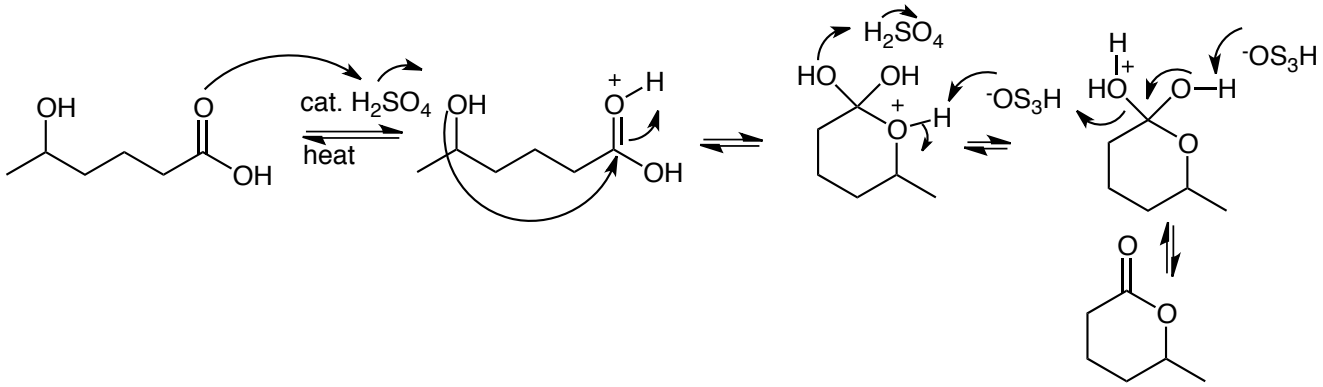
Name .....

L.I.U.

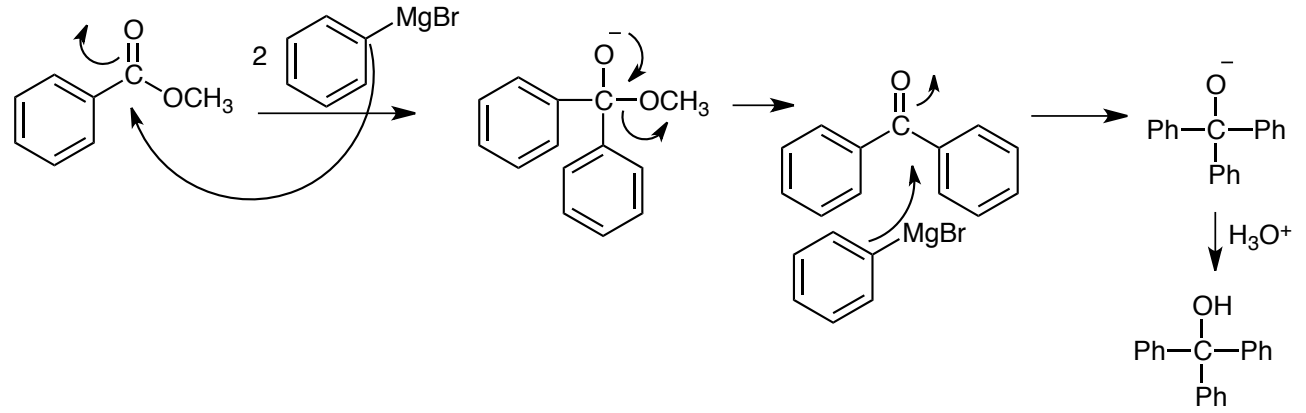
Chem. 122, Sect 012, Quiz 3, 50 pts, Spring, 2011

1. Give the product of the following reactions and in each case give a detailed mechanism, showing all of the steps. (30 pts)

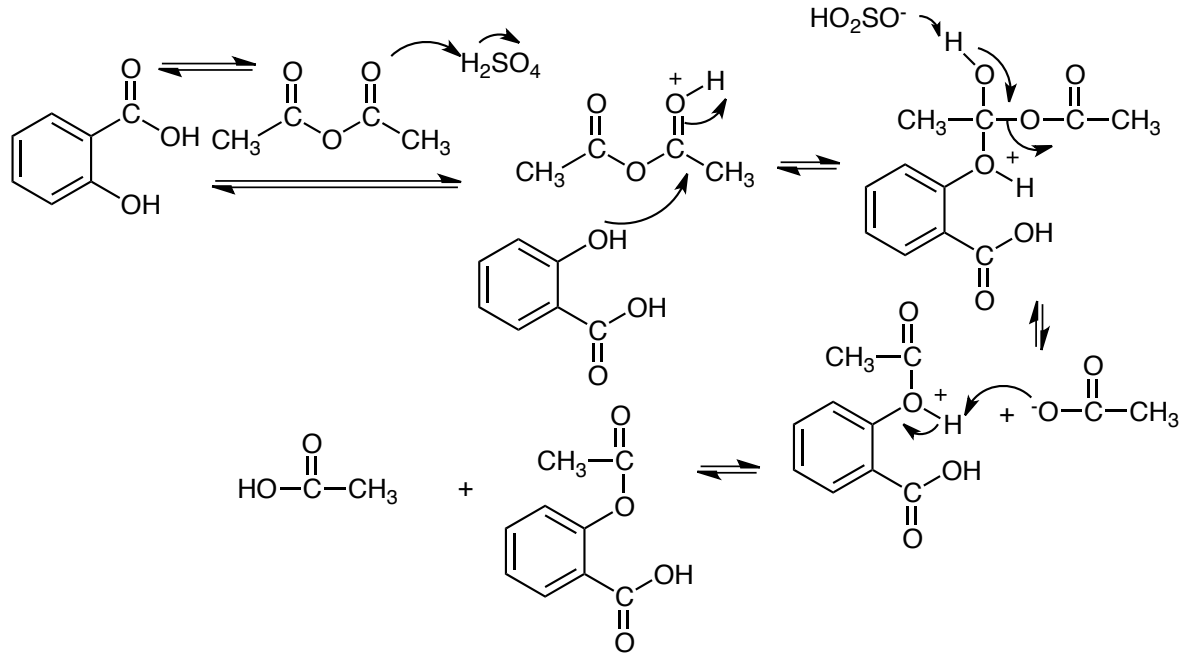
(a)



(b)

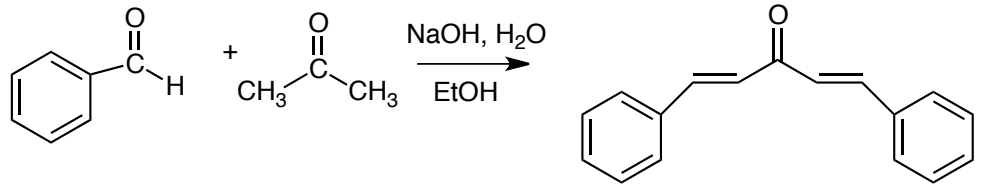


(c)

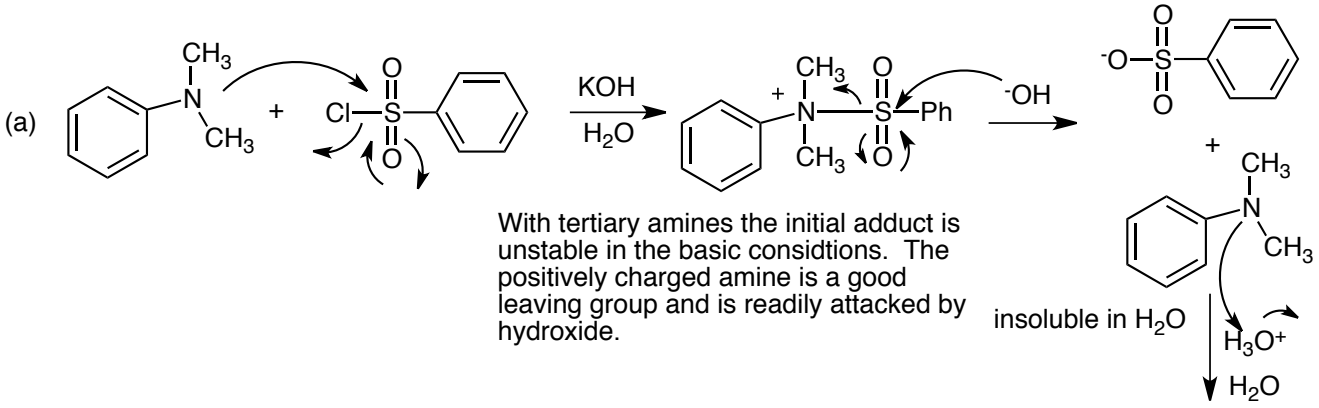


Name .....

2. Show the overall reaction that occurs for the preparation of dibenzalacetone from benzaldehyde and acetone in the presence of aqueous sodium hydroxide and ethanol. (4 pts)

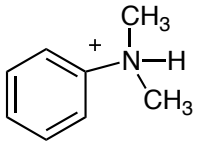
(a) 

3. In the unknown amine experiment, show the reaction that occurs between dimethylaniline [$(CH_3)_2NC_6H_5$] and benzenesulfonyl chloride ($C_6H_5SO_2Cl$) in aqueous KOH solution. (b) How many layers would be formed? Explain. (8 pts)

(a) 

(b) Two layers are formed.

The protonated amine is now soluble in aqueous dilute acid.



4. In the preparation of methyl orange, (a) how many mL of a 12 M solution of HCl would be needed to deliver 0.03 mol of HCl? (b) Explain the purpose of adding the 1.0 M sodium hydroxide in the final step of the reaction. Show any reaction(s) that occur at this stage. (8 pts)

(a) 1000 mL of a 12 M solution will deliver 12 moles. We do not want 12 moles but only 0.03 moles. Therefore we need some fraction, X, of 1000 Ml.

$$\frac{X}{1000\ mL} = \frac{0.03\ moles}{12\ moles} \qquad X = 2.5\ mL$$

(b) The sodium hydroxide neutralized the acetate salt of N,N-dimethylaniline so that it can attack the diazonium salt.