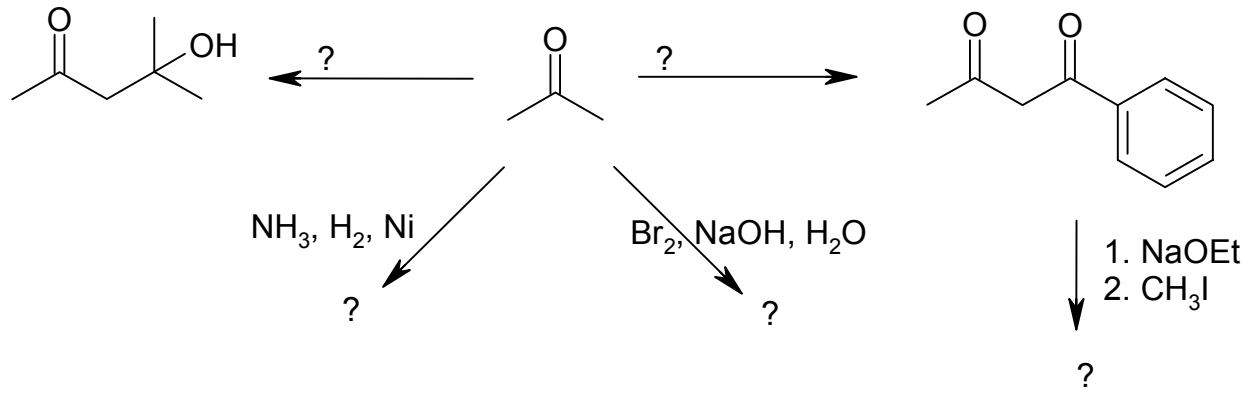
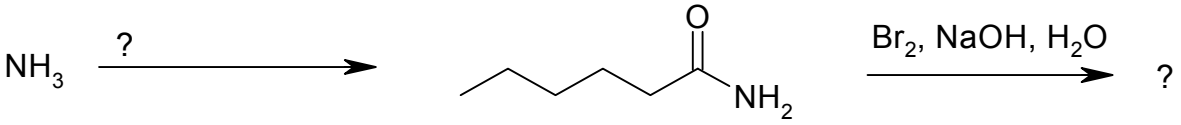
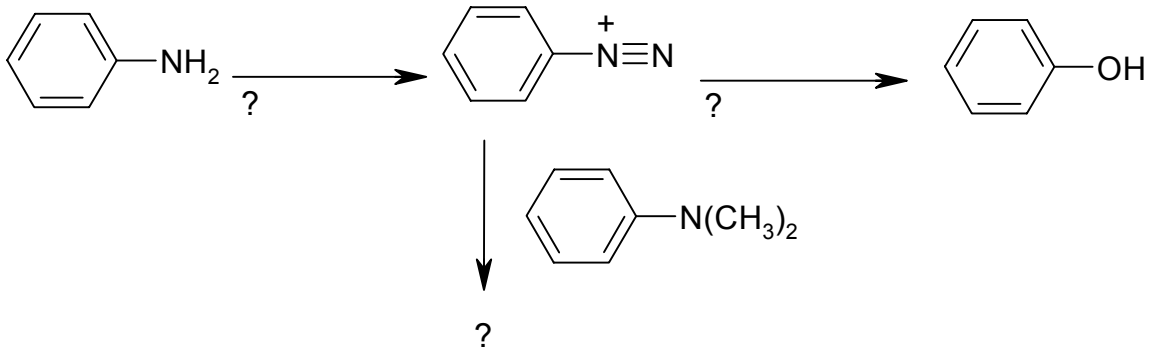
NAME_____

Organic Chemistry II, CHEM 332
Section 003, Dr. Sweeting
Exam 4, May 8, 2002
Full credit:100. Maximum possible about 130.

1. Please complete each of the following reactions by filling in the missing reagent or product, as indicated by the "?" (4 points each, 40 total)







2. a) Outline the mechanism of the aldol condensation of butanal with itself the presence of aqueous sodium hydroxide to form a β-hydroxyaldehyde. (12 points)

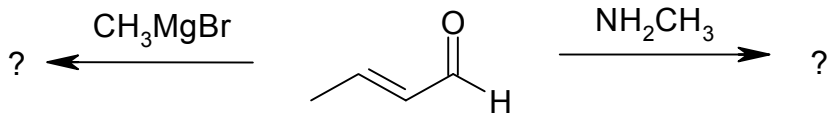
b) Outline the mechanism by which the β-hydroxyaldehyde formed in a) is converted to an α,β-unsaturated (conjugated) aldehyde under these basic reaction conditions. (8 points)

c) Write the structure of the product expected from the aldol with dehydration using butanal and benzaldehyde (phenylmethanal). What precautions must be taken in this experiment to ensure a good yield of the desired product? (10 points)

3. a) Outline the mechanism of the reaction of cyclopentanone with ethyl formate (ethyl methanoate) in the presence of sodium ethoxide. (12 points)

b) BONUS: Define tautomer. (4 points) Sketch an important tautomer of the product formed in 3.a) (6 points)

4. The conjugated ketones and aldehydes produced by the aldol condensation sometimes react differently from saturated ketones and aldehydes. Please complete the two reactions below. (8 points)



5. Write at least three contributors to the resonance hybrid for pyrrole, C_4H_5N (5 points)

6. Outline in equations one method of synthesizing hexan-1-amine, uncontaminated with secondary or tertiary amines, from any compound that is not itself an amine. (5 points) Extra credit (5 points) for any additional methods.