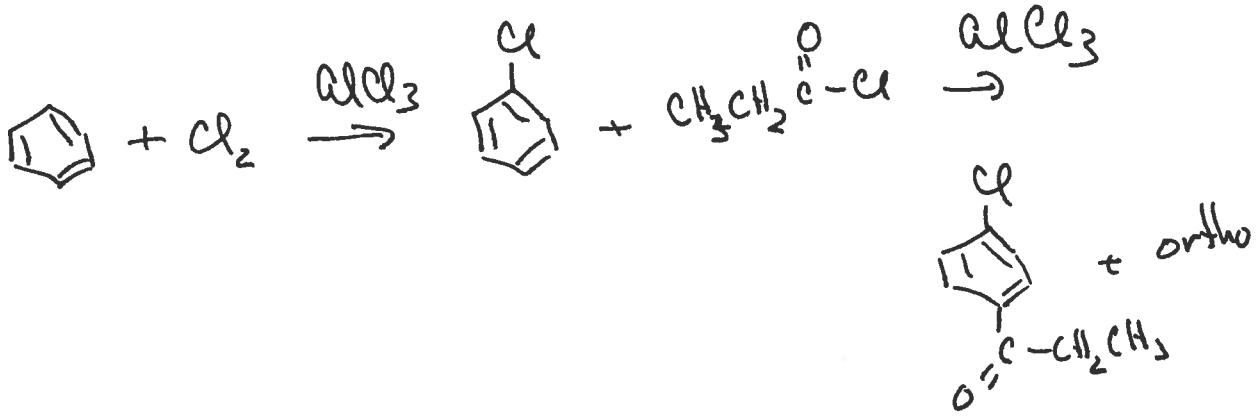
Chemistry 3331-100
Organic Chemistry / Dr. Barney Ellison
Thursday: Sept. 25rd @ **7:00pm → 9:00** / 1st Exam / Hale Science 230-270)

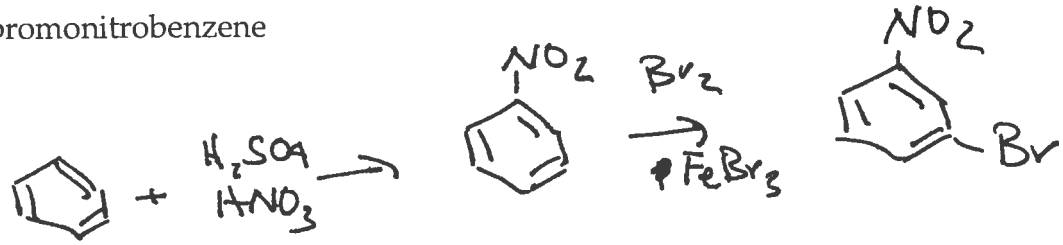
Name: Key (please print)

1. (20 pts) Outline a synthesis of each of the target compound starting with benzene.

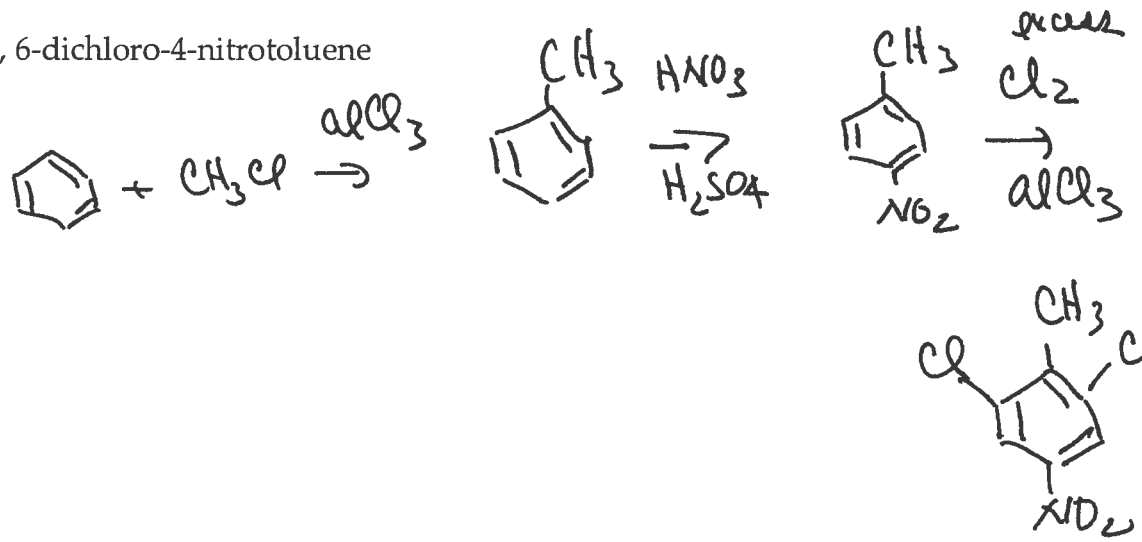
a) *p*-Cℓ-C_6H_4-CO-CH_2CH_3



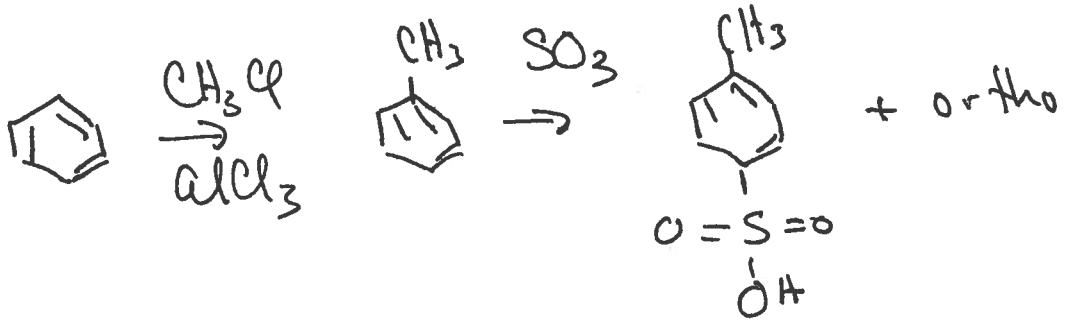
b) *m*-bromonitrobenzene



c) 2, 6-dichloro-4-nitrotoluene

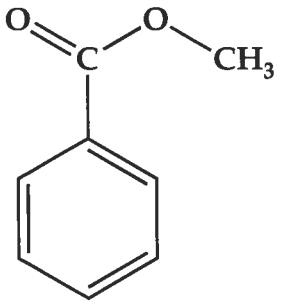


d) *p*-toluene sulfonic acid



2. (10 pts) What is the product of these reactions? Show a mechanism.

a)

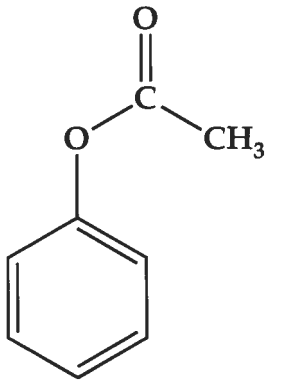


CH_3COCl

$AlCl_3$

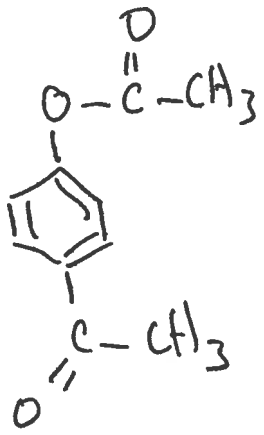
no reaction

b)



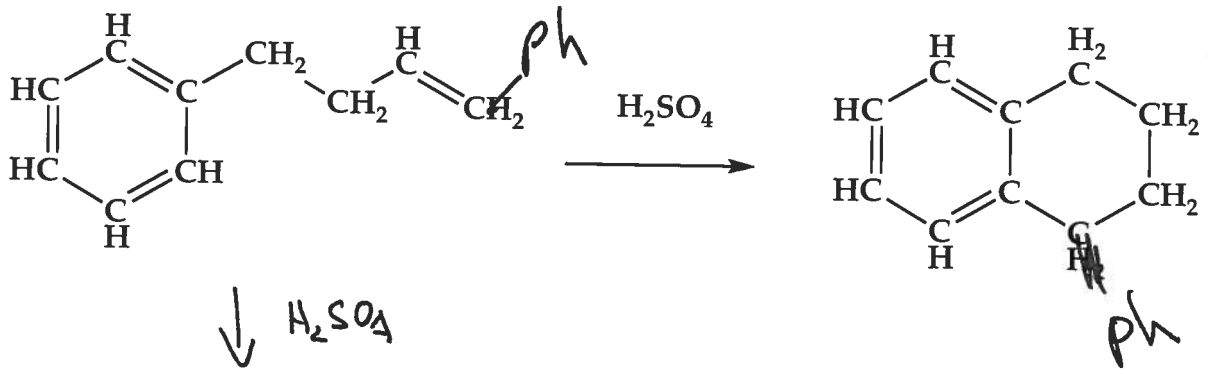
CH_3COCl

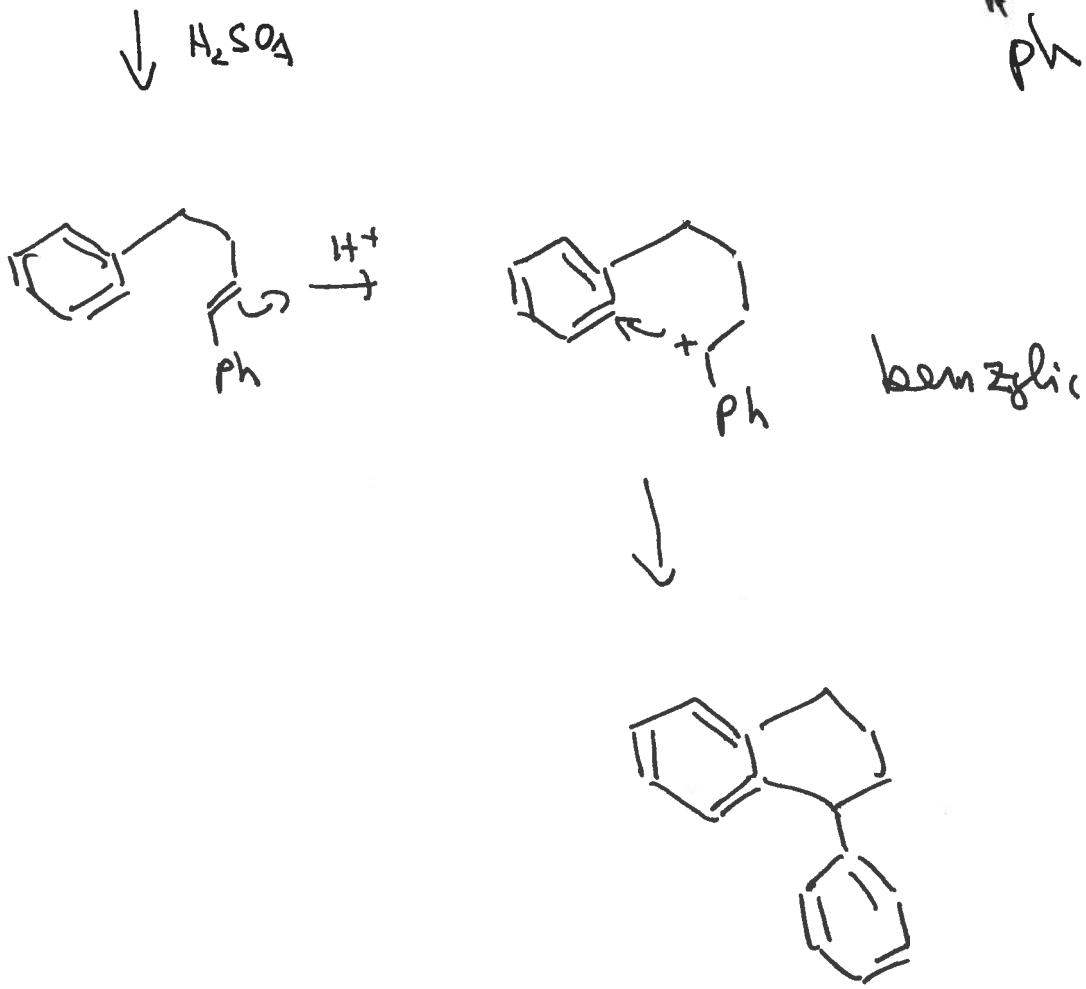
$AlCl_3$



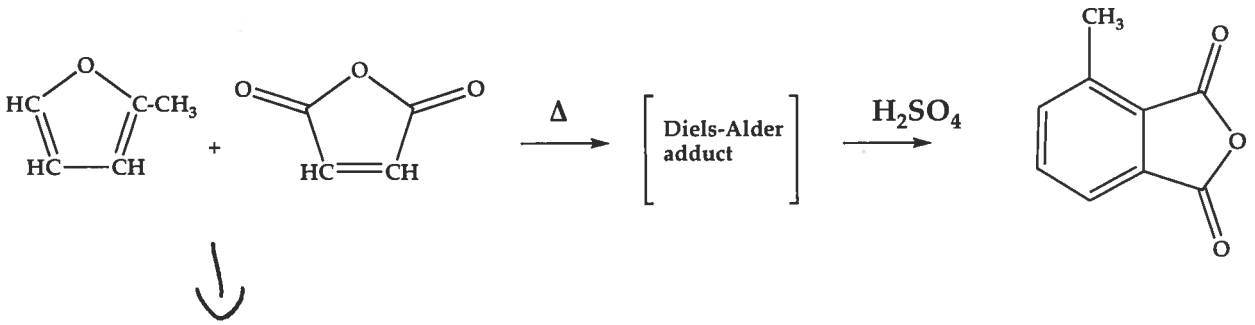
3. (10 pts)

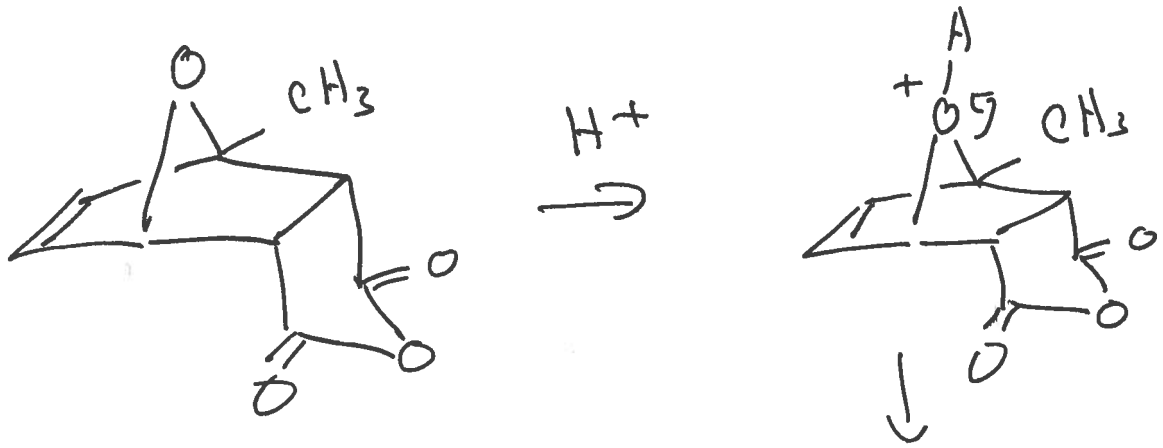
What is the mechanism of the following reaction?

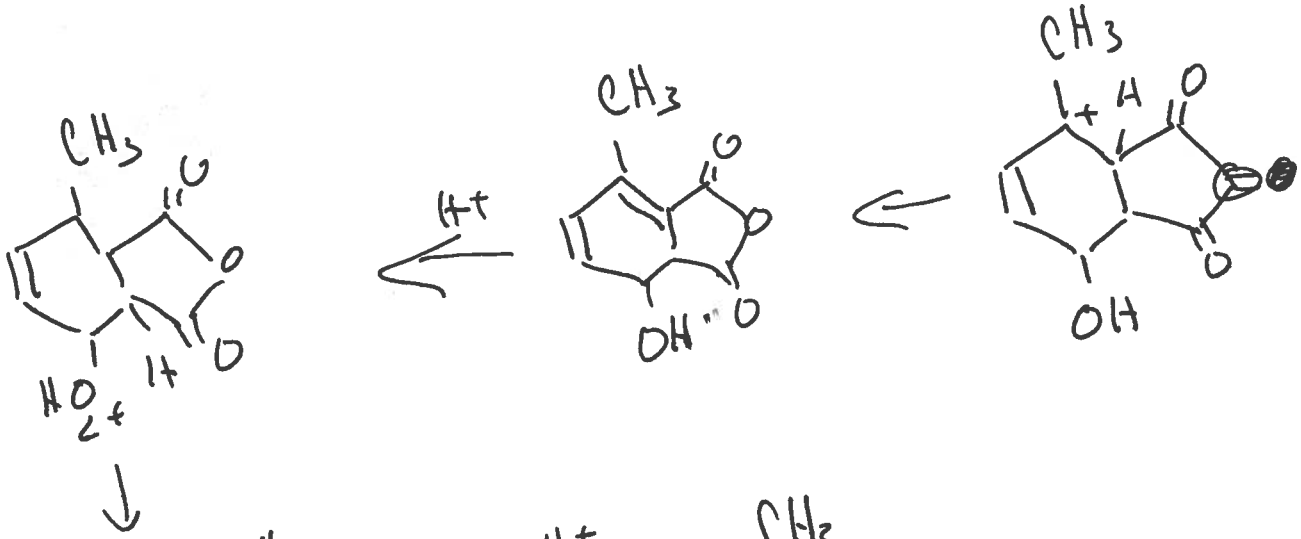


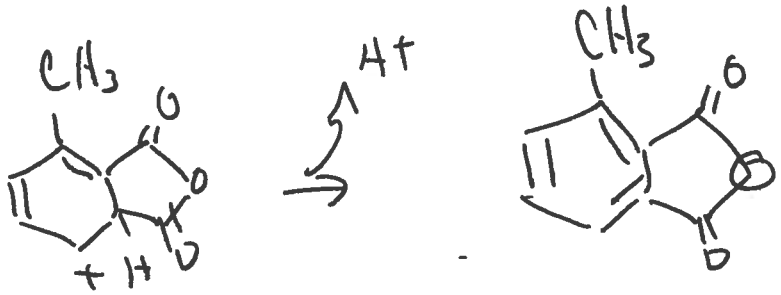


4. (10 pts) What is the mechanism of the following reaction?



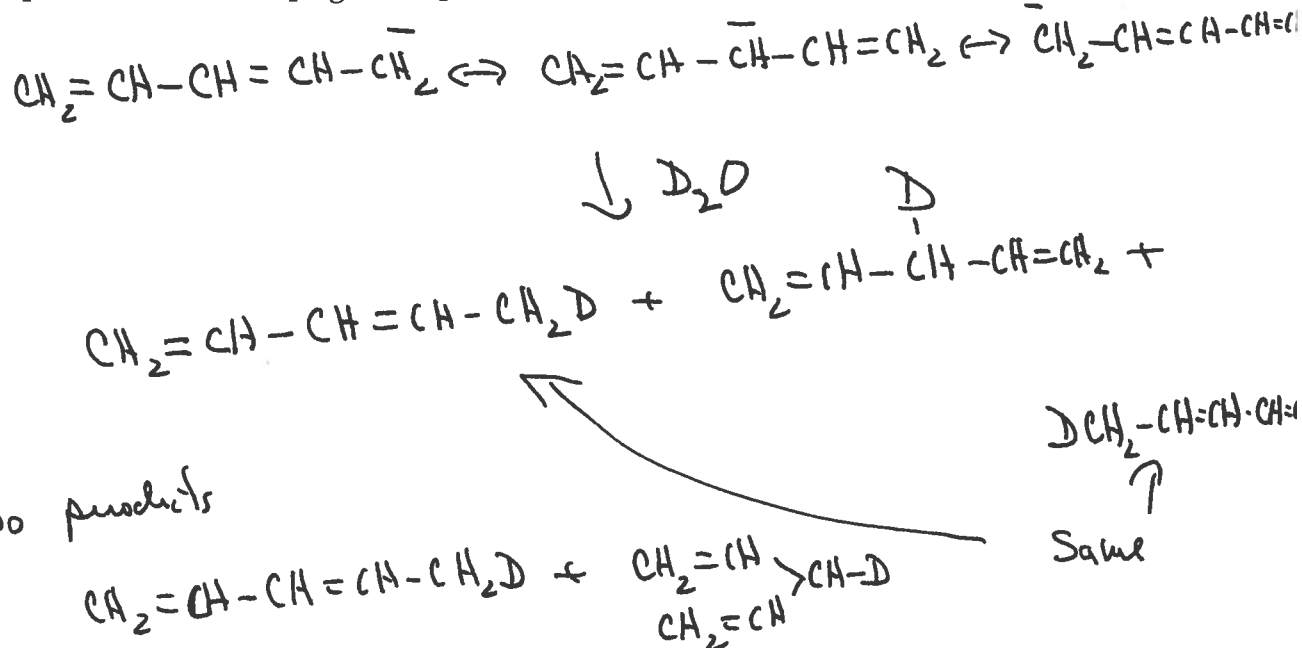


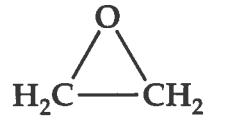


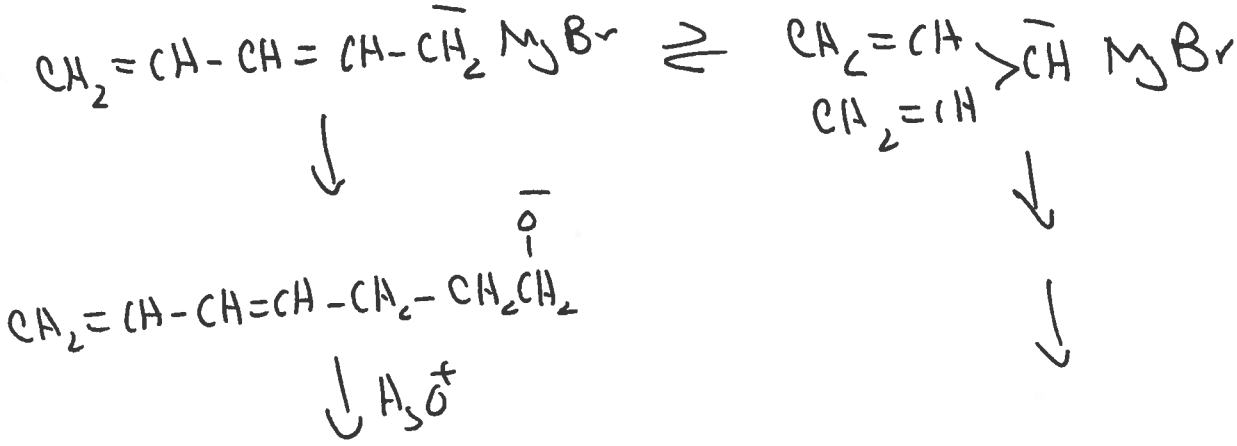


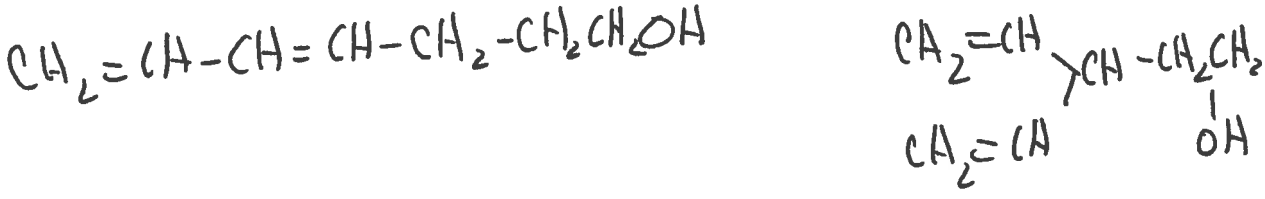
5. (20 pts) What are the major products of the following reactions?

a) $CH_2=CH-CH=CH-CH_2MgBr + D_2O \rightarrow$

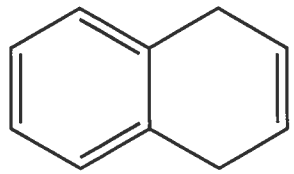


b) $CH_2=CH-CH=CH-CH_2MgBr$ +  $\xrightarrow{H_3O^+}$

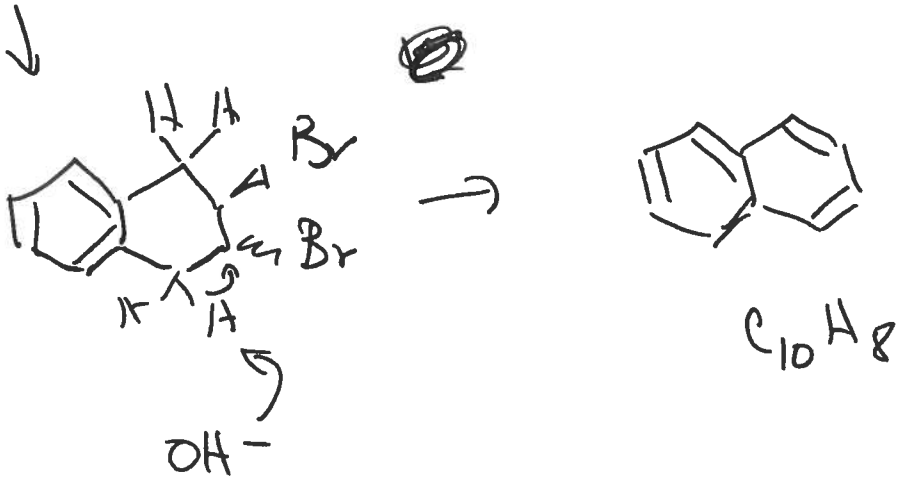




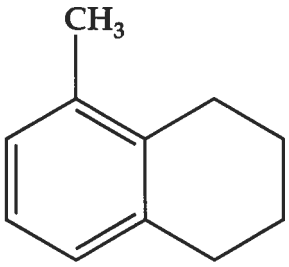
c)



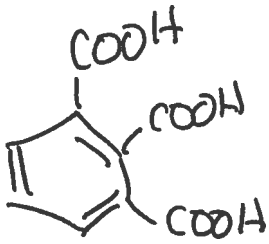
Br_2 / dark → KOH / EtOH → $C_{10}H_8$



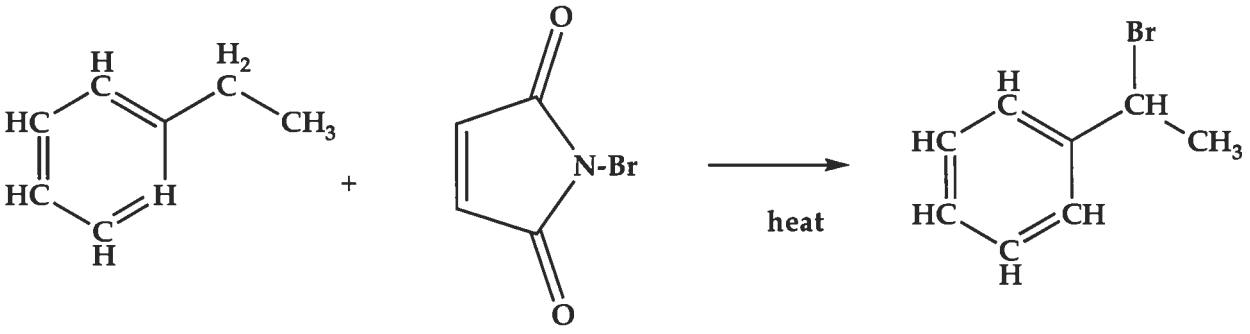
d)



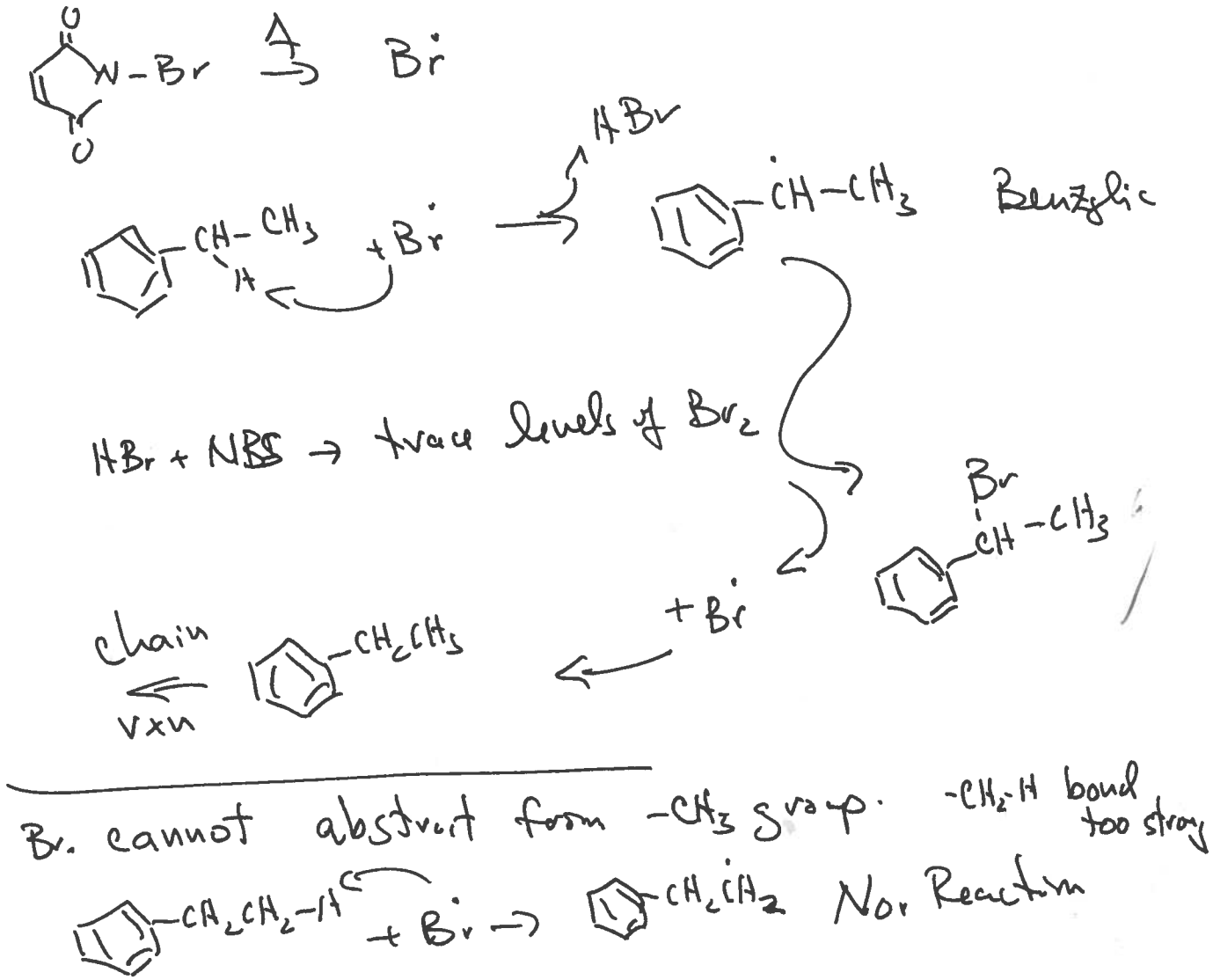
$KMnO_4$ / heat →



6. (10 pts) Consider the bromination of ethylbenzene by NBS.



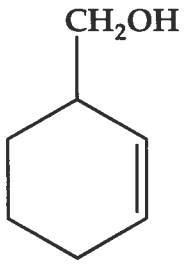
Why is the product C_6H_5-CH(Br)-CH_3 ? Why is C_6H_5-CH_2-CH_2Br not formed?



7. (10 pts)

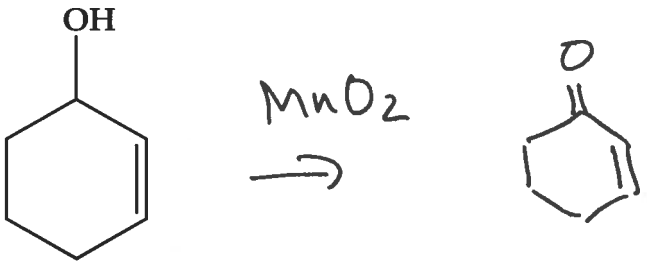
What is the product that results when these substrates are oxidized by MnO_2 in acetone solvent?

a)



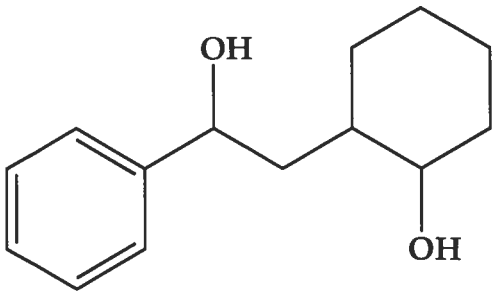
$+ MnO_2 \rightarrow$ No Reaction

b)

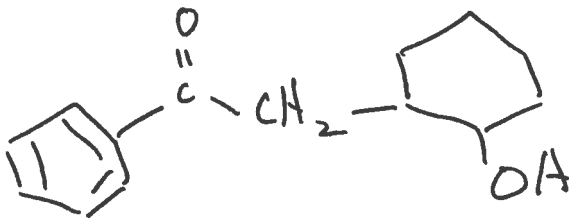


allylic alcohol

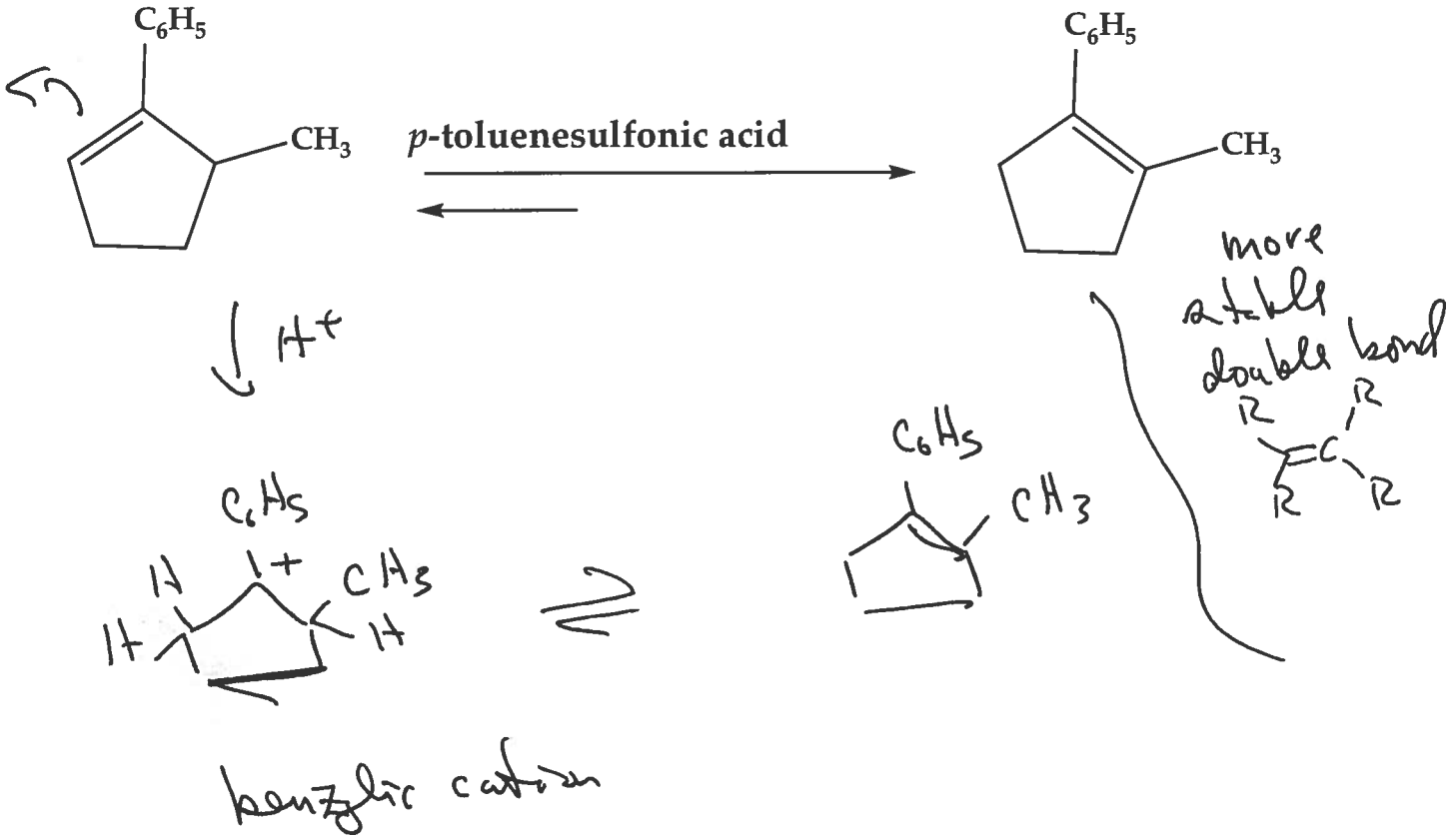
c)



↓ MnO_2



8. (10 pts) What is the mechanism for this isomerization? Why is the equilibrium to the right?



Equilibrium shifts to more substituted, stable alkene.