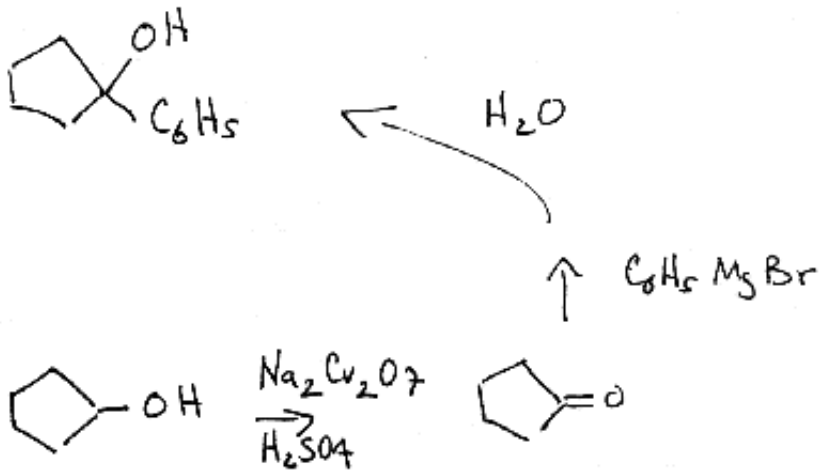
Chemistry 3331-100
Organic Chemistry/Dr. Barney Ellison
Thursday: Oct. 26 @ **7:00pm** → **9:00**/2nd Exam/Hale 270

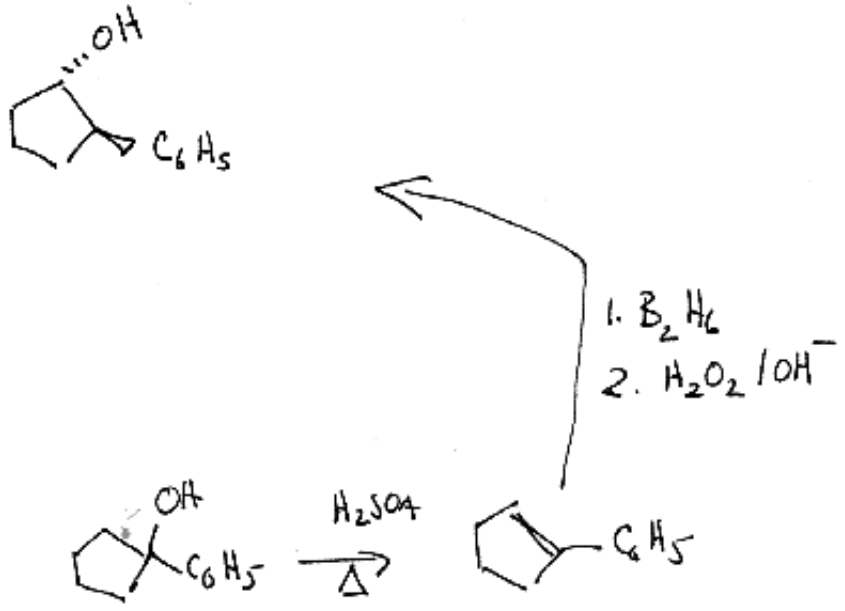
Name: Key (please print)

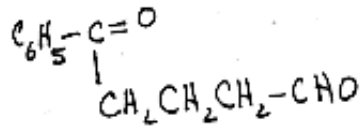
1. (15 pts) Show how the following compounds can be synthesized from cyclopentanol and any necessary organic/inorganic reagent.

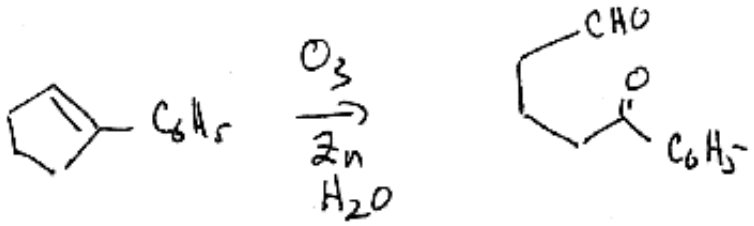
a)



b)

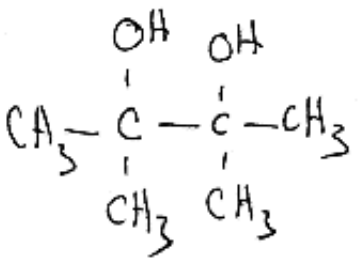


c) 



2. (15 pts) Predict the product in each case, showing stereochemistry where appropriate.

a) $(CH_3)_2C=C(CH_3)_2 \xrightarrow[(CH_3)_3COH,\ HO^-]{(CH_3)_3COOH,\ OsO_4\ (cat.)}$



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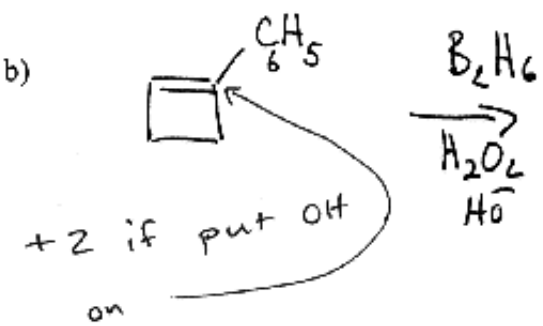
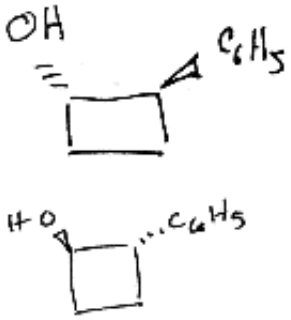
b)





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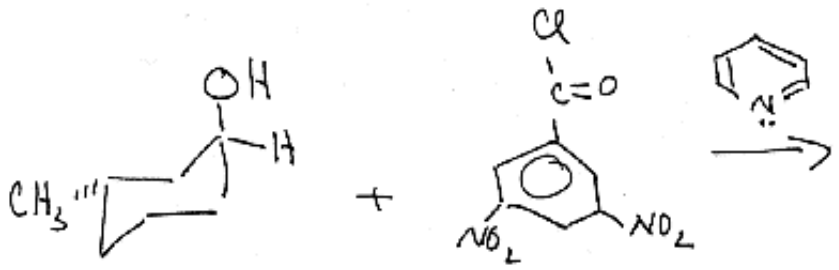
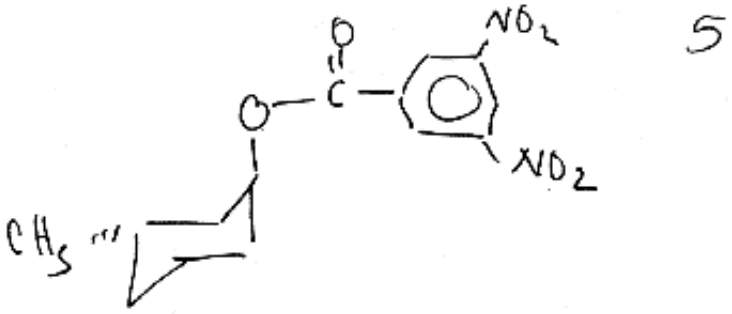
no stereochem −2 pts

c)





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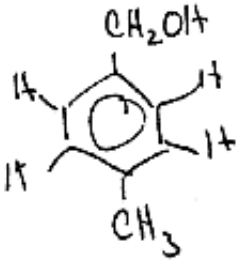
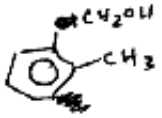
3. (10 pts) An unknown compound, $C_8H_{10}O$, with the following ^1H NMR spectrum. The broad peak at δ 2.1 ppm disappears when D_2O is added.

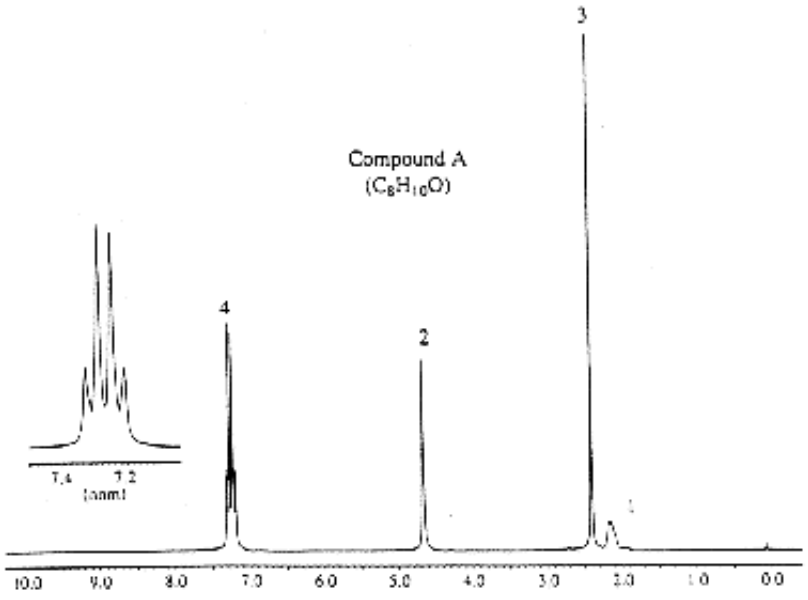


2 pts for 

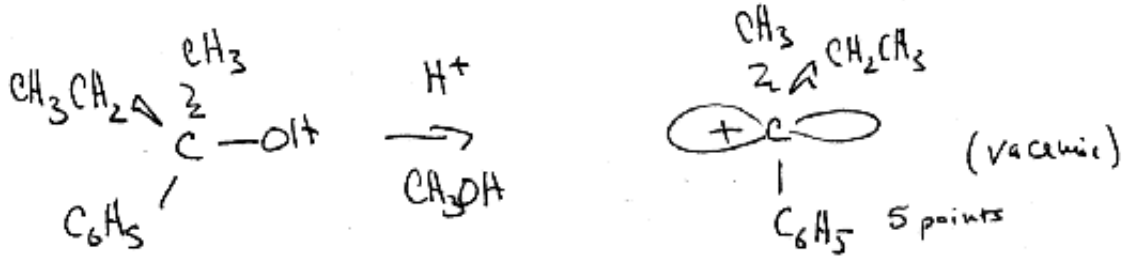
1 pt for CH_2OH

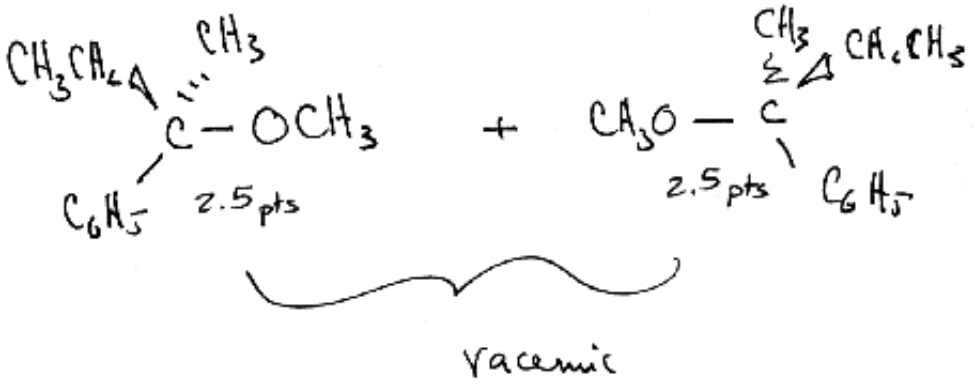
1 pt for CH_3 

5 pts for 

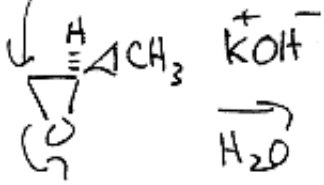


4. (10 pts.) When (R)-(+)-2-phenyl-2-butanol is allowed to stand in methanol containing a few drops of H_2SO_4, racemic 2-methoxy-2-phenylbutane is formed. Suggest a reasonable mechanism.



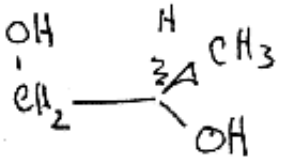


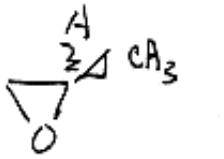
5 (10 pts.) Select reaction conditions that would allow you to carry out each of the following stereospecific transformations.

a) 

(R)-(1,2)-propanediol

+ 3 for saying basic

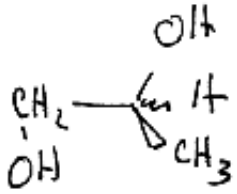


b) 

(S)-(1,2)-propanediol

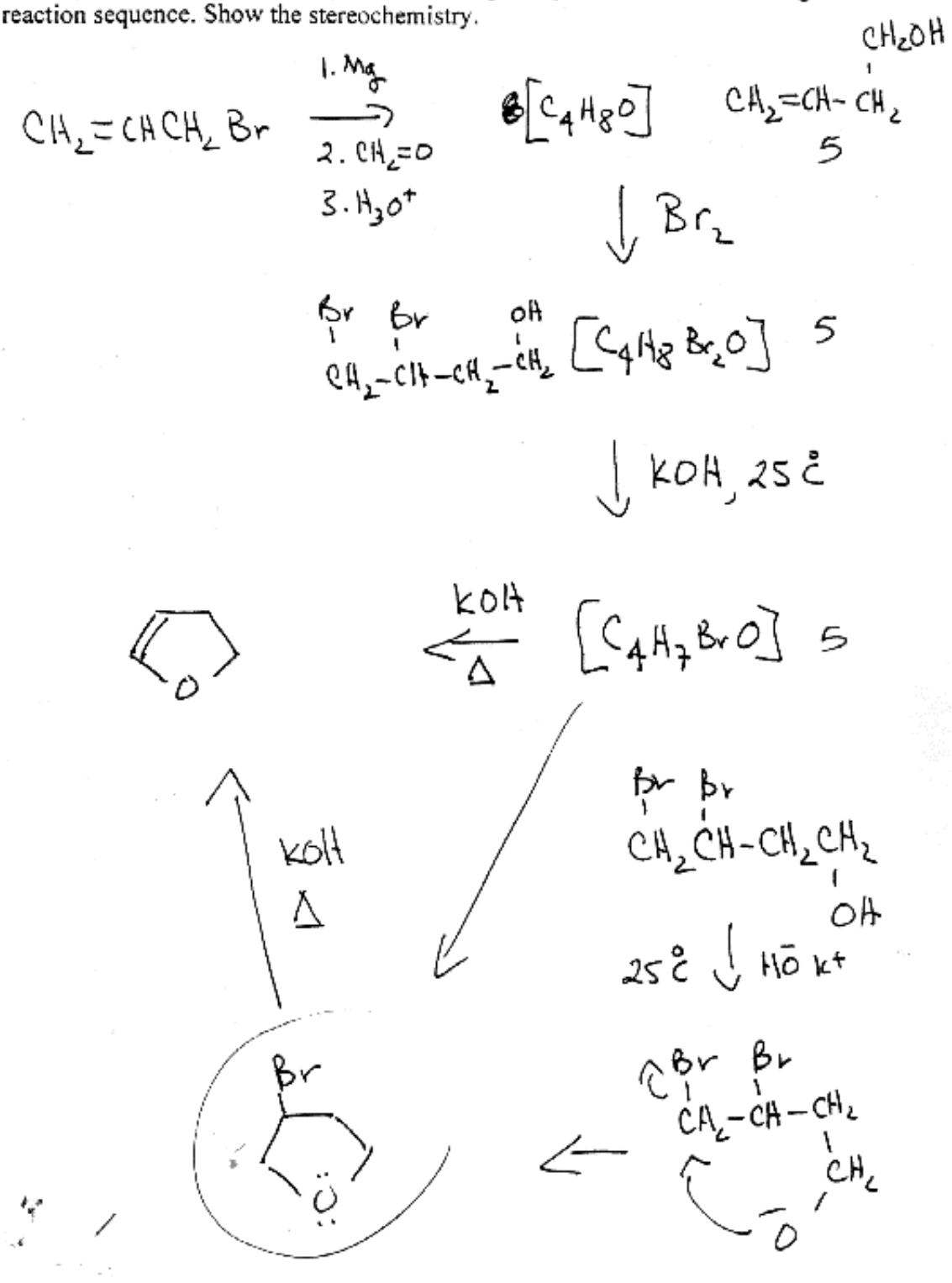
+ 4 pts for other strong acids

+ 3 for saying acidic

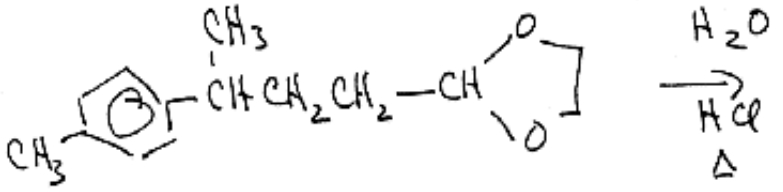


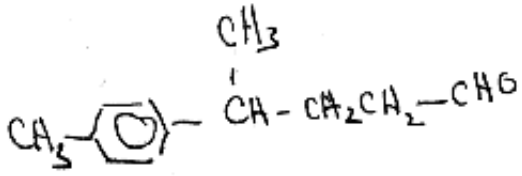
+ 2 overall if reversed

6. (15 pts) Deduce the identity of the missing compounds in the following reaction sequence. Show the stereochemistry.



7. (15 pts) What is the principal product in each reaction?

a) 



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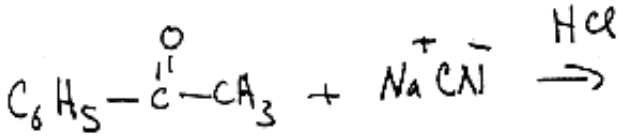
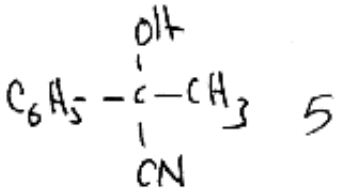
b) 



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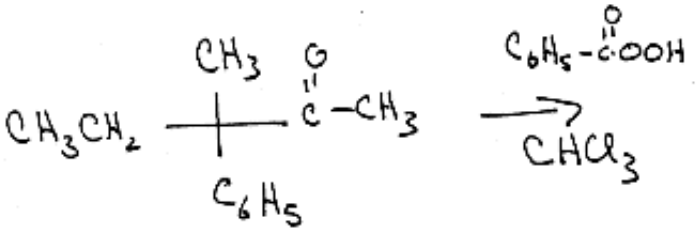
c) 

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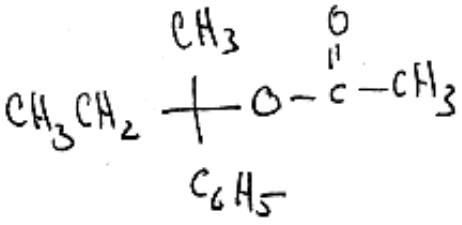

8. (10 pts) Suggest reagents for each step in the following synthesis.