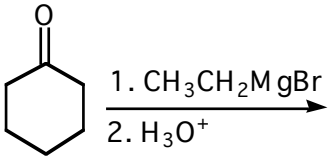
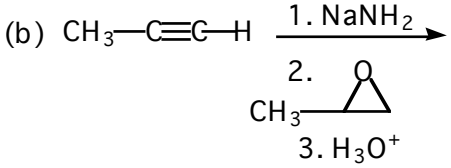
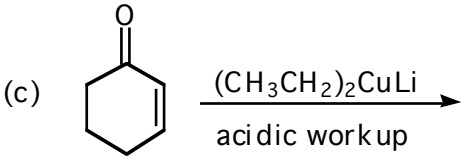
Long Island University, Department of Chemistry

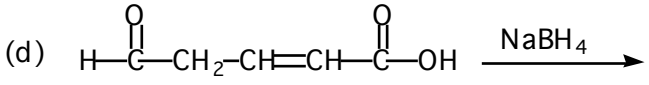
Chem. 122, Sect 002, Final, 250 pts, Sum I, 2008

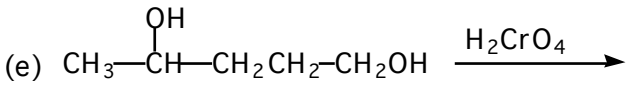
1. Give the product(s) of the following reactions. You do not need to show the reaction mechanism. (8 pts each)

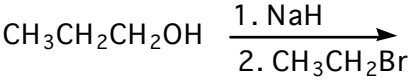
(a) 

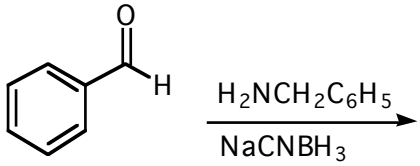
(b) 

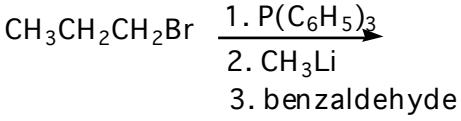
(c) 

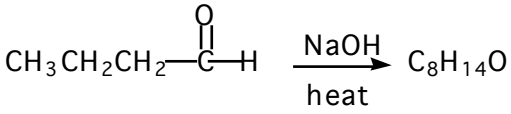
(d) 

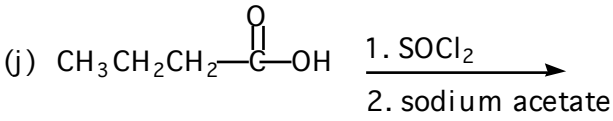
(e) 

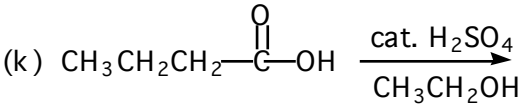
(f) 

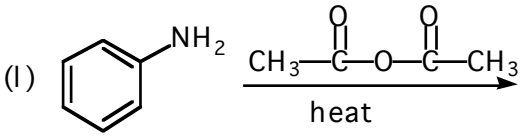
(g) 

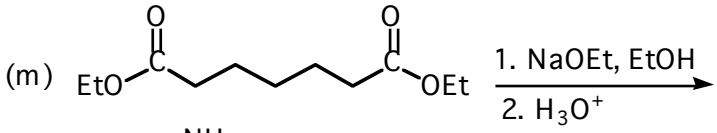
(h) 

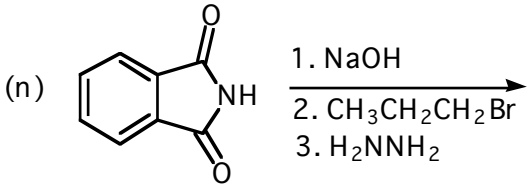
(i) 2 

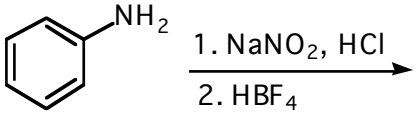
(j) 

(k) 

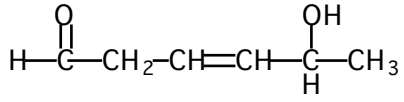
(l) 

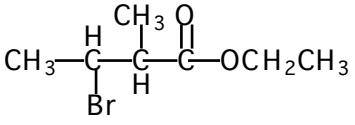
(m) 

(n) 

(o) 

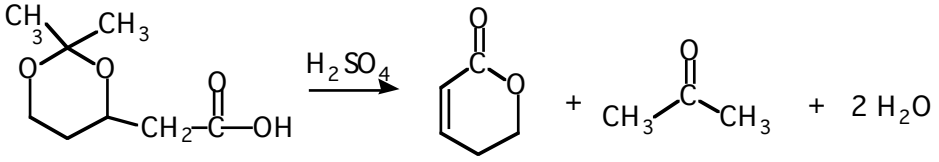
2. Name the following compounds (10 pts).

(a) 

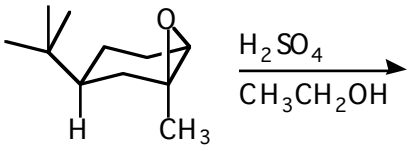
(b) 

3. (a) Draw 4-phenyl-2-pentanone. (b) Predict the proton NMR spectrum of this molecule. Indicate the number of signals, label them and match them with the protons in the molecule (A, B, C, etc), predict the splitting pattern of each type of peak and indicate the value of each integral. You do not have to predict the chemical shifts. (15 pts)

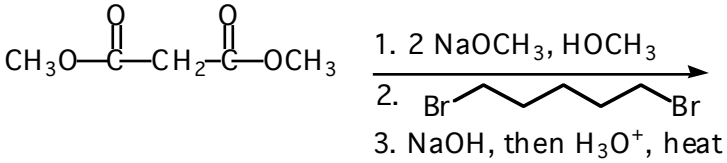
4. Show how the following occurs, showing all of the steps of the reaction mechanisms. (20 pts)



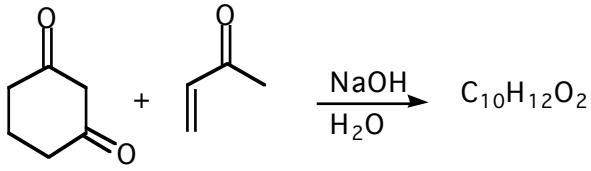
5. Give the product of the following reaction and show the complete reaction mechanism. Pay attention to stereochemistry. (10 pts)



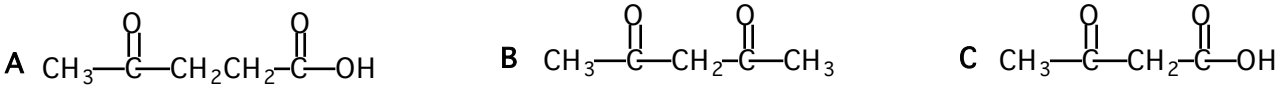
6. Give the product of the following reaction sequence. You do not have to give detailed mechanisms but show each intermediate that is formed. (10 pts)



7. Give the product of the following Robinson Annulation and show how it is formed, giving the complete mechanism. Hint: the product is two fused six-membered rings. (15 pts)



8. Only one of the following molecules can undergo decarboxylation. Which one? Explain your choice and show how the reaction occurs, giving a detailed picture of the reaction mechanism and the final product. (10 pts)



9. Synthesize **four** of the following five molecules from the starting materials given on the left. Do all of them for extra credit. (40 pts)