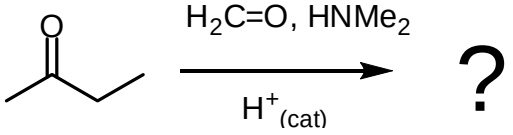
Dept. of Chemistry and Biochemistry

59-331/333 **Mar. 14, 2011**

Test #2 **Time: 55 minutes**

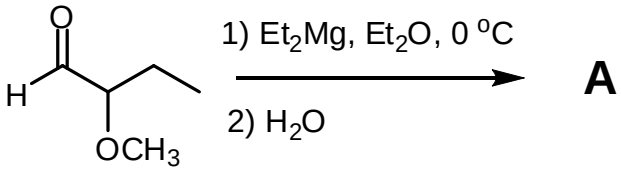
Answer all questions in the test booklet(s) provided. Show stereochemistry where relevant. Answers written in pencil will be marked, but cannot be returned for remarking.

1. Give the complete mechanism for the Mannich reaction of the following ketone. I will allow you to simply draw the formation of the reactive derivative of the ketone without going through every step, but wish to see the steps for the formation of the reactive derivative of the aldehyde + amine. (**10 marks**).

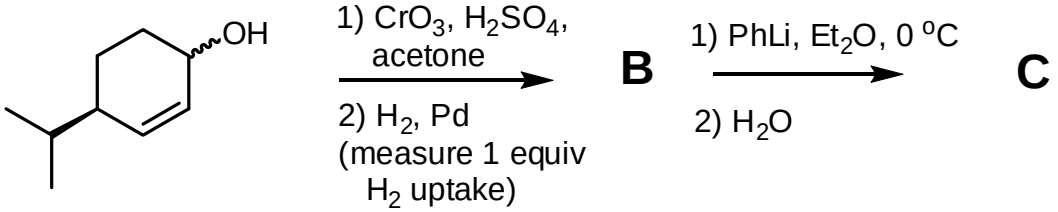


2. Indicate the structure of the expected major product from each of the following reactions. Include stereochemistry where it is relevant. Mechanisms are *not* necessary, but showing your work is likely to be a help. (**5 for each letter, 40 marks total**)

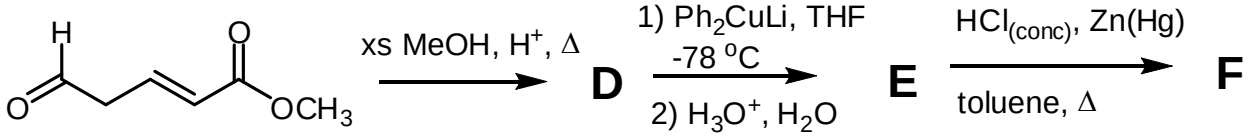
a)



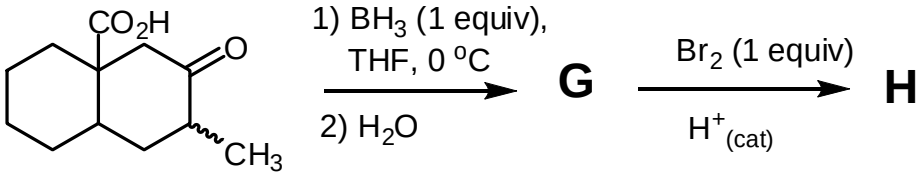
b)



c)

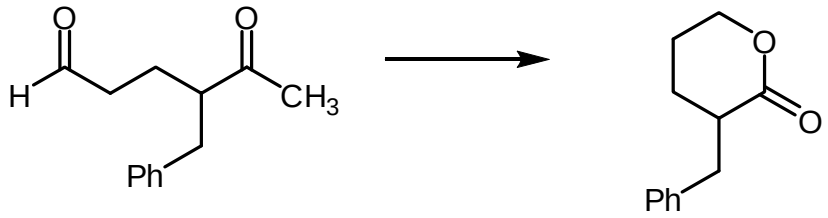


d)

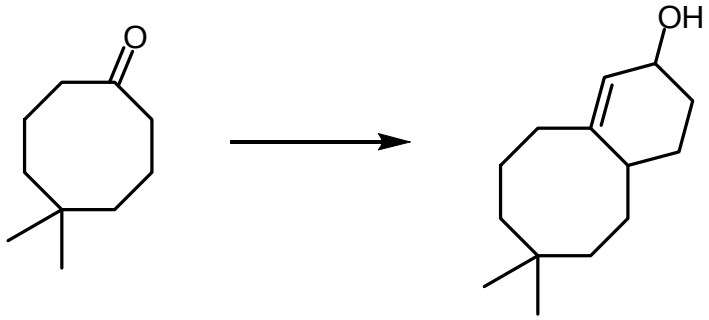


3. Show by equation how you would prepare the products illustrated below from the indicated starting material. Each requires >1 step. You may use *any* other reagents you deem to be fit. Show all reagents, conditions, and *intermediates that could be isolated.* Mechanisms are not necessary, but showing your work may be a help. ***DO ANY THREE*** **(10 each, 30 total)**

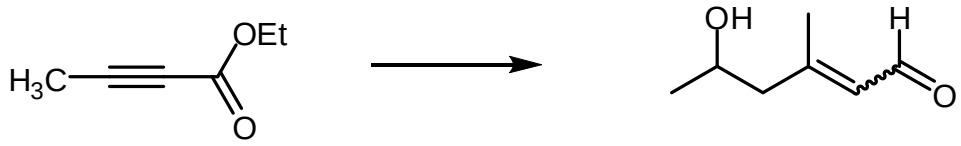
a)



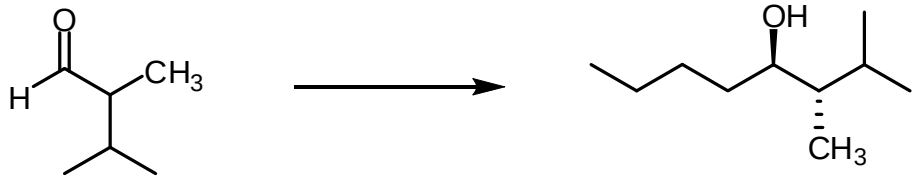
b)



c)



d)



Hint: The one step process does *not* give the right compound

Bonus (5 marks) We have discussed the preparation of α-halo ketones extensive, but very little on their reactions. One of the most interesting reactions on these compounds is the Favorskii rearrangement, show below. Propose a reasonable mechanism of the transformation.