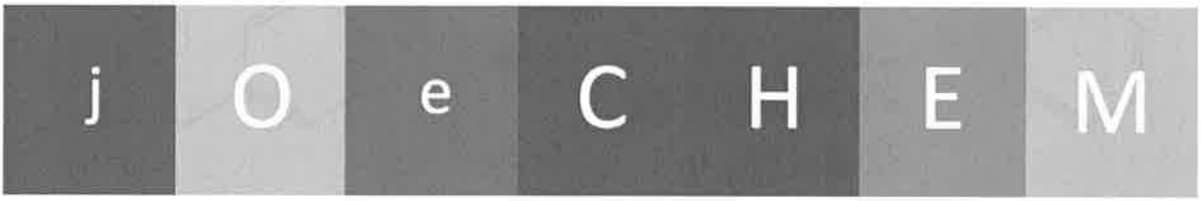
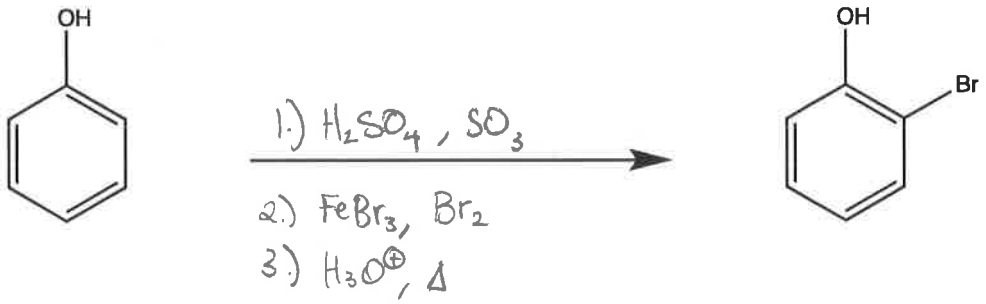
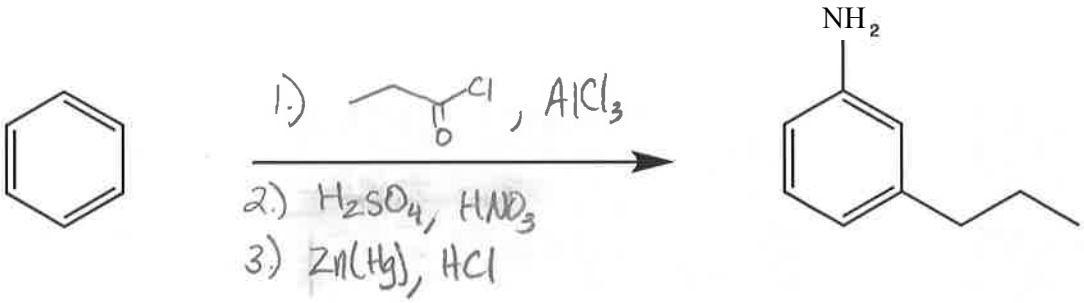
Organic Chemistry II

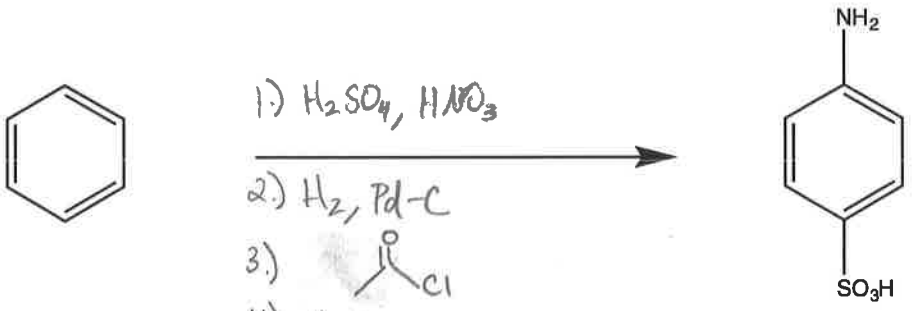
Exam 1

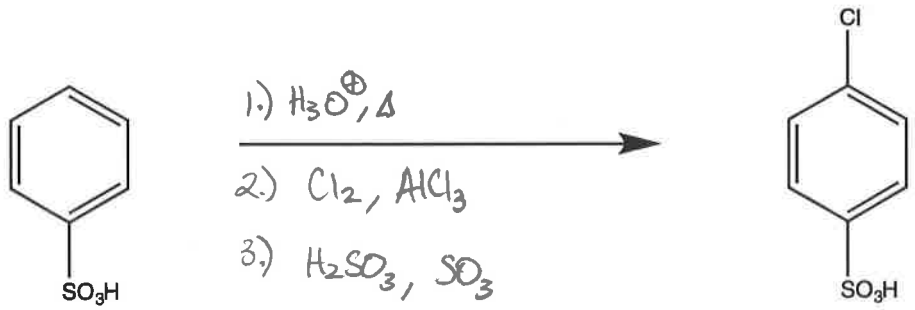


1.) Below various reactants and products are shown. In each reaction, provide the necessary reagents to make the given transformations occur (kind of like mini synthesis problems). **Note:** The reactions can possibly require multi-step reagents.

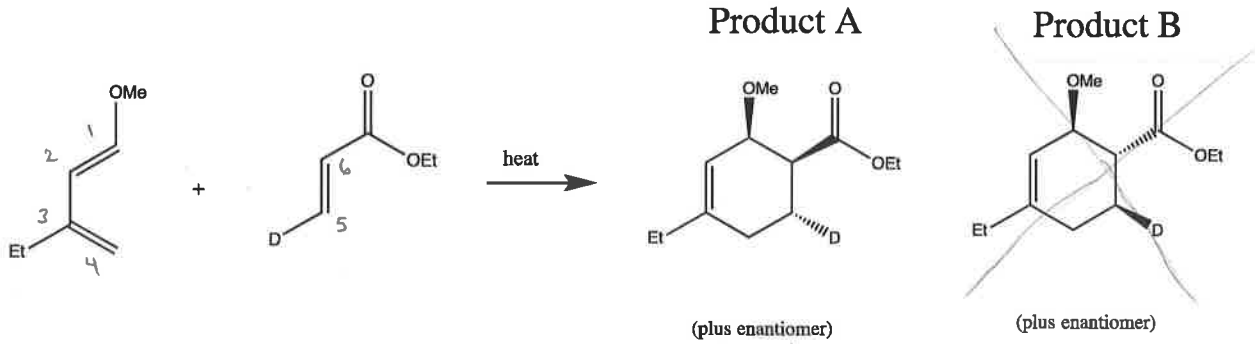






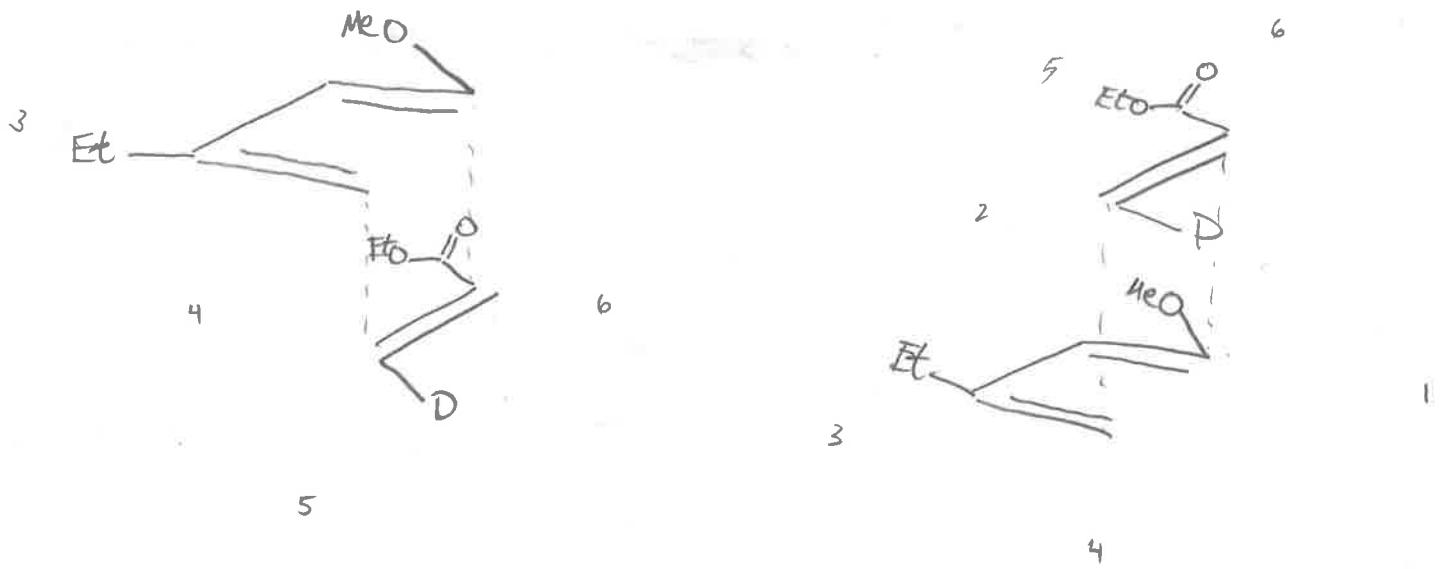


2.) The Diels Alder reaction (pictured below) is executed in a lab setting. After completing the reaction, product A is observed and B is **NOT** observed. BRIEFLY explain why this is the case: Provide a transition state to aid your brief explanation.



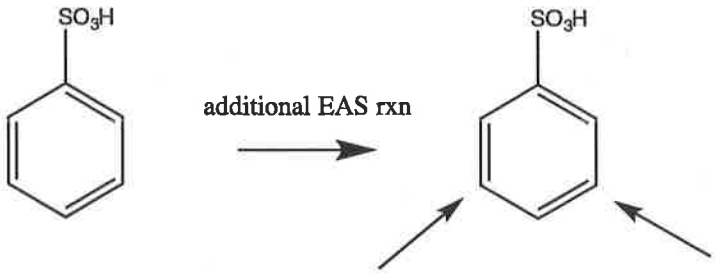
endo product

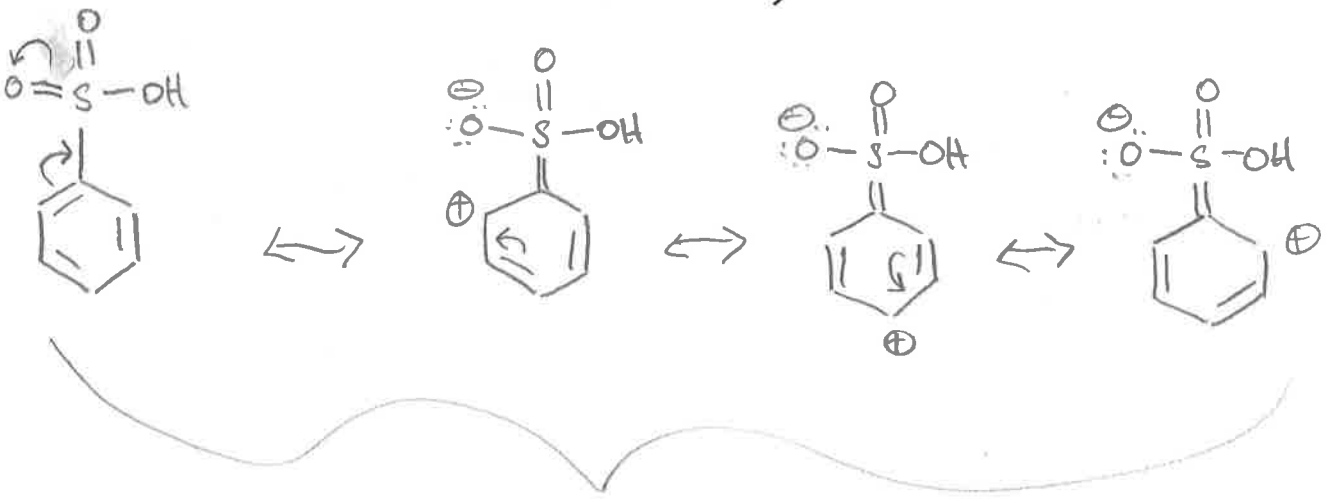
exo product

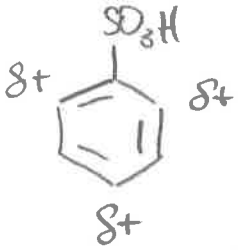


Both transition states represent the endo products, (product A & its enantiomer) and the endo products are favored because the p orbitals overlap / stabilize the transition state best in the endo conformation.

3.) When benzenesulfonic acid undergoes a subsequent EAS reaction and an additional group is added to the ring, the reaction proceeds slowly and the new group is placed meta to the preexisting sulfonyl group. Using structures and a **BRIEF** explanation, illustrate why this is observed.

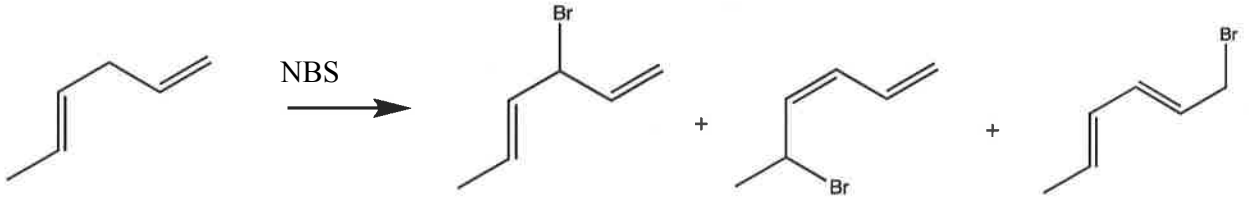


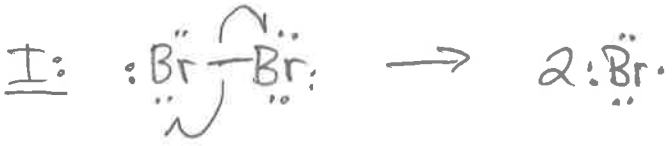


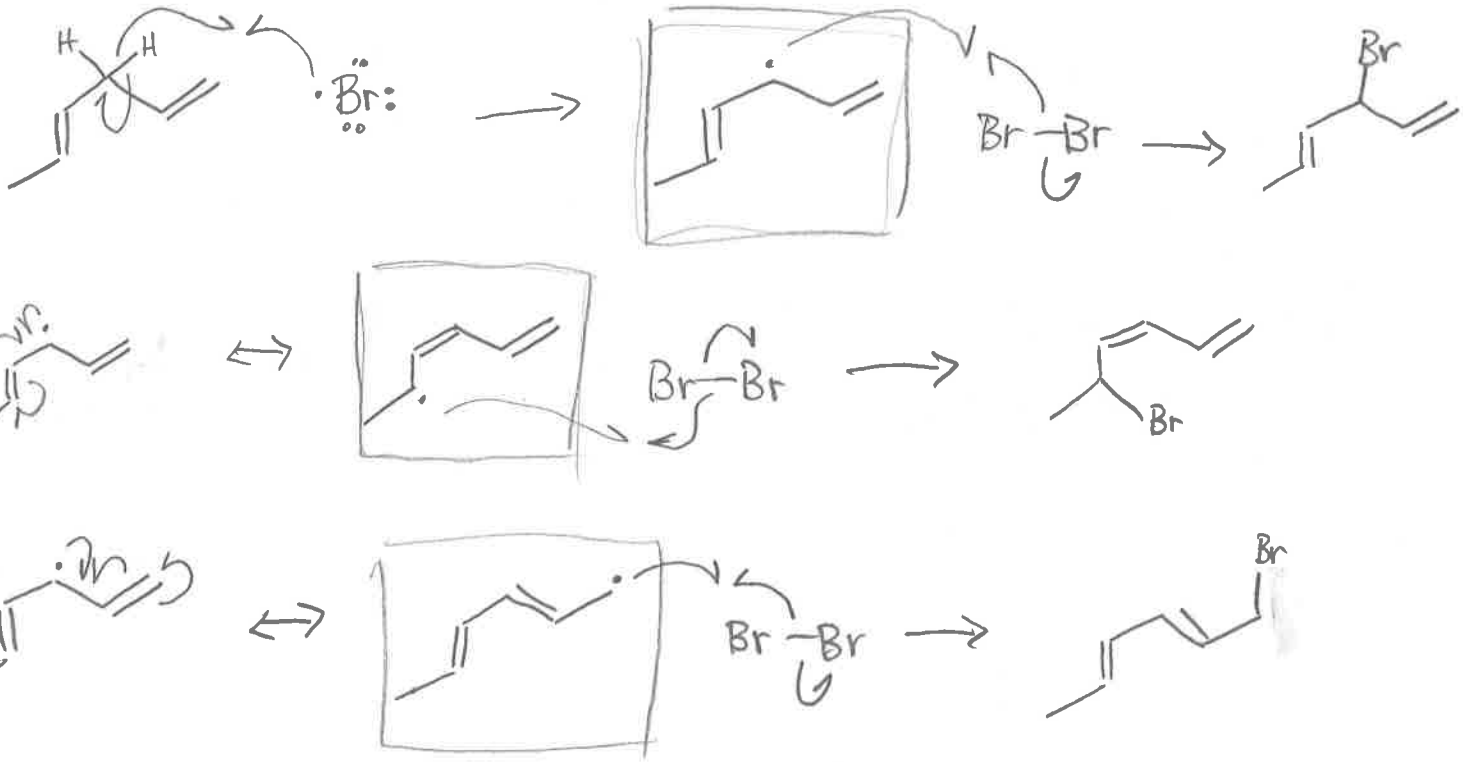


Through the resonance, the best positions to add groups through EAS are at the 2 meta positions since they DO NOT bear partial positive charges.

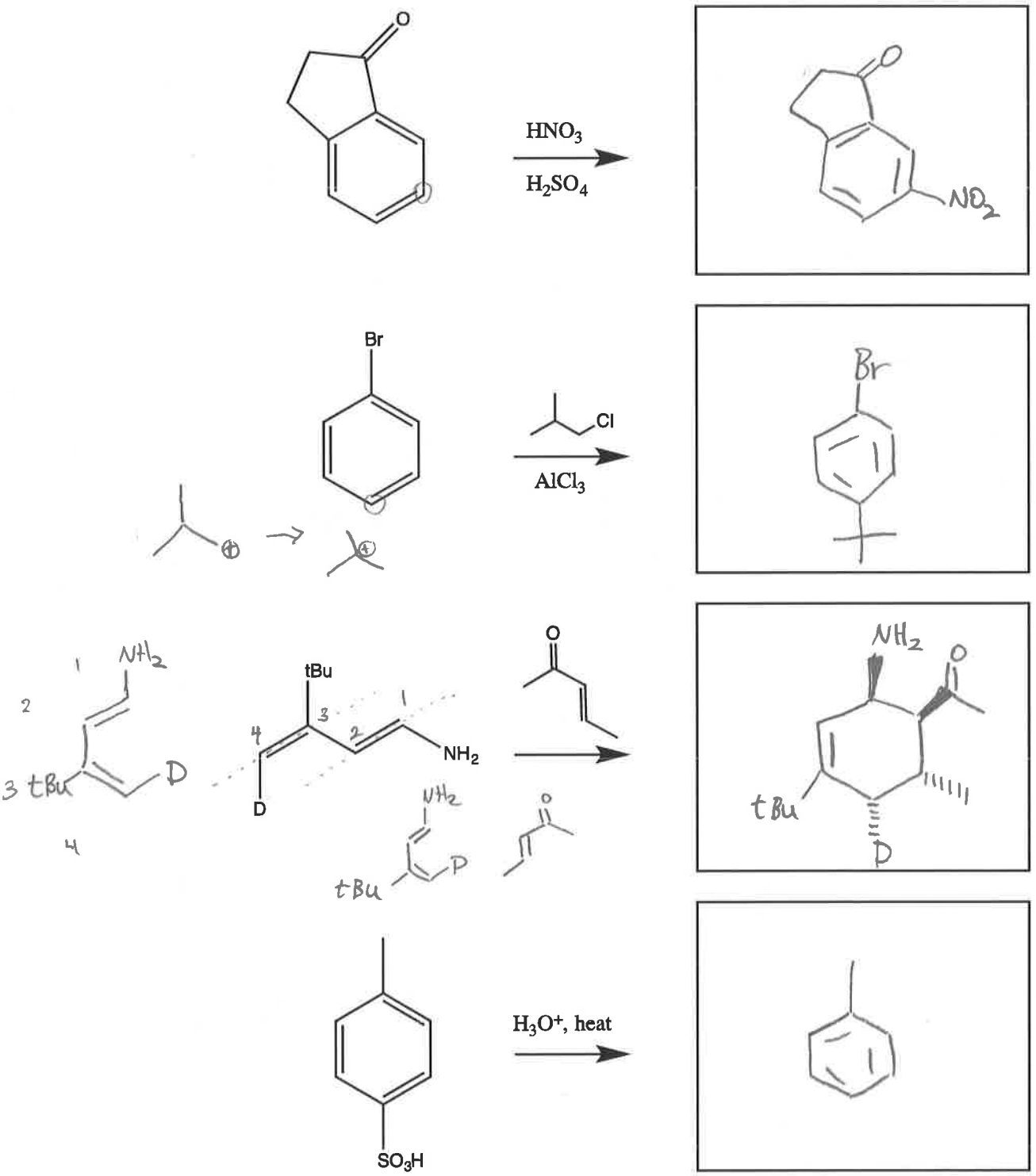
4.) When the following Free Radical Bromination (pictured below) is executed in a lab setting, instead of observing one monobrominated product, a mixture of 3 monobrominated products are seen. Using electron pushing arrows and structures, illustrate why this mixture of products resulted.

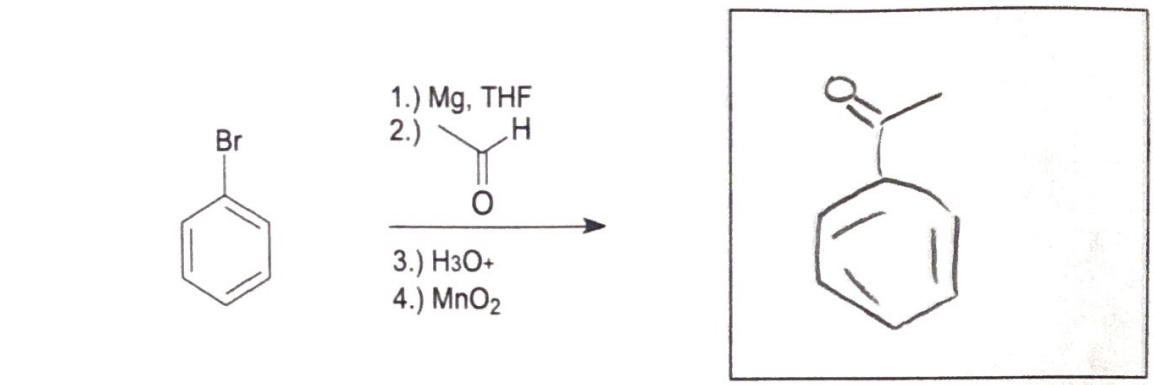


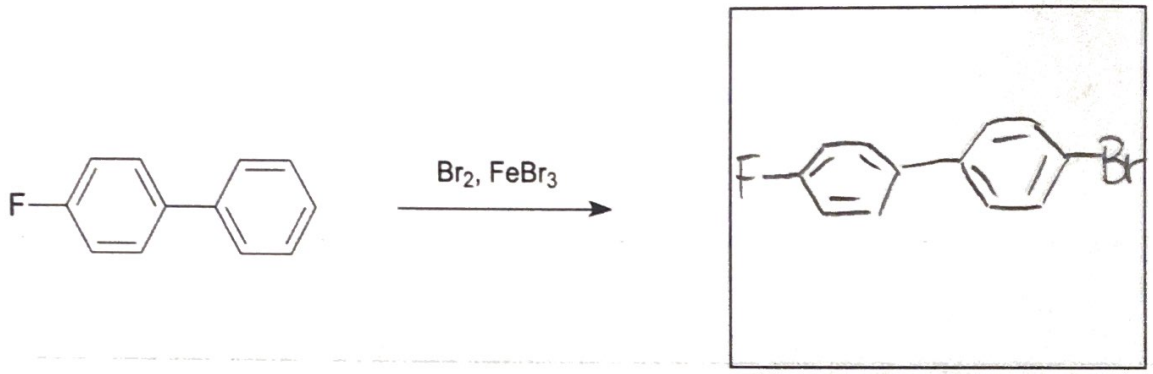


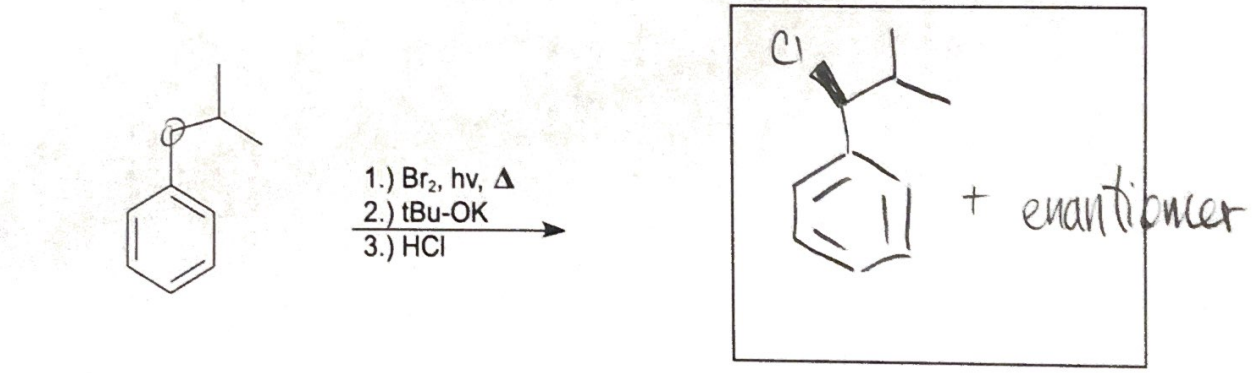


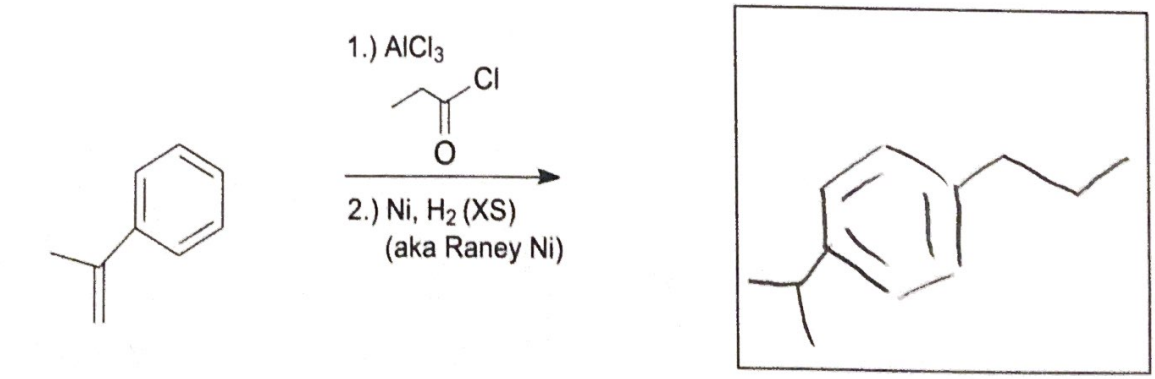
5.) The reactions below are shown missing their **final product**. For each problem below, correctly predict the final product. If you believe no product is formed/no reaction occurs, write **"NR"**.



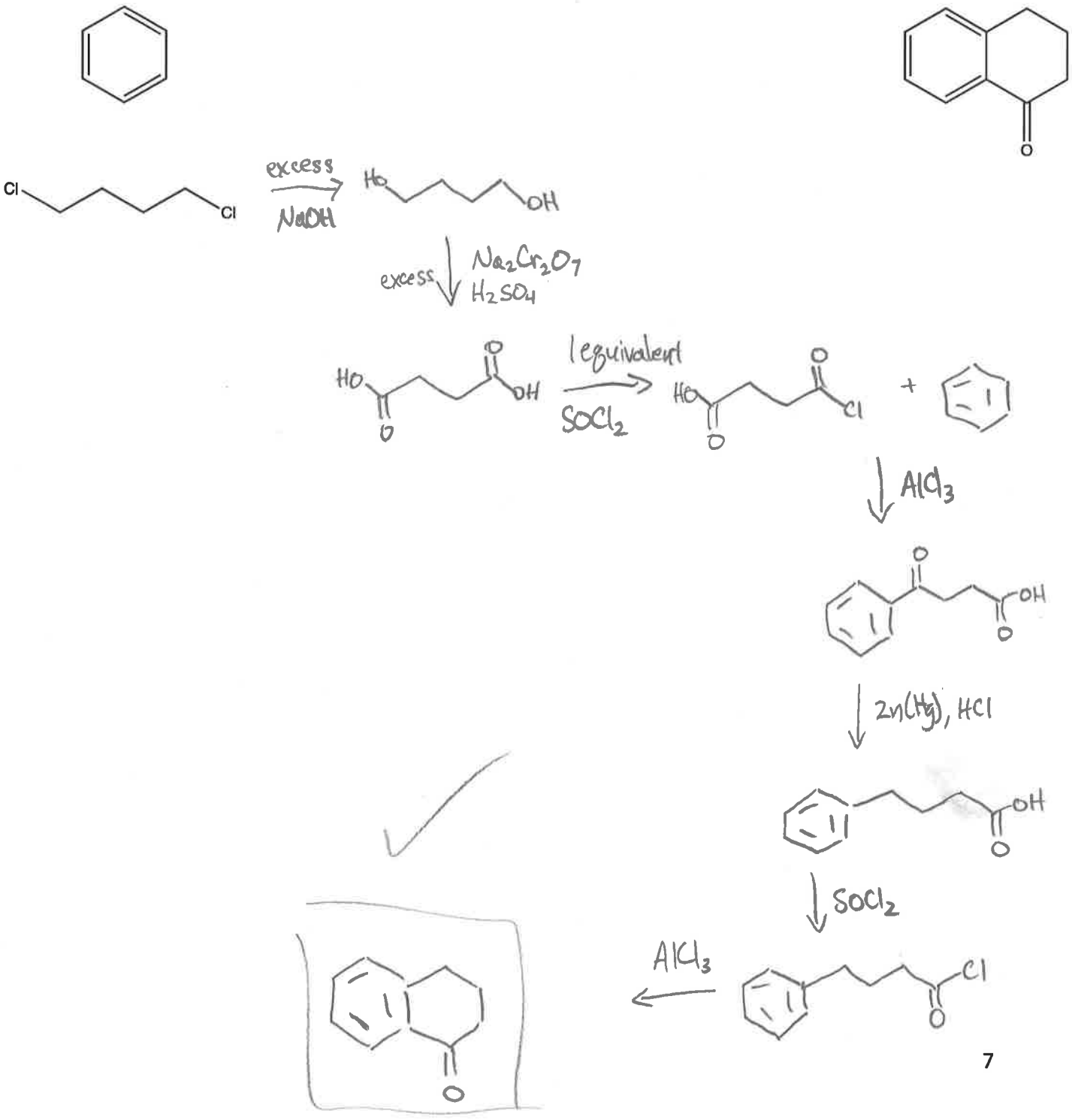

Br
1.) Mg, THF
2.)
H
O
3.) H3O+
4.) MnO2


F
Br2, FeBr3
F
Br

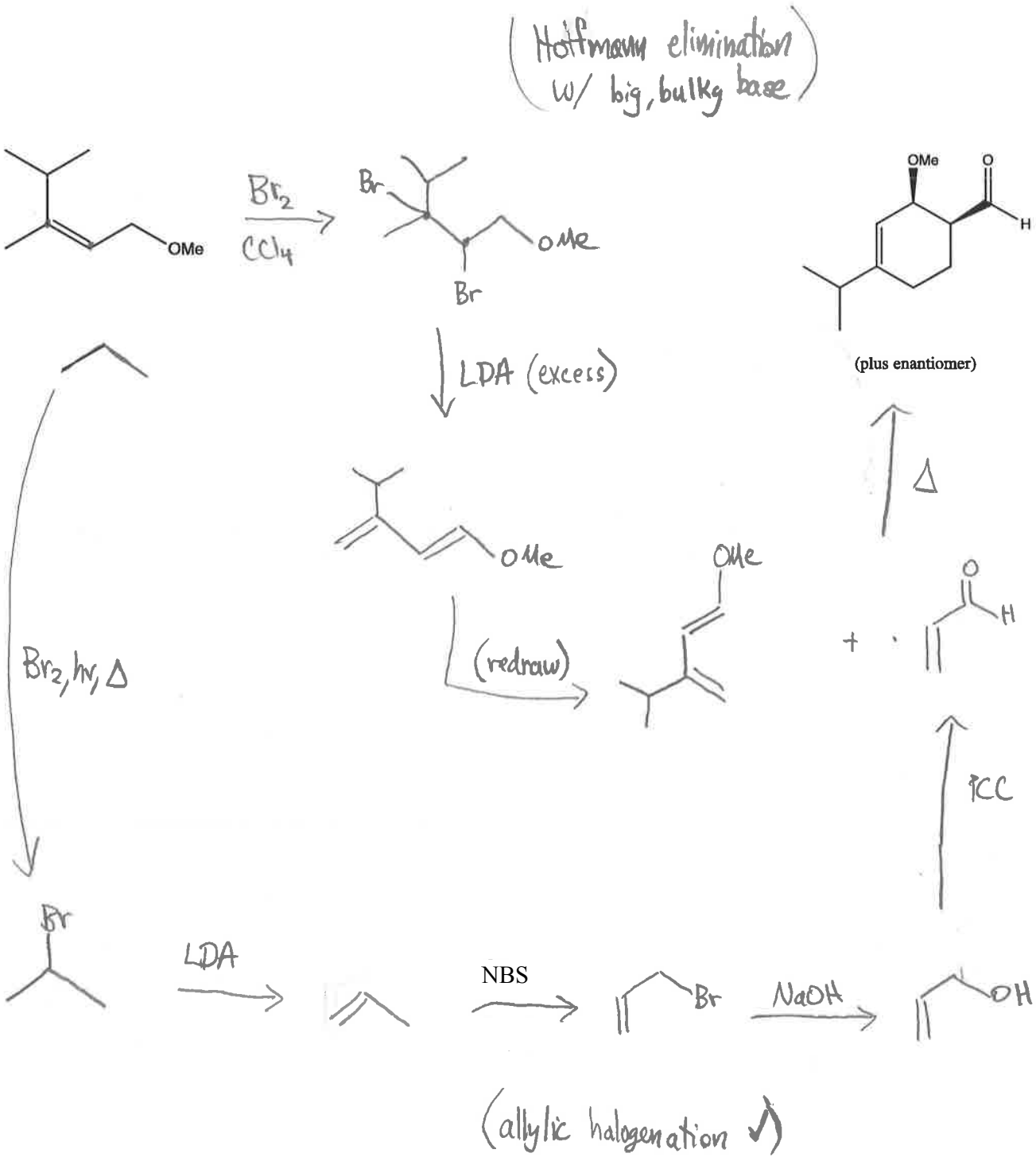

1.) Br2, hv, Δ
2.) tBu-OK
3.) HCl
Cl
+ enantiomer


1.) AlCl3
Cl
O
2.) Ni, H2 (XS)
(aka Raney Ni)

6.) Given the target molecule pictured below on the right hand side of the page, provide an efficient synthesis using only benzene and 1,4-dichlorobutane as your carbon sources. You may use whatever inorganic reagents to achieve the synthesis.



7.) **Okay**, so this is an extra credit synthesis question. I thought of this when I was making the test, and I think this is a little, but if you can do understand this/replicate it/solve it, you are in pretty good shape. Give it your best shot, you got this!



8.) Okay, gang, last question to bring it on home. One more synthesis—you got this!