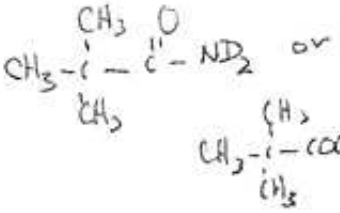
Chemistry 3371-100
Organic Chemistry/Dr. Barney Ellison
Thursday: March 17th **@ 7:00pm → 9:00**/2nd Exam/Chem 142

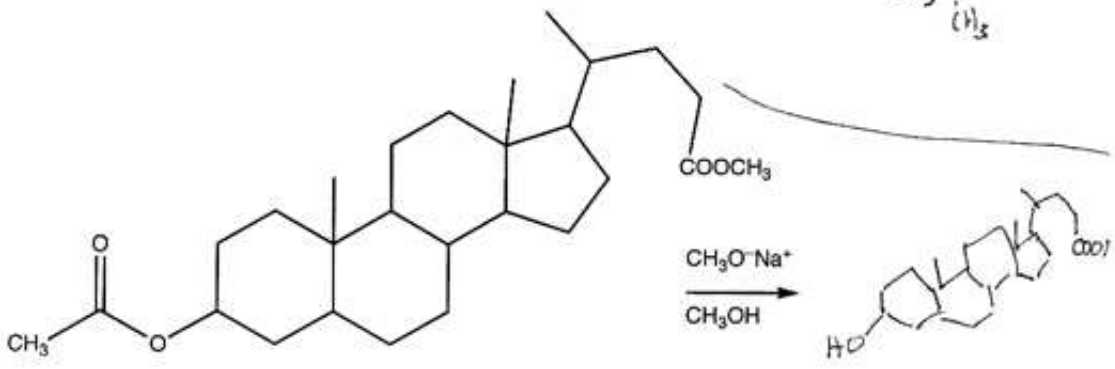
Name: Key (please print)

1. (10 pts) What are the products of the following reactions?

a) $(CH_3)_3CCONH_2 + NaOD/D_2O + \Delta \rightarrow ?$

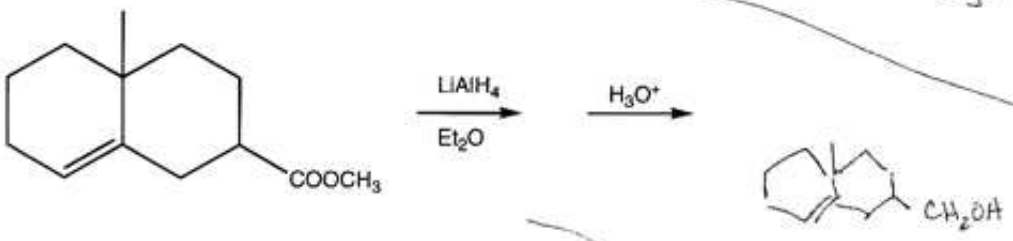


b)

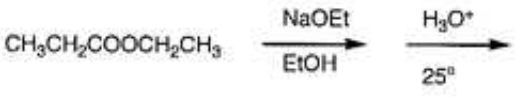


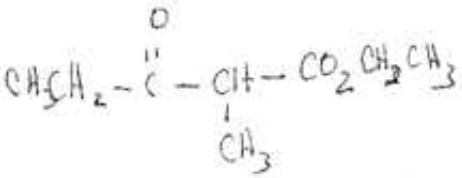
+ CH_3COOCH_3

c)

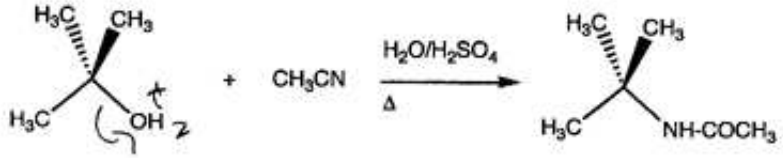


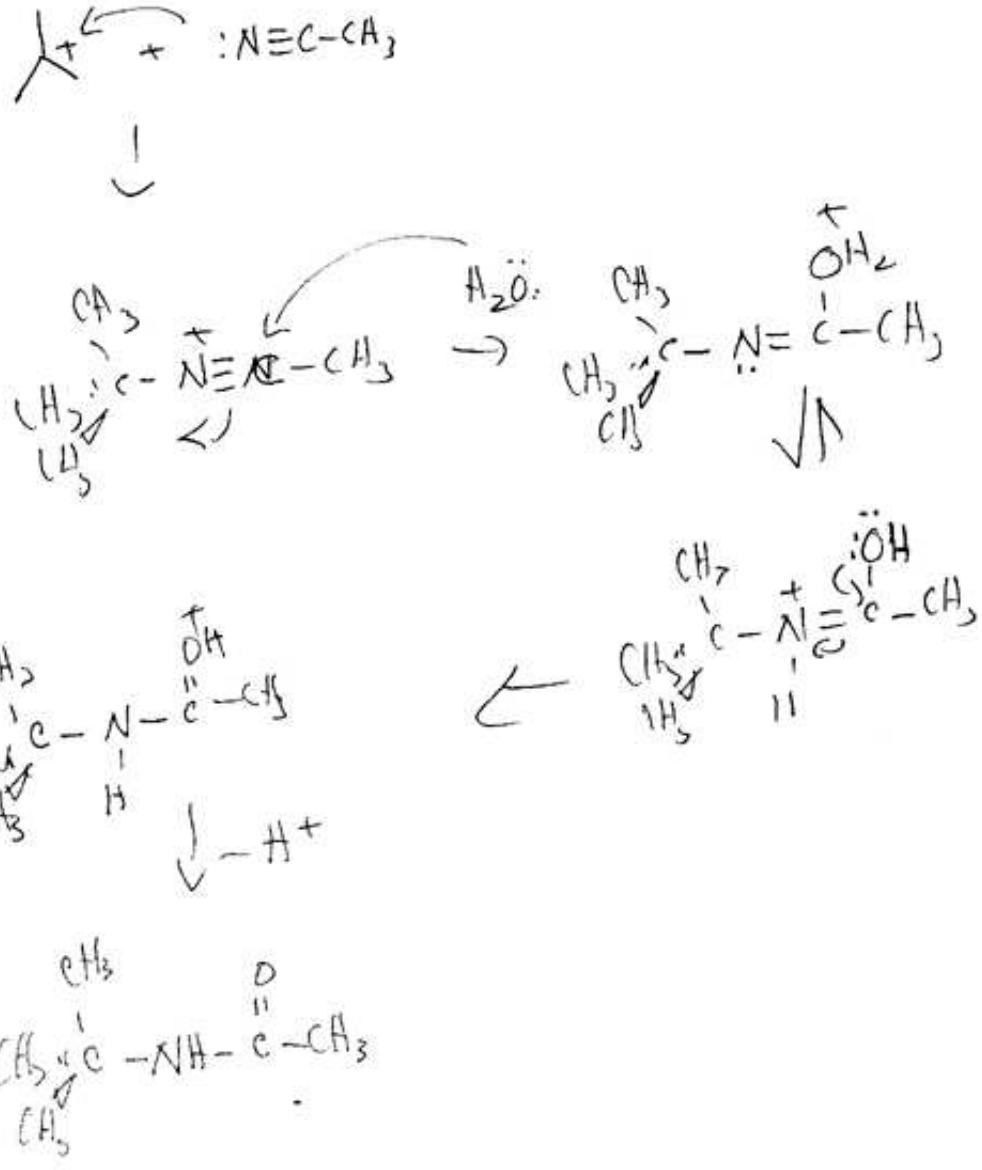
d)





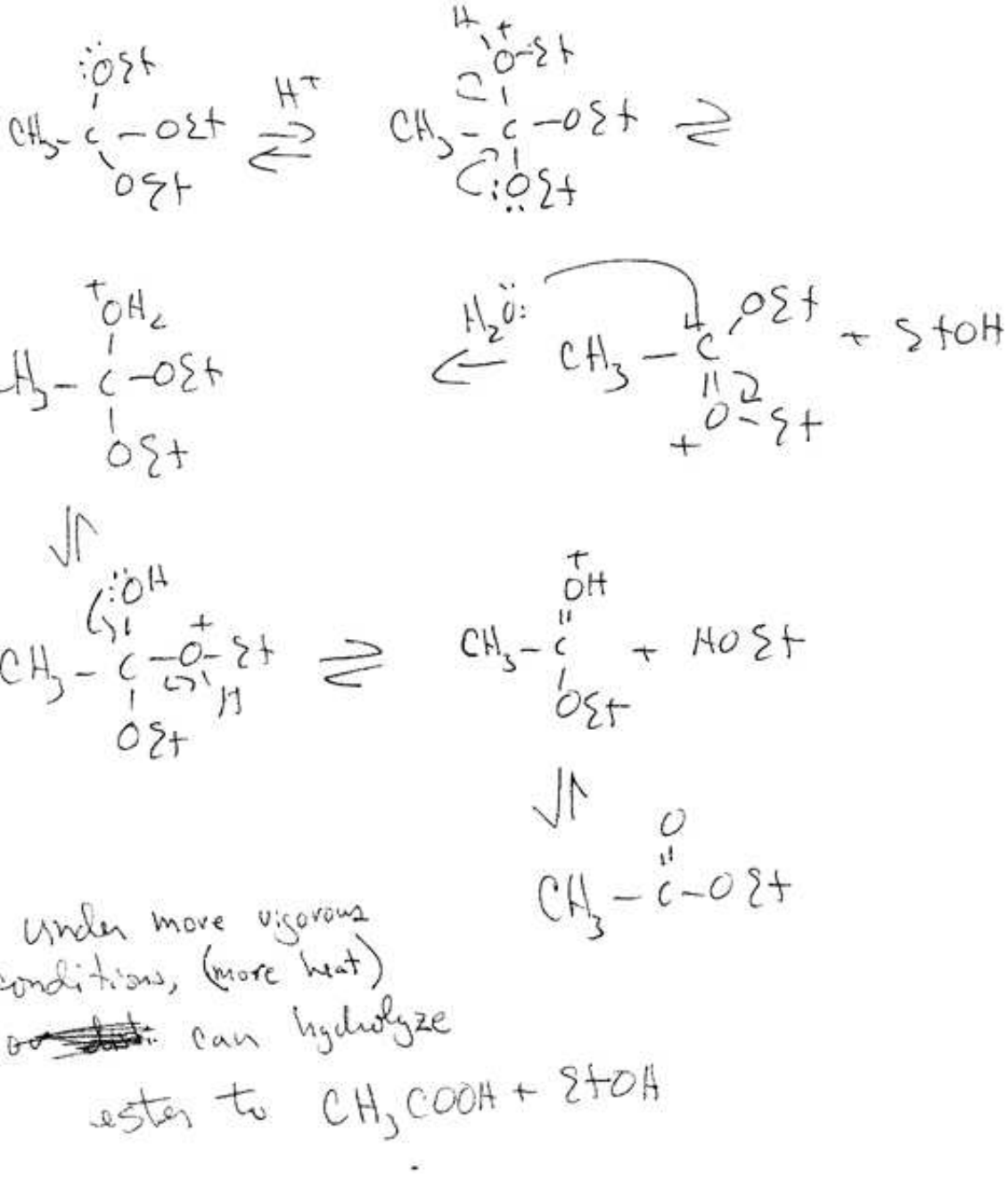
2. (10 pts) Write a mechanism that explains the Ritter reaction.





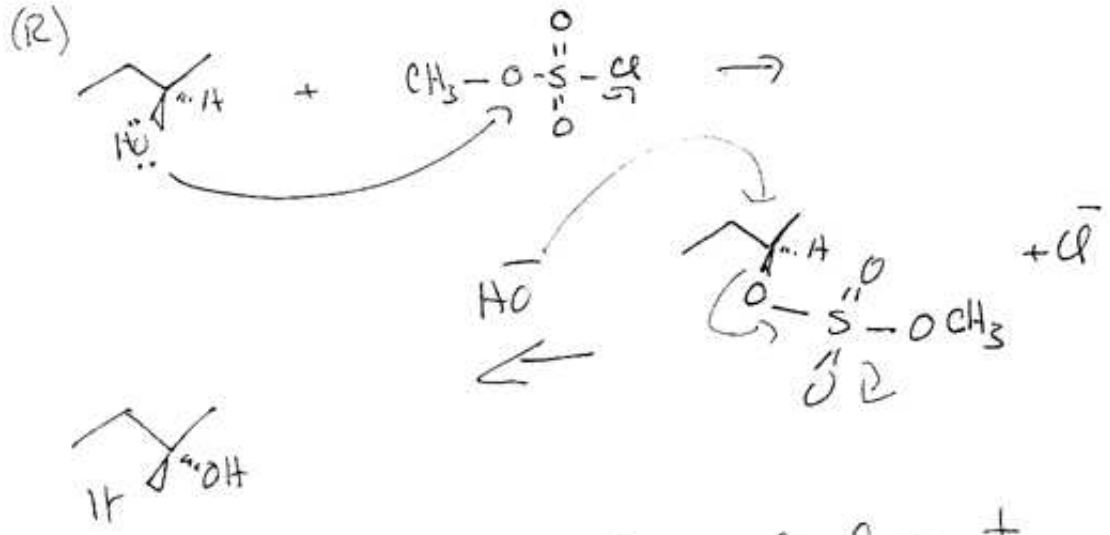
3. (10 pts) When ethyl orthoacetate is treated with dilute aqueous acid, ethyl acetate is obtained. Explain.

$$CH_3C(OEt)_3 + H_2O \xrightarrow{H_3O^+} CH_3COOEt + 2\,EtOH$$



under more vigorous conditions, (more heat) can hydrolyze ester to $CH_3COOH + EtOH$

4. (10 pts) (*R*)-2-butanol, $[\alpha]_D$ = -13.5°, reacts with methanesulfonyl chloride to give a methanesulfonate. Treatment of the methanesulfonate with aqueous sodium hydroxide affords 2-butanol having $[\alpha]_D$ = + 13.5°. What is the mechanism of the hydrolysis? How can you prove it?

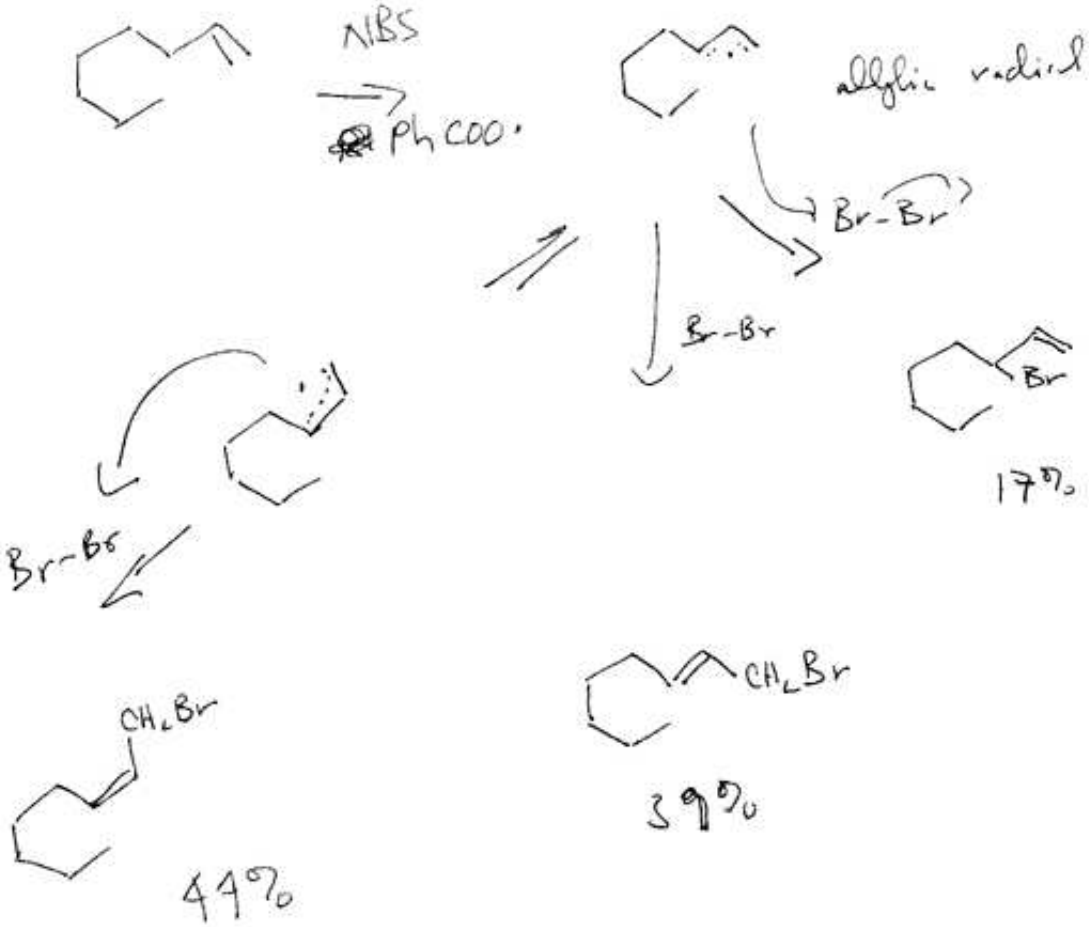


(S)

Mech. is S_N2 displacement with inversion.

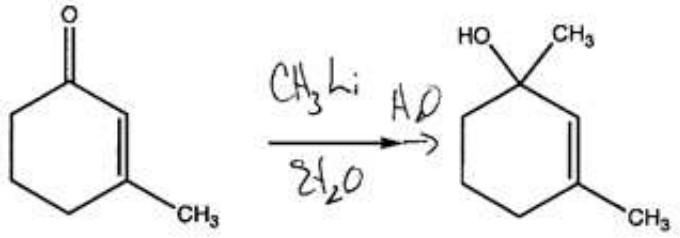
$[\alpha]_D = +13.5°$

5. (10 pts) The reaction of 1-octene with N-bromosuccinimide in CCl_4 with a small amount of of benzoyl peroxide, $(PhCOO)_2$, gives a mixture of 17% 3-bromo-1-octene, 44% *trans*-1-bromo-2-octene and 39% *cis*-1-bromo-2-octene. What is the mechanism?



6. (10 pts) Show how each of the following conversions can be accomplished.

a)



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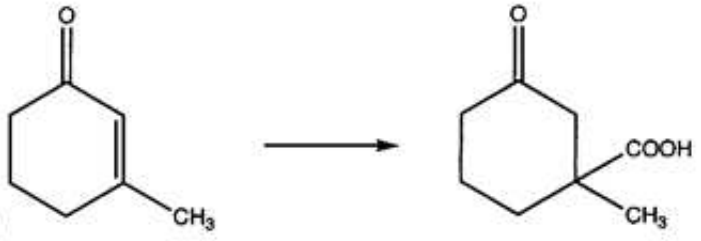
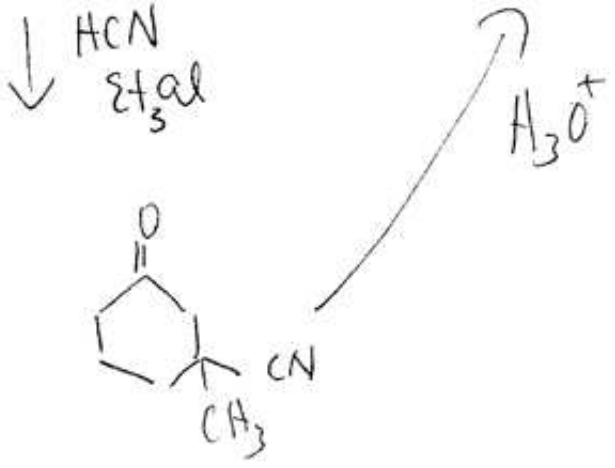
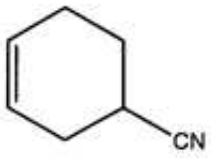
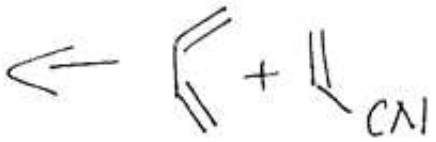
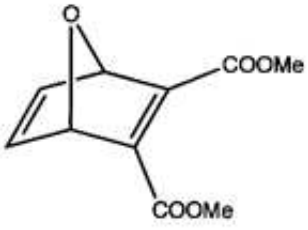




7. (10 pts) What diene and dienophile produce the following Diels-Alder adducts?

a) 



b) 

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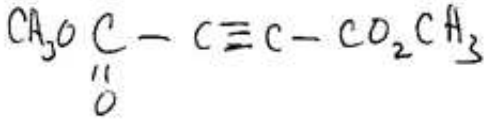
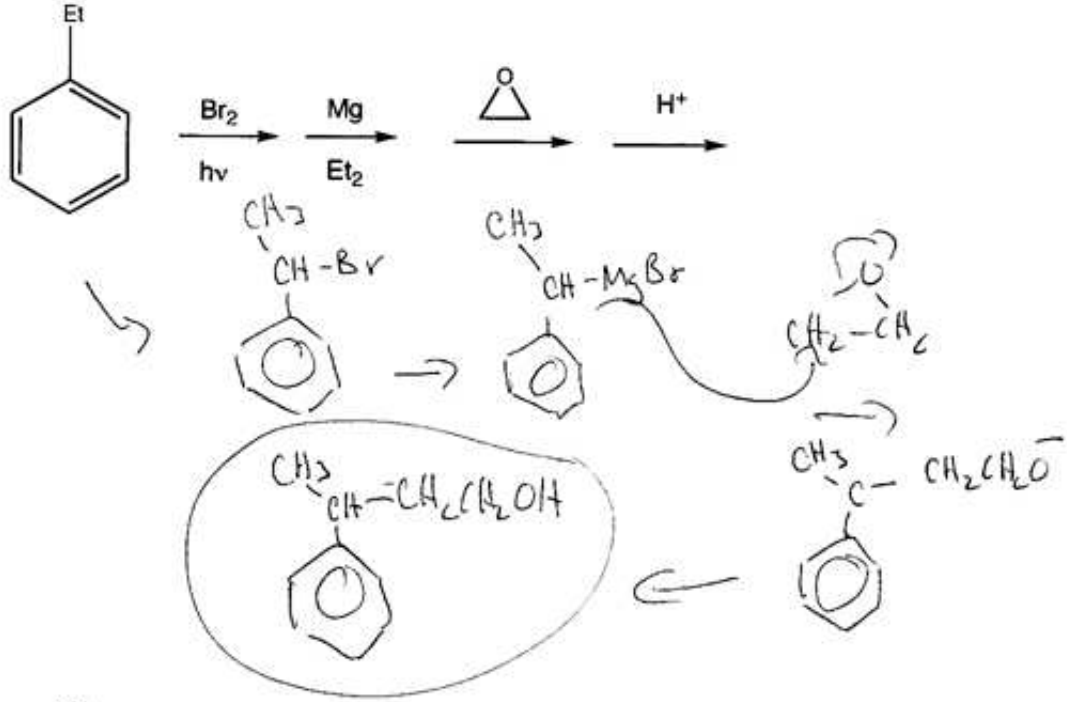


8. (10 pts) What are the products of the following reactions?

a)



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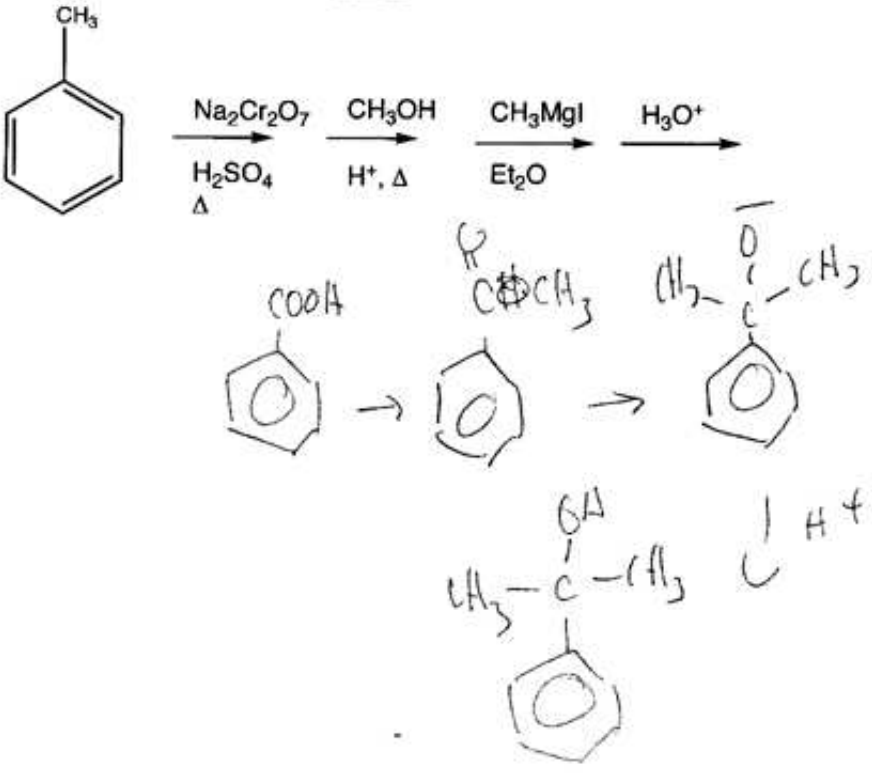
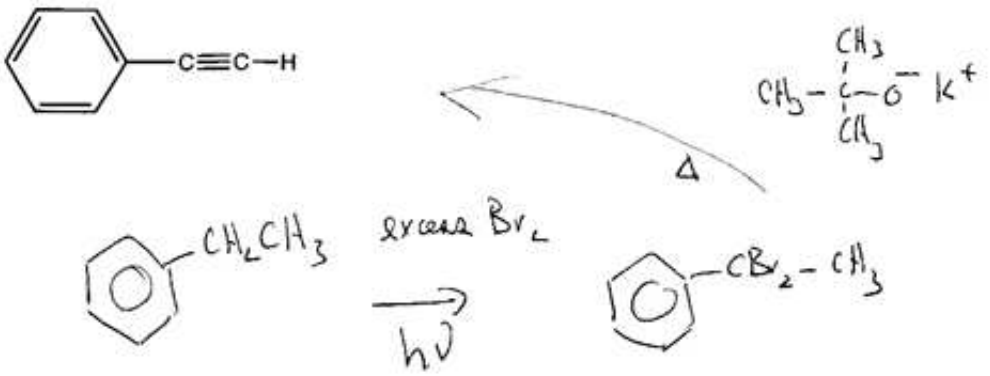
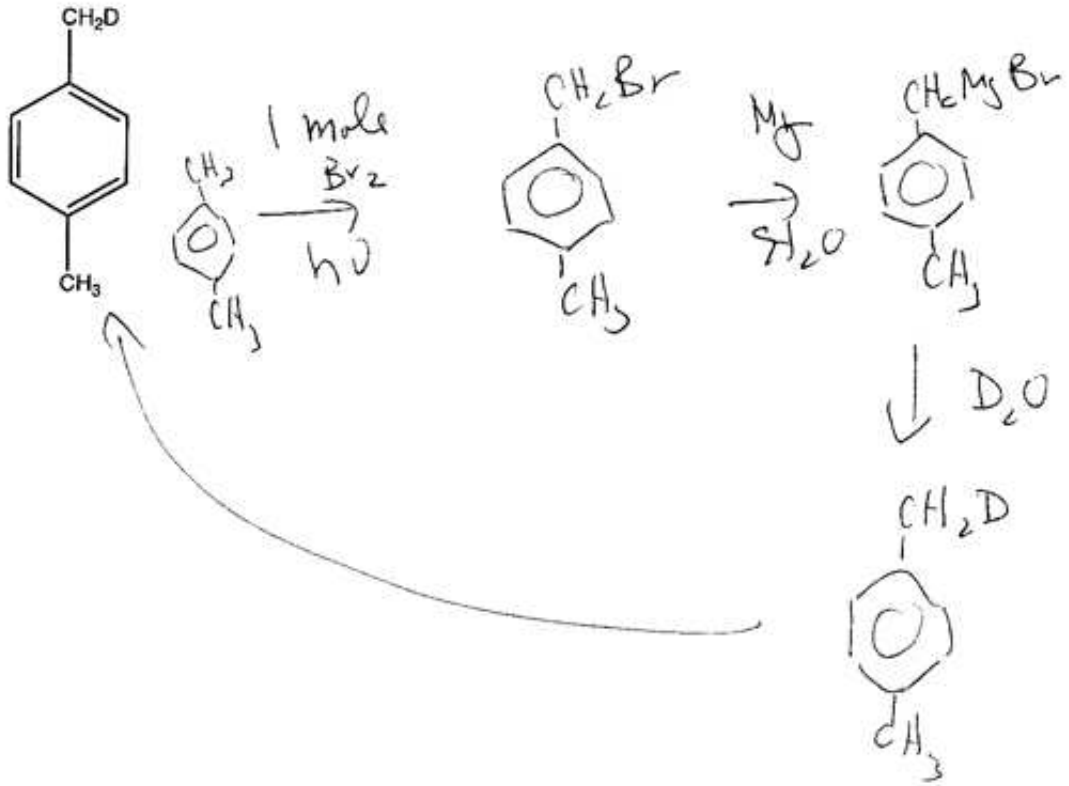


9. (10 pts) Show how each of the following conversions can be accomplished starting with benzene, toluene, the three xylenes (*o*, or *m*, or *p*), or ethylbenzene.

a)



b)



10. (10 pts) *o*-phthalyl alcohol on treatment with acid gives the corresponding cyclic ether. Propose a reasonable mechanism.