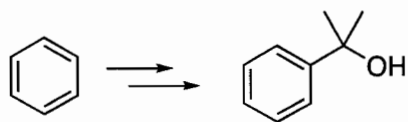
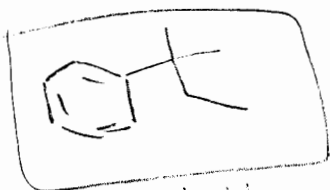
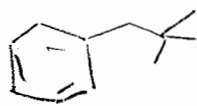
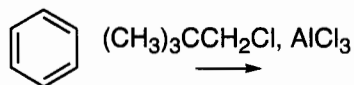
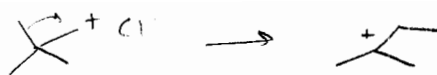


1. Propose a synthesis.

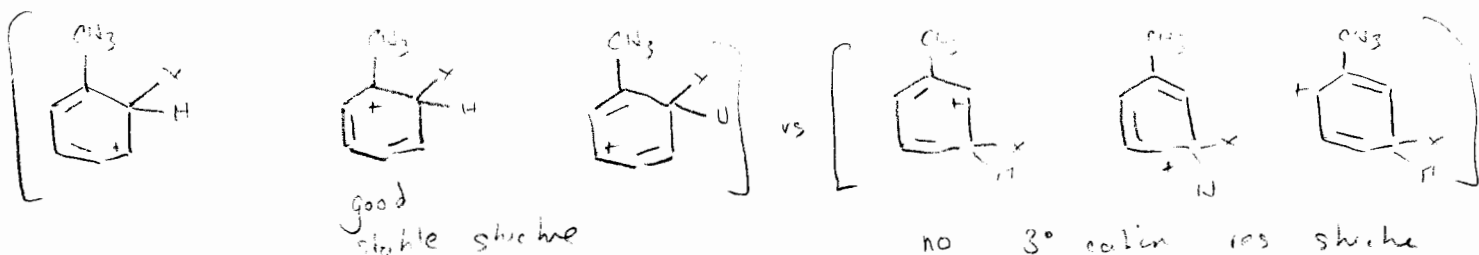
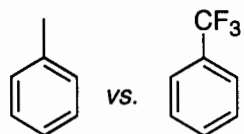


2. Provide the major products.



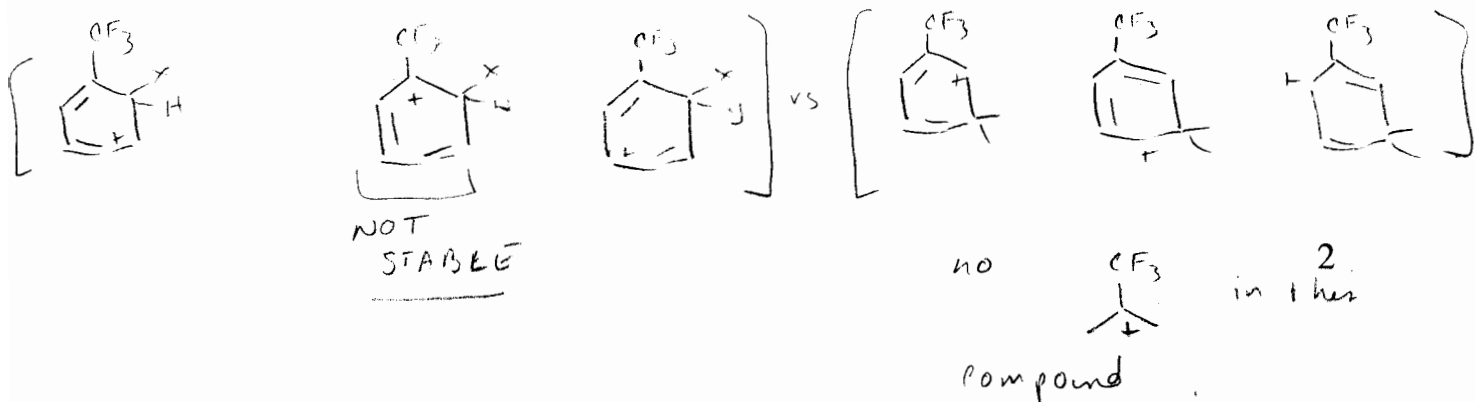
probably major

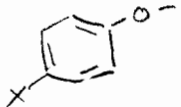
3. Toluene is ortho, para directing while trifluoromethylbenzene is meta directing. Explain, using resonance structures in your answer.



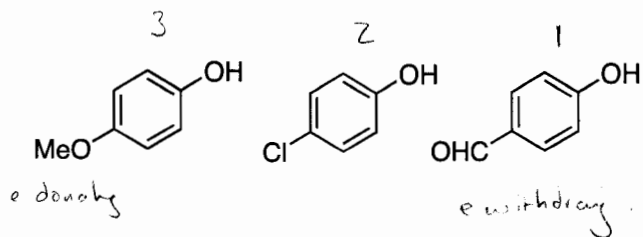
electron withdrawing  
think about inductive effect  
electron deficient because of fluorine on it

The carbon of  $\text{CF}_3$  is  
electron deficient

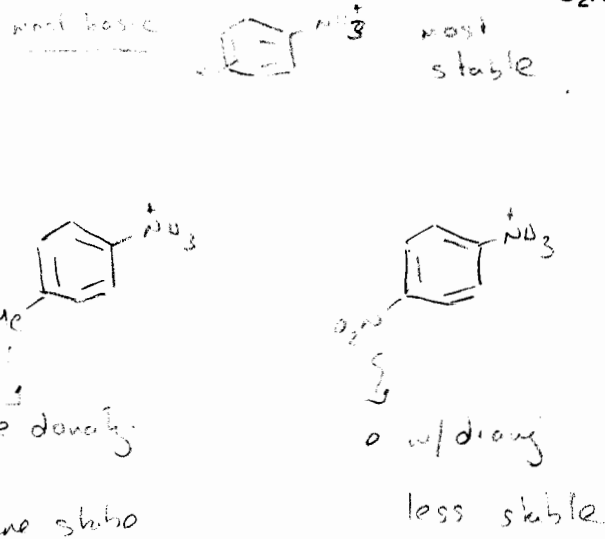
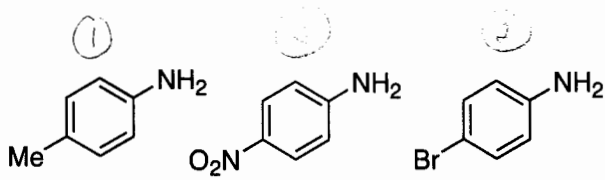


most acidic  is most stable

4. List the following compounds in order of ~~decreasing~~ increasing acidity. (1 = most acidic)

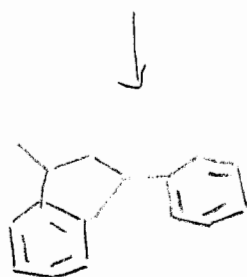
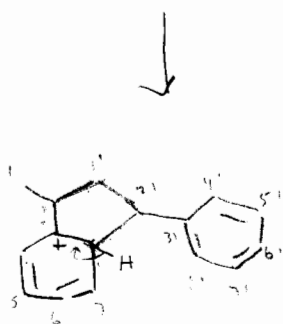
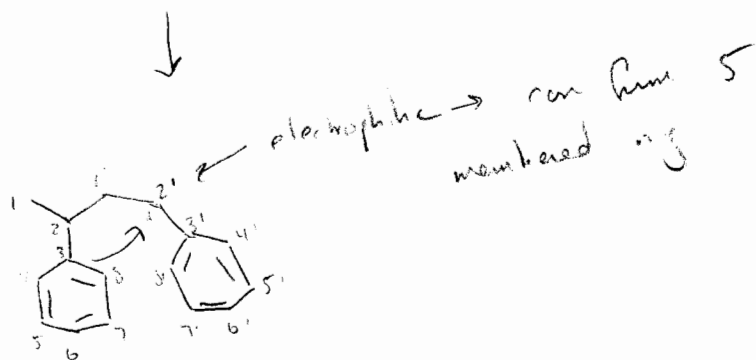
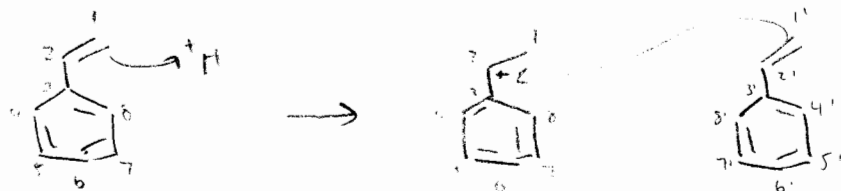
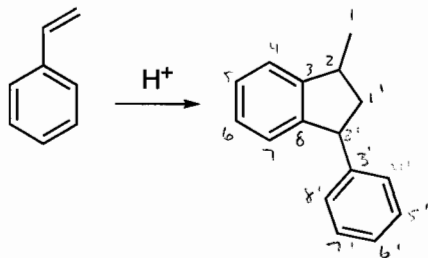


5. List the following compounds in order of ~~decreasing~~ increasing basicity. (1 = most basic)

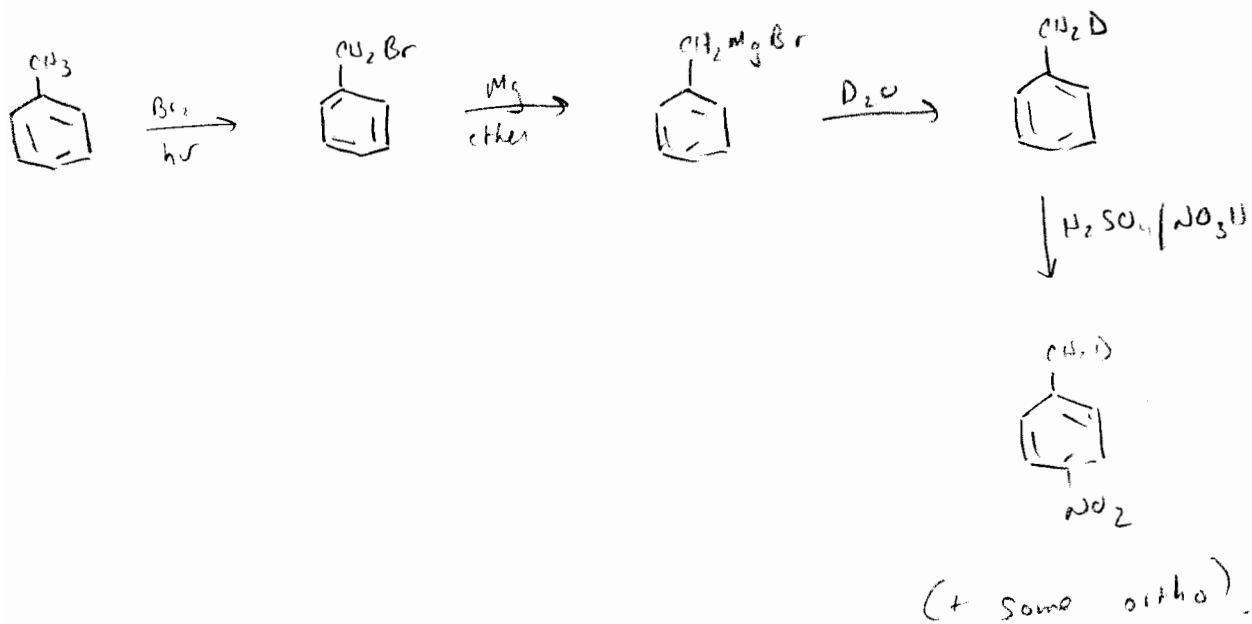
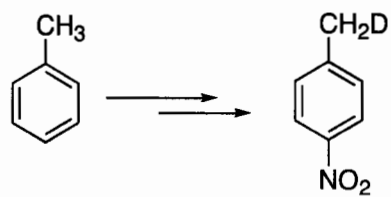


6. Propose a mechanism.

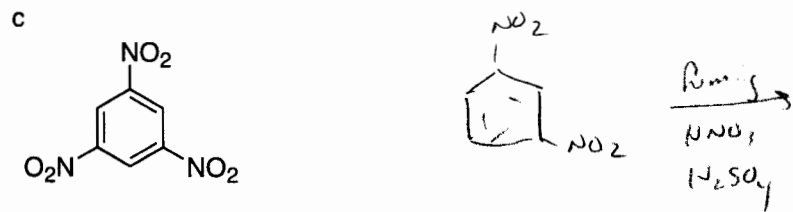
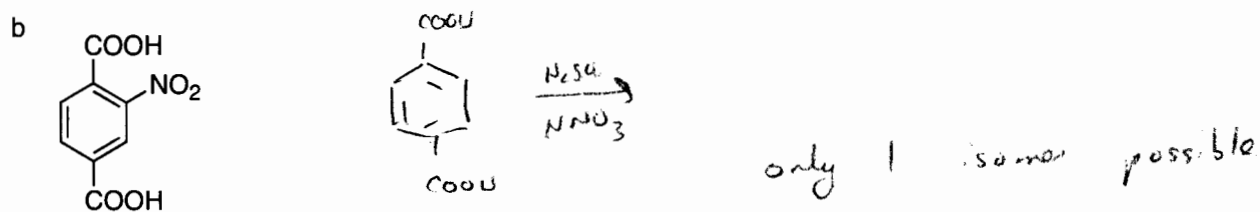
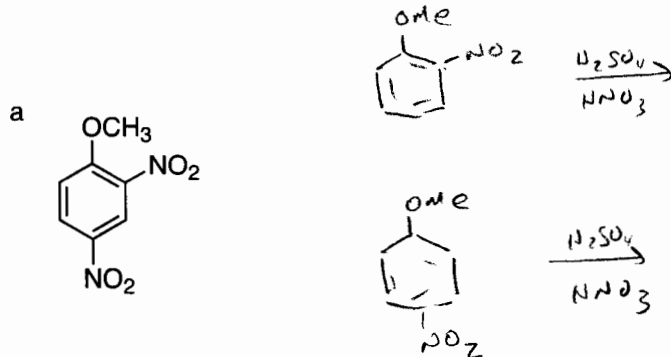
Tricky!



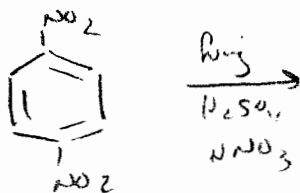
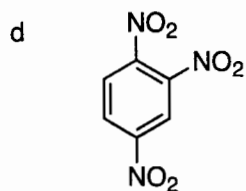
7. Outline a multistep synthesis of 1-ethyl-4-nitrobenzene from toluene.



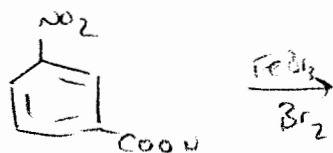
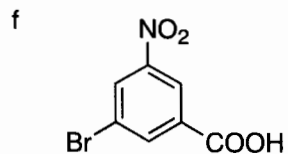
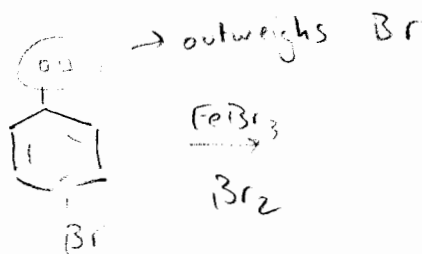
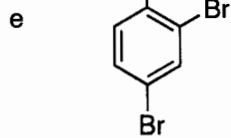
8.a-c Which of the following compounds can likely be prepared in a pure state by electrophilic substitution on a disubstituted benzene? Outline the method in each case.



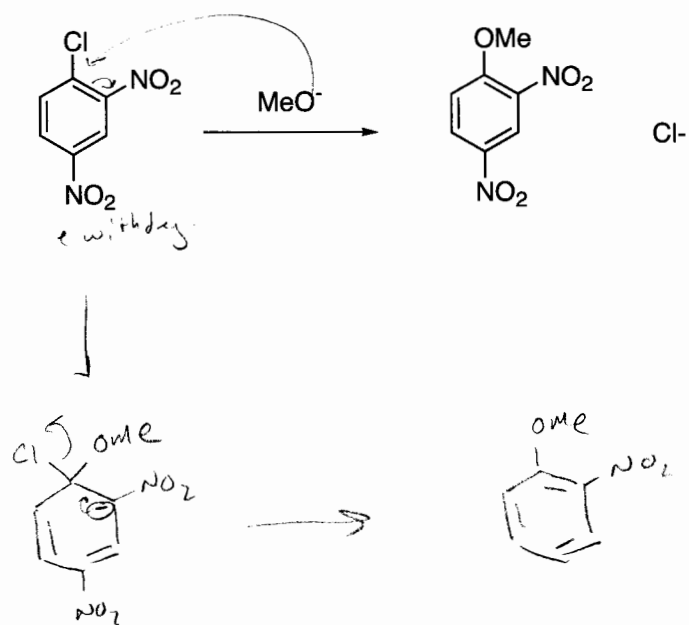
8.d-f Which of the following compounds can likely be prepared in a pure state by electrophilic substitution on a disubstituted benzene? Outline the method in each case.



no other  
isomers  
possible

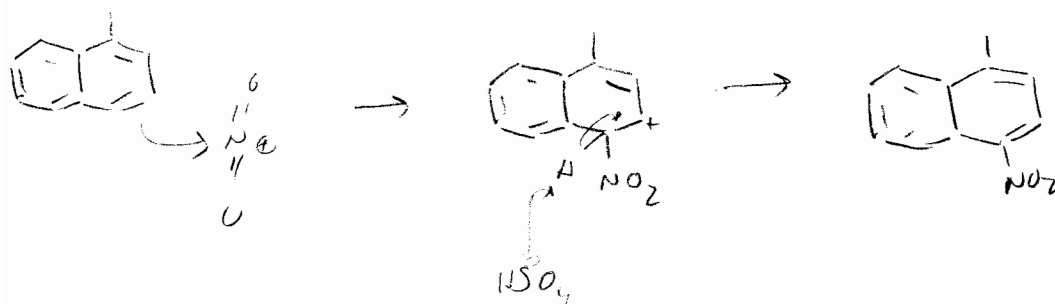
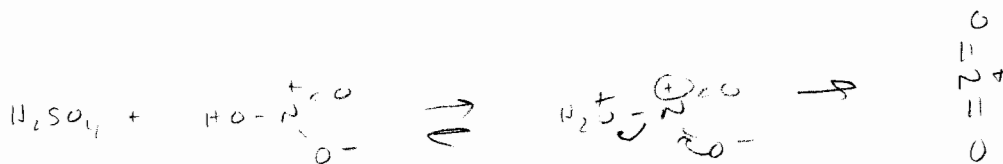
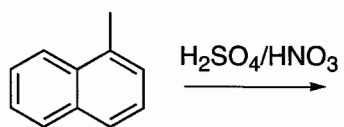


9. Provide a detailed stepwise mechanism for the following reaction.





10. Propose the mechanism of the following reaction and provide the MAJOR product.



minor      some ortho