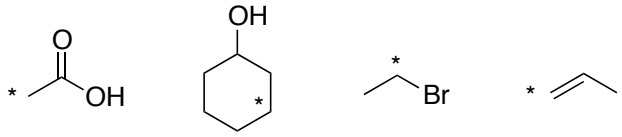
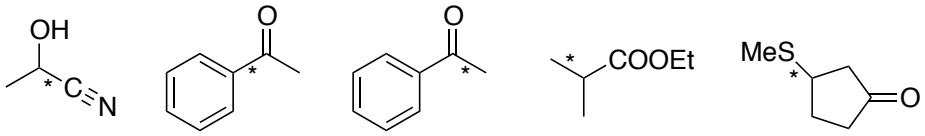
CHEM 330

Problem set 1

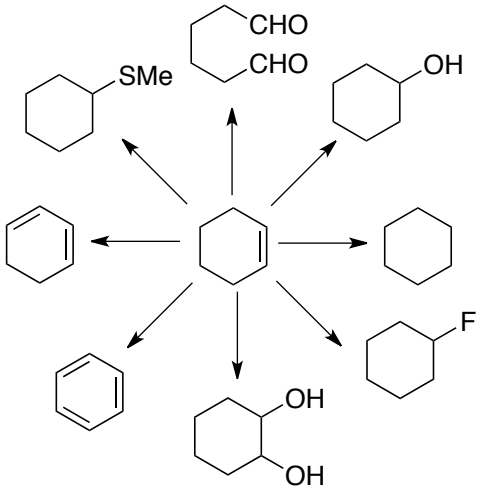
1. Indicate the polarity of the starred carbon atoms in the following molecules:



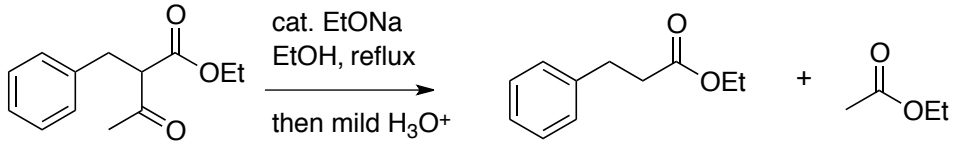
2. Identify appropriate synthons and suitable reagents for the formation of the starred bonds in the following molecules



3. Estimate ΔH for the following reactions (obtain BDE's from the Internet):

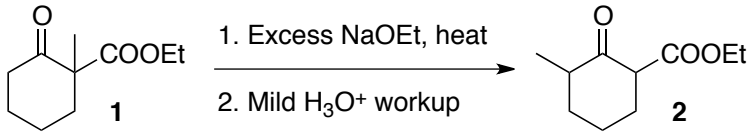


4. Write an accurate mechanism for the following reaction:

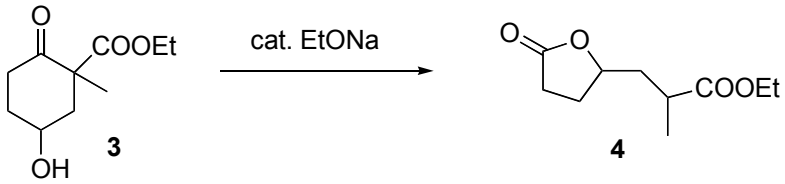


5. Provide an explanation for the following experimental observations and write accurate reaction mechanisms for each transformation:

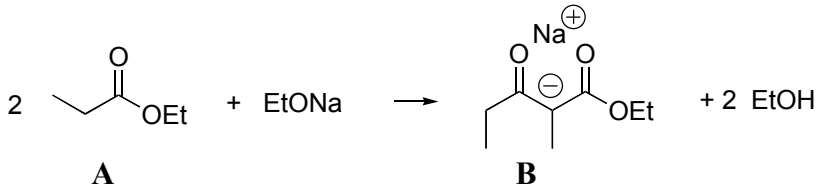
   (a) treatment of compound **1** with excess NaOEt causes isomerization to **2**.



(b) lactone **4** is obtained as one of the products of treatment of compound **3** with a catalytic amount of NaOEt



6. Consider the following transformation



(a) write a detailed step-by-step electronic mechanism for the reaction.

(b) estimate the equilibrium concentration of the enolate of **A** in a solution that contains a 1 M instant concentration of both **A** and EtONa.

(c) Assuming that the rate-limiting step for the conversion of **A** to **B** is the addition of a molecule of the enolate of **A** to an intact molecule of **A**, write a kinetic equation that describes the rate of the reaction as a function of a rate constant, k_{add}

(d) Imagine replacing EtONa with t-BuOK in the above reaction, all other reaction parameters (concentration, solvent, temperature, etc.) being equal. Predict whether the reaction will proceed at a faster or a slower rate, and estimate the extent of such rate increase or decrease.