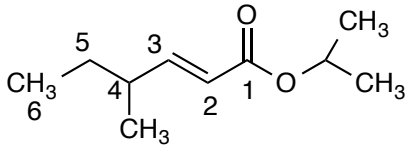
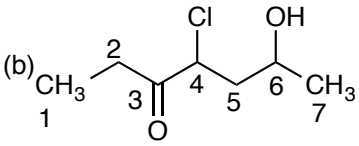
L.I.U.

Chem. 122, Sect 001 and Sect. 002 Final, 250 pts, Fall, 2008

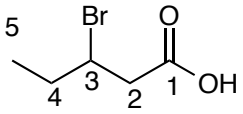
1. Name the following molecules. (15 pts)

(a) 

isopropyl 4-methyl-2-hexenoate

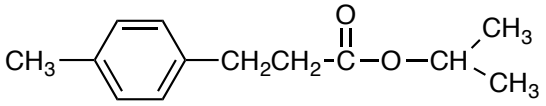
(b) 

4-chloro-6-hydroxy-3-heptanone

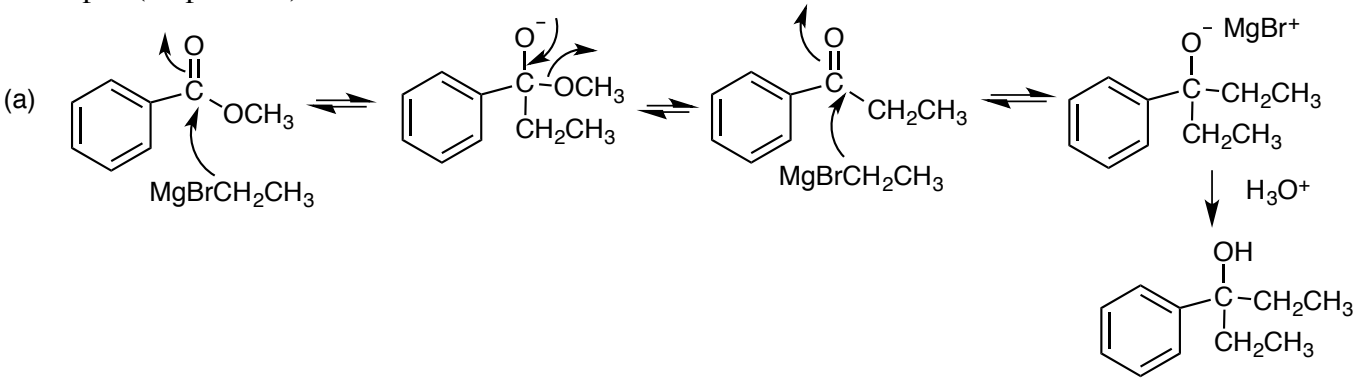
(c) 

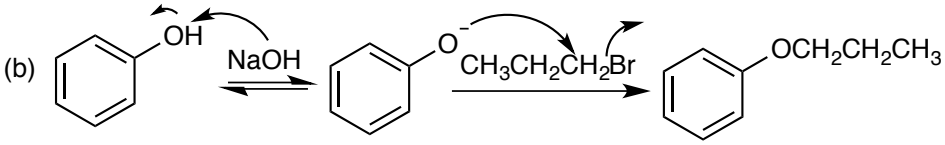
3-bromopentanoic acid

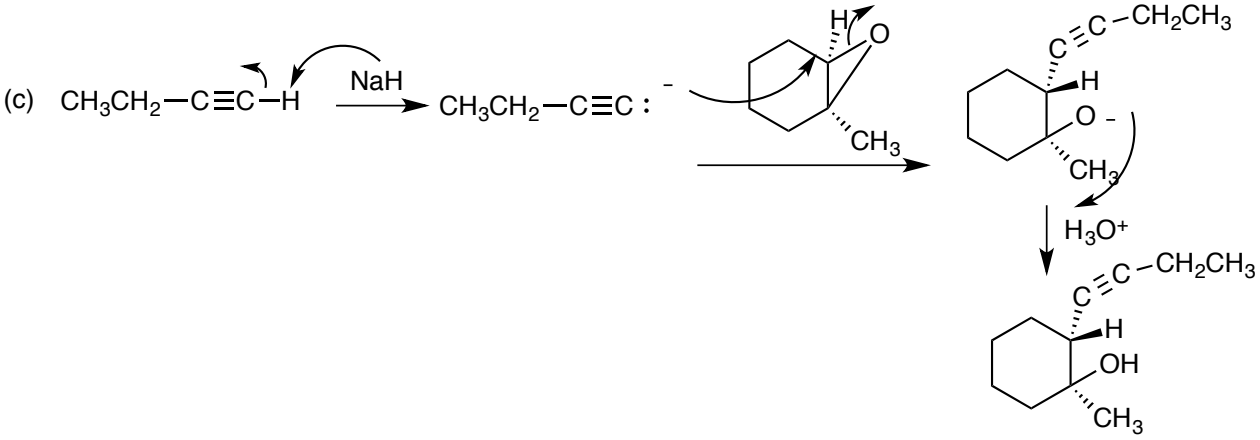
2. Find the structure of the following molecule. Formula: $C_{13}H_{18}O_2$. IR: 1740 cm^{-1}. ^1H NMR: δ 0.8, doublet, 6 H; 2.2, triplet, 2H; 2.4, triplet, 2H; 2.5, singlet, 3H; 3.8, septet, 1H; 7.1, doublet, 2H; 7.3, doublet, 2H. ^{13}C NMR: 32, 50, 55, 61, 65, 112, 118, 120, 122, 175 ppm. (15 pts)



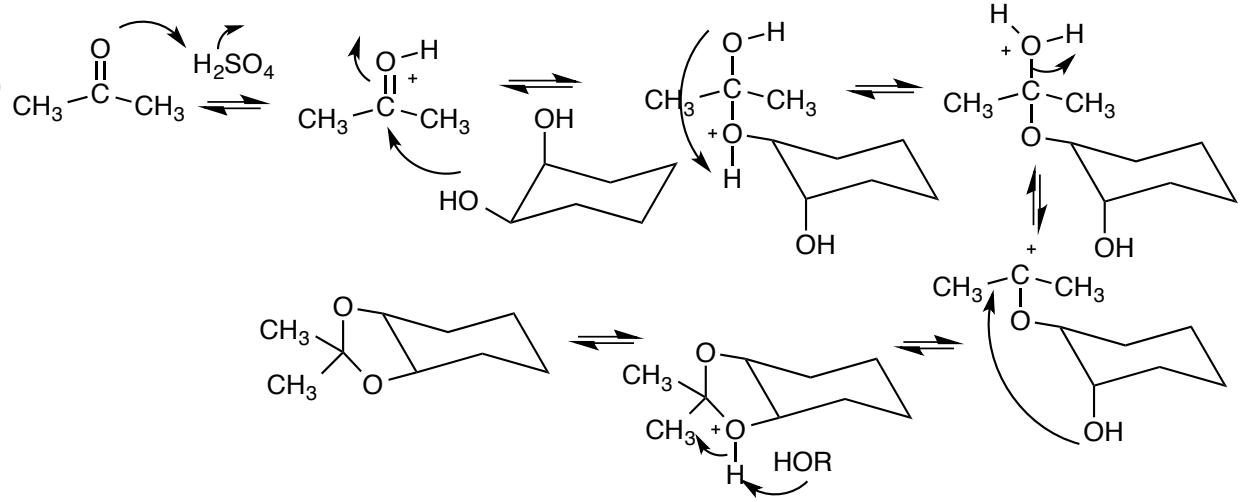
3. For the following reactions give the product and show the complete reaction mechanism, showing all the steps. (15 pts each)

(a) 

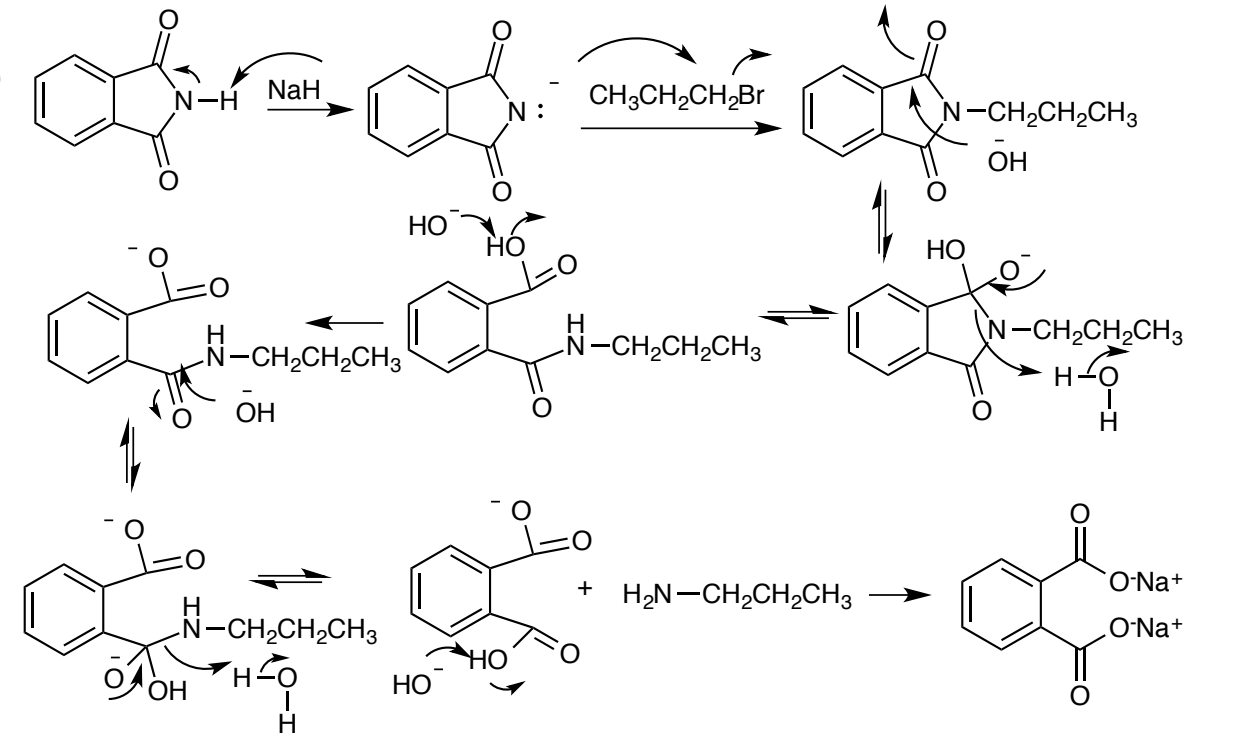
(b) 

(c) 

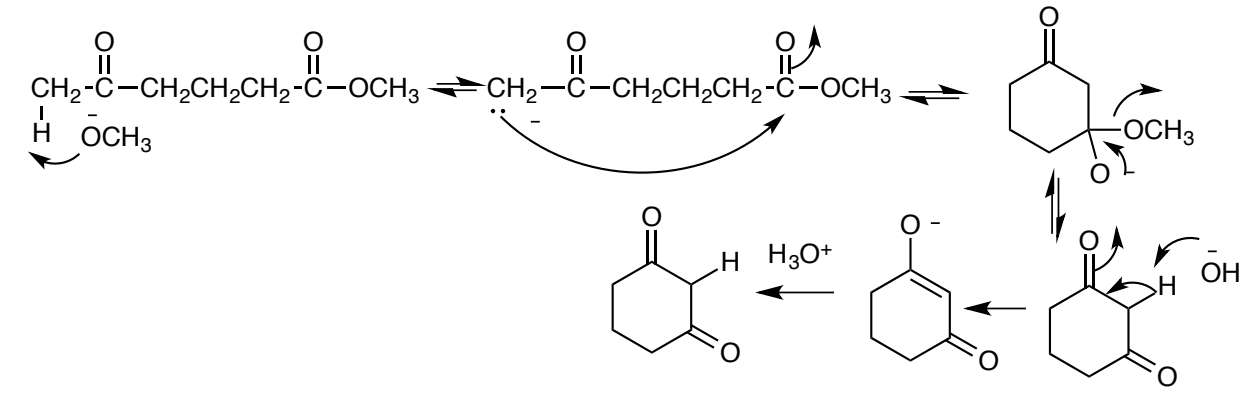
(d)

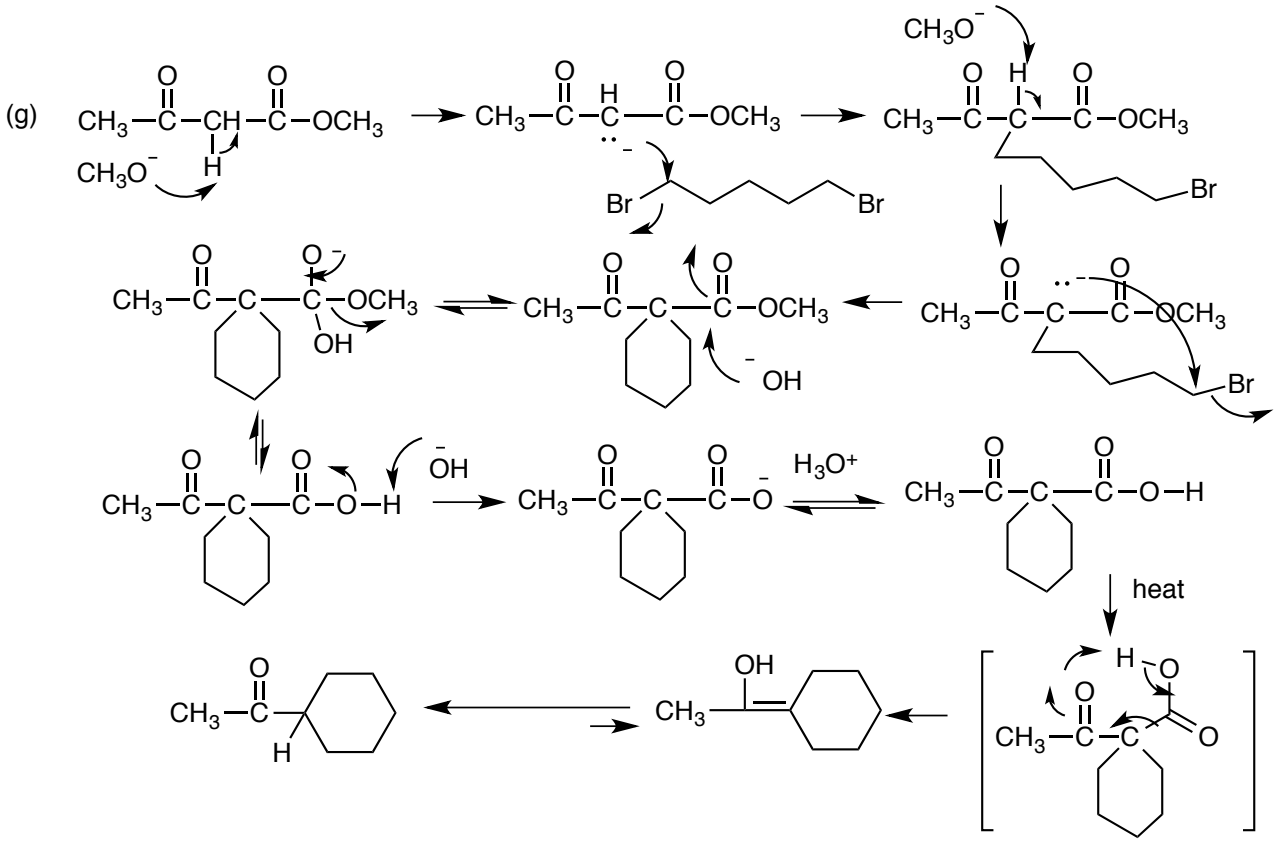


(e)

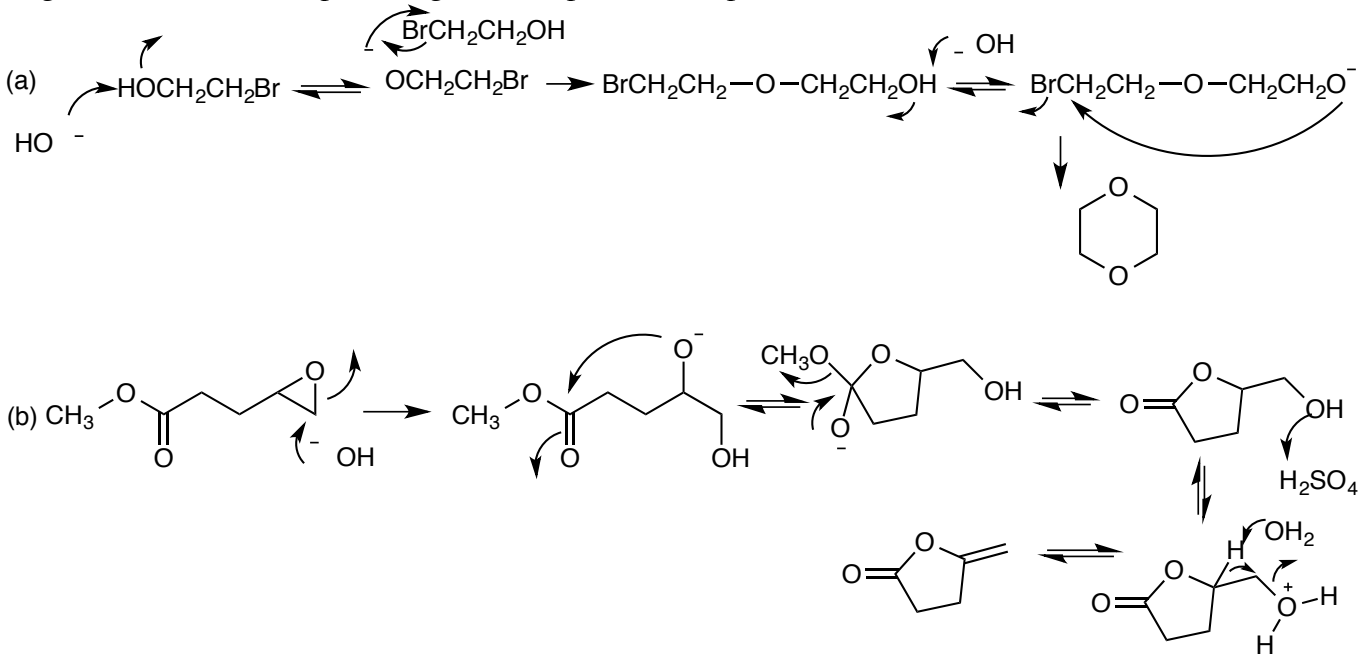


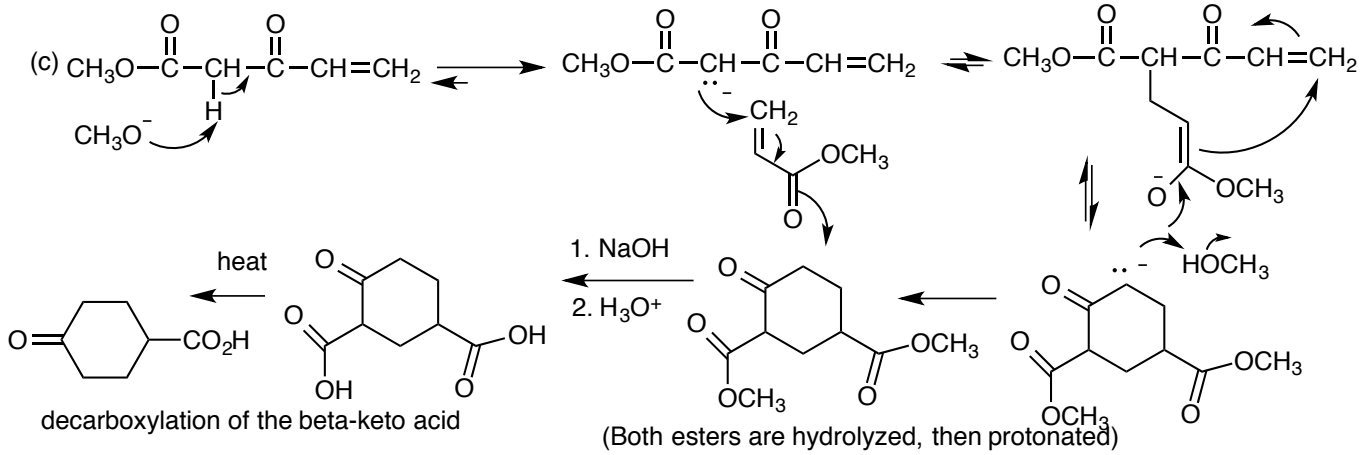
(f)



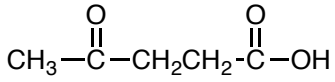
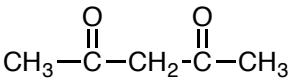
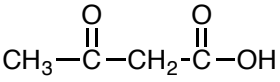


4. Show how the following transformations occur, showing all the steps of the reaction. No other reagents are needed except those given. (20 pts each, 60 pts)

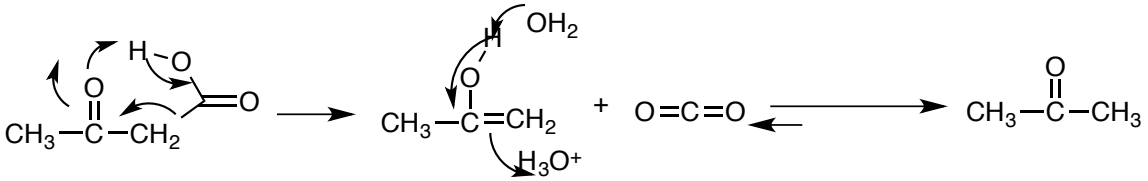




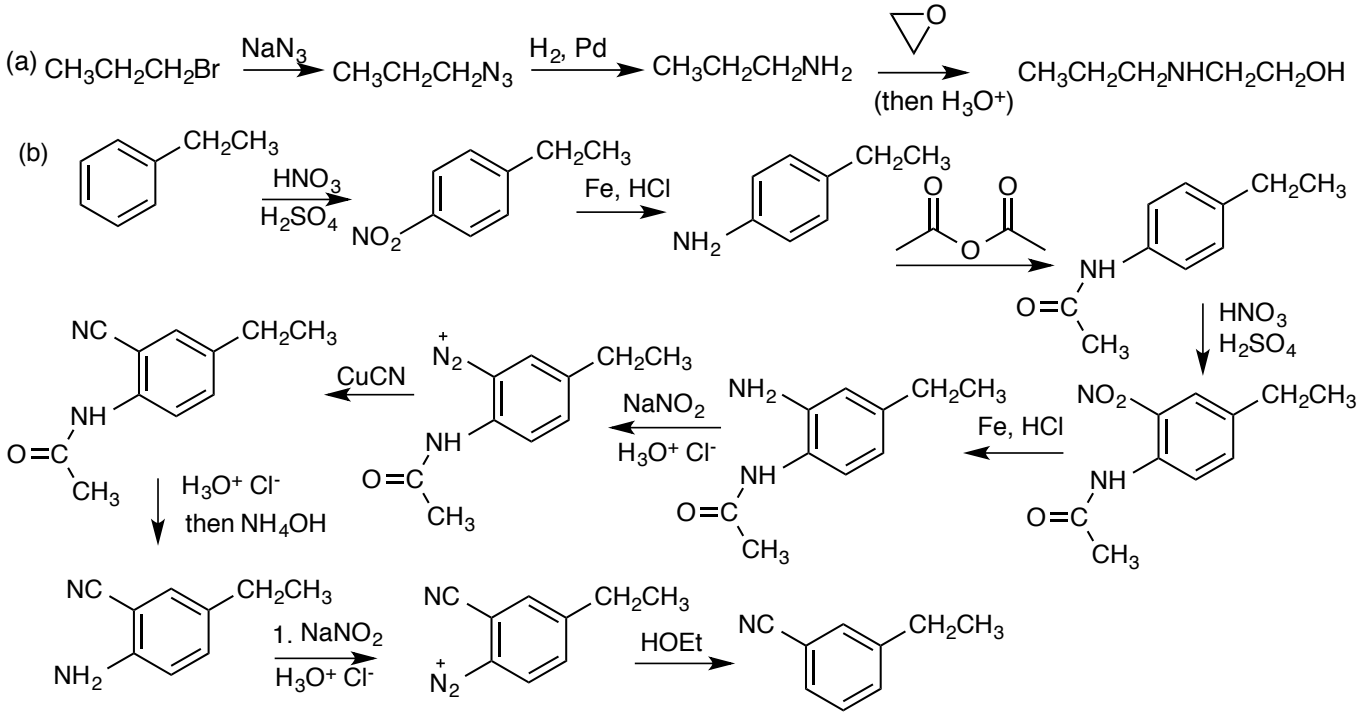
5. Only one of the following molecules can undergo decarboxylation on heating. Which one? Explain your choice and show how the reaction occurs, giving a detailed picture of the reaction mechanism and the final product. (10 pts)

A  **B**  **C** 

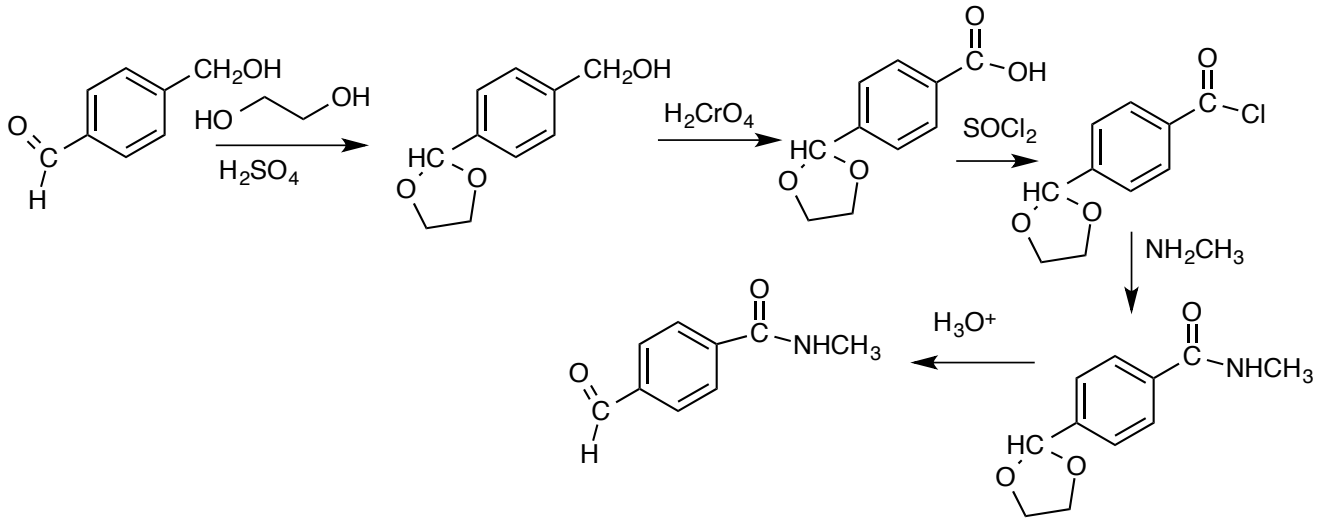
Only **C** can undergo decaroxylation since it is the only beta-keto carboxylic acid present.



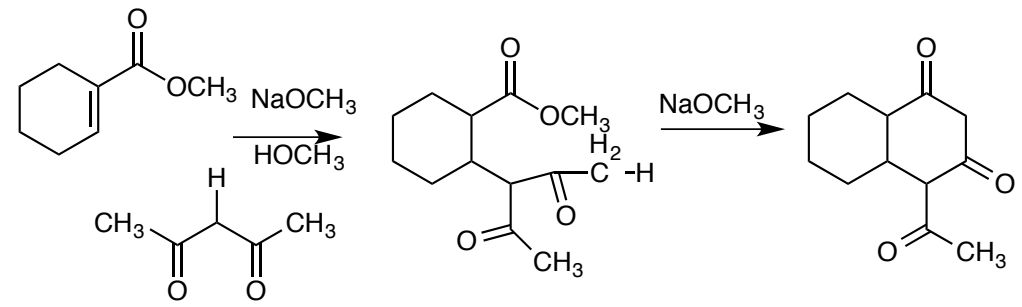
6. Synthesize **three** of the following **four** molecules from the starting materials given on the left. Do all **four** for extra credit. (15 pts each)



(c)


CH2OH
HO
OH
H2SO4
HC
O
O
H2CrO4
C
OH
SOCl2
Cl
NH2CH3
NHCH3
H3O+
H

(d)


O
OCH3
NaOCH3
HOCH3
H
CH3
CH3
H2
C
-H
NaOCH3