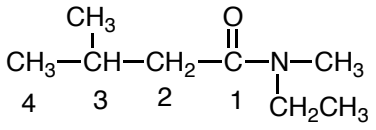
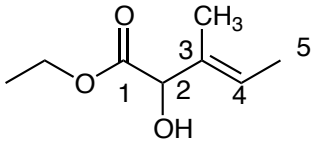
Long Island University, Department of Chemistry

Chem. 122, Sect 007, Exam 3, 100 pts, Spring, 2011

1. Name the following compounds. (10 pts)

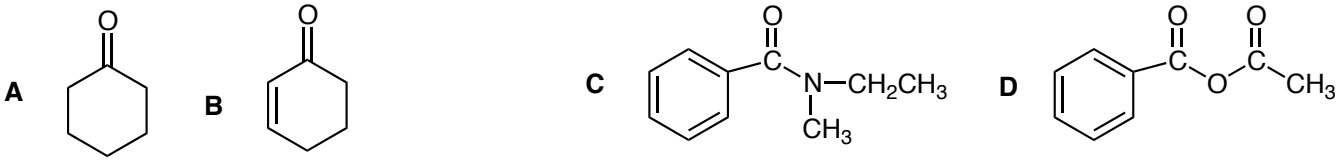
(a) 

N-ethyl-N-methyl-3-methylbutanamide

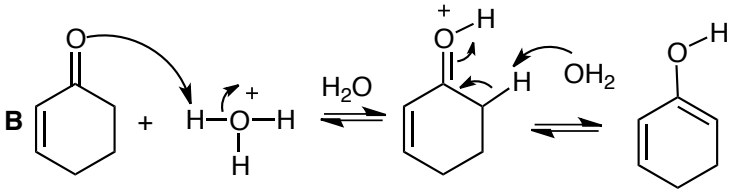
(b) 

ethyl 2-hydroxy-3-methyl-3-pentenoate

2. (a) Look at molecules **A** and B. Which compound would form the greater concentration of enol in acidic conditions? Briefly explain your choice and show the complete reaction mechanism for enol formation for the molecule you choose. (b) Look at molecules **C** and **D.** Which molecule would be more reactive to acid hydrolysis? Explain briefly and show the reaction that occurs for the molecule you choose, including the complete reaction mechanism. (20 pts)

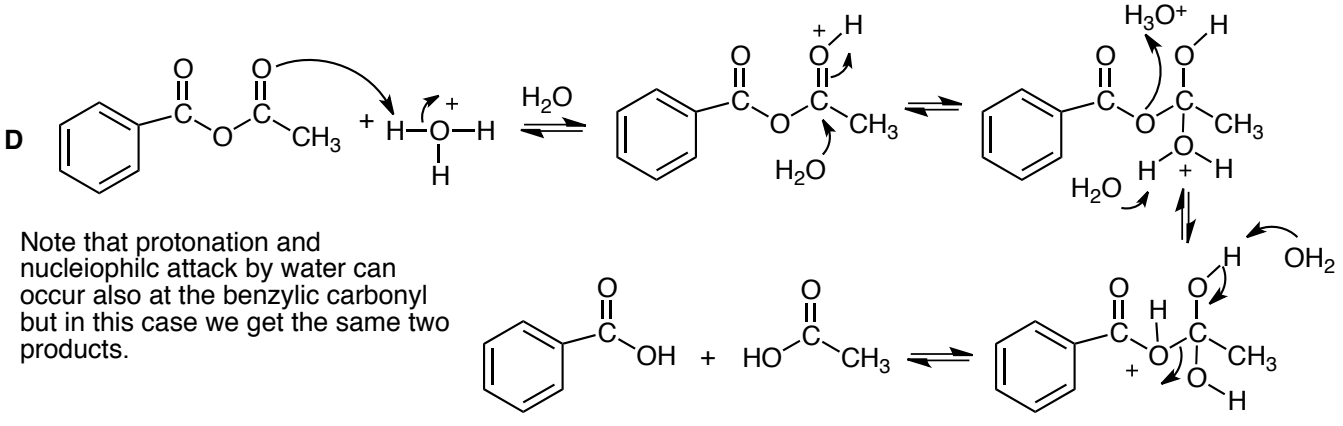


(a) **B** would form the greater concentration of enol in acidic conditions since the new enol double bond in **B** would be conjugated with the existing double bond.



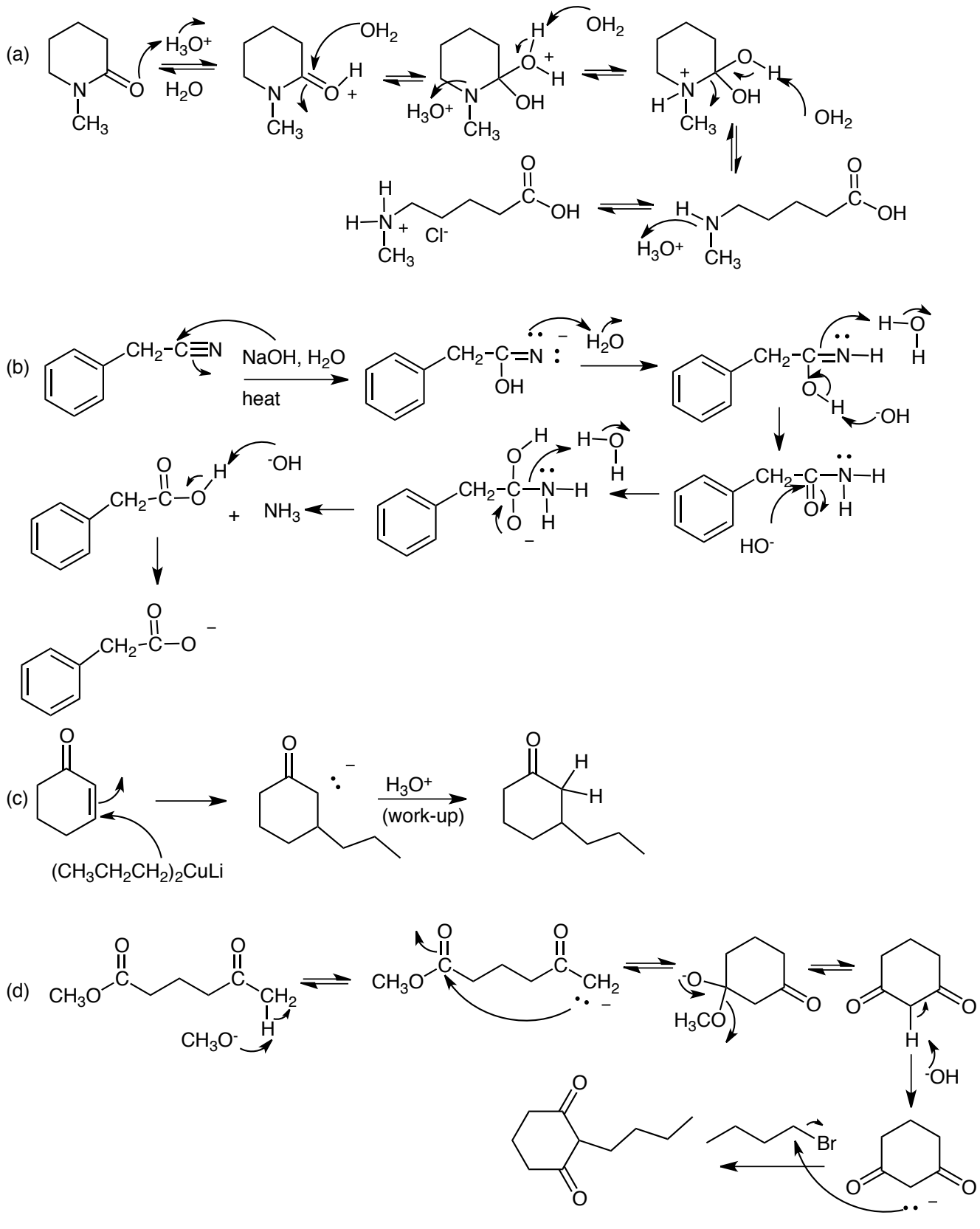
New double bond in th enol is conjugated with the existing double bond.

(b) **D** would be more reactive to hydrolysis in acidic (or basic) conditions. It is an anhydride. The oxygen attached to the two carbonyls is more electronegative than the nitrogen of the amide and in the anhydride there are two carbonyl groups competing for the oxygen lone pair.

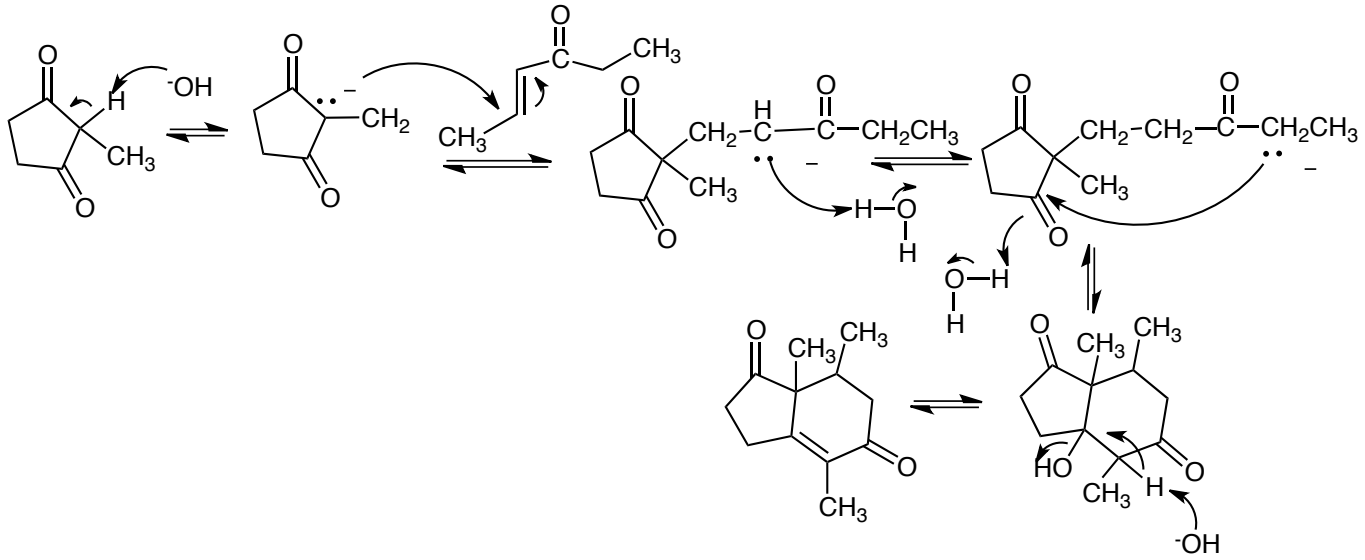


Note that protonation and nucleiophilc attack by water can occur also at the benzylic carbonyl but in this case we get the same two products.

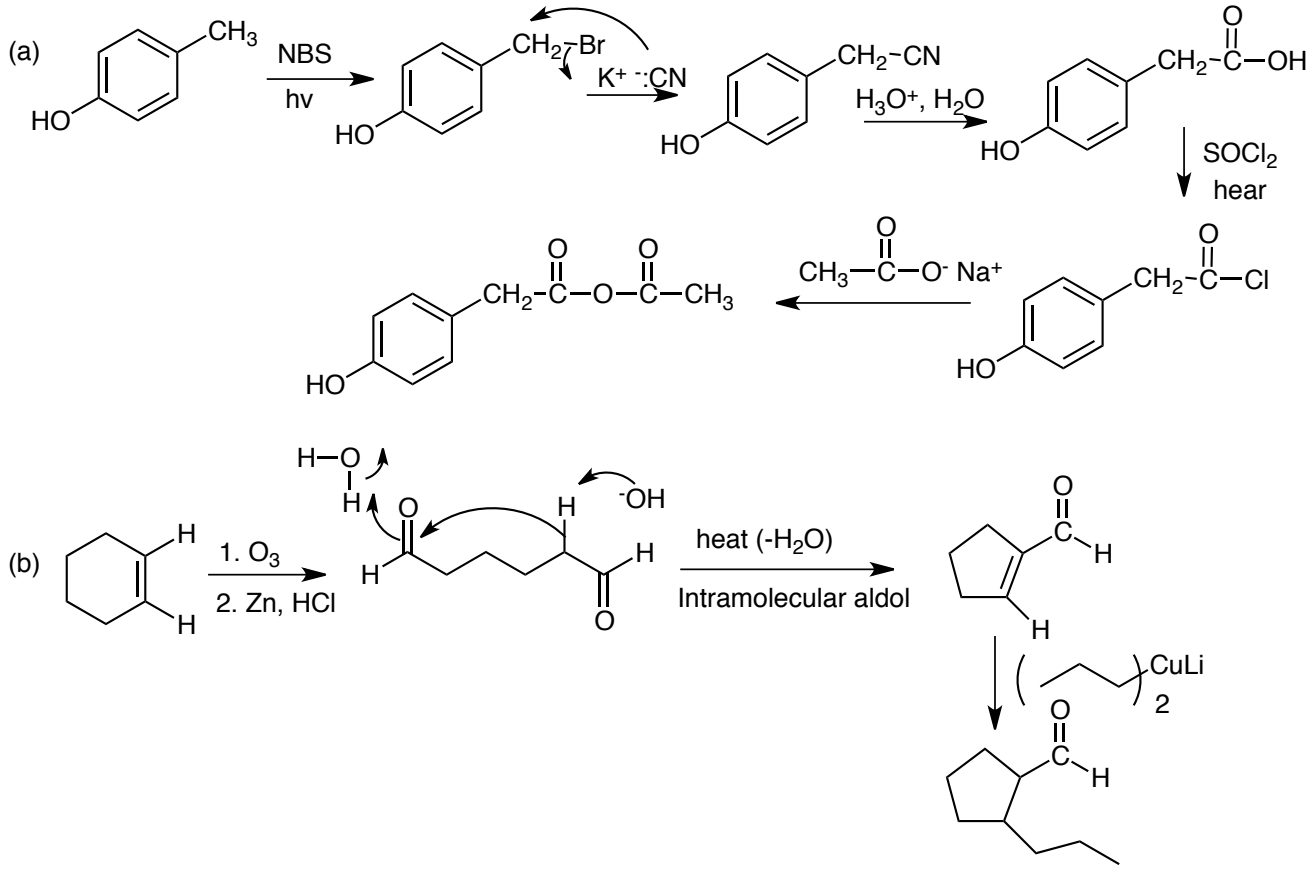
3. Give the product of the following reactions and in each case show the complete reaction mechanism by which it is formed. (40 pts)

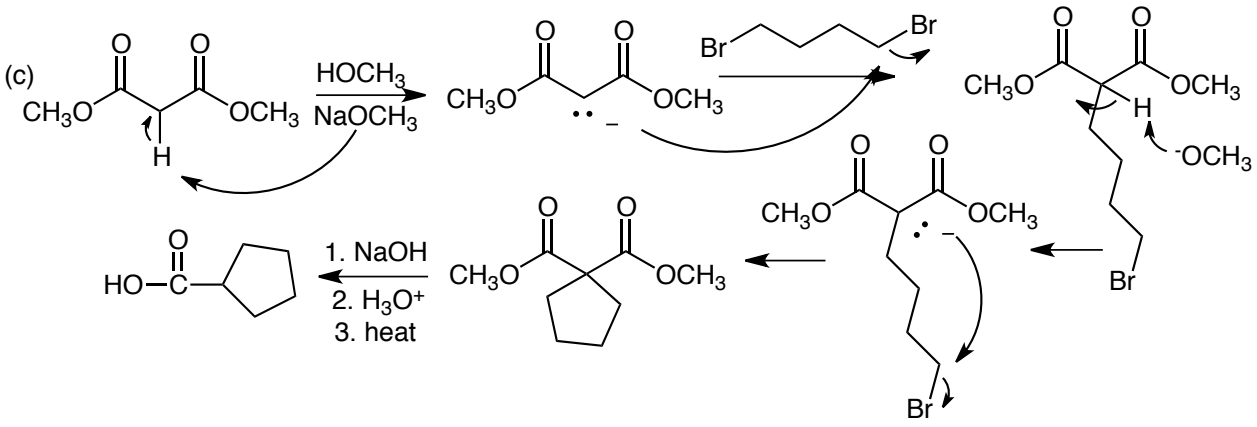

(a)
(b)
NaOH, H2O
heat
(c)
H3O+
(work-up)
(CH3CH2CH2)2CuLi
(d)
CH3O-
Br

5. Show how the following reaction occurs, giving all steps of the mechanism. No other reagents are needed except those given. (10 pts)



5. Synthesize **TWO** of the molecules shown on the right from the starting materials given on the left. Do all three for extra credit. (20 pts).




(c)
HOCH3
NaOCH3
1. NaOH
2. H3O+
3. heat