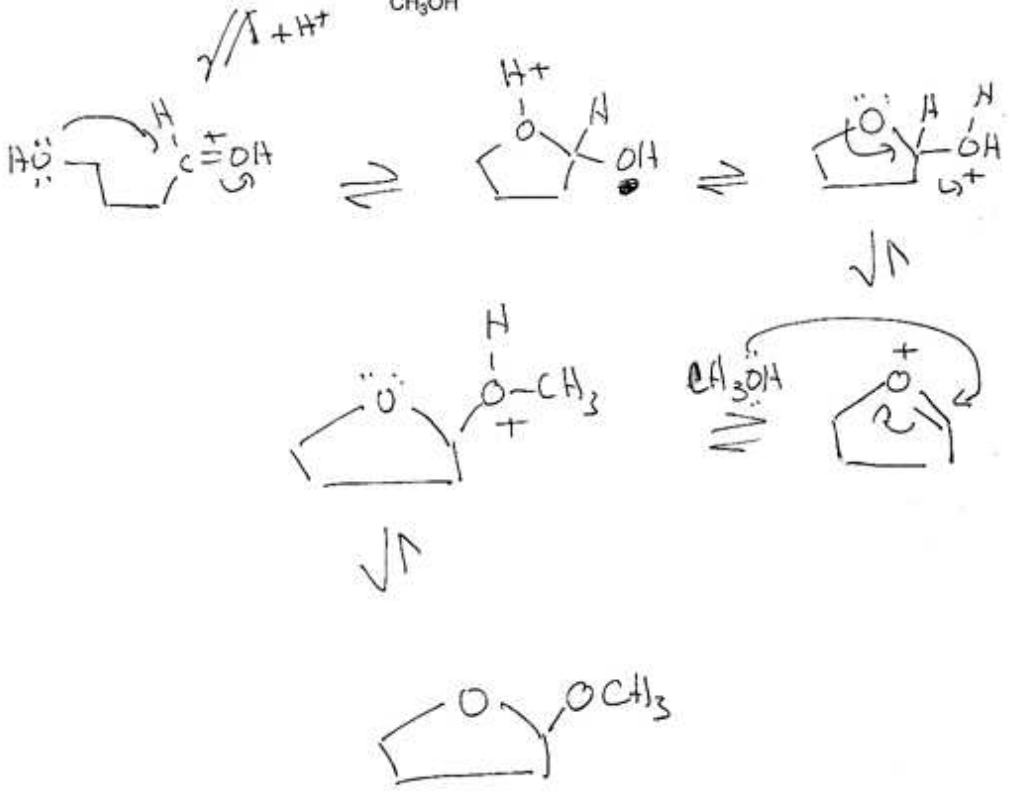
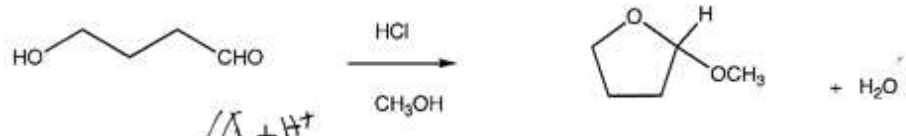


Avg 99.8 -1-  
 Low 60  
 High 145

Chemistry 3371-100  
 Organic Chemistry / Dr. Barney Ellison  
 Final Exam: Wednesday, May 10, 1:30—4:00 PM; Econ 205

Name: Key (please print)

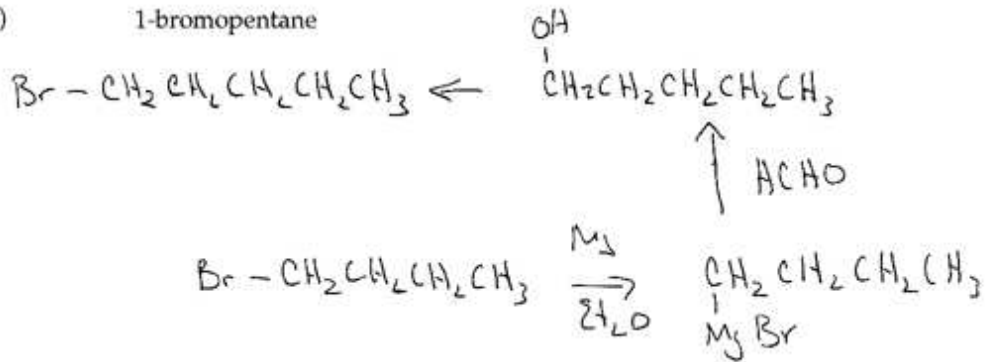
1. (10 pts) Suggest a mechanism for the following reaction.



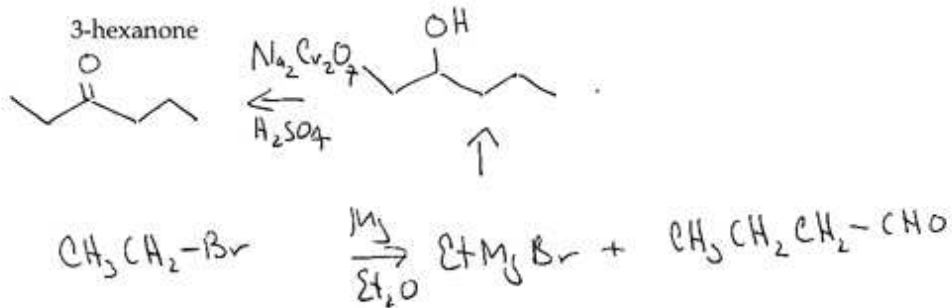
Excess of  $\text{CH}_3\text{OH}$  pushes equilibria to the end.

2. (20 pts) Devise a synthesis of the following compounds that starts from an aldehyde, or a ketone, or an alkyl halide (4 carbons or less) and uses a Grignard reagent.

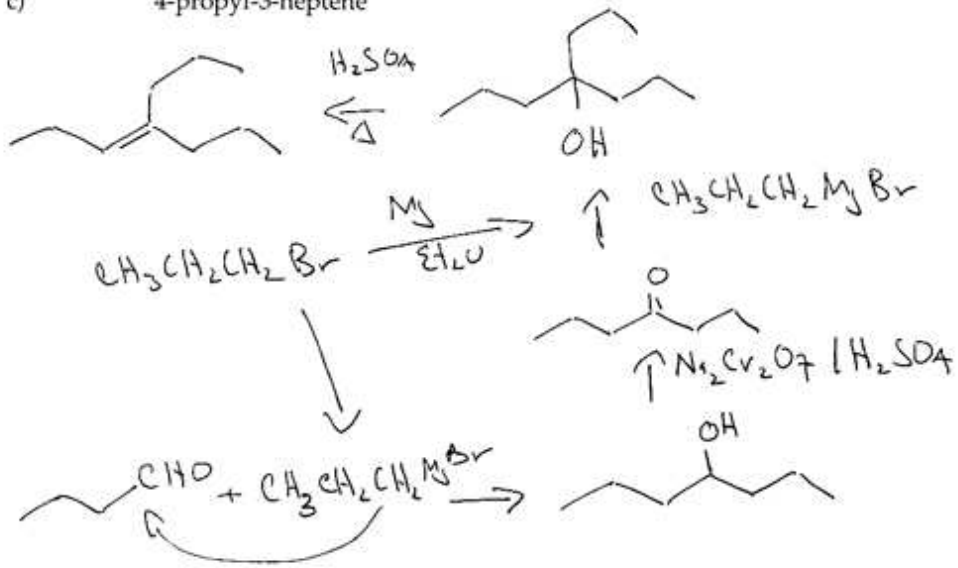
a) 1-bromopentane



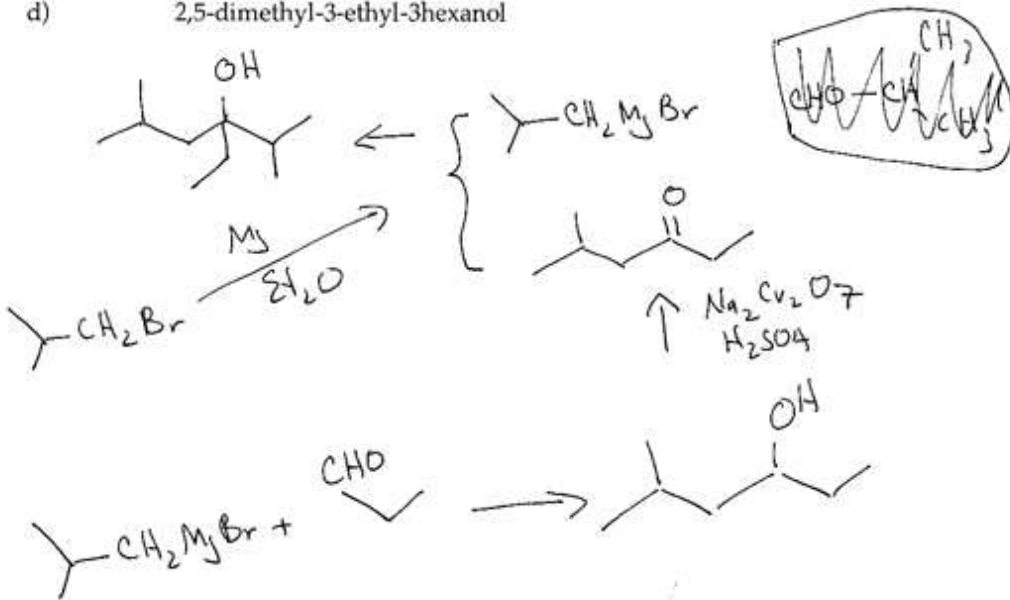
b)



c) 4-propyl-3-heptene

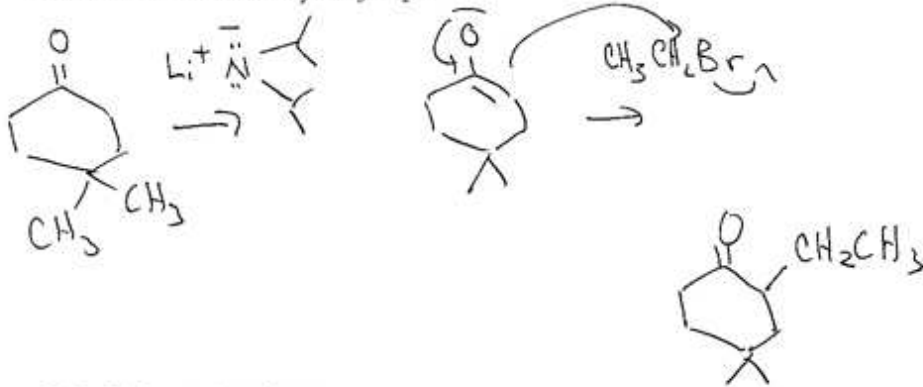


d) 2,5-dimethyl-3-ethyl-3-hexanol

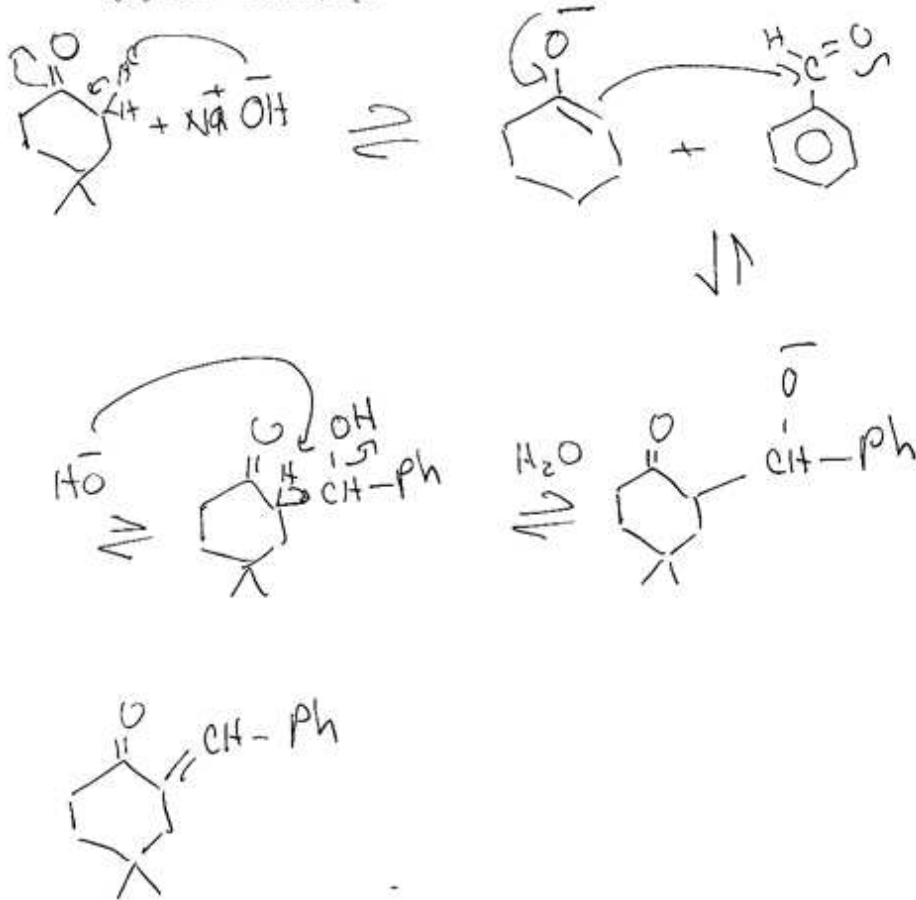


3. (10 pts) What is the product of the reaction of 4,4-dimethylcyclohexanone with:

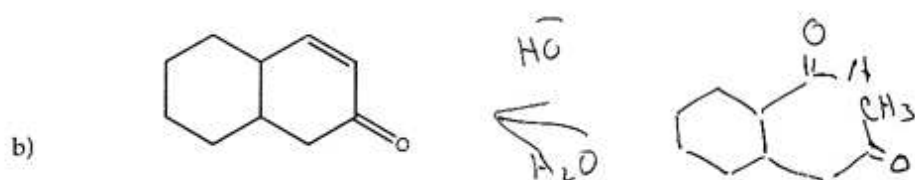
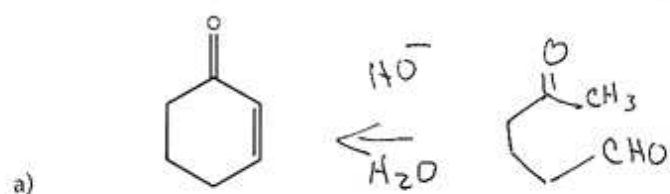
a) LDA in THF followed by  $\text{CH}_3\text{CH}_2\text{Br}$



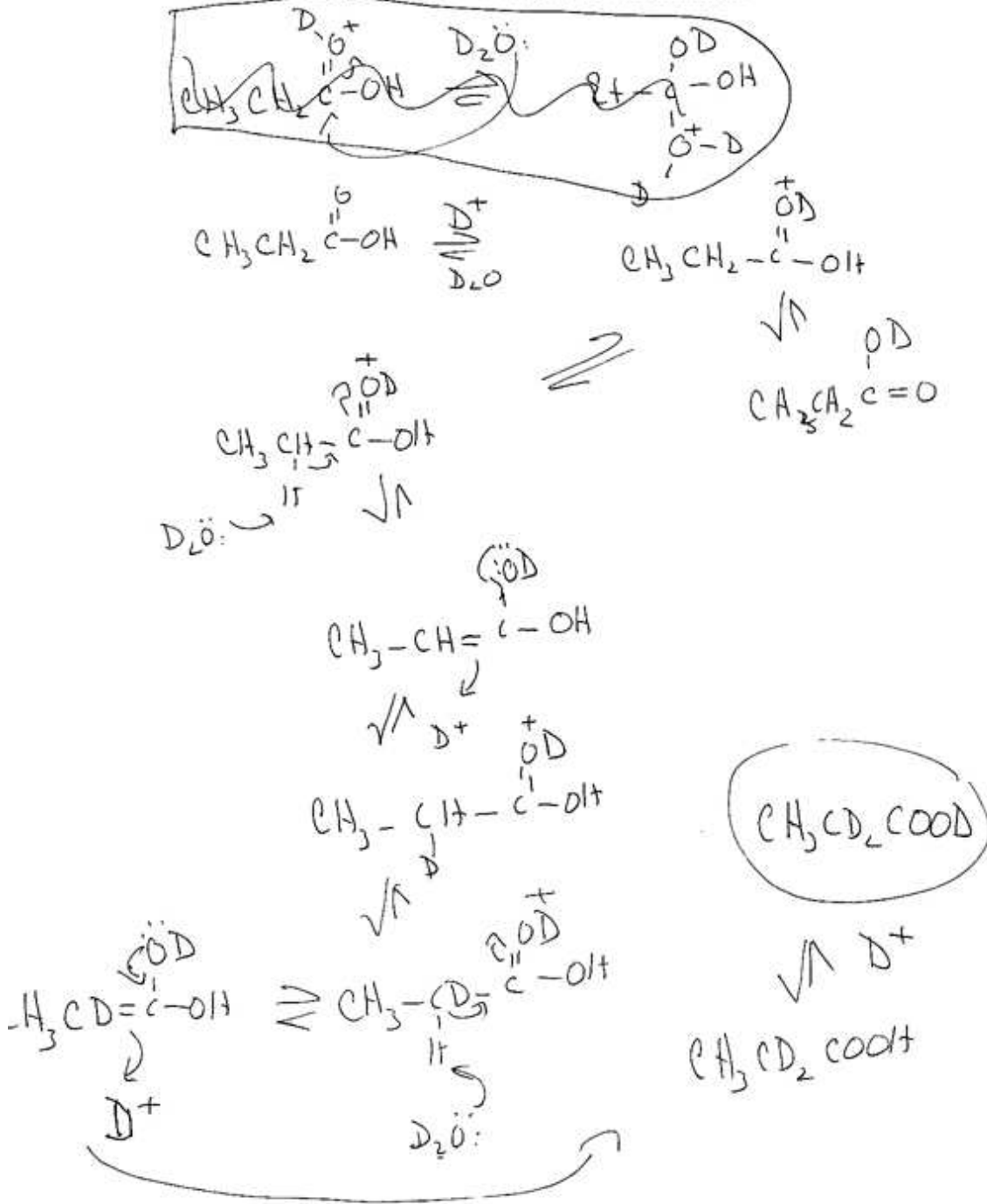
b)  $\text{C}_6\text{H}_5\text{-CHO} + \text{NaOH}/\text{H}_2\text{O}$



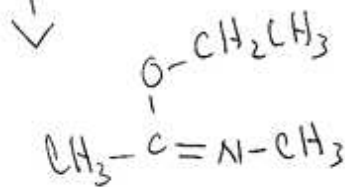
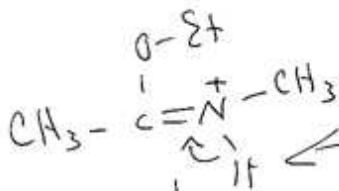
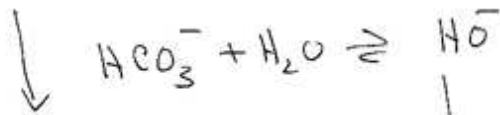
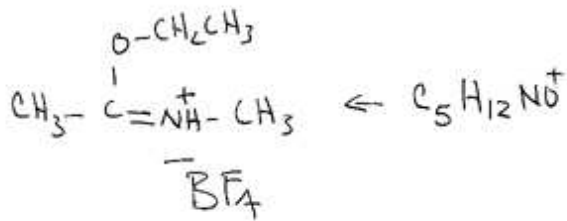
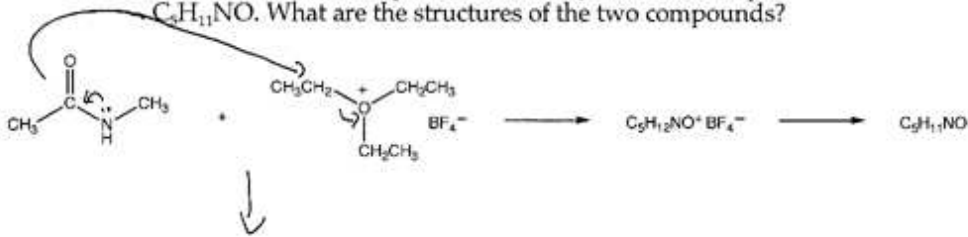
4. (10 pts) Show how the following compounds may be obtained by an intramolecular aldol condensation. Show the precursor in each case.



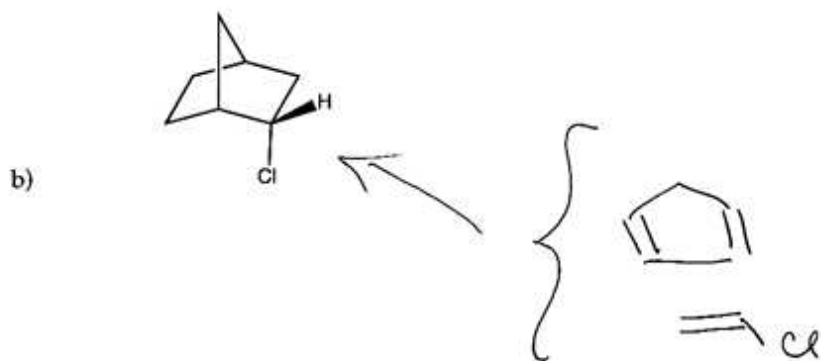
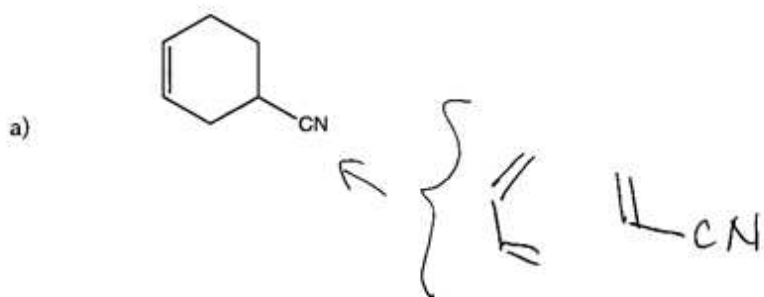
5. (10 pts) On refluxing with D<sub>2</sub>O containing a strong acid, propanoic acid is slowly converted to CH<sub>3</sub>CD<sub>2</sub>COOD. Write a plausible mechanism.



6. (10 pts) N-methylacetamide reacts with the  $\text{Et}_3\text{O}^+\text{BF}_4^-$  salt to produce a second salt having the empirical formula,  $\text{C}_5\text{H}_{12}\text{NO}^+\text{BF}_4^-$ . When this salt is treated with dilute base, aqueous  $\text{Na}^+\text{HCO}_3^-$ , a neutral product is formed,  $\text{C}_5\text{H}_{11}\text{NO}$ . What are the structures of the two compounds?

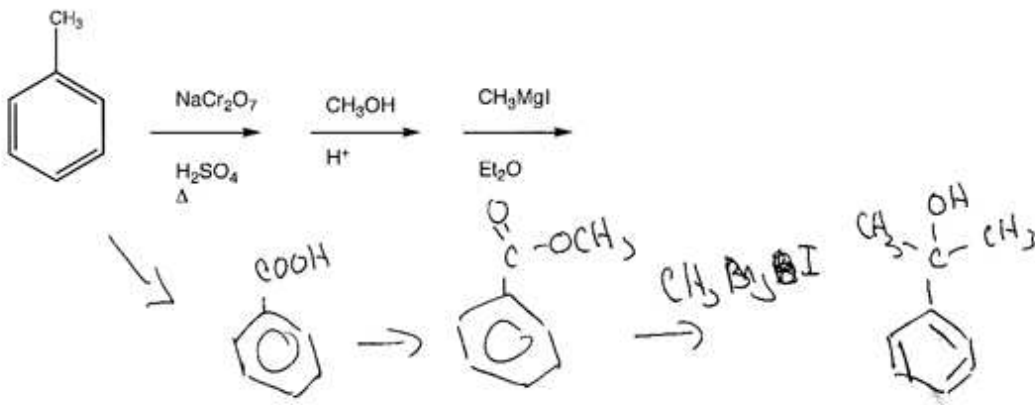
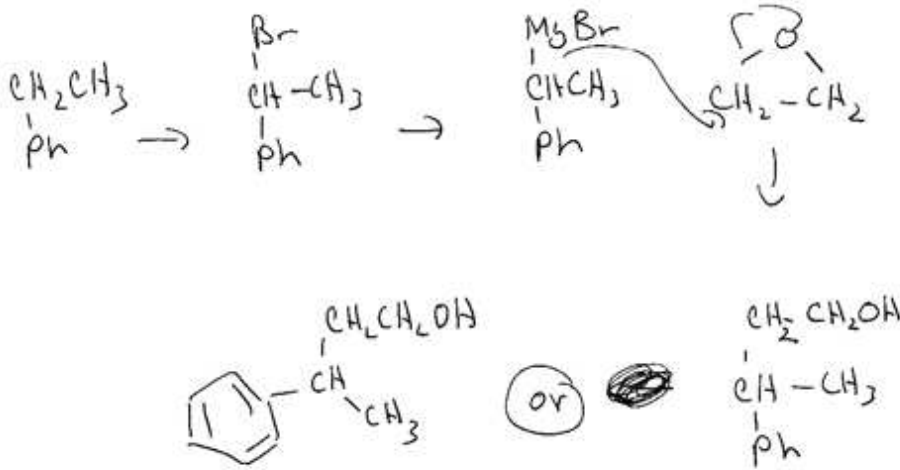
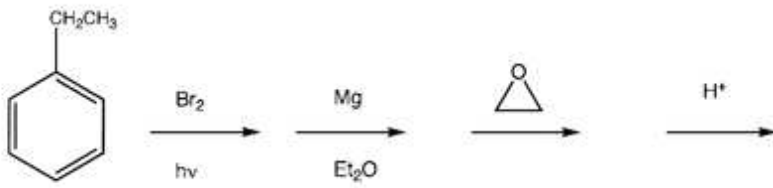


7. (10 pts) What diene and dienophile produce the following Diels-Alder adducts?

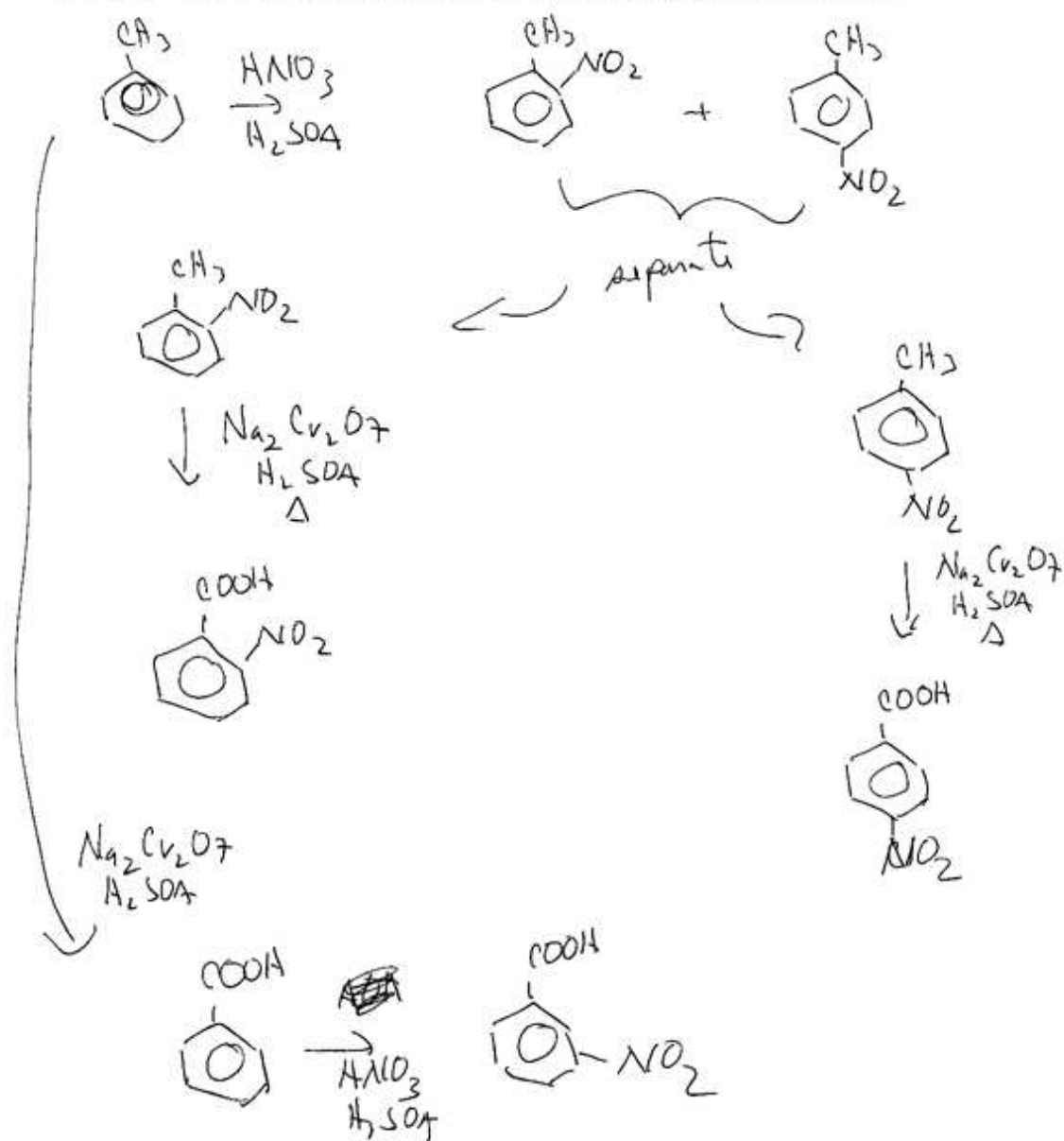




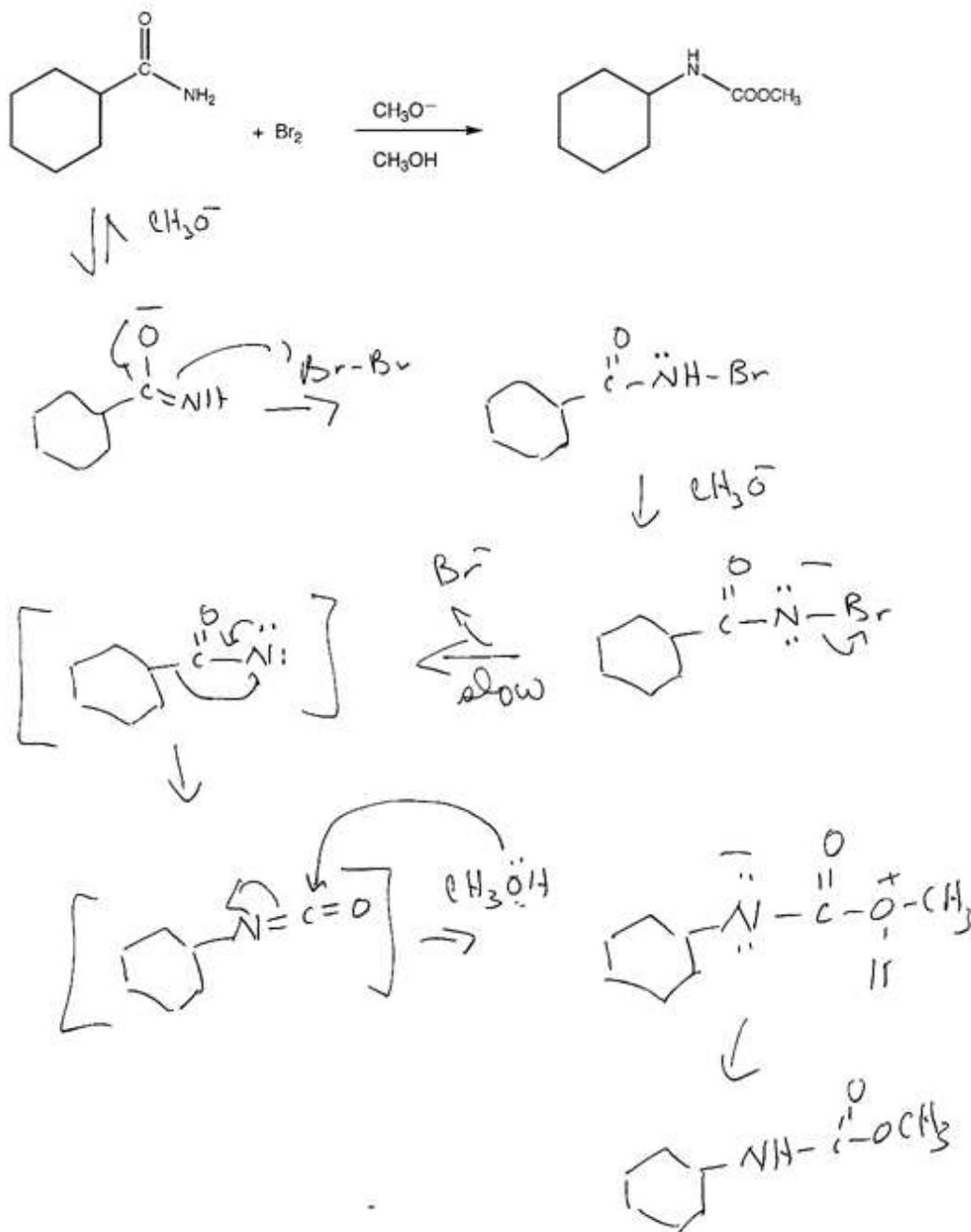
8. (10 pts) Give the principal product of the following reactions.



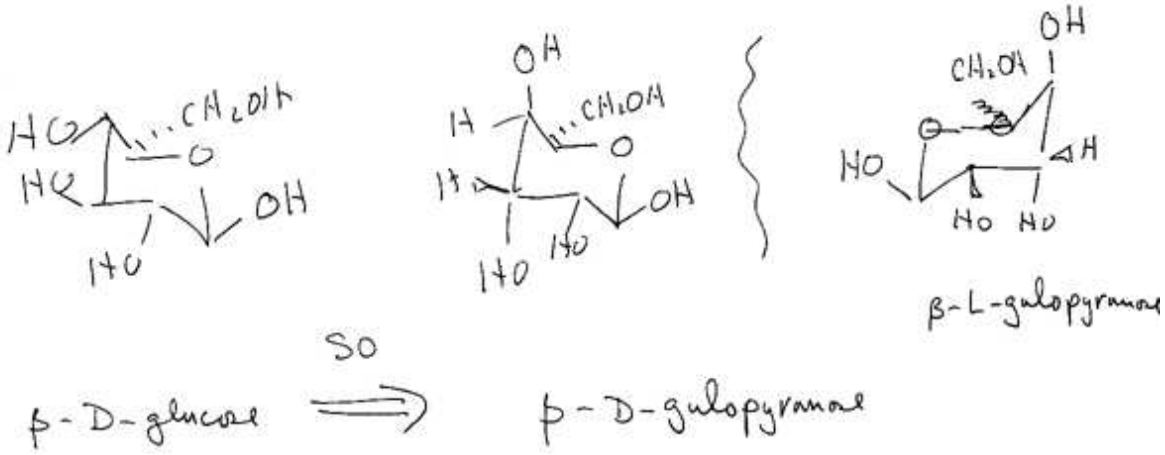
9. (10 pts) Show how all three nitrobenzoic acids can be prepared from toluene.



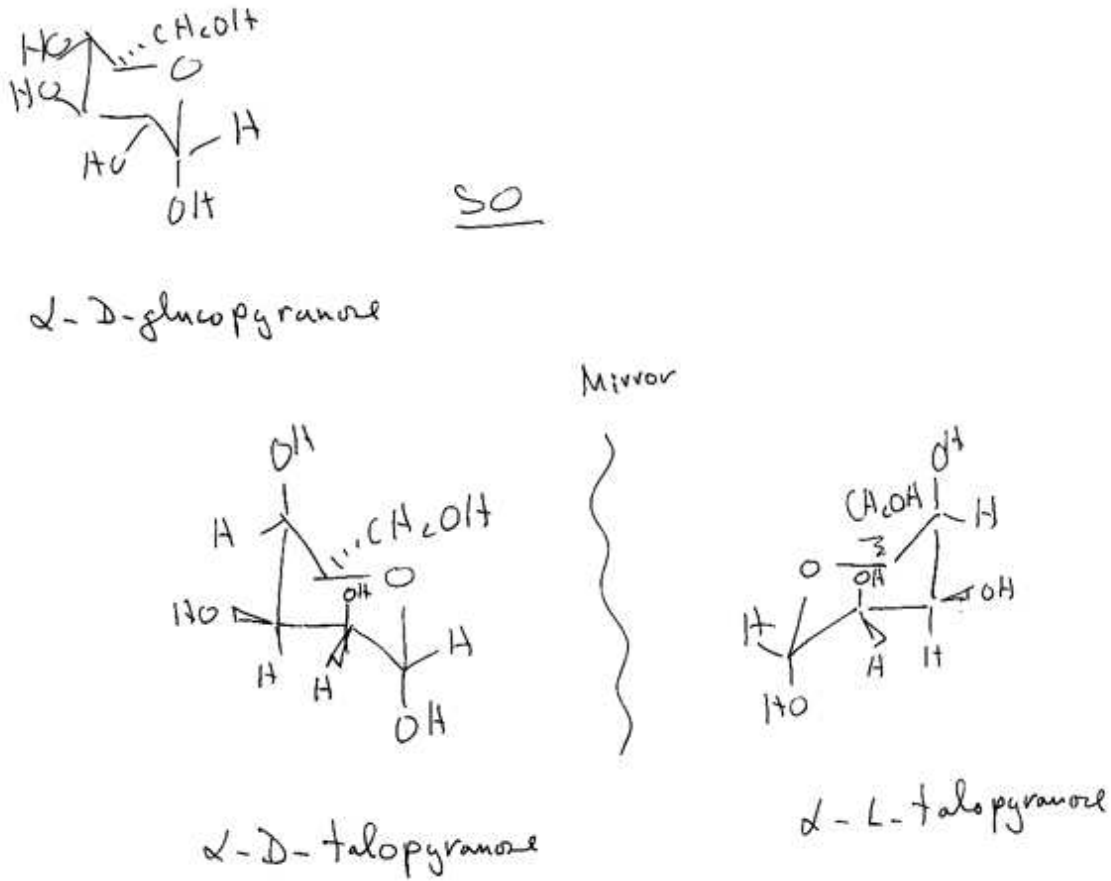
10. (10 pts) When cyclohexanecarboxamide is treated with bromine and sodium methoxide in methanol, the product obtained is methyl-N-cyclohexylcarbamide. What is the mechanism?



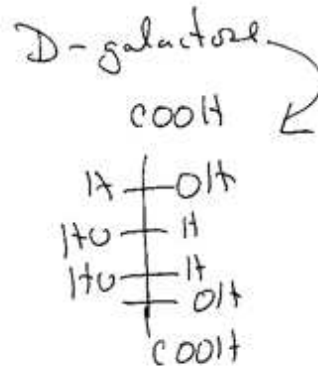
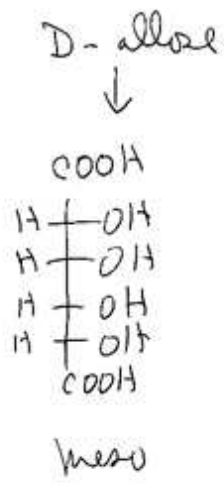
11. (20 pts) Write the chair formulae for  $\beta$ -D-gulopyranose and  $\beta$ -L-gulopyranose.



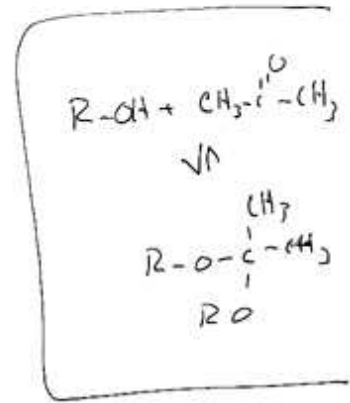
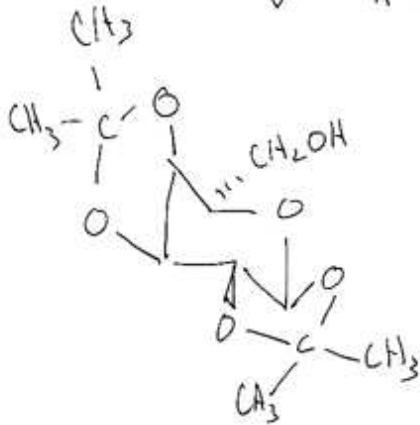
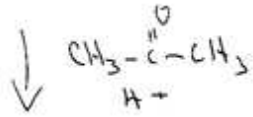
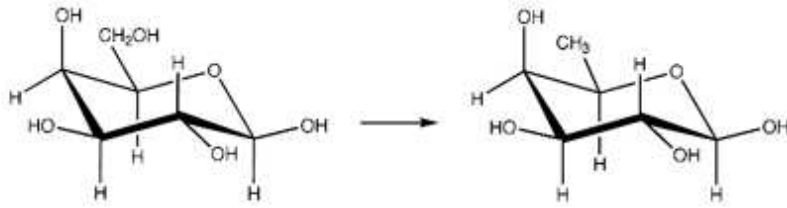
Do the same for  $\alpha$ -D-talopyranose and  $\alpha$ -L-talopyranose.



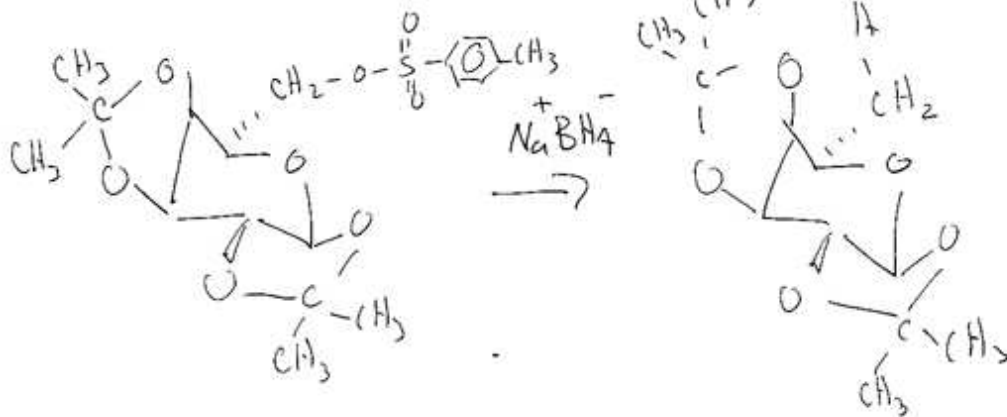
12. (10 pts) Which hexoses give meso saccharic acids on oxidation by nitric acid?

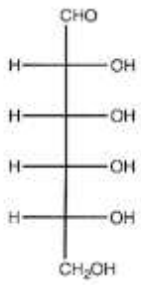


13. (10 pts) Suggest a method for the synthesis of 6-deoxygalactose from galactose. (hint: use acetone as a masking agent)

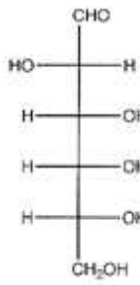


$\text{H}_3\text{O}^+$

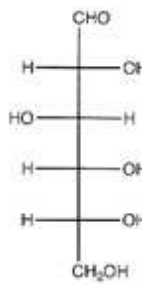




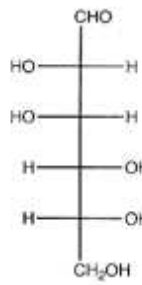
D-Allose



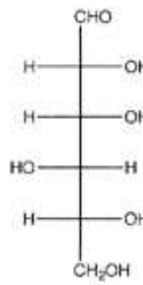
D-Altrose



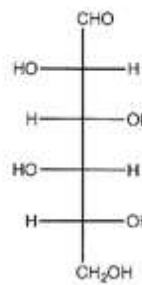
D-Glucose



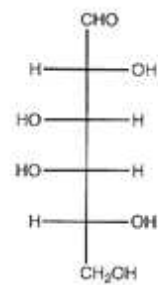
D-Mannose



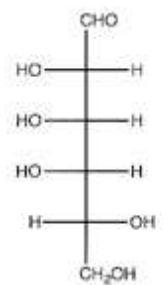
D-Gulose



D-Idose



D-Galactose



D-Talose