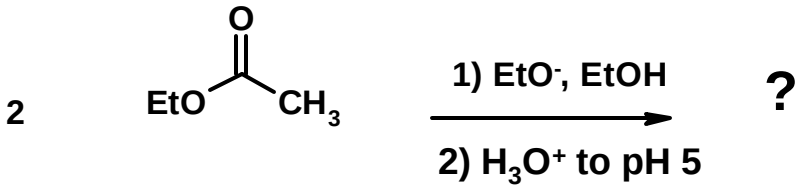
Chemistry and Biochemistry
School of Physical Sciences

59-331/333 **Feb. 15, 2002**
Test #1 **Time: 50 minutes**

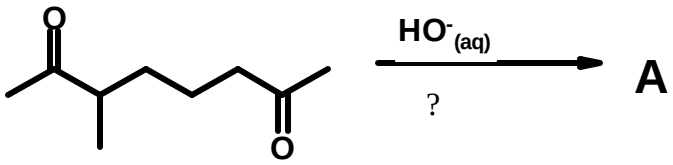
Answer all questions in the test booklet(s) provided. Answers written in pencil will be marked, but cannot be returned for remarking.

1. Give the **complete** mechanism for the base ($^-$OEt) induced Claisen condensation between two molecules of ethyl acetate. Please show **all** steps and **all** intermediates, and all small molecules given off or used during the reaction. Please also indicate which steps are reversible and which are (essentially) irreversible. (**10 marks**)

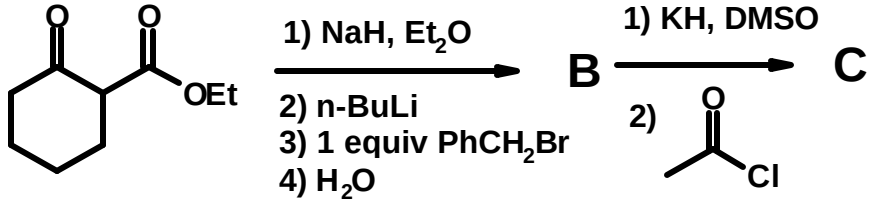


2. Indicate the structure of the expected major product from each of the following reactions. Include stereochemistry where it is relevant. Mechanisms are *not* necessary, but showing your work is likely to be a help. (**5 for each letter, 40 marks total**)

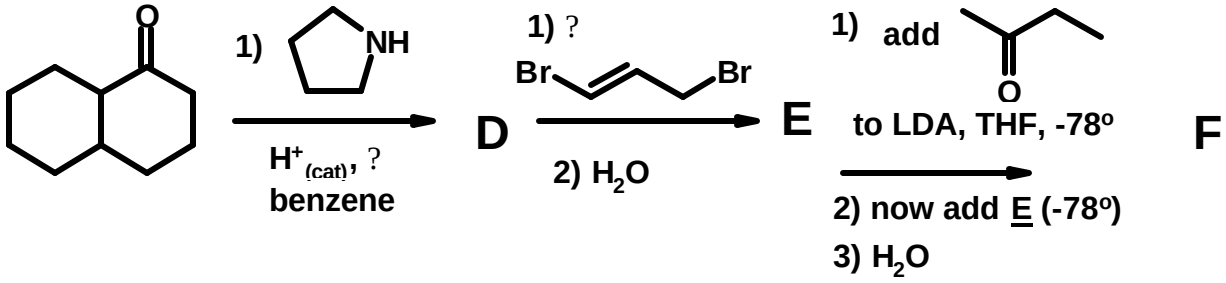
a)



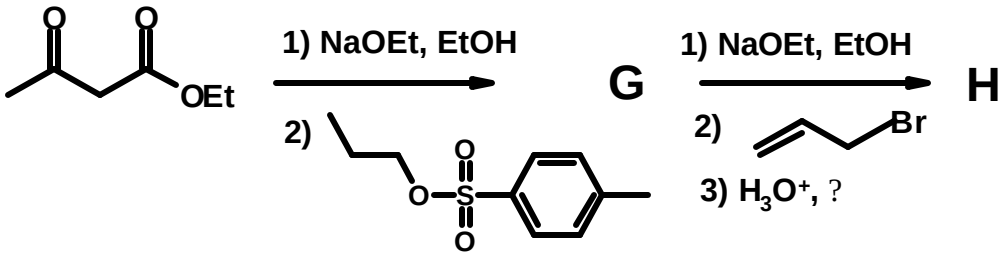
b)



c)

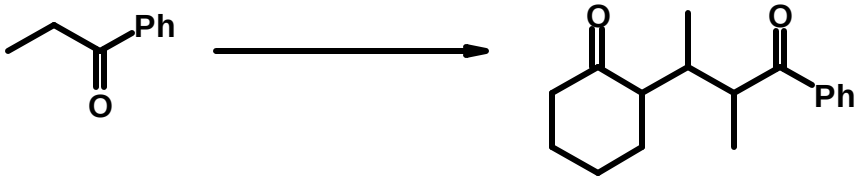


d) see next page

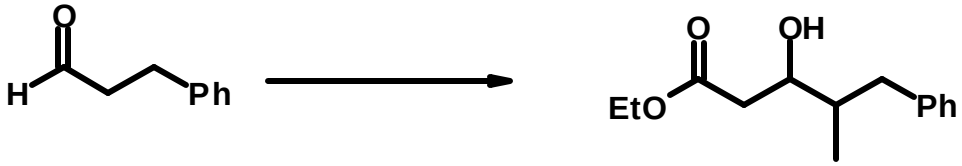


3. Show by equation how you would prepare the products illustrated below from the indicated starting material. You may use *any* other reagents you deem to be fit. Show all reagents, conditions, and *intermediates that could be isolated.* Mechanisms are not necessary, but showing your work may be a help. (**10 marks each, 30 total)**

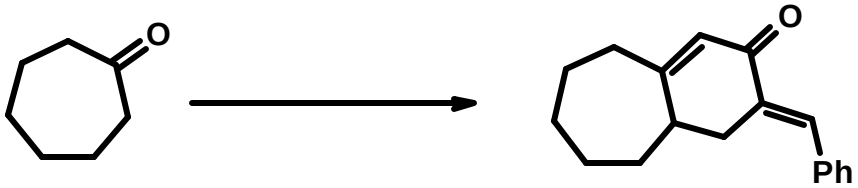
a)



b)



c)



Bonus In the final step of **3c**, there is an final step that everyone is overwhelmingly likely to try. There is another very reasonable product formed in that step; what is it, and how is it formed? (Note: If you come up with a different/unusual final step, I'm still willing to look at proposed alternative reactions).