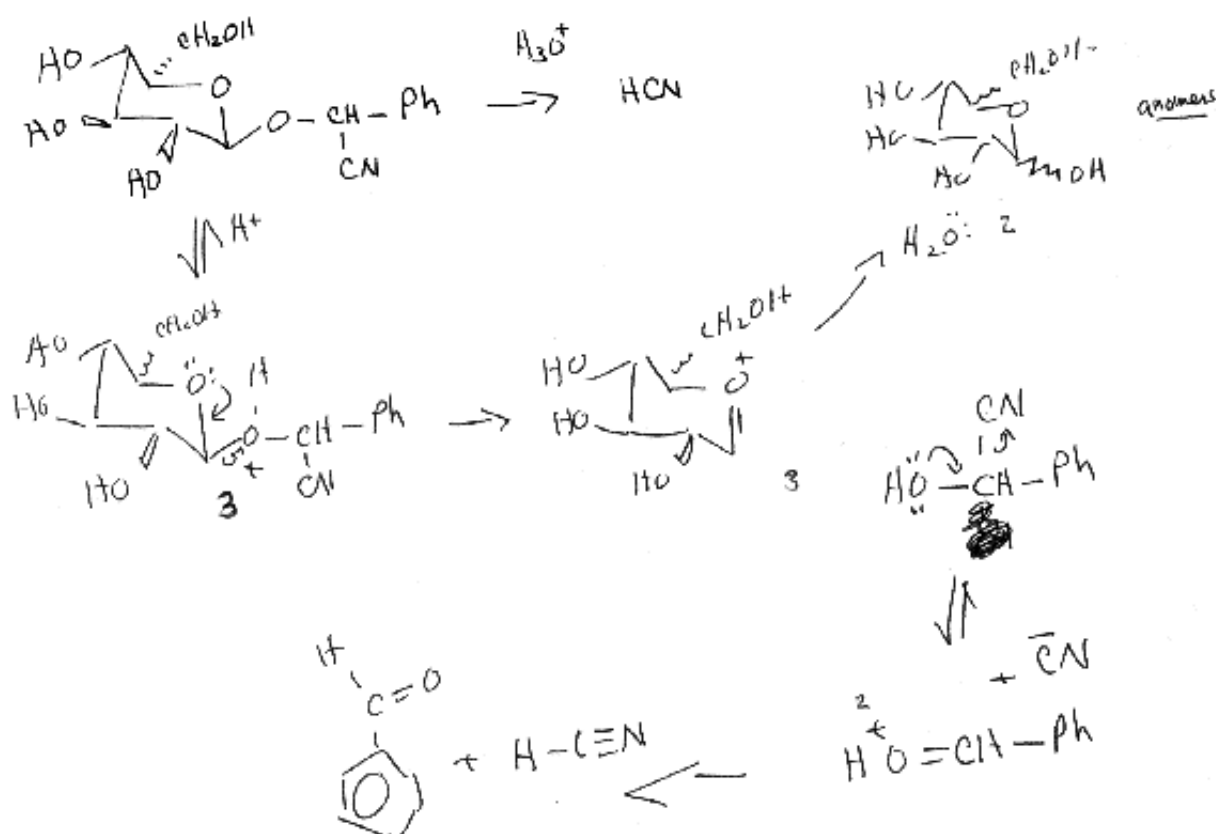


Name: Key (please print)

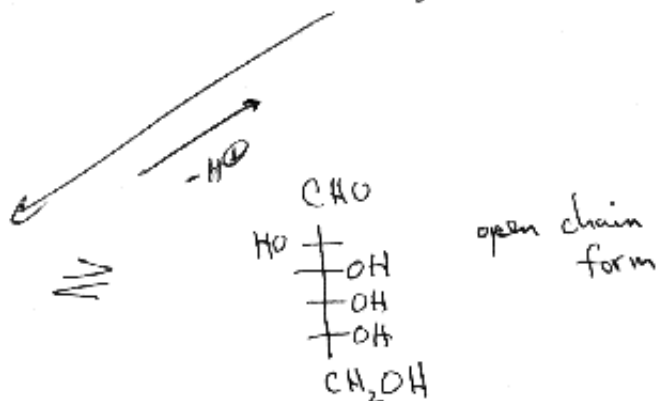
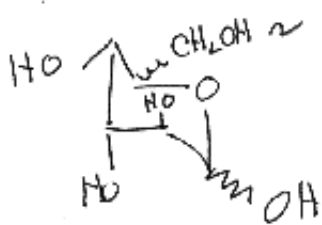
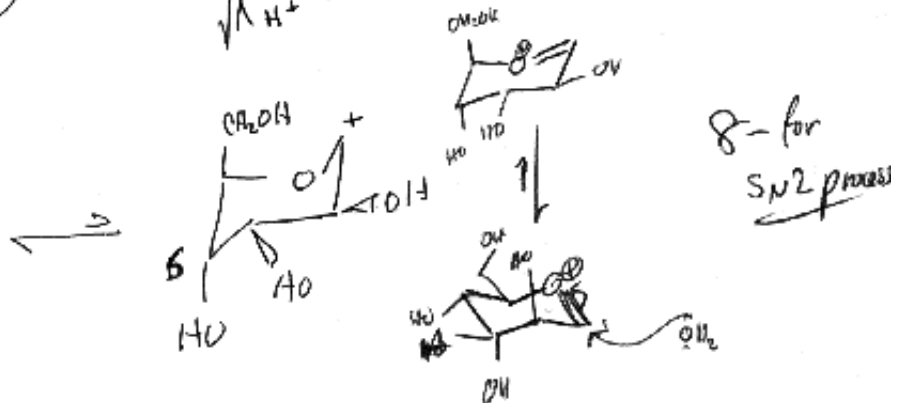
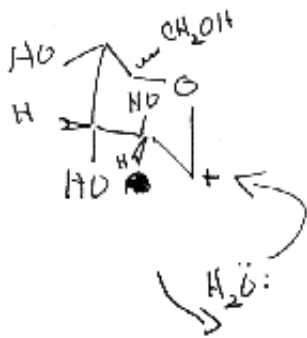
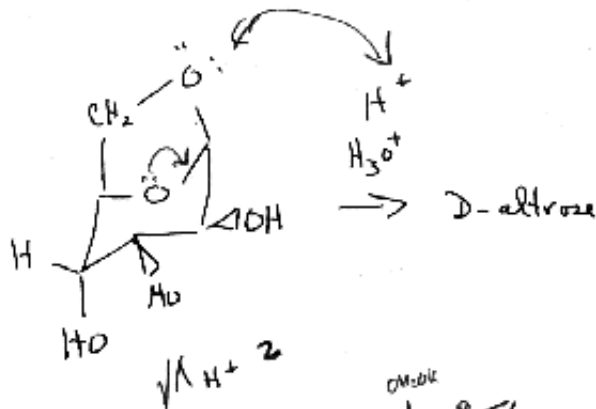
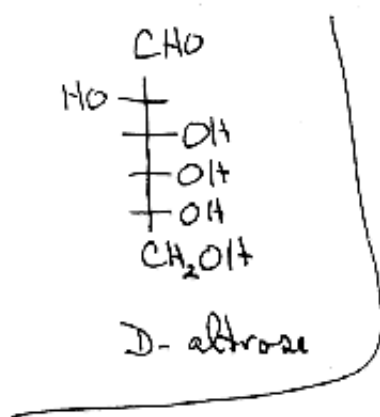
To double check my records, please list the scores of each of your hour exams?

1<sup>st</sup> \_\_\_\_\_ 2<sup>nd</sup> \_\_\_\_\_ 3<sup>rd</sup> \_\_\_\_\_

1. (10 pts) Laetril is a glycoside. When it undergoes acidic hydrolysis, HCN is produced. Suggest a mechanism?



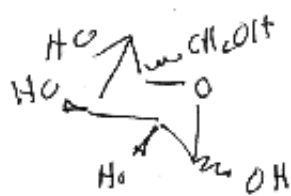
2. (10 pts) D-Altrosan is converted into D-altrose by  $H_3O^+$ ; what is the mechanism?



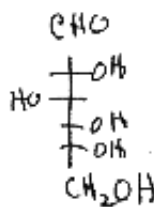
both  $\alpha$  &  $\beta$  anomers

D-altrose

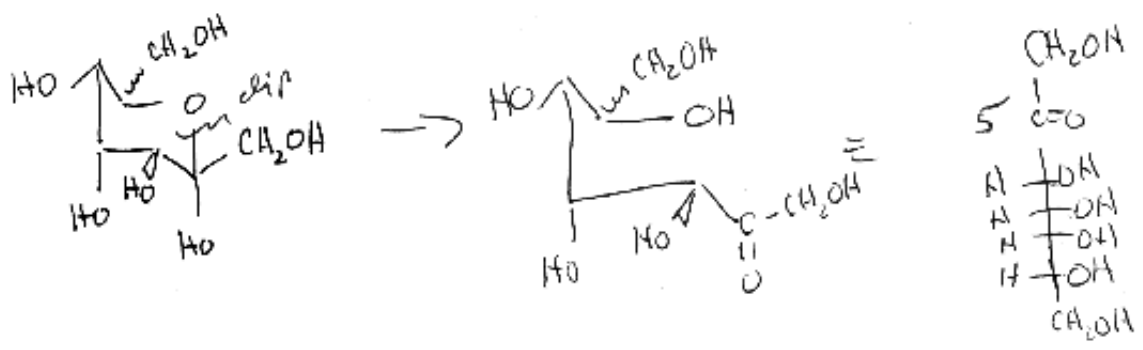
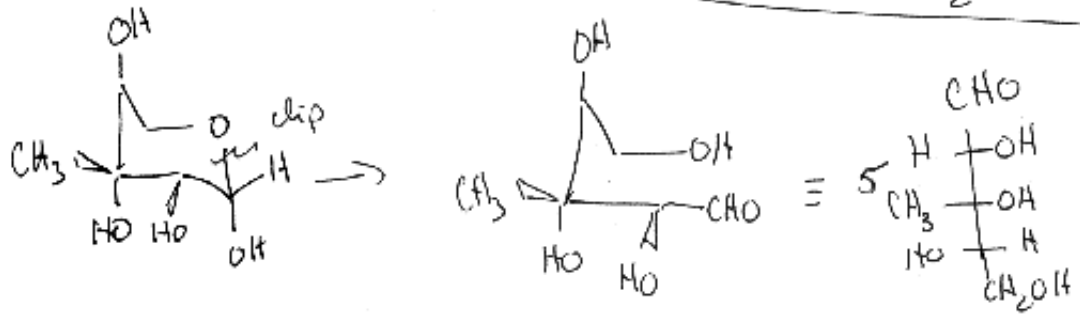
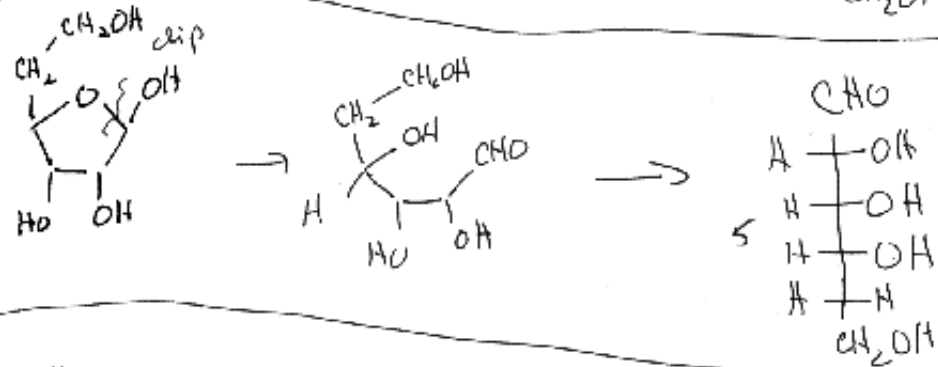
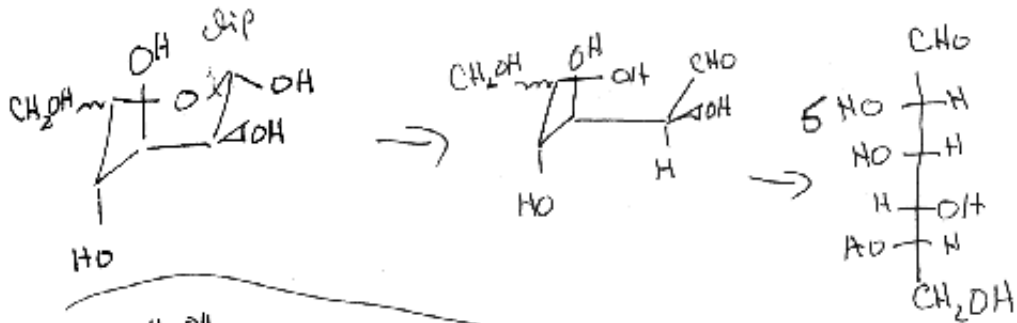
Glucose is



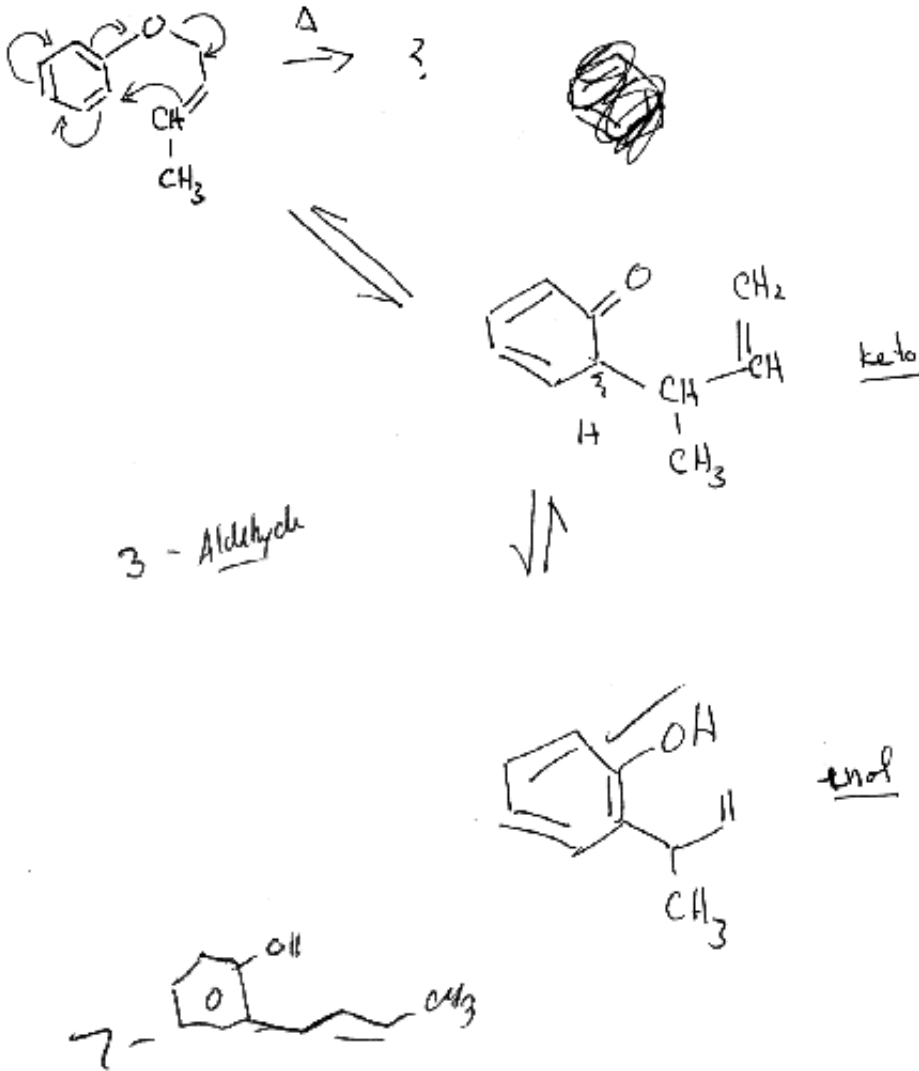
$\rightleftharpoons$



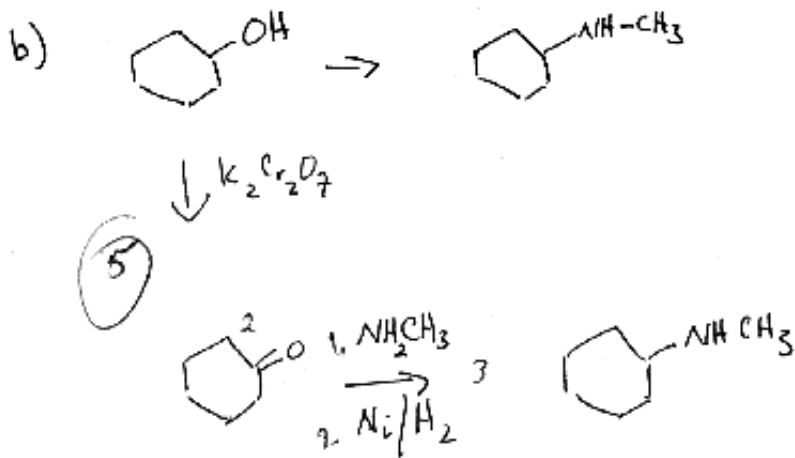
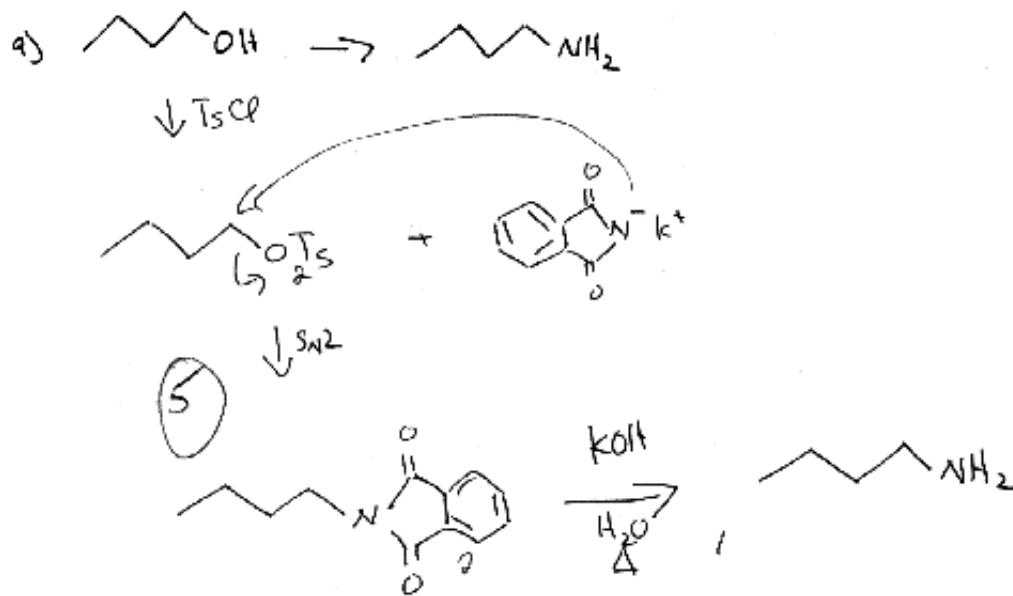
3. (20 pts) Write the Fischer projection formula of the open chain form of each of the following



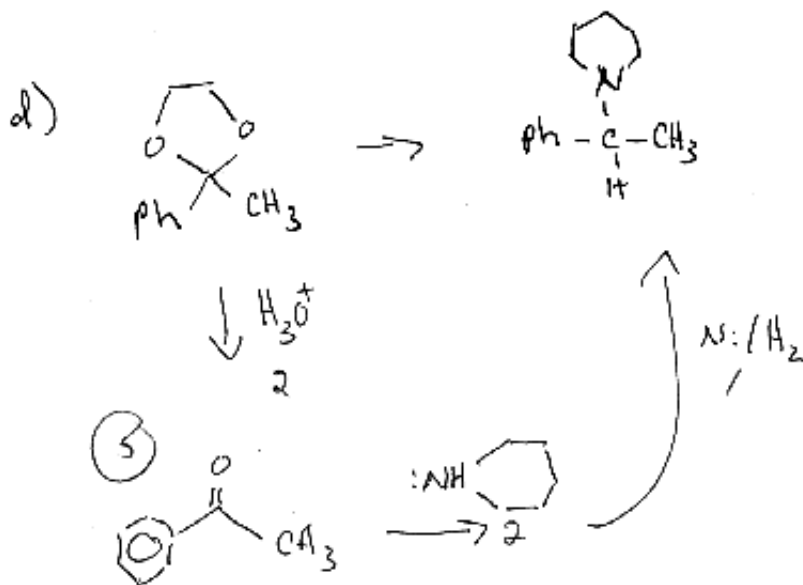
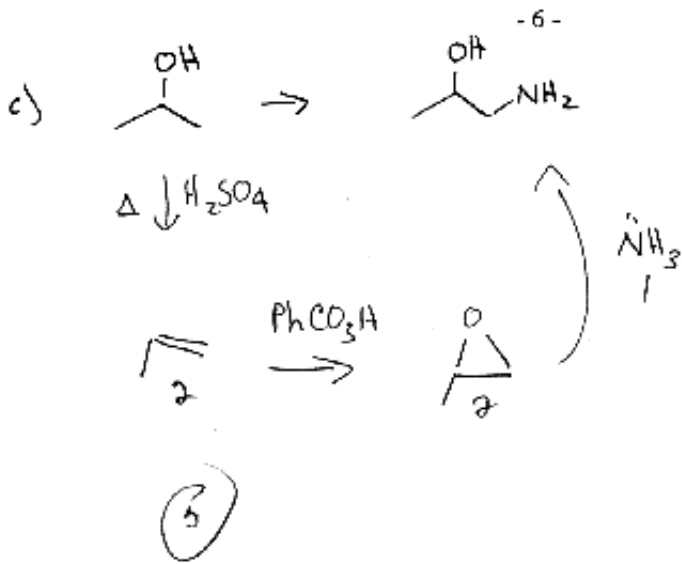
4. (10 pts) What is the product of the Claisen rearrangement of  $C_6H_5-O-CH_2CH=CHCH_3$ ?



5. (20 pts) Carry out the following transformations.

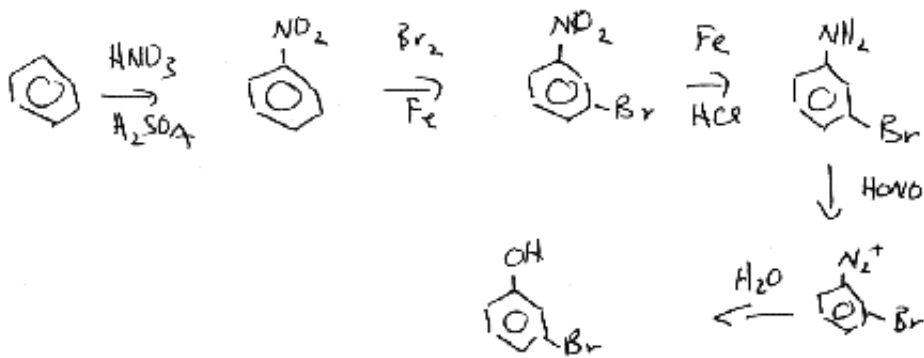


Amion Addition - 3

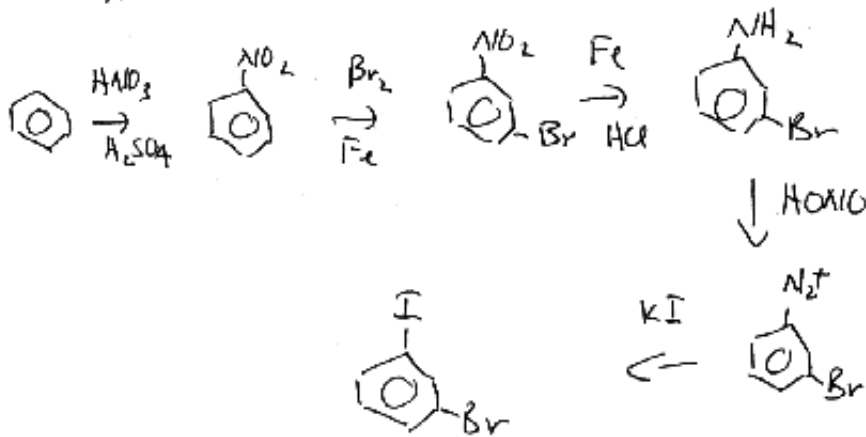


6. (20 pts) Carry out the following transformations

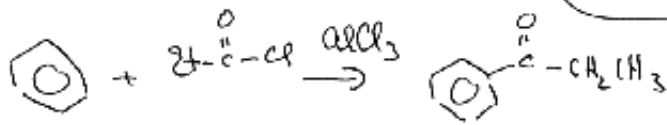
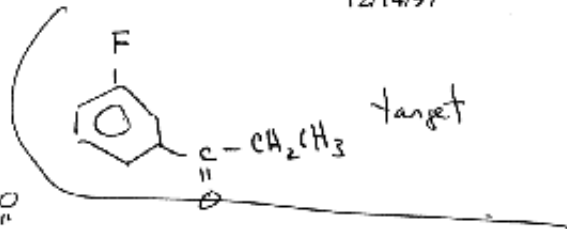
a)  $C_6H_6 \rightarrow$  *meta*-bromophenol



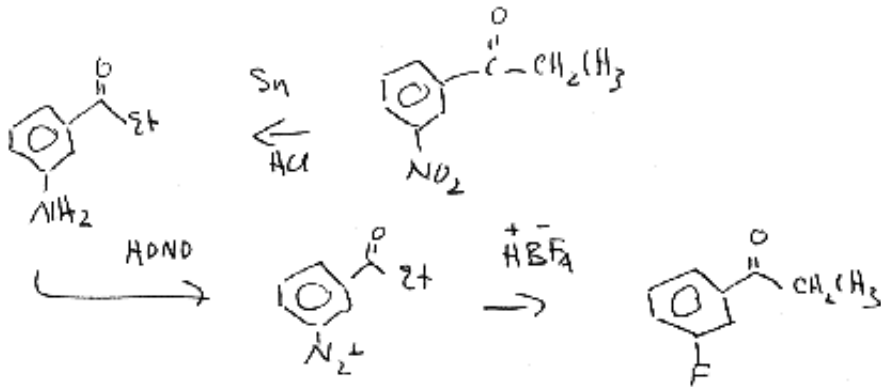
*brano*  
b)  $C_6H_6 \rightarrow$  *meta*-iodobenzene



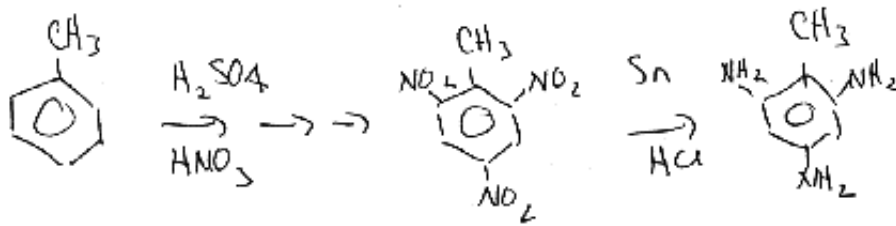
c)  $C_6H_6 \rightarrow$  ethyl *meta*-fluorophenyl ketone



$H_2SO_4 / HNO_3$

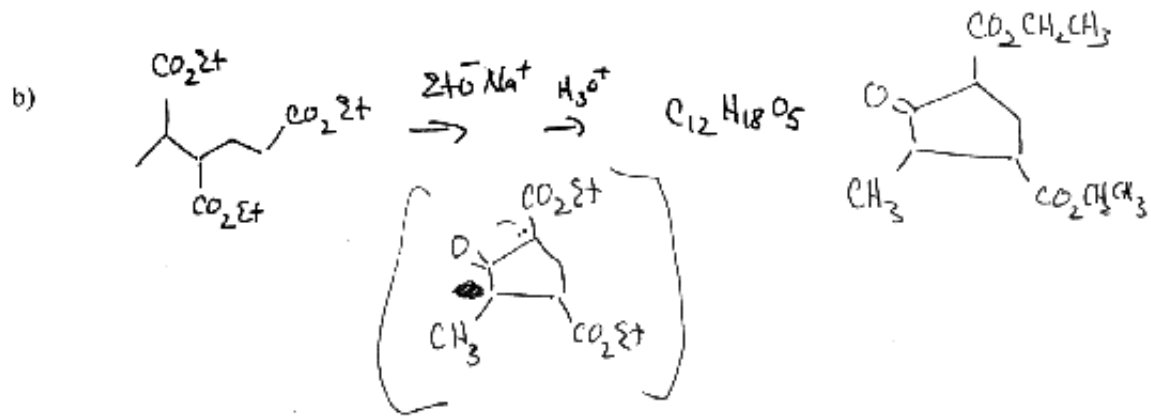
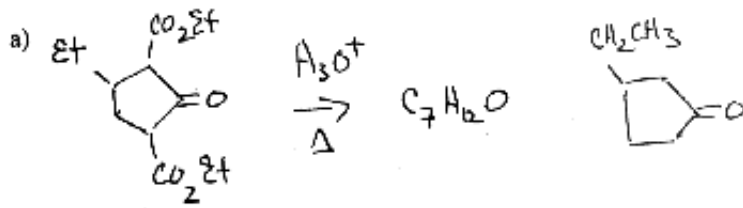


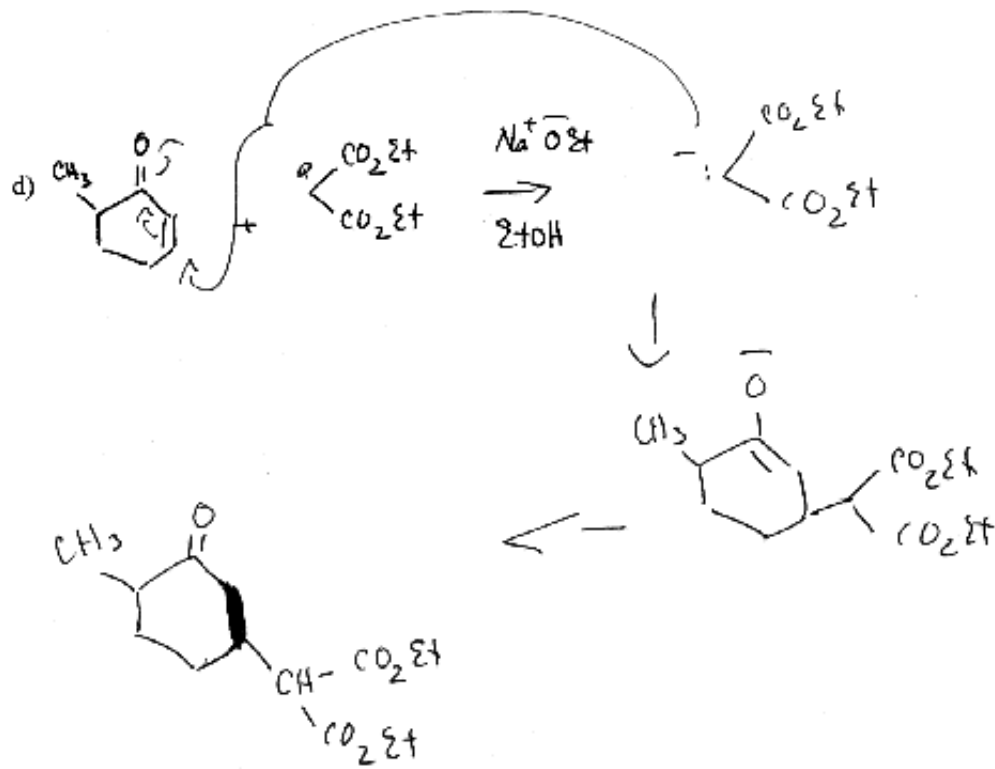
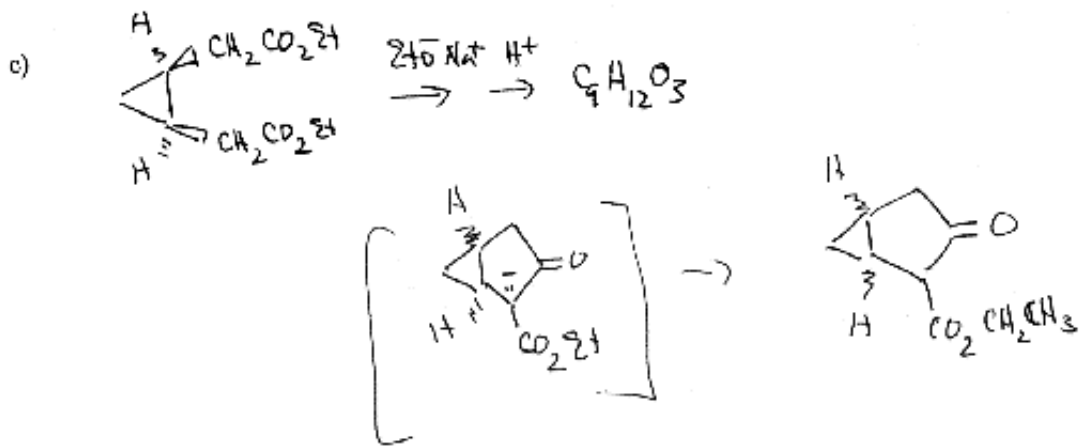
d) toluene  $\rightarrow$  1, 3, 5-triaminotoluene



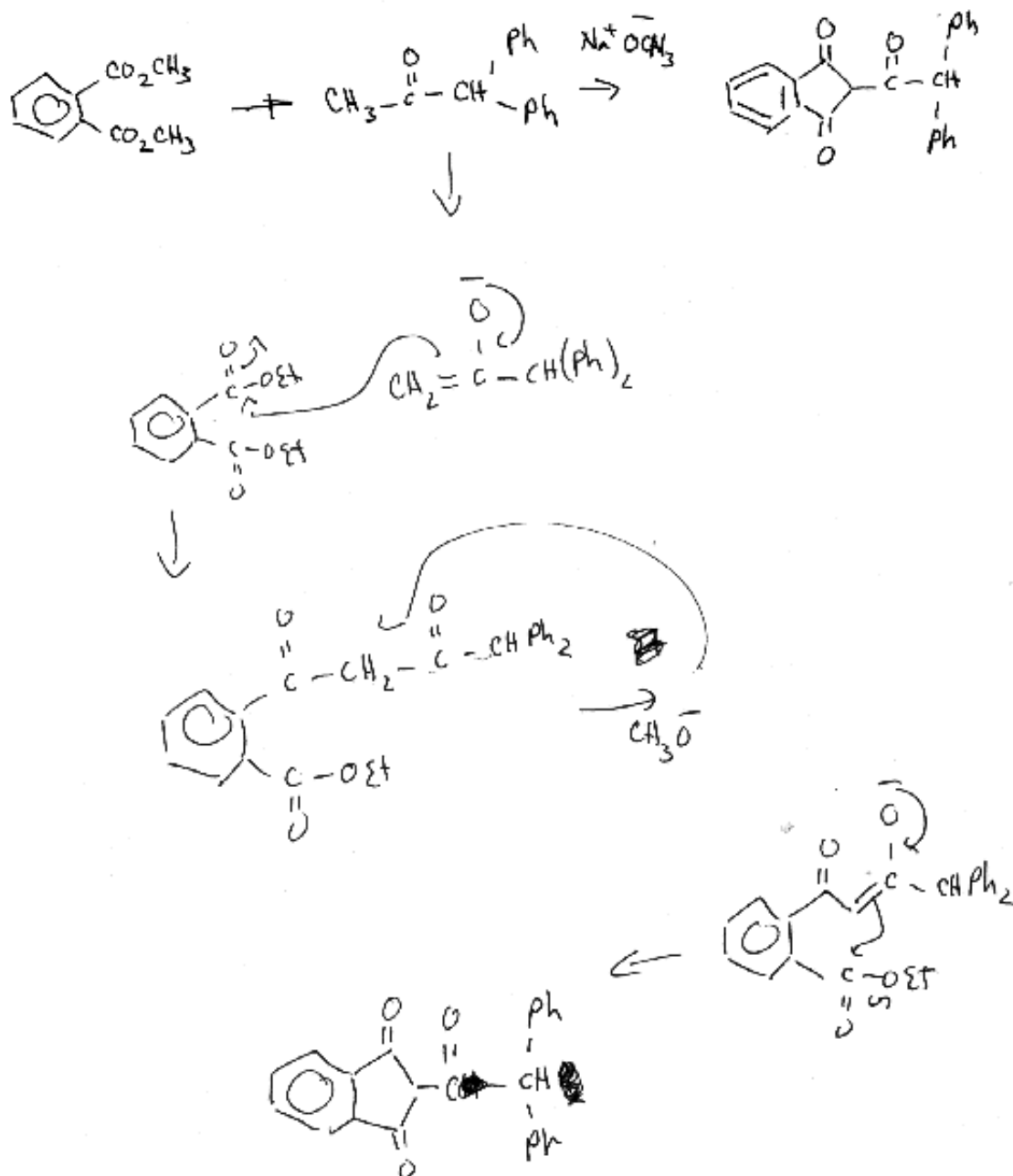


7. (20 pts) Give the structure of the principal organic product of each

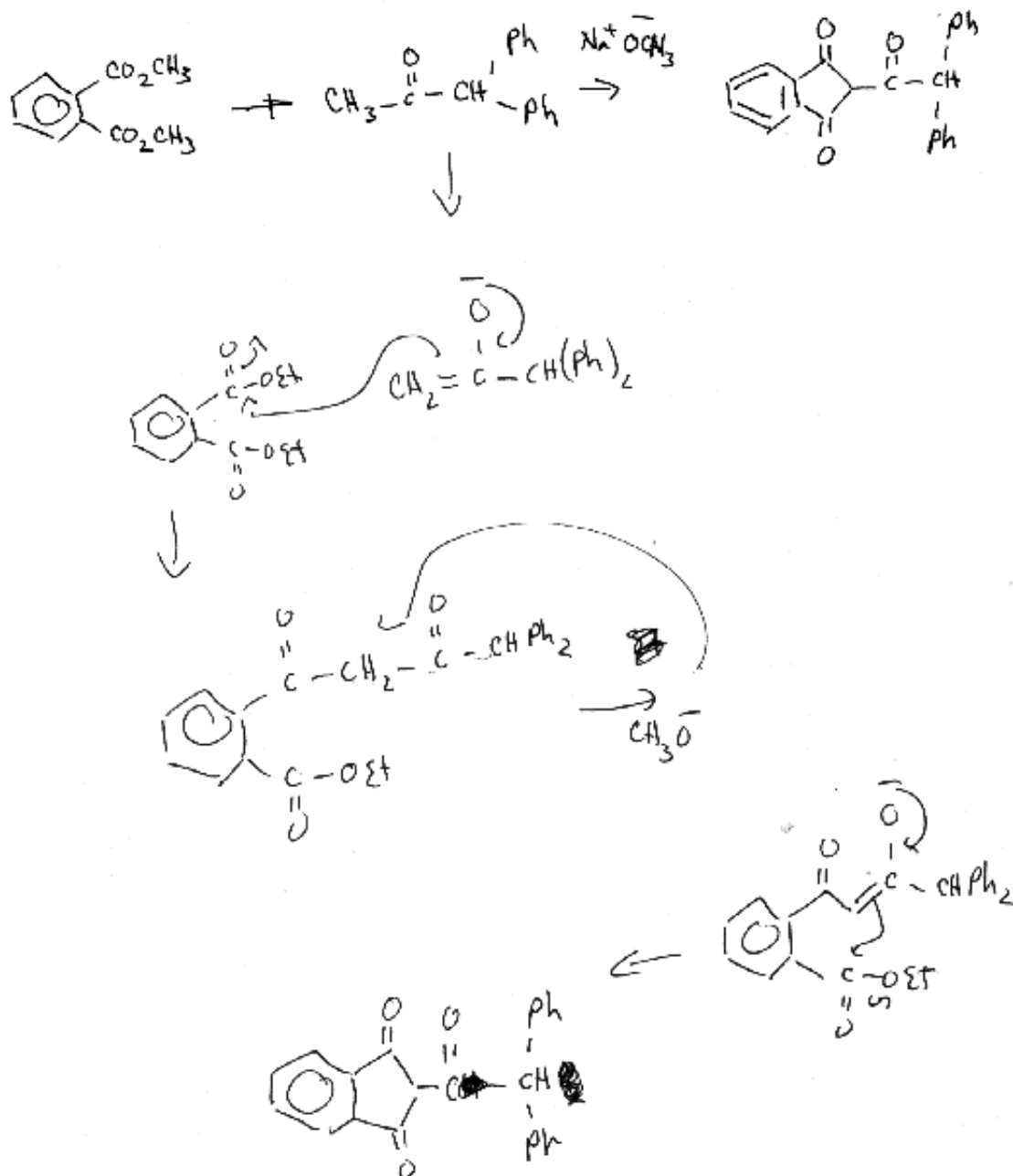




8. (10 pts) When 1,1-diphenylacetone and dimethyl-1,2-benzene dicarboxylate are heated with base, diphenadione is formed. What is the mechanism?

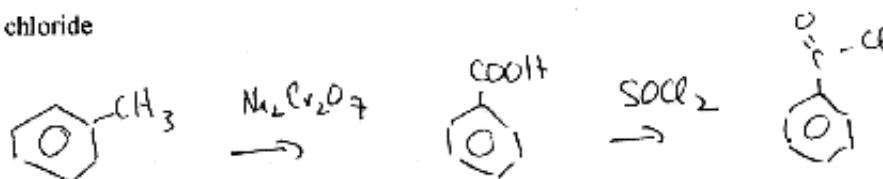


8. (10 pts) When 1,1-diphenylacetone and dimethyl-1,2-benzene dicarboxylate are heated with base, diphenadione is formed. What is the mechanism?

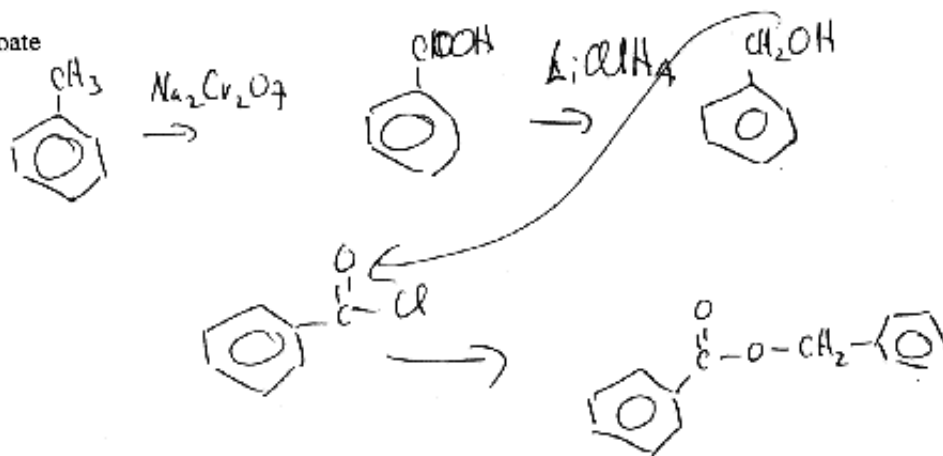


9. (20 pts) Using toluene as the ultimate source of all the carbon, show how to prepare:

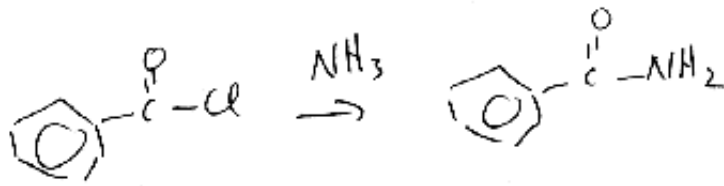
a) benzoyl chloride



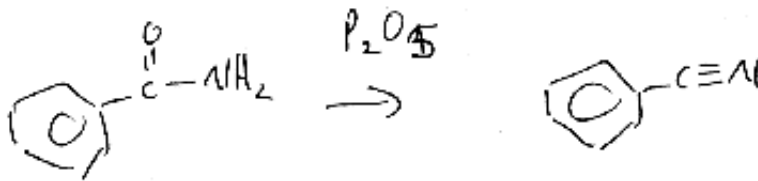
b) benzyl benzoate



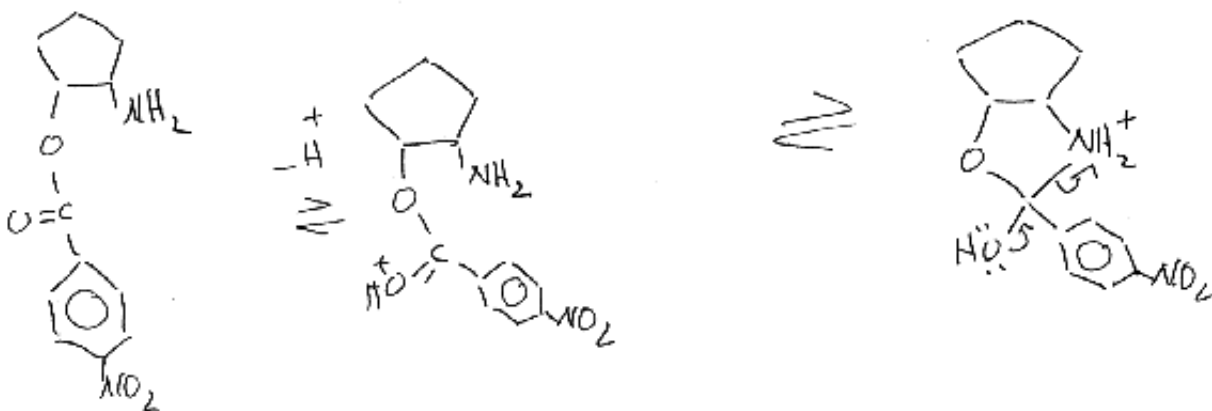
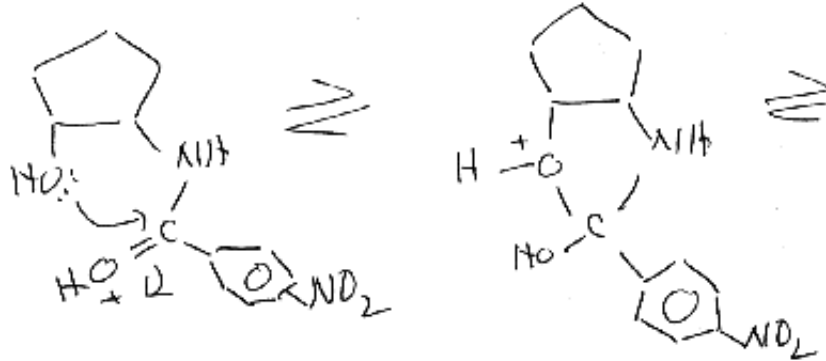
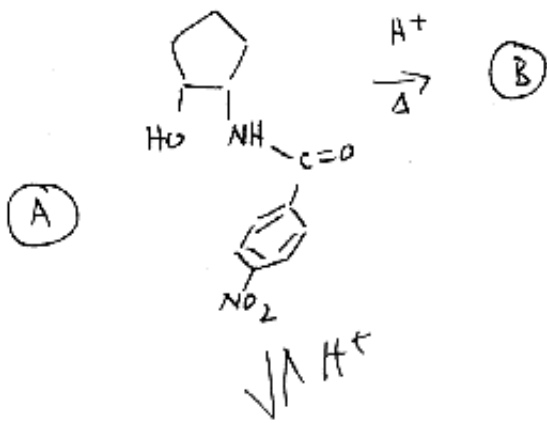
c) benzamide



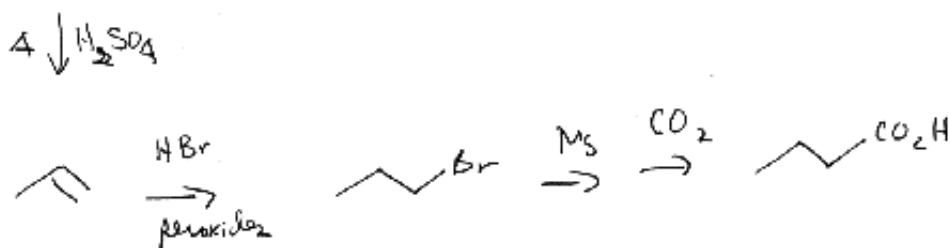
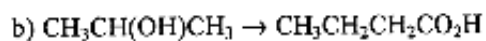
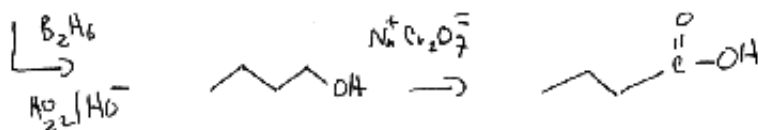
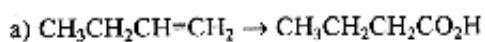
d) benzonitrile



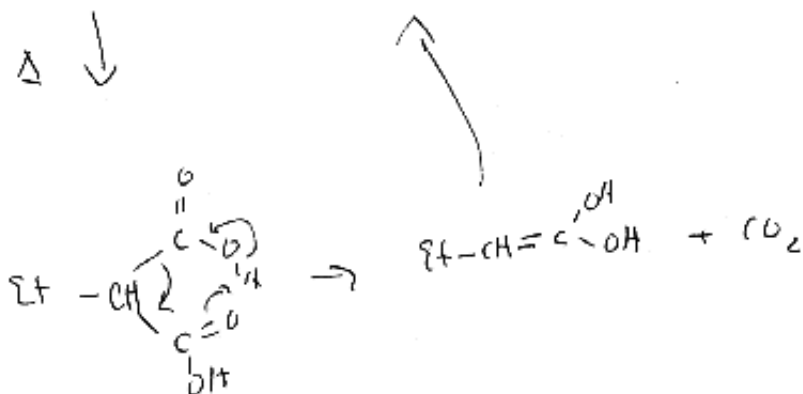
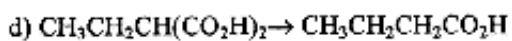
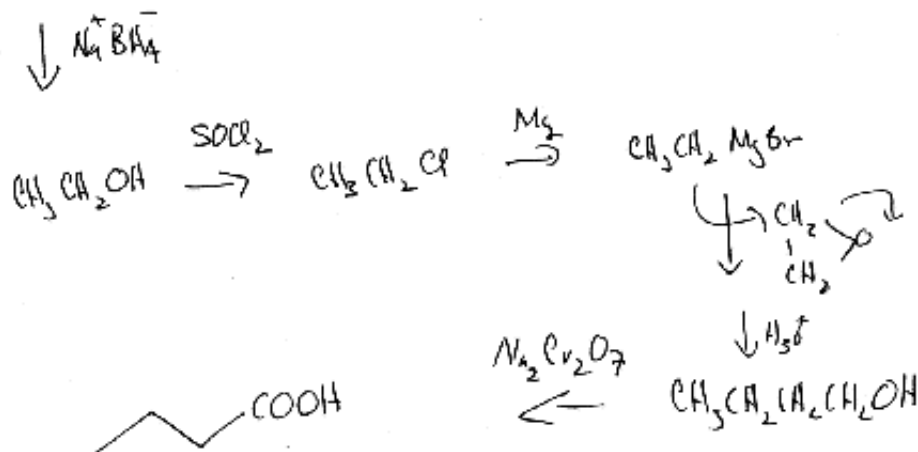
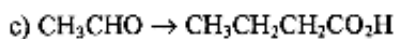
10. (10 pts) When compound A is heated in dilute HCl, it is converted to a constitutional isomer, B. What is B? How is it formed?



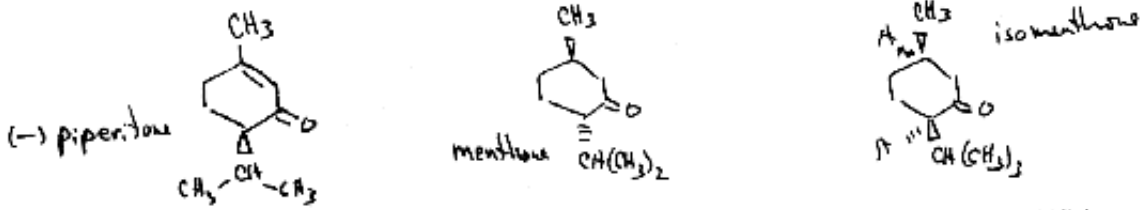
11. (20 pts) Propose methods to carry out the following conversions.



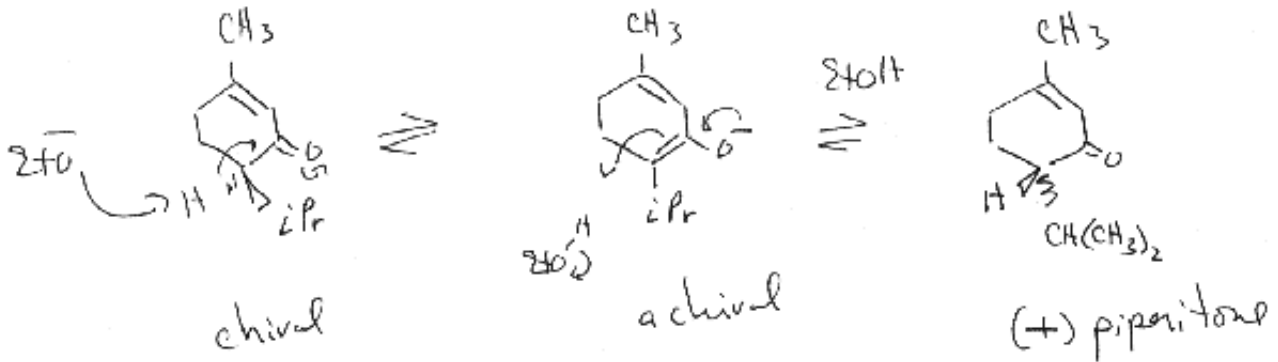




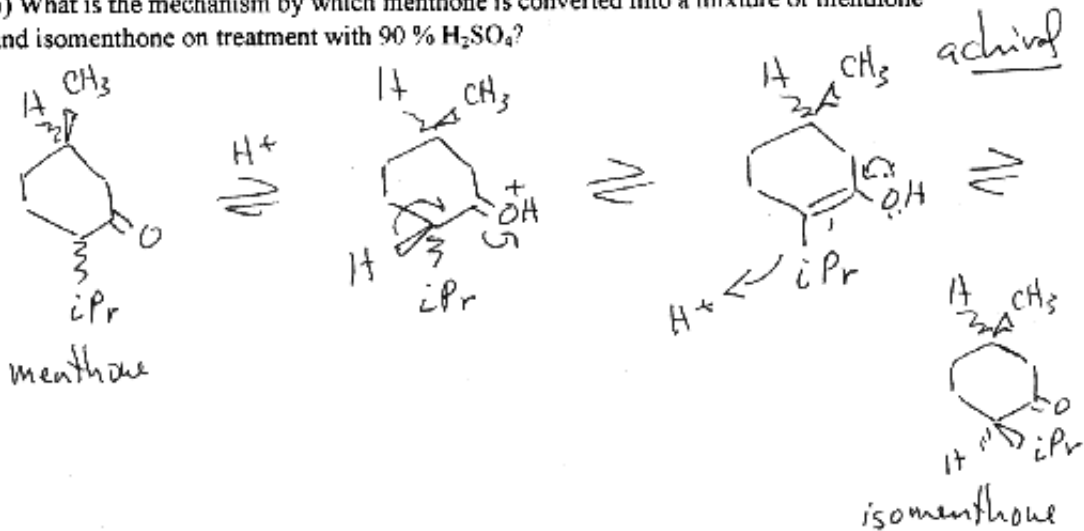
12. (10 pts) Consider the ketones piperitone, menthone, and isomenthone.



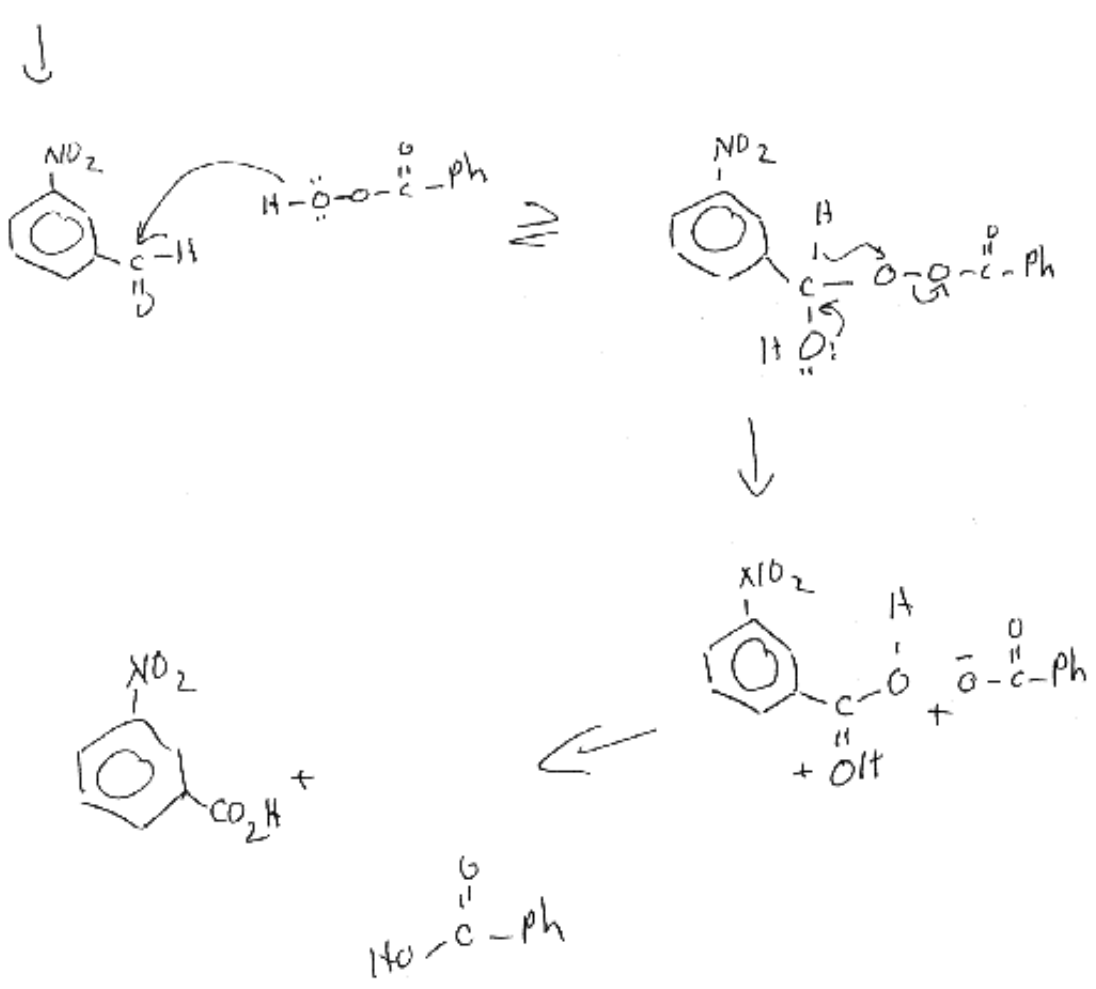
a) What is the mechanism by which an optically pure sample of piperitone ( $\alpha_D = -32^\circ$ ) is converted into racemic piperitone on standing in a solution of  $\text{CH}_3\text{CH}_2\text{O}^- \text{Na}^+/\text{EtOH}$ ?



b) What is the mechanism by which menthone is converted into a mixture of menthone and isomenthone on treatment with 90%  $\text{H}_2\text{SO}_4$ ?



13. (10 pts) When *meta*-nitrobenzaldehyde undergoes a Bayer-Villiger oxidation, *meta*-nitrobenzoic results. What is the mechanism?



14. (10 pts) When the *p*-toluenesulfonate shown undergoes an intramolecular Williamson reaction on treatment with base, a spirocyclic ether is formed. What is the product and how is it formed?

