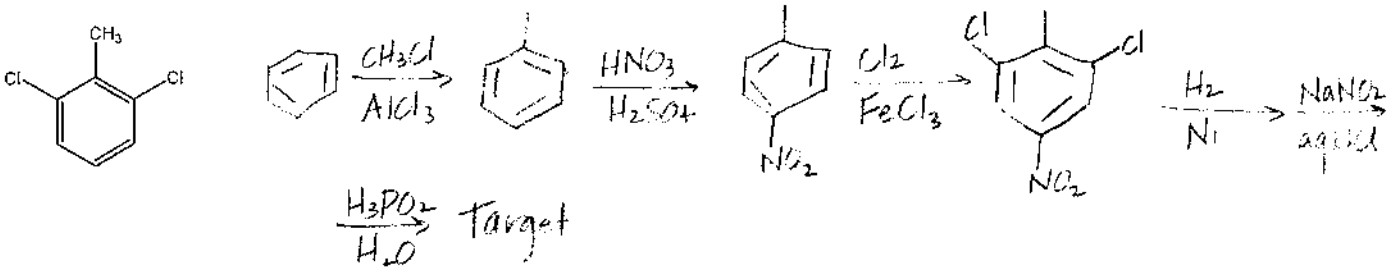
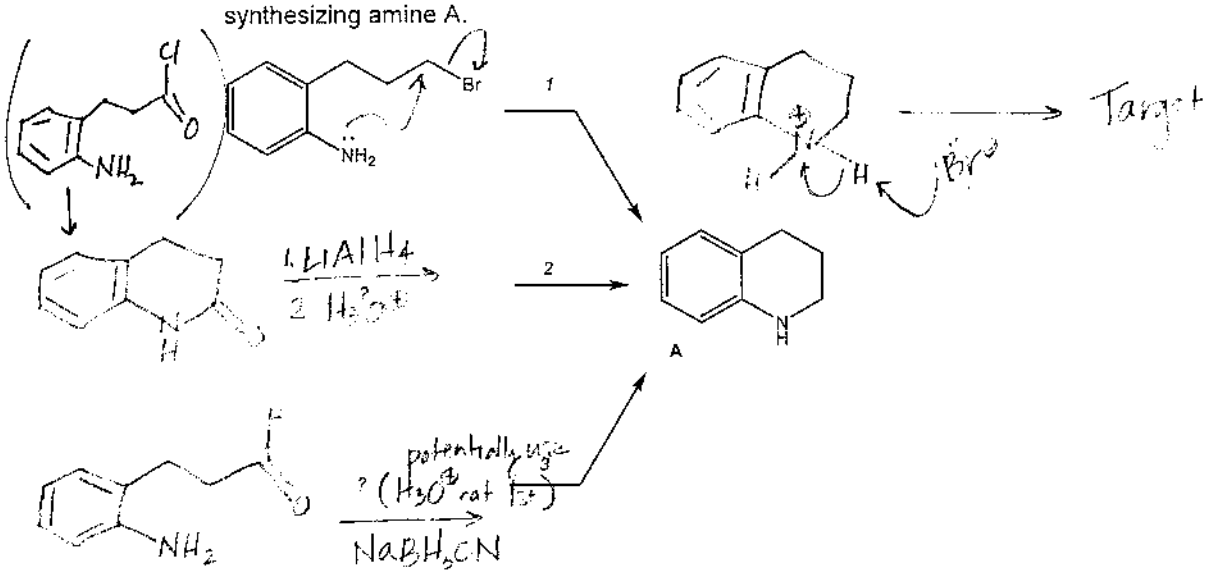
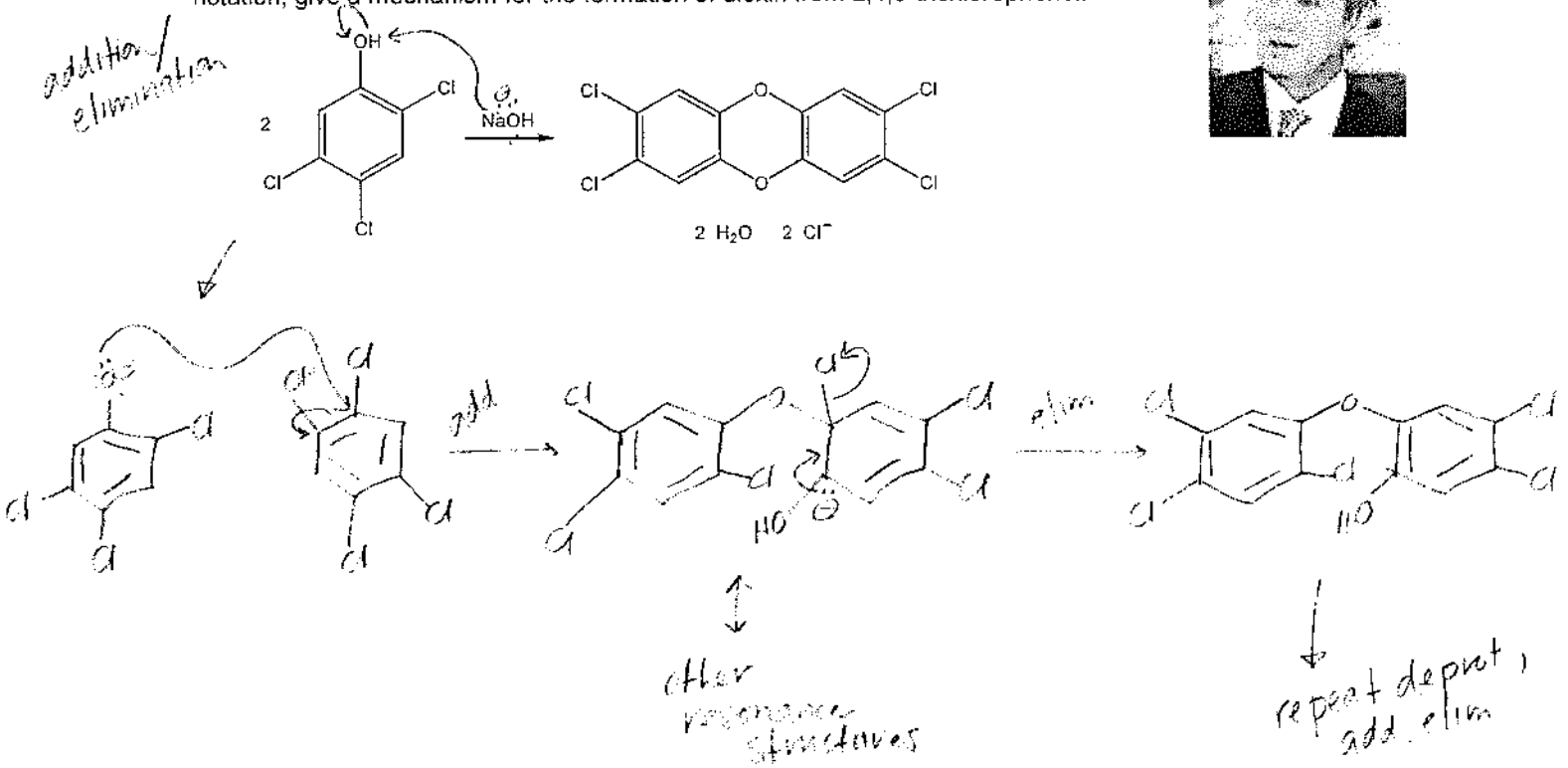
1. Synthesize the following compound starting from benzene.



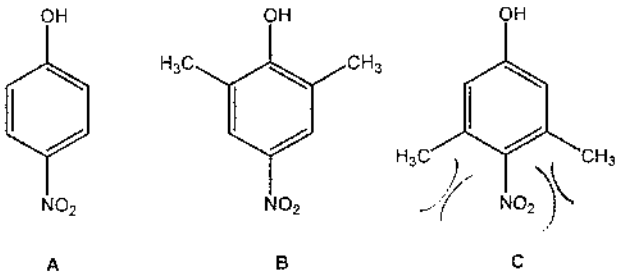
2 (a) Draw a mechanism to represent reaction **1**. (b) Propose at least two additional, different methods of synthesizing amine A.



3. Dioxin, a by-product formed during the synthesis of herbicide 2,4,5-T, has gained notoriety because of the poisoning of Vicktor Yushchenko. Using good curved arrow notation, give a mechanism for the formation of dioxin from 2,4,5-trichlorophenol.



4. Phenols A and B have approximately the same pK_a, indicating that the inductive effect of the additional methyl groups is small. However, phenol C is significantly less acidic than phenol A or B. Explain why? (Hint: conformation is the key.)

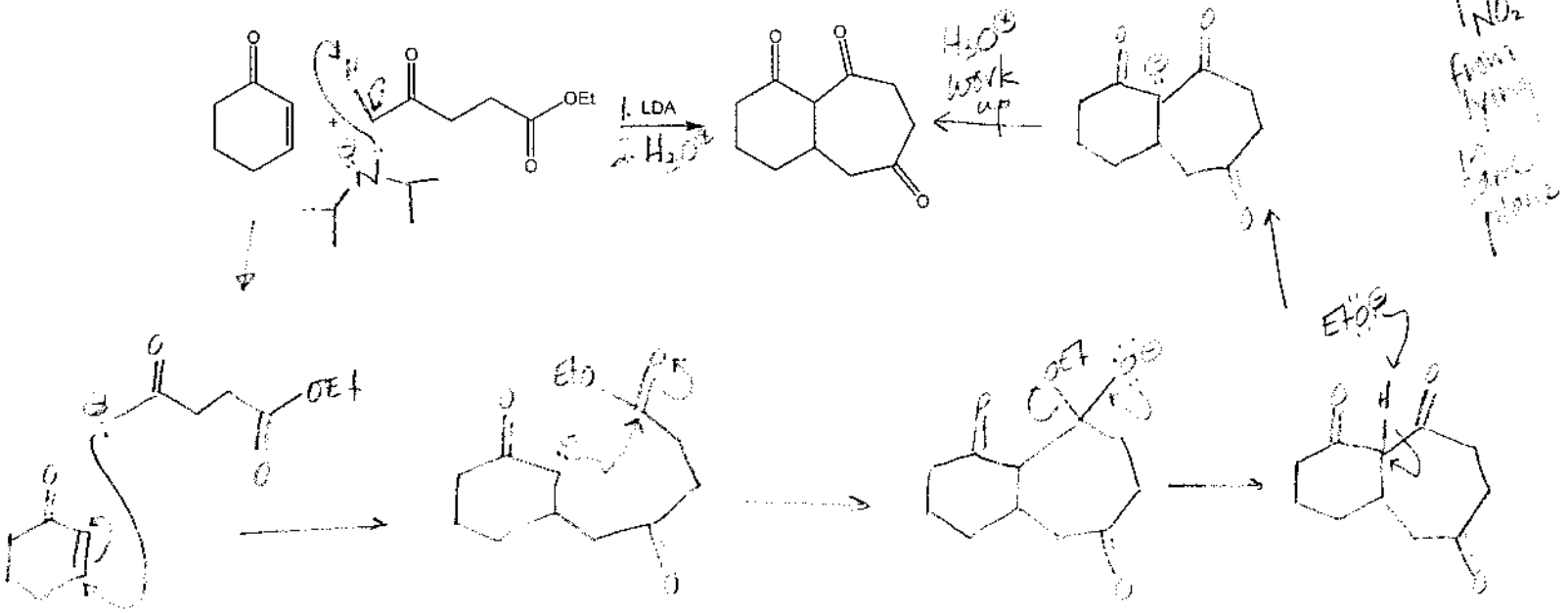


conj base B stabilized by extra resonance so B is more acidic

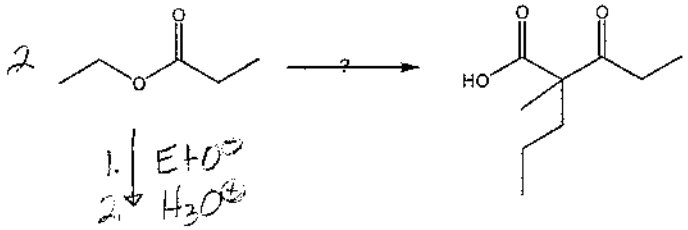
conj base C only has inductive effect of NO2

steric

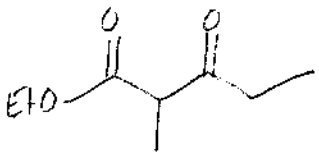
5. Provide a mechanism for the reaction shown below.



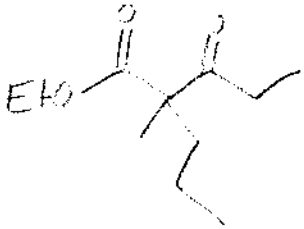
6. Show how you would accomplish the synthesis below. Include all necessary reagents and intermediates formed along the way. Hint: Perform an ester condensation first.



what would be the product if the target decarboxylated?



1. EtO⊖
2. PrBr



1. HO⊖
2. H3O⊕

target

(assuming it doesn't decarboxylate to readily)