

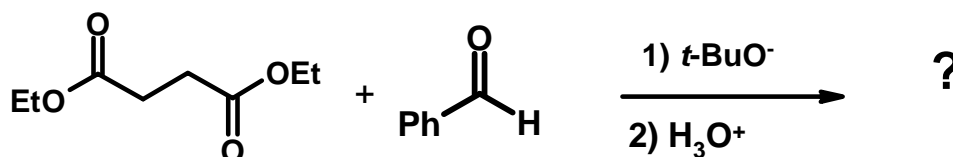
Chemistry and Biochemistry
School of Physical Sciences

59-331/333
Test #1

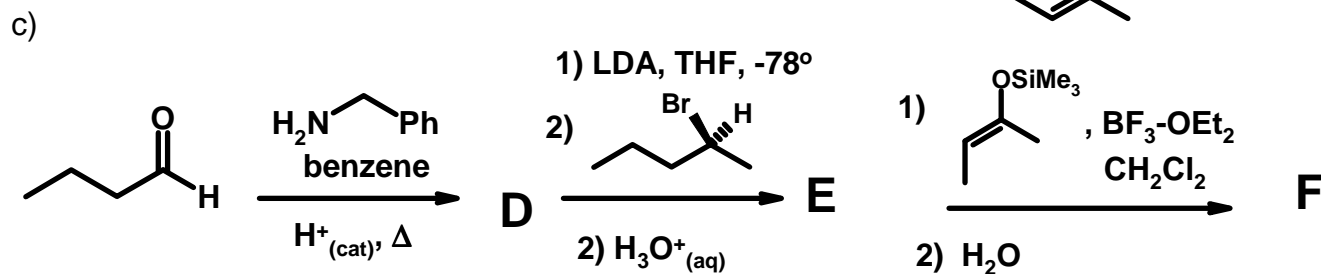
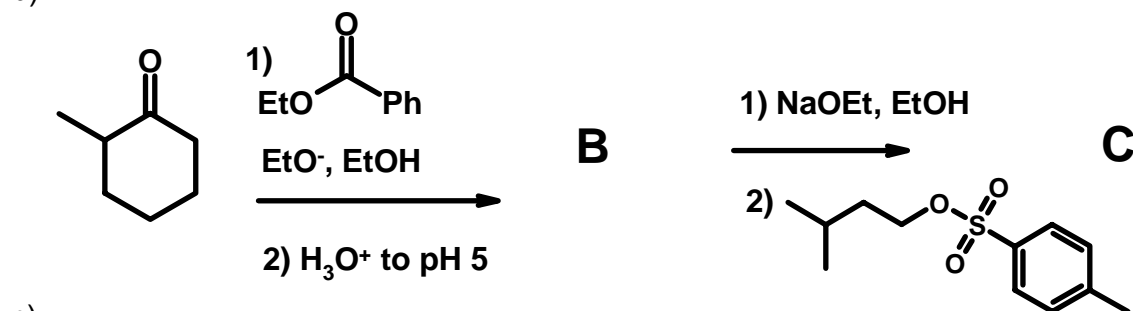
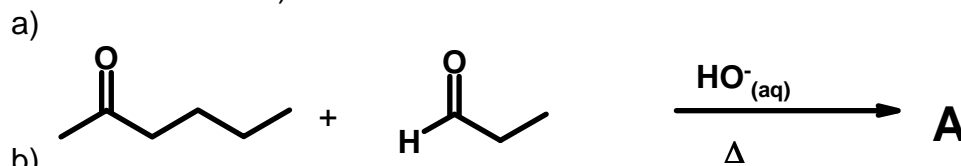
Feb. 13, 2004
Time: 50 minutes

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

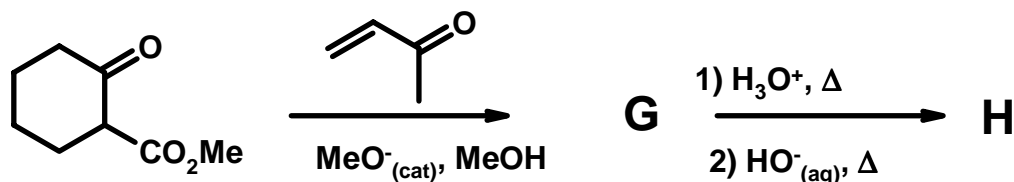
1. Give the **complete** mechanism for the base (*tert*-BuO⁻) induced Stobbe condensation between diethyl succinate and benzaldehyde. Please show **all** steps and **all** intermediates, and all small molecules given off or used during the reaction. Please also indicate which steps are reversible and which are (essentially) irreversible. Note: I added the protonation step just for completeness. (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)

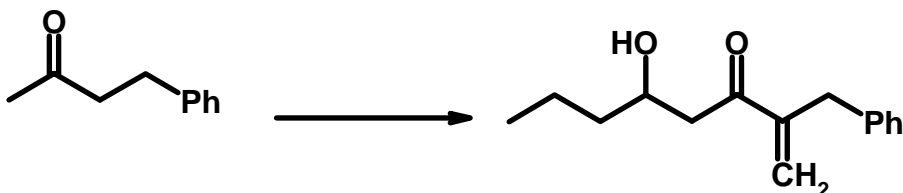


d) see next page

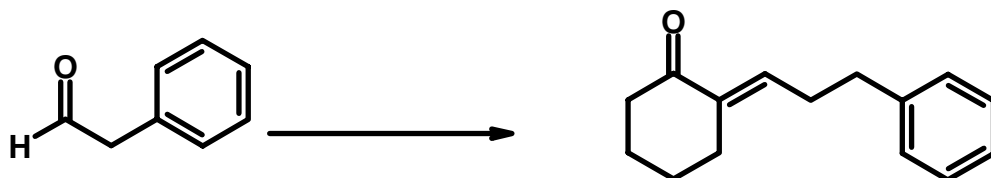


3. Show by equation how you would prepare the products illustrated below from the indicated starting material. You may use *any* other reagents you deem to be fit. Show all reagents, conditions, and *intermediates that could be isolated*. Mechanisms are not necessary, but showing your work may be a help.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

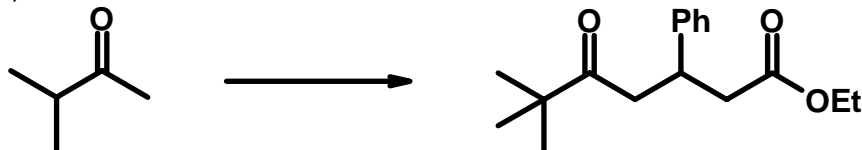
a)



b)



c)



Bonus Rule #1 from the 235 course was that benzenes are susceptible to electrophilic substitution, not nucleophilic substitution. This is not *always* true, given the appropriate substrate. Suggest how the following reaction is occurring.

