

Chemistry 3331-001 **Final Exam**

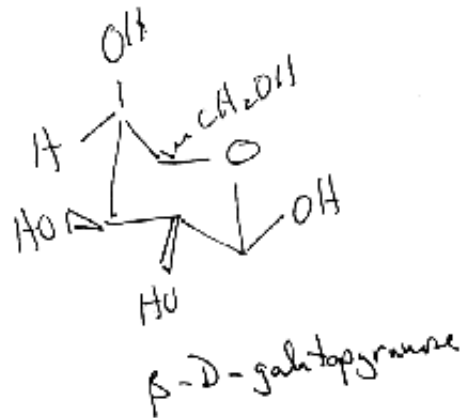
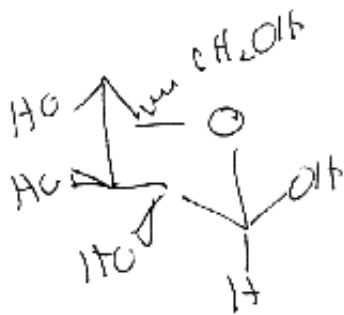
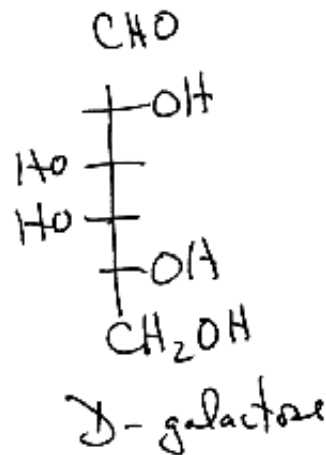
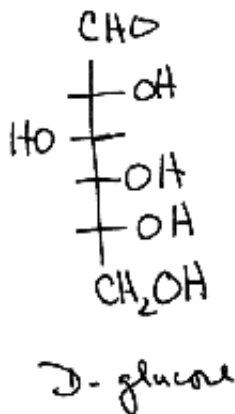
Thursday, 17.XII.98 from 7:30 am to 10:30 am in Chem 142

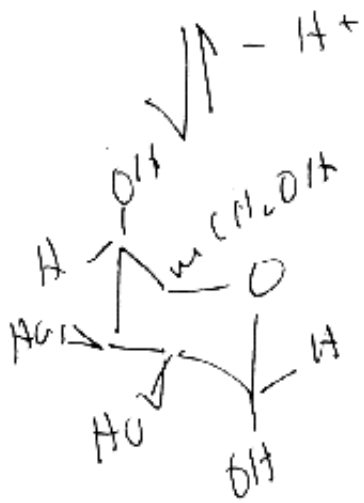
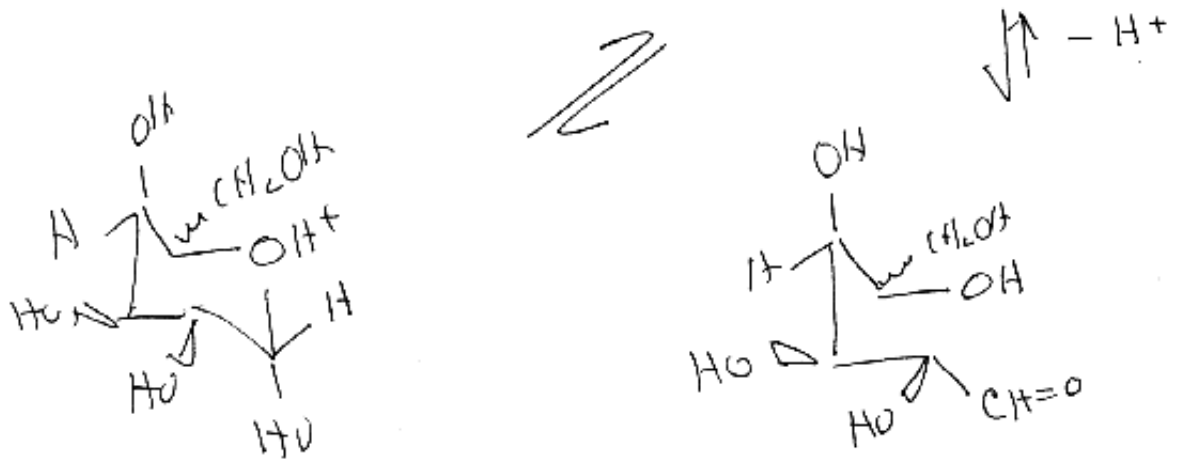
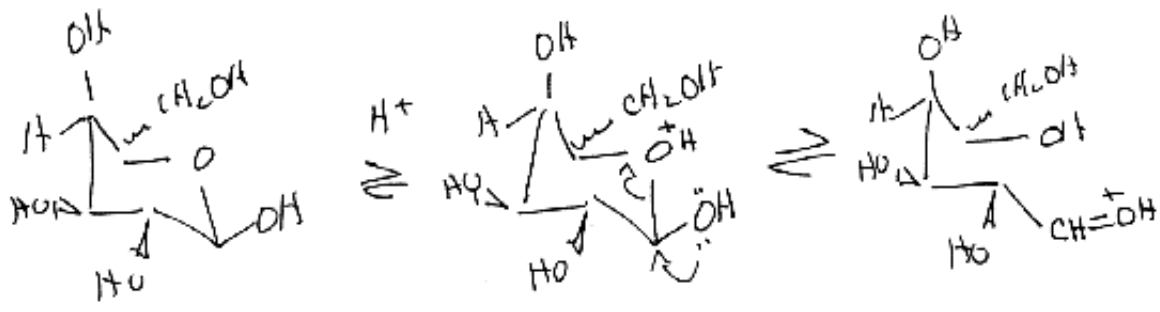
Dr. Barney Ellison

Name: Key

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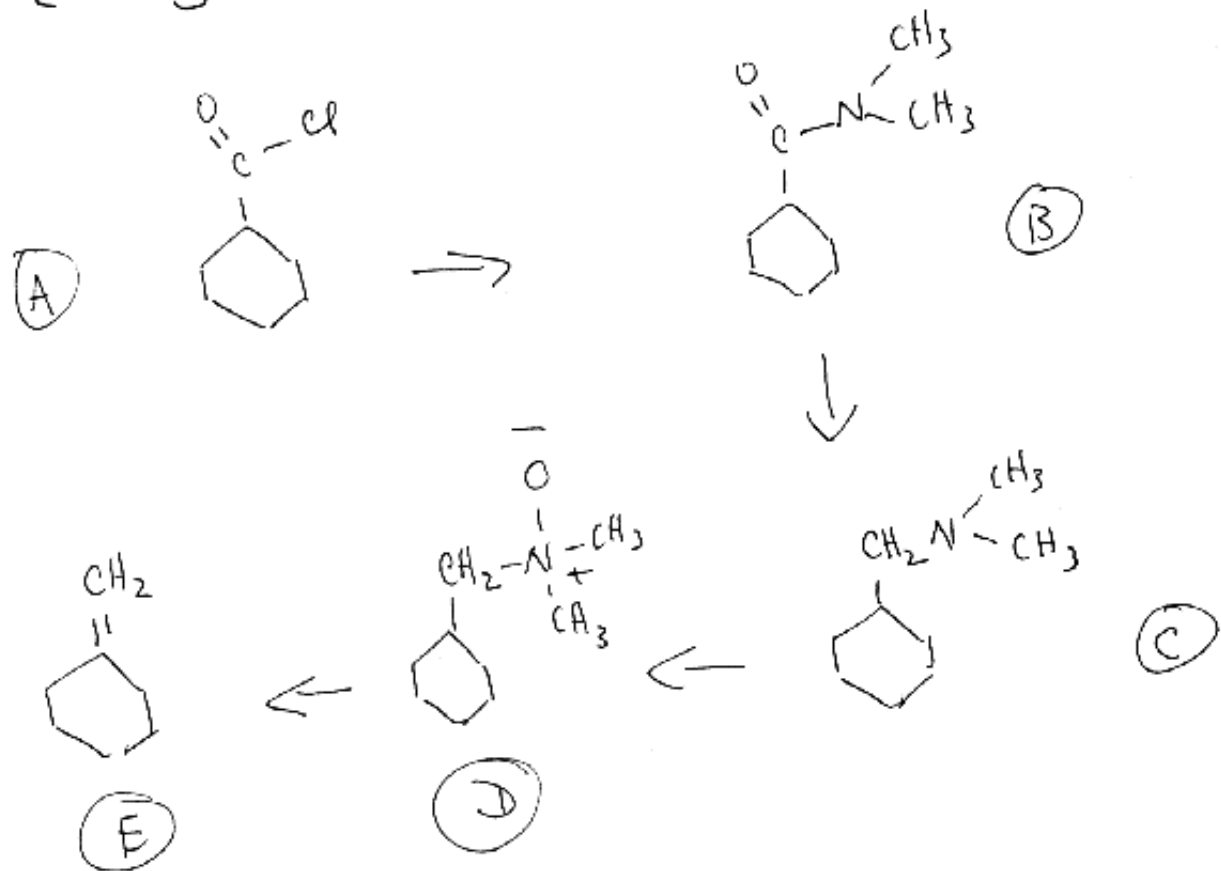
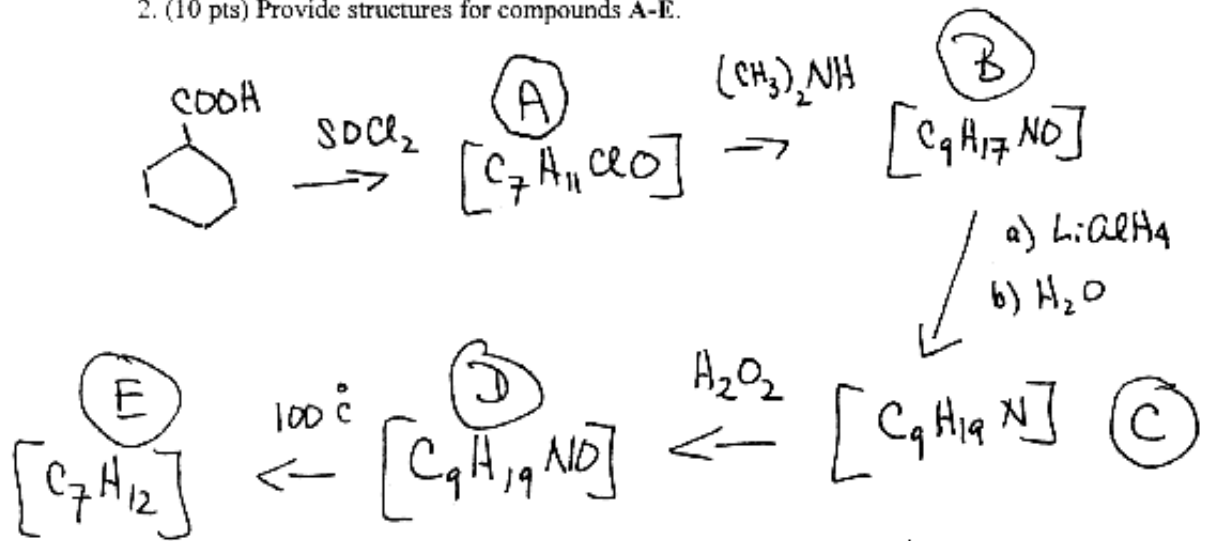
1. (20 pts) Consider D-Galactose; what is the structure of β -D-galactopyranose? Write the mechanism for the mutarotation of β -D-galactopyranose to a mixture of α -D-galactopyranose and β -D-galactopyranose.



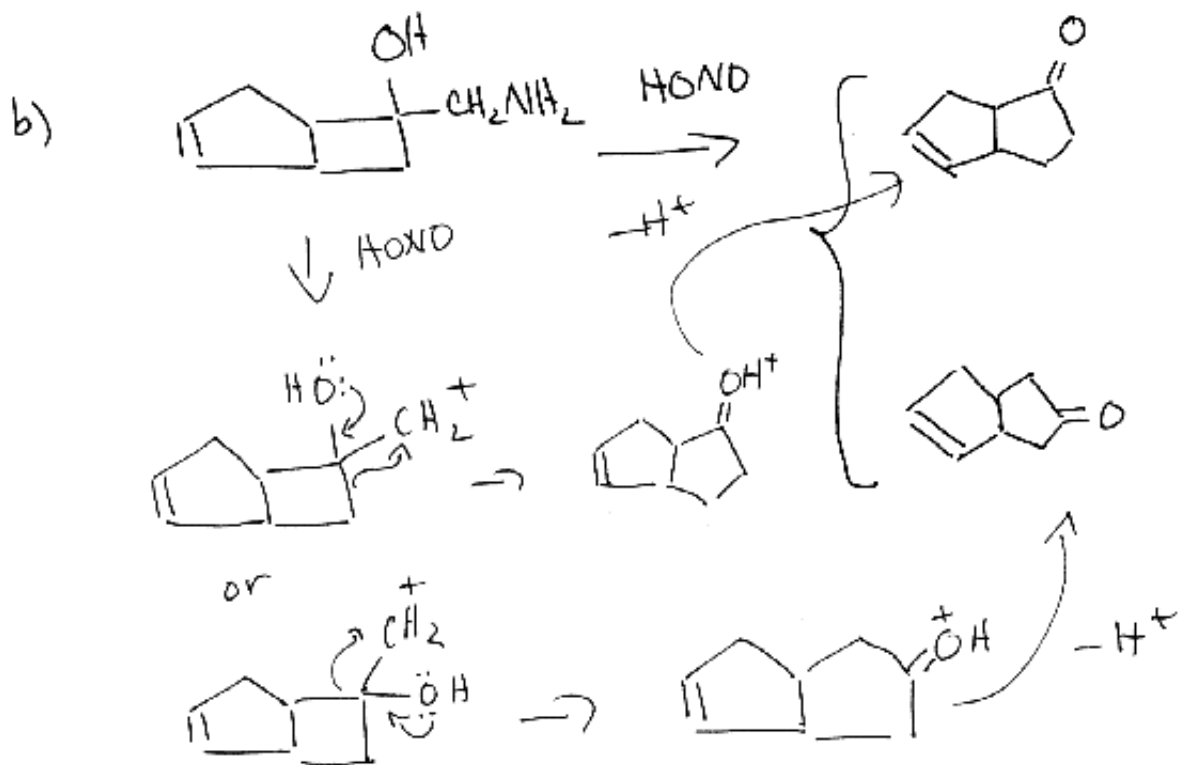
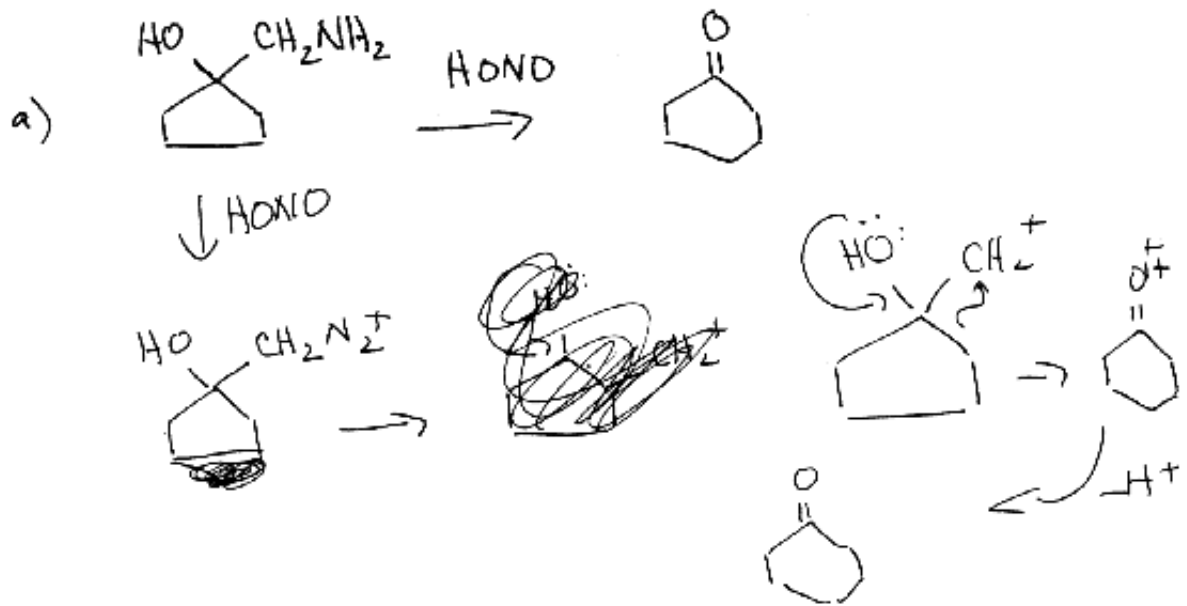


α -D-galactopyranose

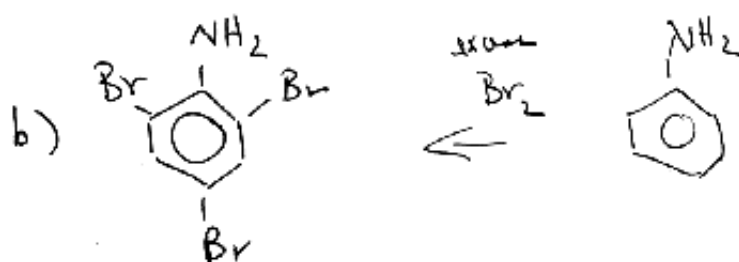
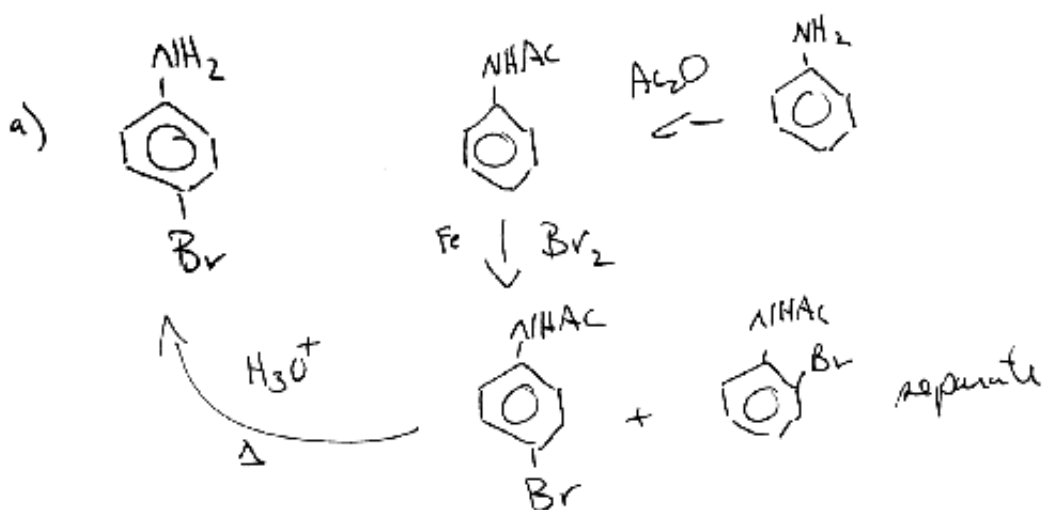
2. (10 pts) Provide structures for compounds A-E.

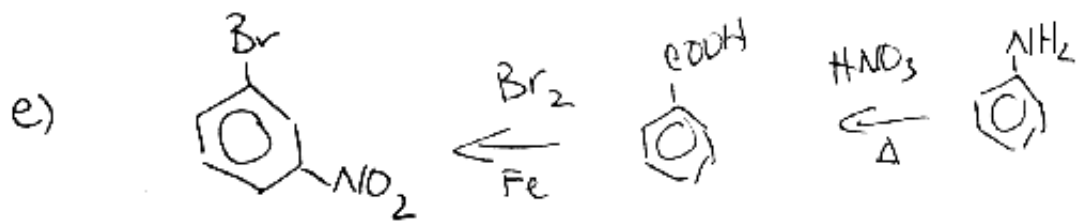
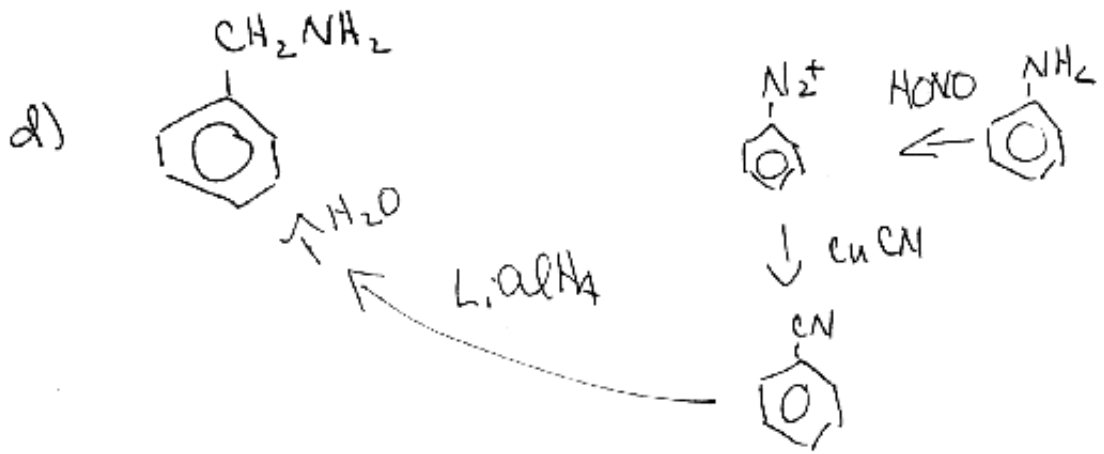
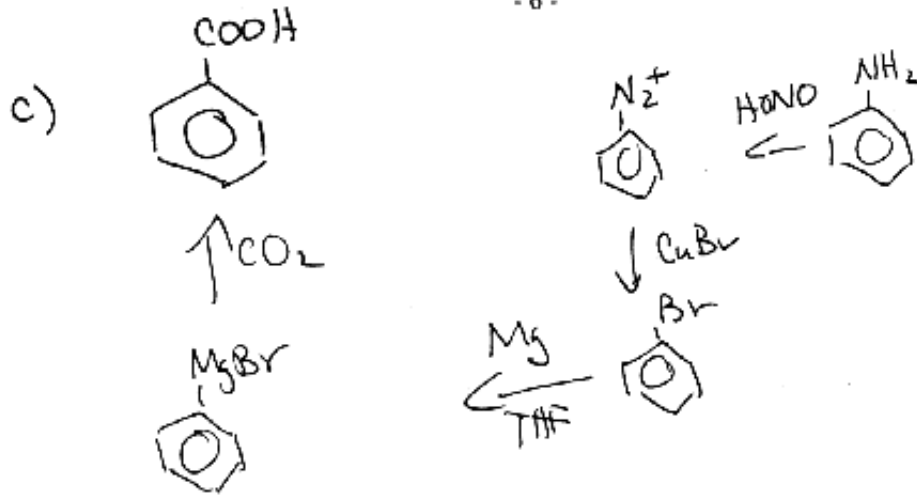


3. (10 pts) What is the mechanism for the following reactions?

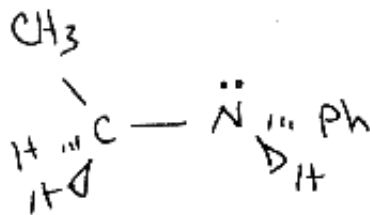


4. (20 pts) Convert aniline ($C_6H_5NH_2$) into the following molecules.



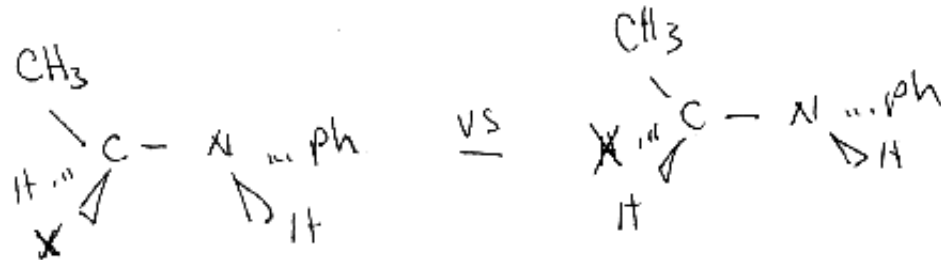


5. (10 pts) How many signals for the methylene hydrogens (underlined) of $\text{CH}_3\text{CH}_2\text{NHC}_6\text{H}_5$ will appear in the proton NMR spectrum? Answer this question by considering the compound *exactly* as drawn.

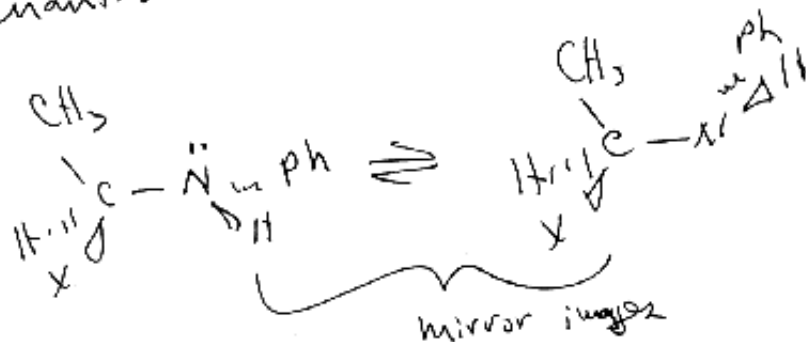


In fact, only a single methylene signal appears for this compound. Why?

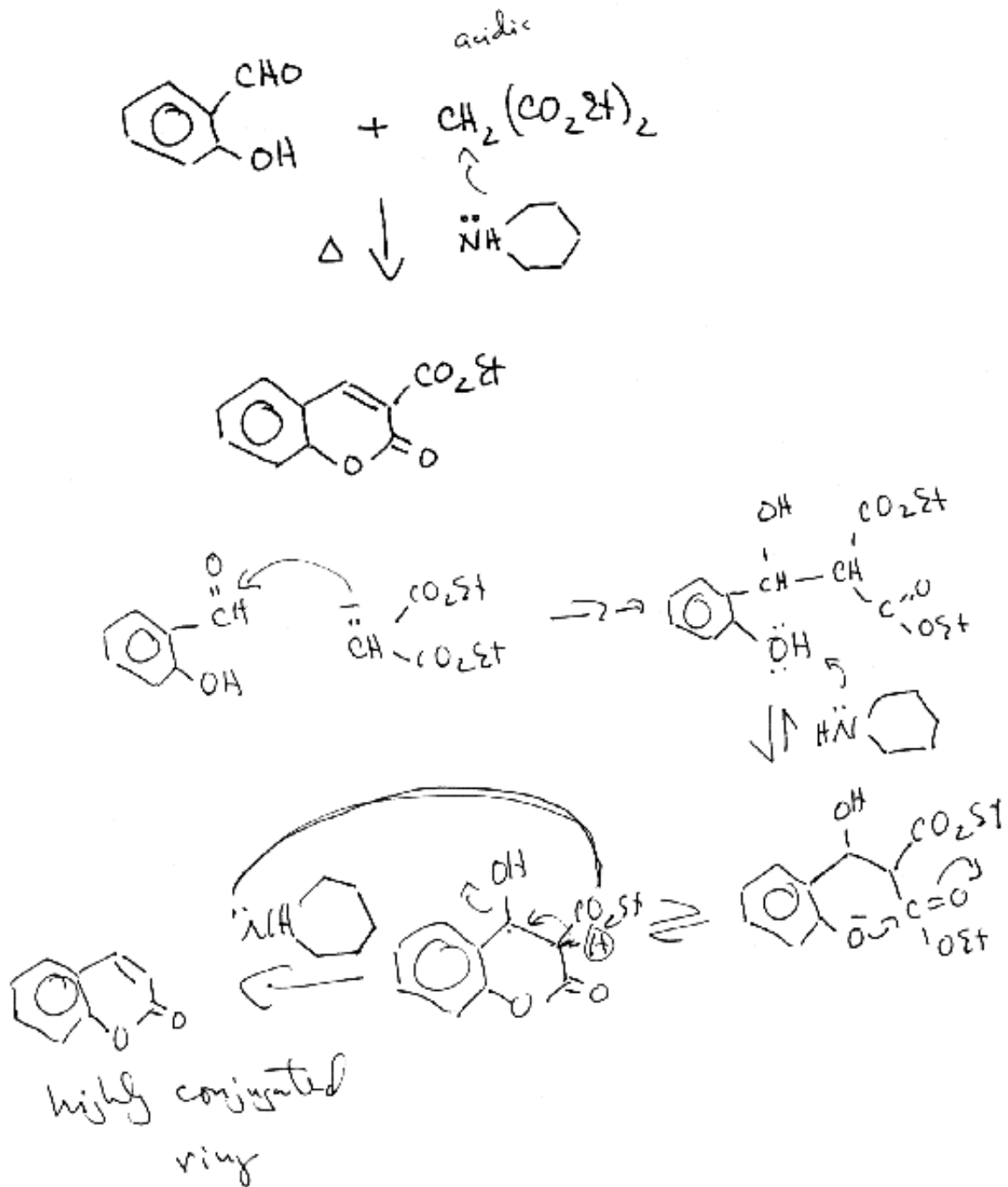
The two methylene protons are diastereomeric in the static compound so you expect 2 signals.



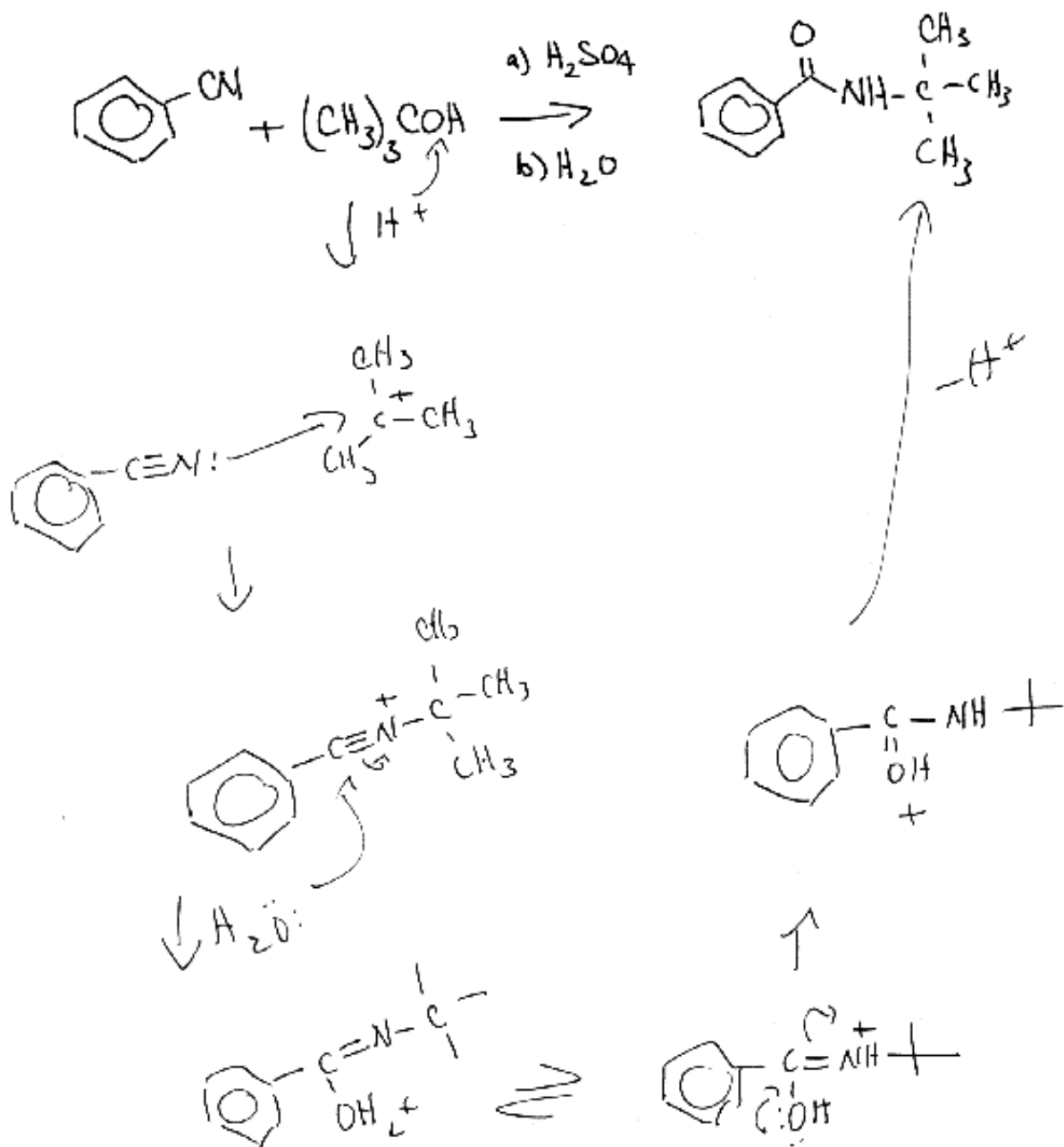
You only observe a single CH_2 resonance because amine inversion converts the diastereomers into enantiomers.



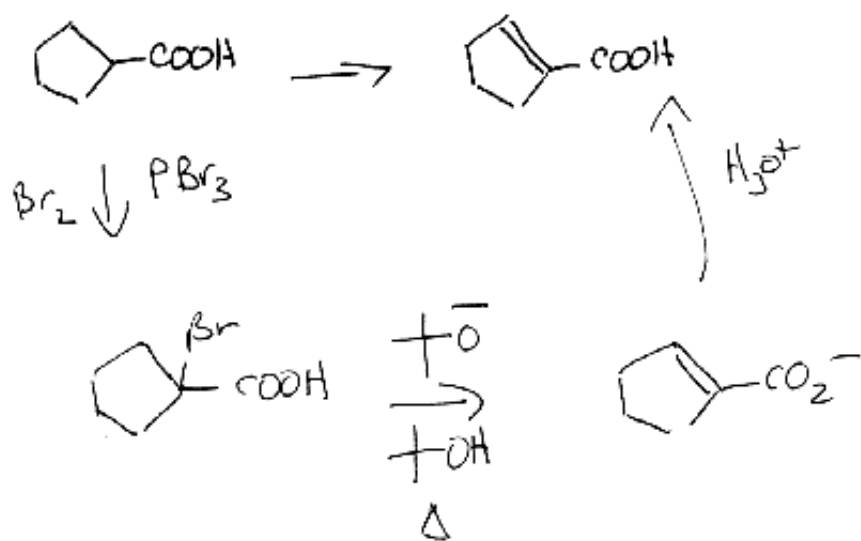
6. (10 pts) Write the mechanism for the following transformation.

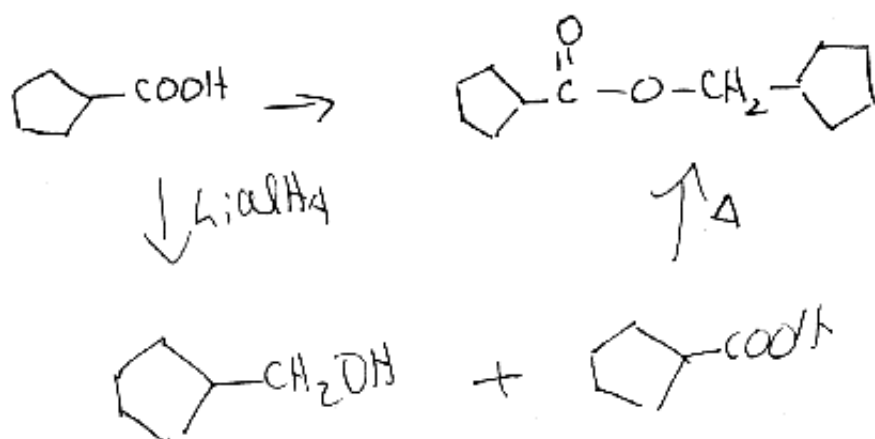
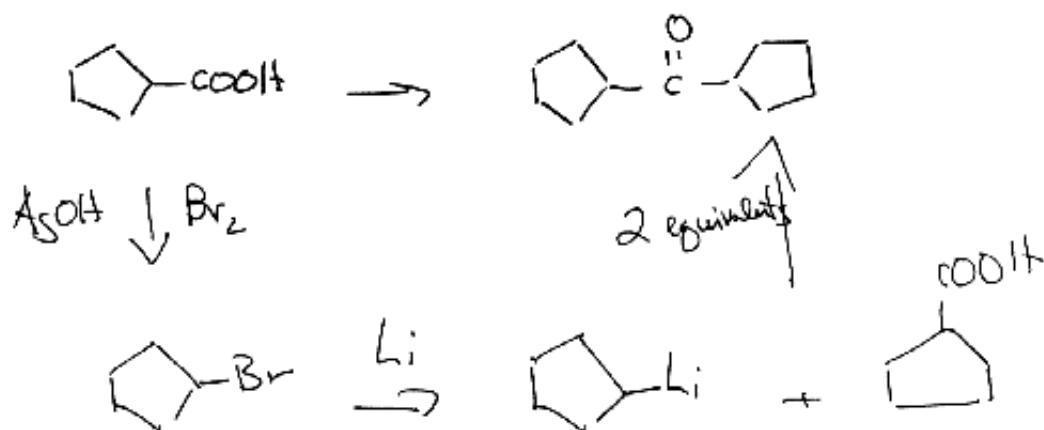


7. (10 pts) Write the mechanism for the following transformation.

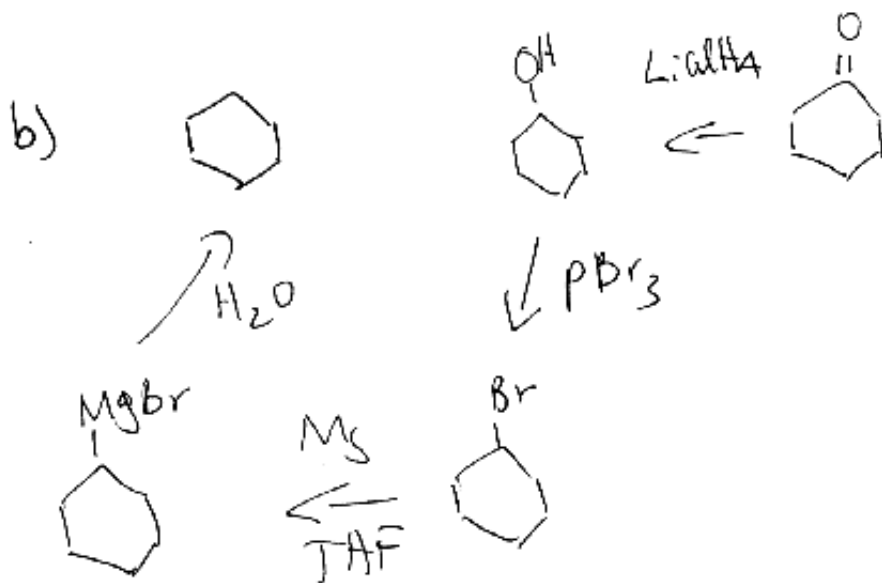
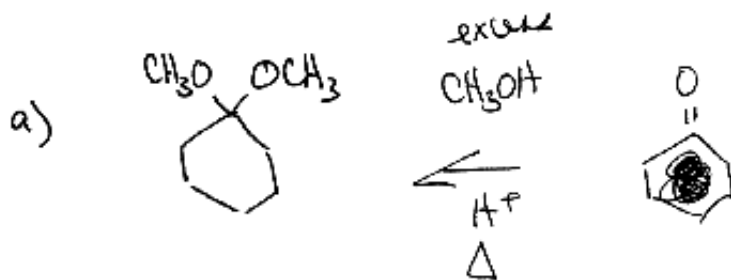


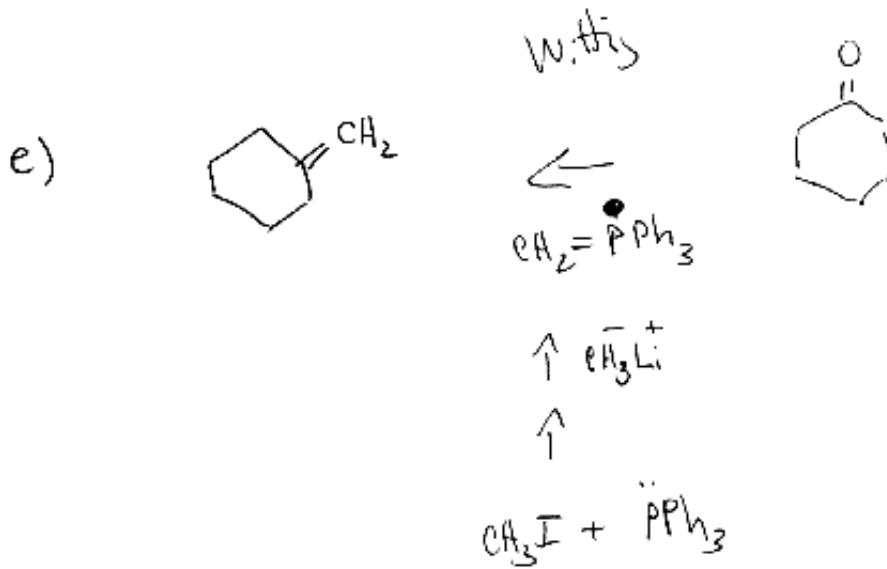
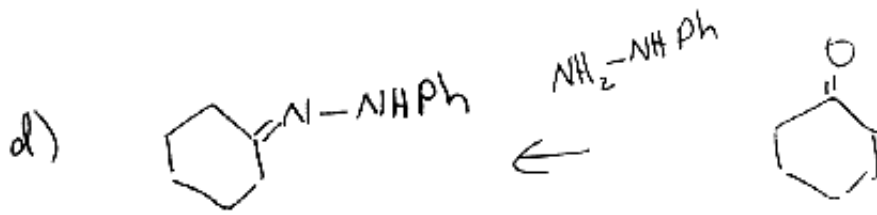
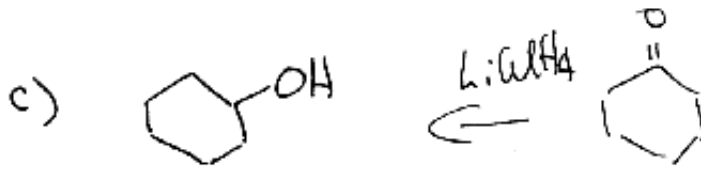
8. (15 pts) Carry out the following syntheses.



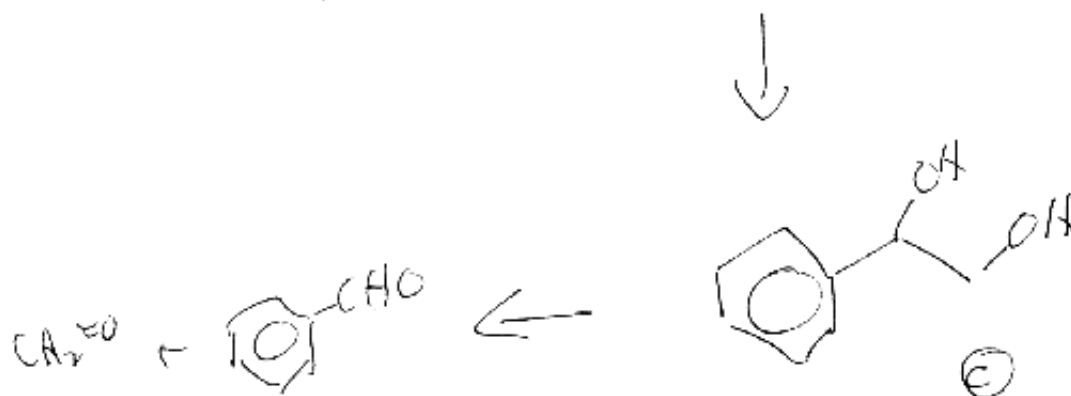
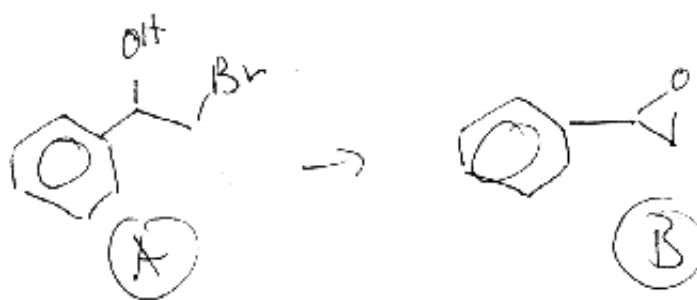
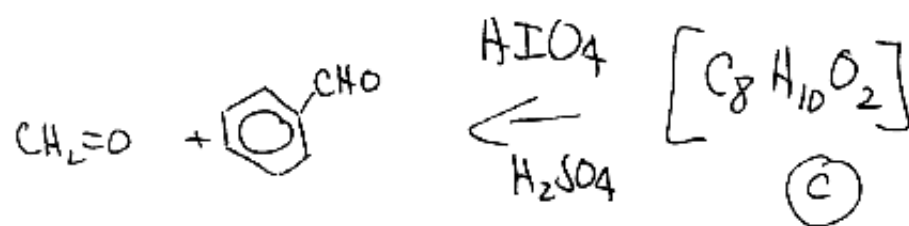
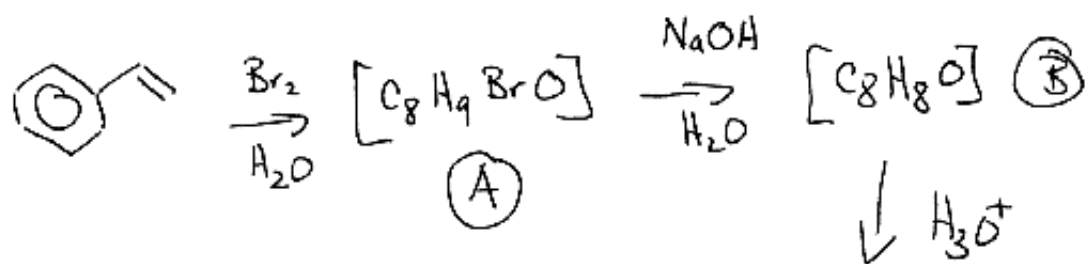


10. (20 pts) Provide simple synthetic routes from cyclohexanone to the following compounds.



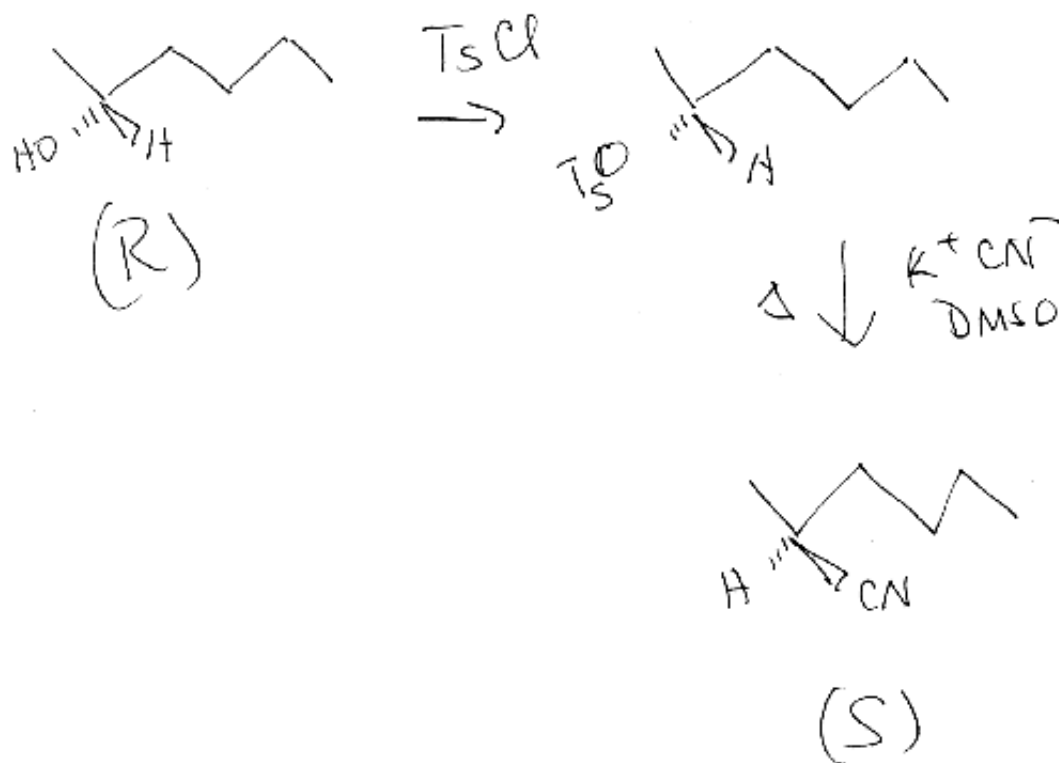
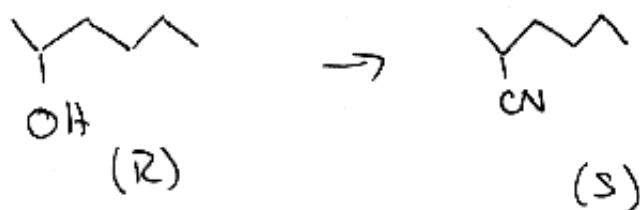


11. (10 pts) Provide structures for compounds A-C.

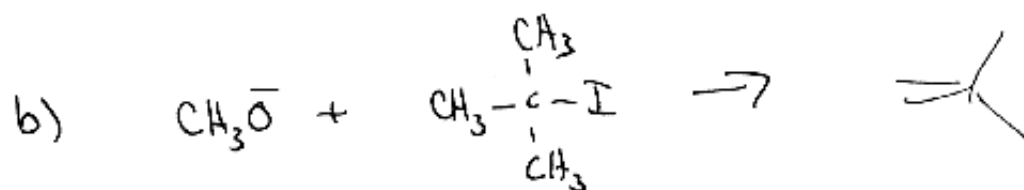
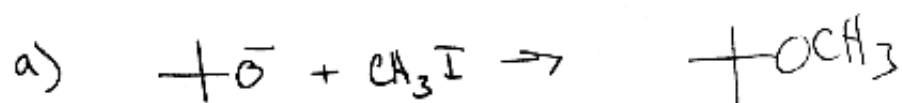


12. (10 pts) Provide a simple synthetic route from (R)-2-hexanol to (S)-2-cyanohexane.

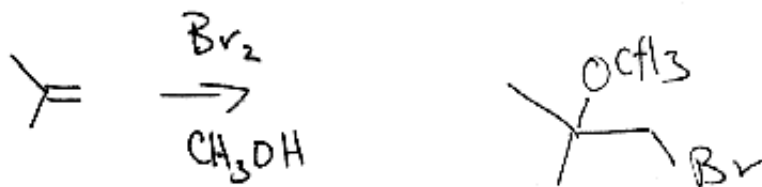
↑ please draw! ↗



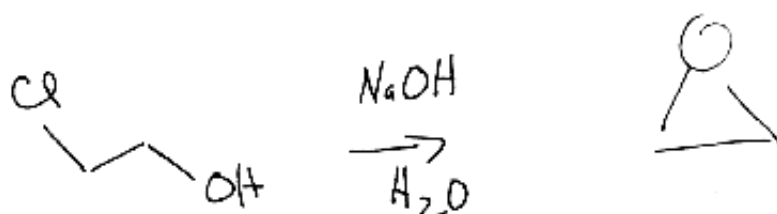
13. (20 pts) What are the principal organic products of the following reactions?



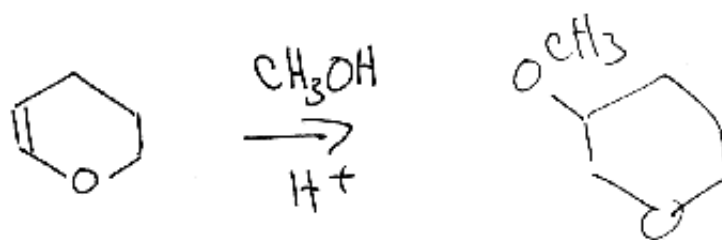
c)



d)



e)



14. (10 pts) Write the mechanism for the following transformation.

