

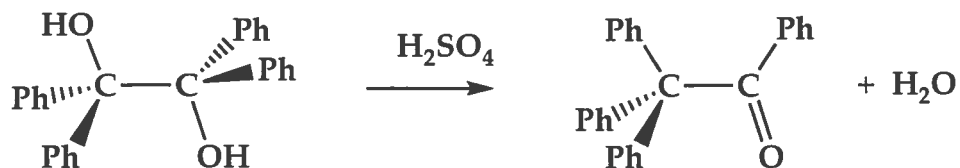
Chemistry 3331-100

Organic Chemistry / Dr. Barney Ellison

Tuesday: October 23st @ 7:00pm → 9:00 / 2nd Exam / Hale Science 270

Name: _____ (please print)

1. (10 pts) What is the mechanism for the following rearrangement?



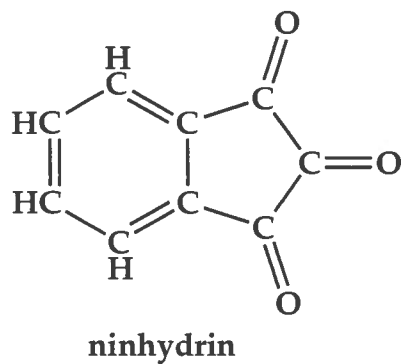
2. (15 pts) Give the expected products when benzaldehyde (C_6H_5CHO) reacts with the following:

a) $PhMgBr$ followed by H_3O^+

b) $LiAlH_4$ followed by H_3O^+

c) $Ag_2O/NaOH/H_2O$

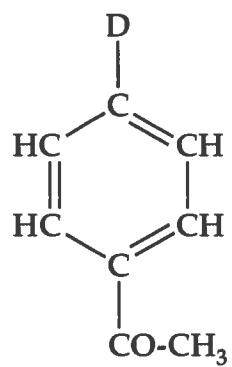
3. (10 pts) The compound ninhydrin exists as a hydrate. Why is a tri-carbonyl compound so unstable? Which carbonyl group will be hydrated? What is the structure of the hydrate?



4. (10 pts) The $pK_a(\text{CH}_3\text{COOH})$ is 4.76. Succinic acid, $\text{HOOC-CH}_2\text{CH}_2\text{-COOH}$, is a diacid. It is measured that the 1st $pK_a(\text{succinic acid})$ is 4.21 and the 2nd $pK_a(\text{succinic acid})$ is 5.64.

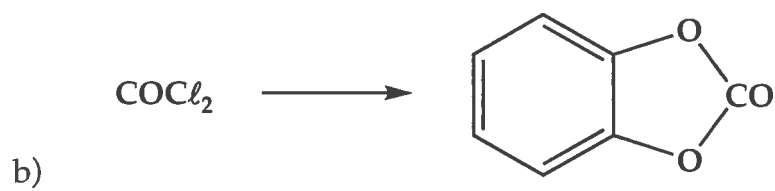
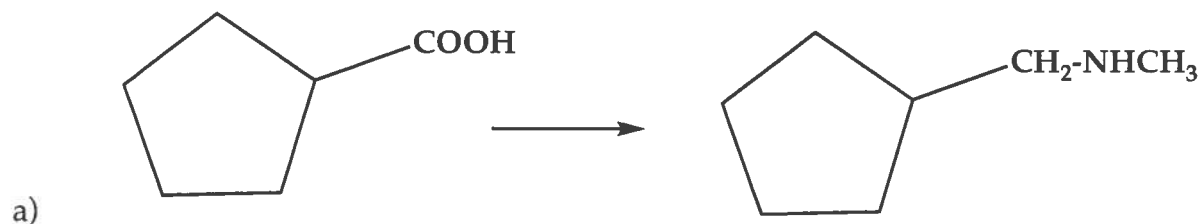
Why is the 1st $pK_a(\text{succinic acid}) < pK_a(\text{CH}_3\text{COOH})$ and the 2nd $pK_a(\text{succinic acid}) > pK_a(\text{CH}_3\text{COOH})$?

5. (10 pts) Outline a synthesis of the deuterated ketone starting with bromobenzene.

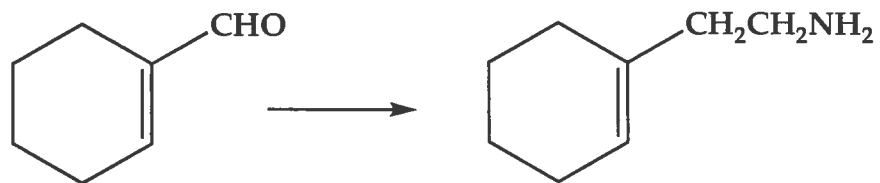


6. (10 pts) Fumaric acid, *trans*-HOOC-CH=CH-COOH, and maleic acid, *cis*-HOOC-CH=CH-COOH, are E, Z isomers. One forms a cyclic anhydride upon heating and the other does not. Which one forms the cyclic anhydride? Why?

7. (10 pts) Starting with the indicated reagent, outline a synthesis of each of the following compounds



8. (10 pts) Suggest a route to carry out the following synthesis.



10. (5 pts) What are the two products that result from the following reaction?

