

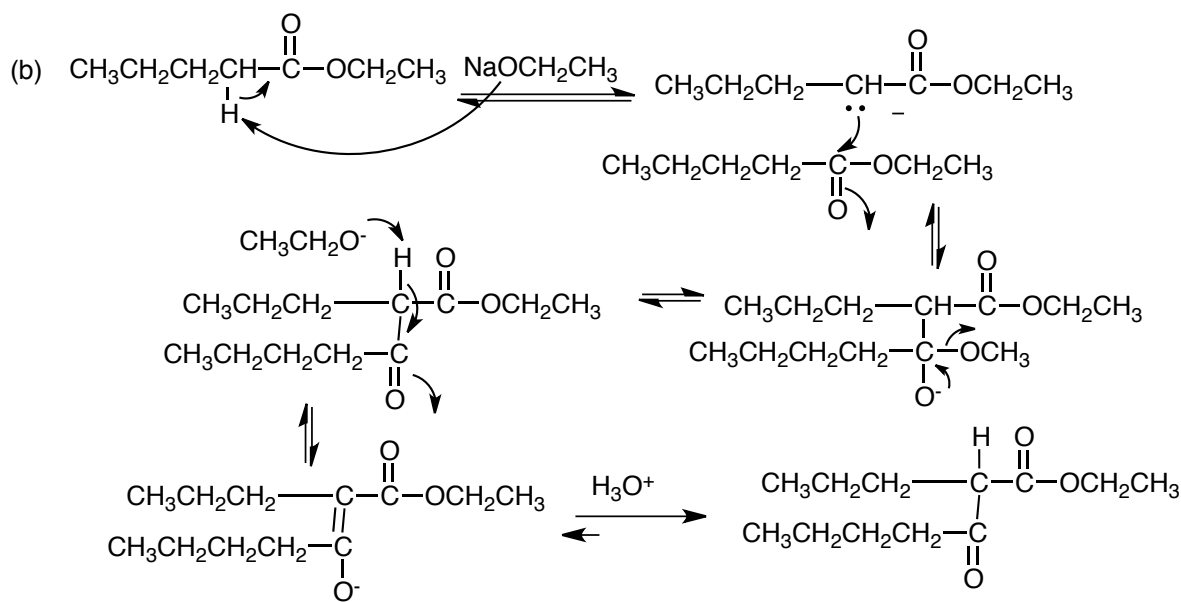
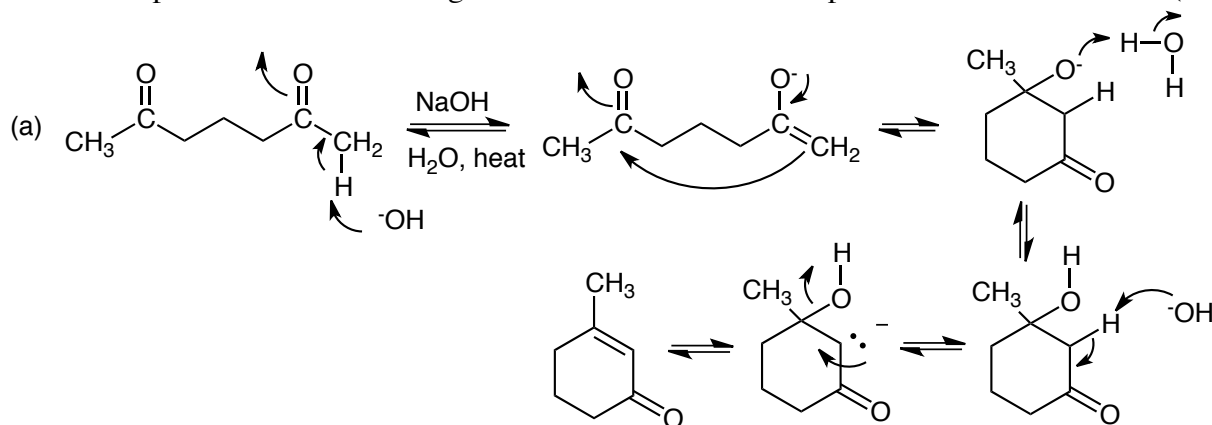
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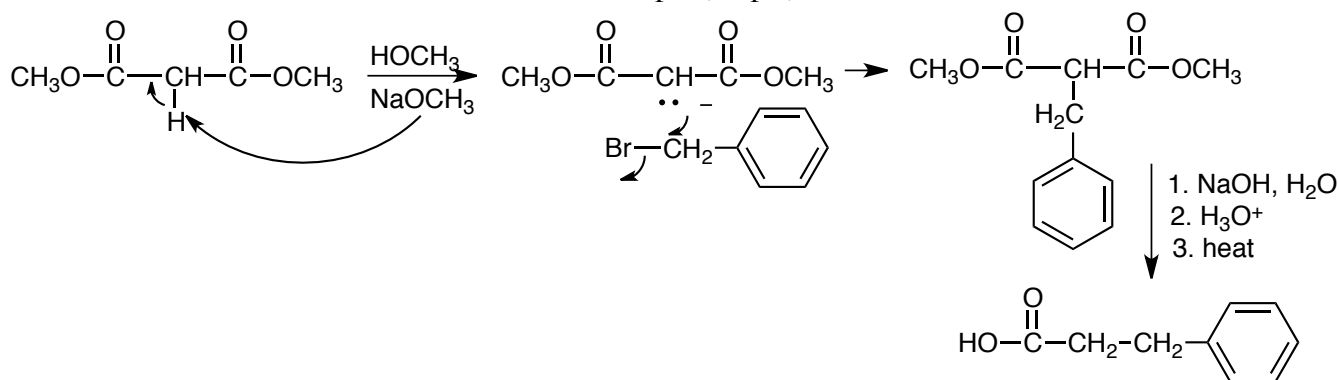
Chem. 122, Sect 012,

Quiz 4, 50 pts, Spring, 2011

1. Give the product of the following reactions and show the complete reaction mechanism. (20 pts)



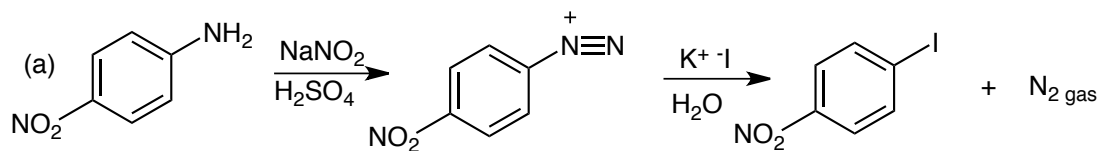
2. Synthesize the molecule on the right from the starting material given on the left. You do not need to shown reaction mechanisms but show the intermediate steps. (10 pts)



3. In the preparation of *p*-iodonitrobenzene from *p*-nitroaniline, sodium nitrite, sulfuric acid and potassium iodide (a) show the overall reaction, including the major intermediate. (b) Explain the purpose of adding the sodium nitrite and sulfuric acid. (c) Why must the intermediate be kept cold at all times? (8 pts)

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(b) The purpose of the sodium nitrite and sulfuric acid was to form the diazonium salt.

(c) The diazonium salt intermediate must be kept cold since it is unstable above about 5°C.

4. In the preparation of *para*- and *ortho*-nitrophenol (a) what was the technique used to separate the products?

(b) Why was it important to keep the cooling water in the condensing column off most of the time? (c) Which product was collected first? Explain why this particular product distilled first and discuss the physical and structural basis for this. (12 pts)

(a) We used the technique of steam distillation to separate the products.

(b) The cooling water must be kept off at all times so as to prevent the *ortho*-nitrophenol from condensing in the column. This could cause a dangerous pressure build up if the condenser became plugged.

(c) The *ortho*-nitrophenol came over first due to the intramolecular H-bonding, which lowers its b.p. (less intermolecular H-bonding) and decreases its solubility in water (less H-bonding with water).

