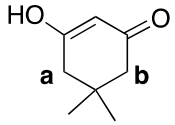
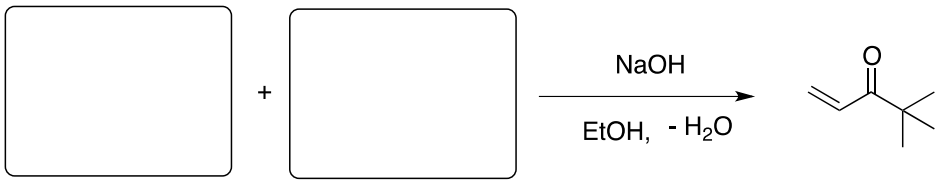
CHM2123 Problem Set #6: Reactions of Aldehydes and Ketones under Basic Conditions

1. Characterization of enolates by ^1H NMR can produce interesting results. The ^1H NMR spectrum of the following molecule indicates that the protons of carbons **a** and **b** give one single signal. Explain this observation.



2. Provide the starting materials for the following Aldol condensation reaction.



3. Robert Nadon, one of our technicians in undergrad chem lab, found two jugs of reagents containing acetophenone and benzaldehyde on the shelf for exp. 6, but the labels have peeled off. Using your knowledge of enolate chemistry, *briefly* describe a single chemical test (with a chemical equation) to help Bob identify which bottle is which without the use of spectroscopy or chromatography.

4. The haloform reaction is executed in this experiment to synthesize benzoic acid from a methyl ketone, acetophenone. Provide an explanation for the following steps in the procedure.

a) Why is acetone added at the end of the reaction? Explain with a balanced chemical equation.

b) Why do you add HCl in step 5?