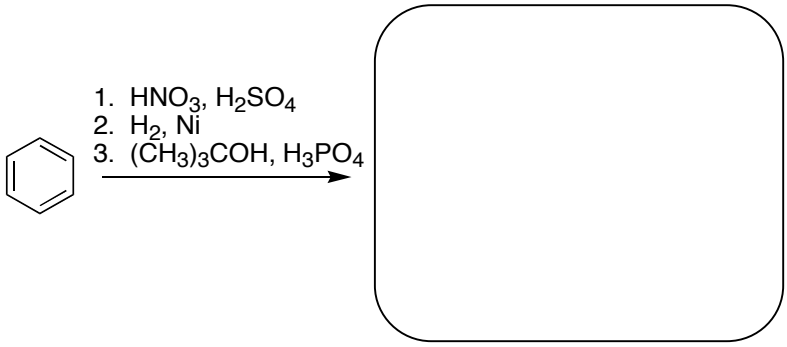
w)


HBr
0⁰C

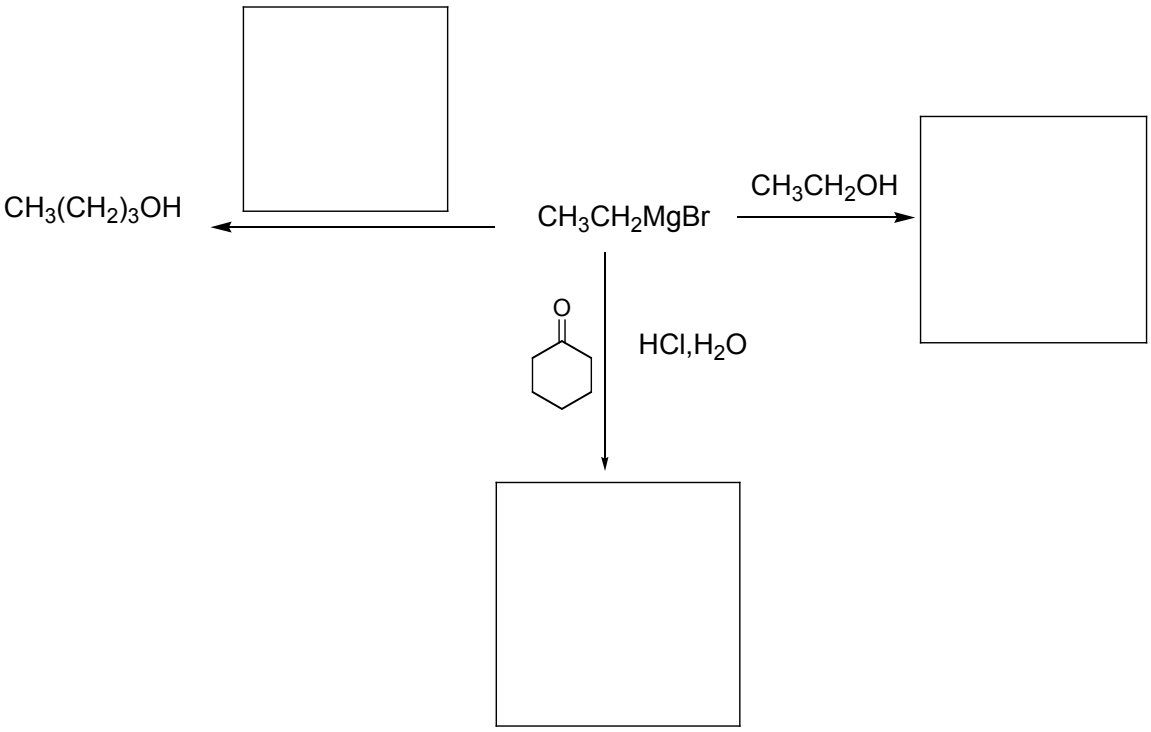
x)


1.
2.
3.
1. NBS
2. Mg
O

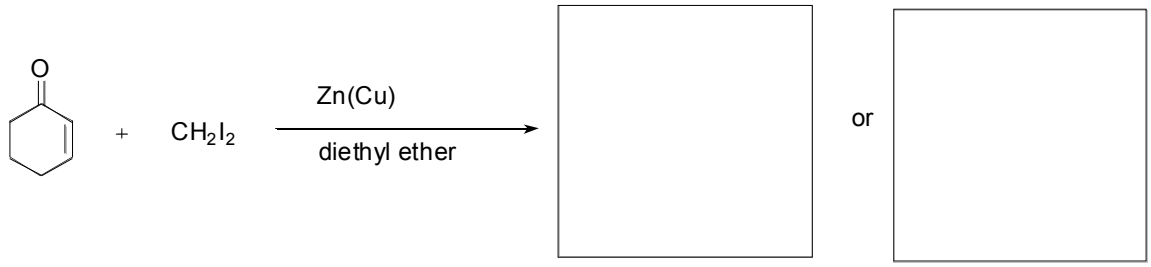
y)


1. HNO3, H2SO4
2. H2, Ni
3. (CH3)3COH, H3PO4

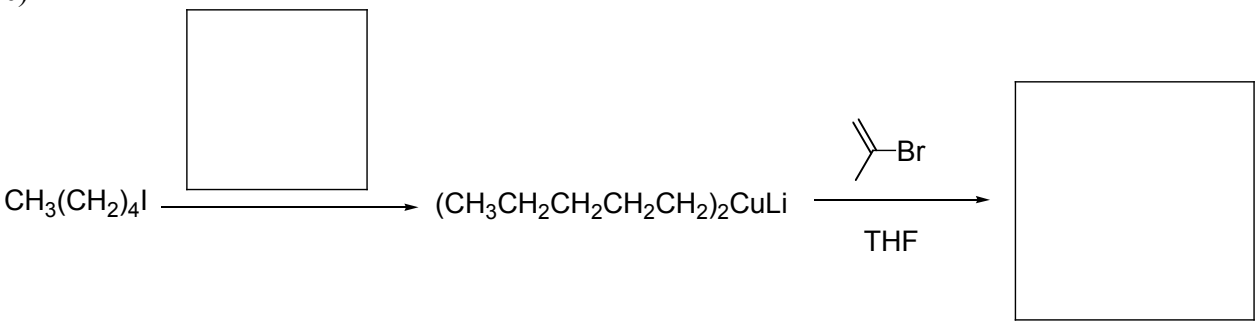
z)


CH3(CH2)3OH
CH3CH2MgBr
CH3CH2OH
O
HCl,H2O

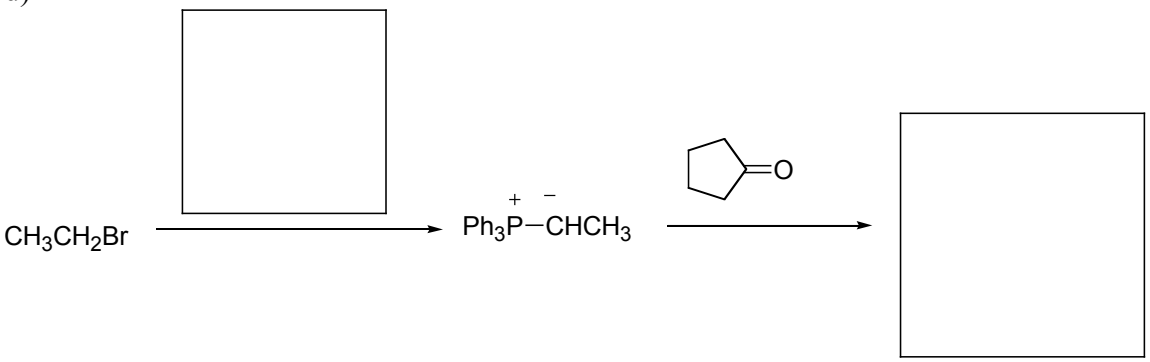
)


O
+
CH2I2
Zn(Cu)
diethyl ether
or

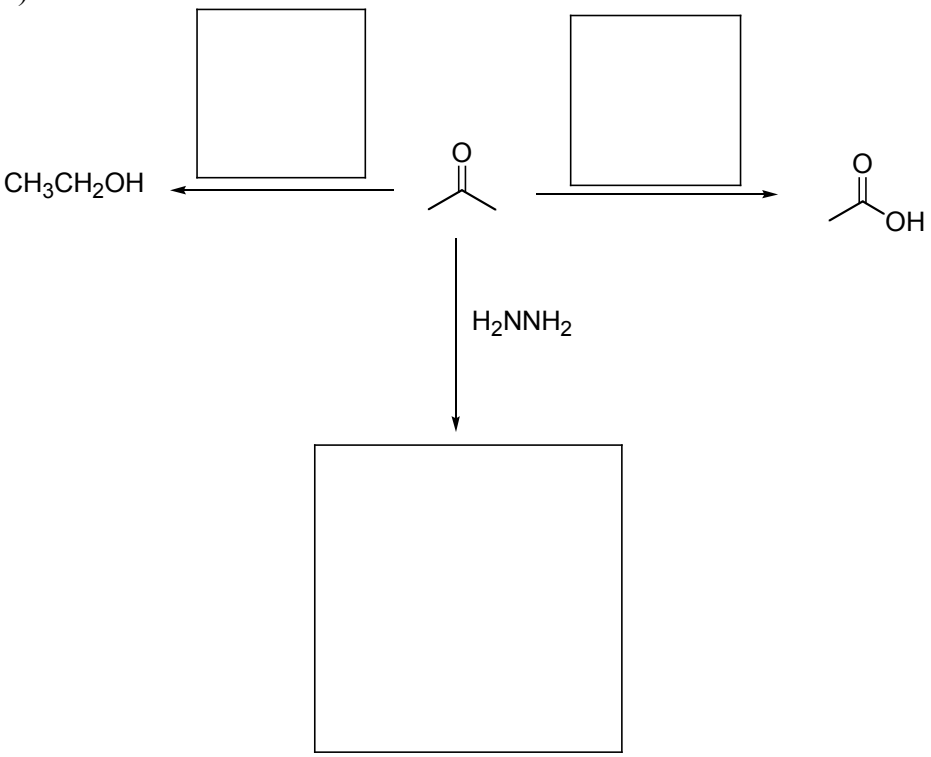
c)


CH3(CH2)4I
(CH3CH2CH2CH2CH2)2CuLi
Br
THF

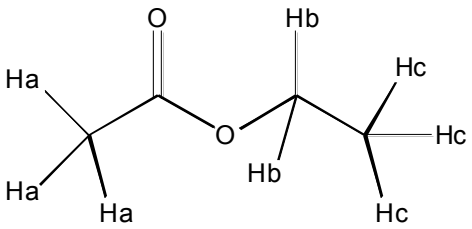
d)

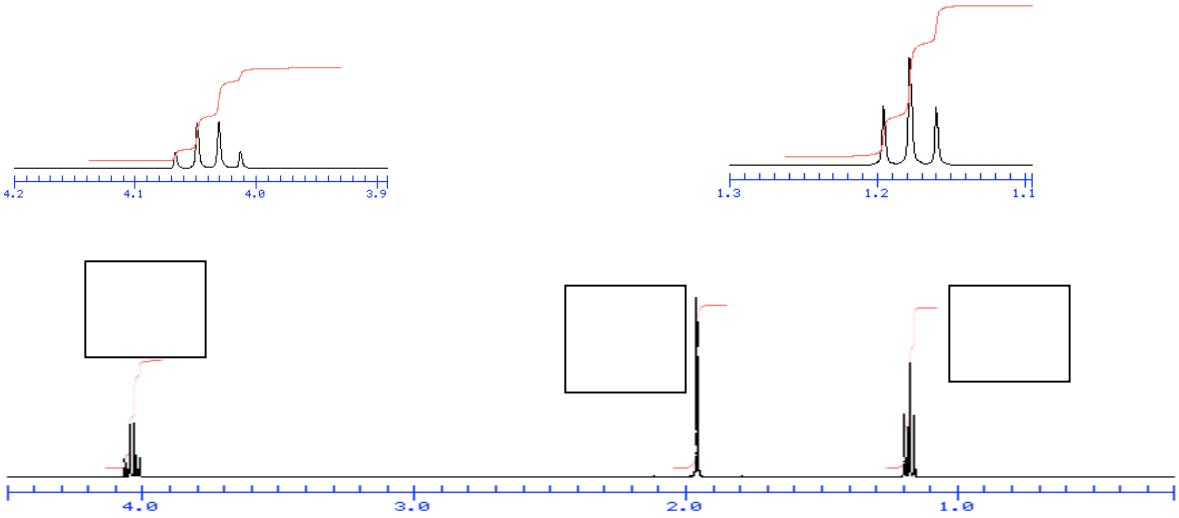


e)

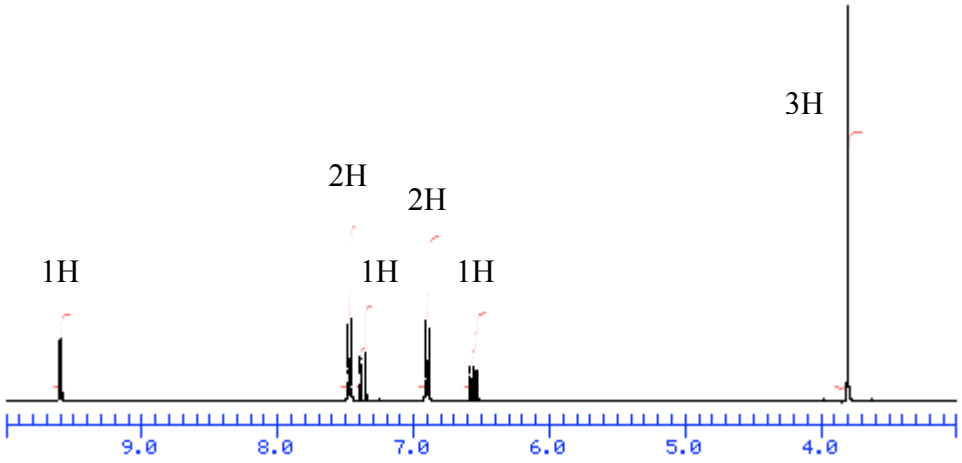


3) Below is the H-NMR spectrum and structural formula of ethyl acetate. Label the peaks in the H-NMR by filling in the provided boxes with Ha, Hb, and Hc. Explain the splitting pattern of proton, **Hc** by sketching the spin alignment of proton, **Hb** in arrows in the applied magnetic field in the bottom box.

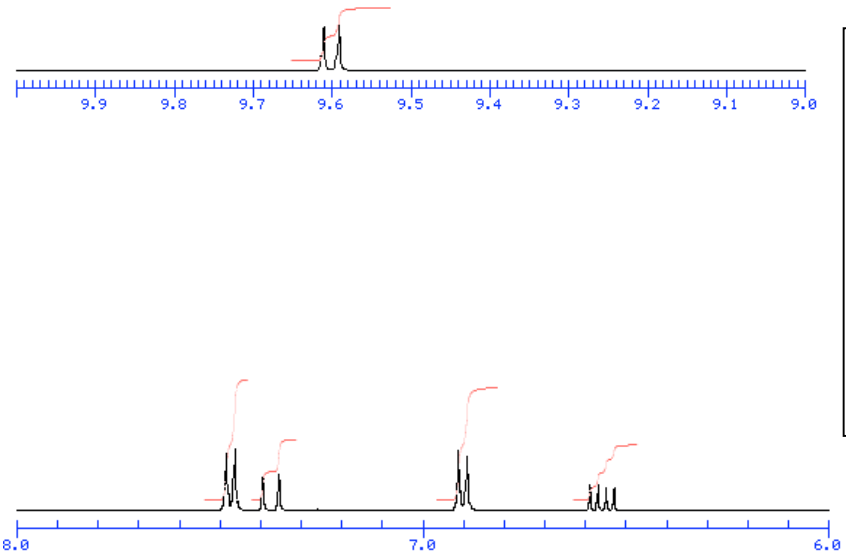




4) Below is the ^{1}H-NMR spectrum of a compound, with a molecular formula, **$C_{10}H_{10}O_2$**. This compound reacts with the nucleophile by **Michael Addition**. Draw the structure in the provided box.

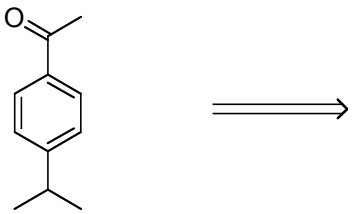


Expanded spectrums:

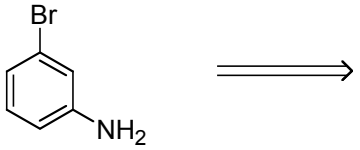


5) Show the retrosynthesis of each product, starting from benzene as your starting material. You may use any other organic and inorganic material necessary.

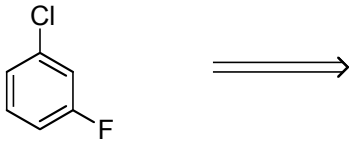
a)



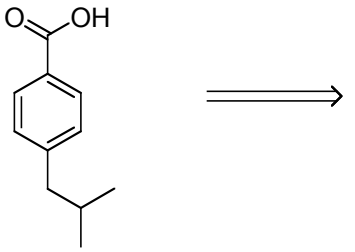
b)



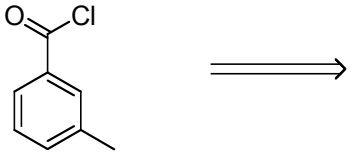
c)



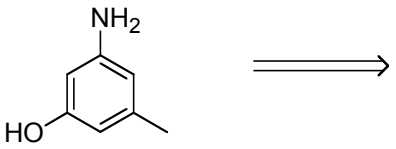
d)



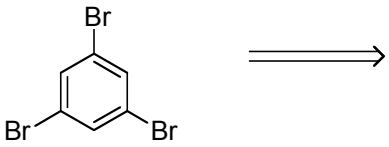
e)



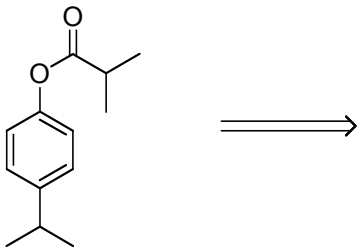
f)



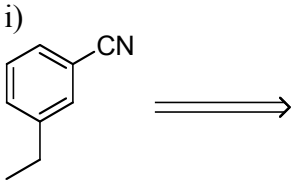
g)



h)

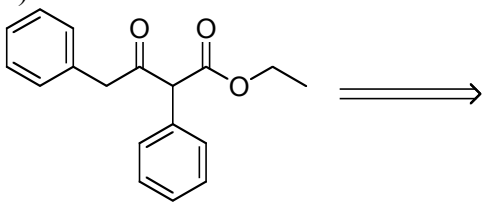


i)

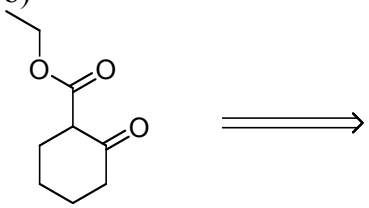


6) Suppose you were trying to devise a synthesis of the following molecules using a retrosynthetic approach. Draw what the starting material would be for the Claisen Condensation, Malonic Ester Synthesis, Aldol Condensation, Acetoacetic Ester Synthesis, Acetoacetic Ester Type Conjugate Addition, Robinson Annulation, Malonic Ester Conjugate Addition, or Dieckman reaction.

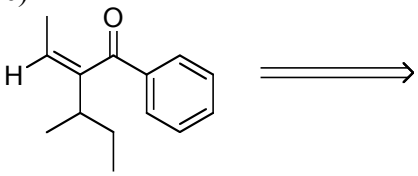
a)



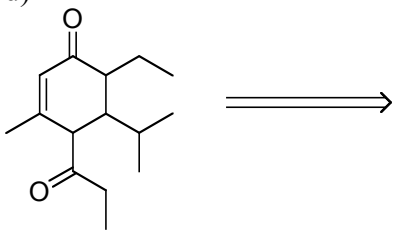
b)



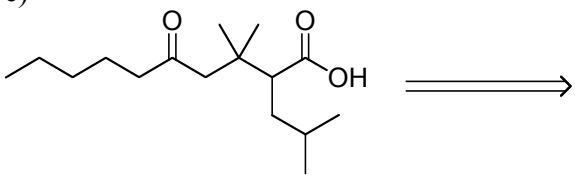
c)



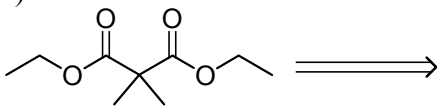
d)



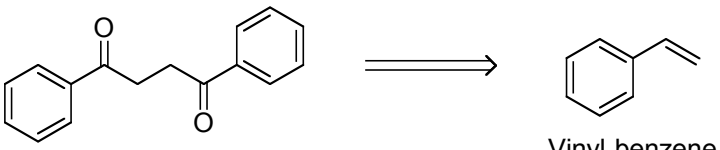
e)



f)



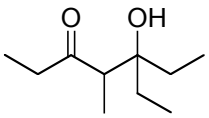
7)
Show how **1,4-diphenyl-butane-1,4-dione** is synthesized from **vinyl-benzene**. Vinyl-benzene is the only carbon source. You may use any inorganic reagents necessary.

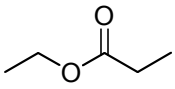


1,4-Diphenyl-butane-1,4-dione

Vinyl-benzene

8) Show how to synthesize:

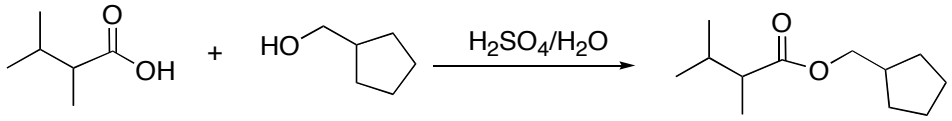


using 

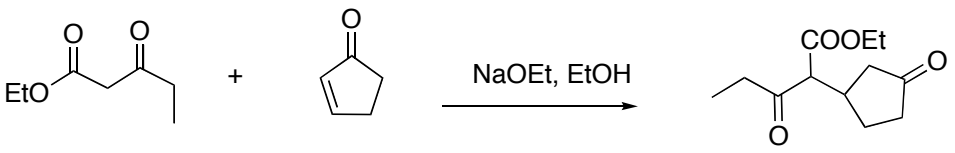
as your only carbon source.

You may use any inorganic reagents necessary. Do not worry about showing arrow pushing (mechanism).

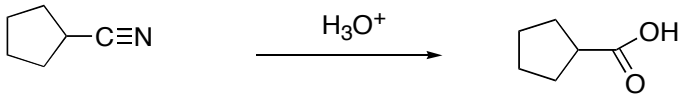
9) Propose a mechanism for the following reactions? Show all the arrow pushing and resonance structures if any.



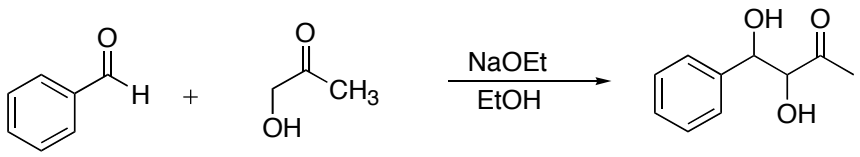
10) Propose a mechanism for the following reaction. Show all the arrow pushing and resonance structures if any.



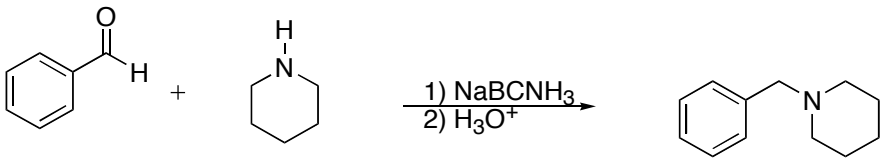
11) Propose a mechanism for the following reaction. Show all the arrow pushing and resonance structures if any



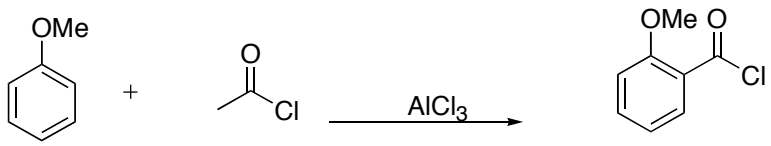
12) Propose a mechanism for the following reaction. Show all the arrow pushing and resonance structures if any

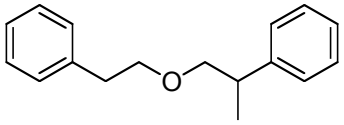


13) Propose a mechanism for the following reactions? Show all the arrow pushing and resonance structures if any



14) Propose a mechanism for the following reactions? Show all the arrow pushing and resonance structures if any



15) Propose a synthesis of  from benzene and any 3 carbon source. You may use any inorganic reagents necessary.