

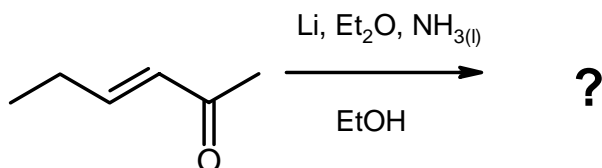
**Chemistry and Biochemistry**  
**School of Physical Sciences**

59-331/333  
Test #2-makeup

Apr. 2, 2001  
Time: 50 minutes

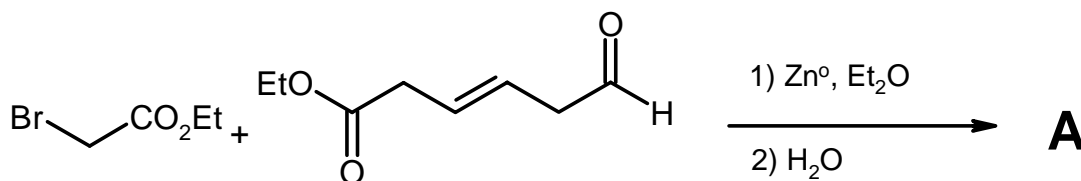
Answer all questions in the test booklet(s) provided. Answers written in pencil will be marked, but cannot be returned for remarking.

1. Give the complete mechanism for the dissolving metal reduction of the following alkenone. (10 marks)

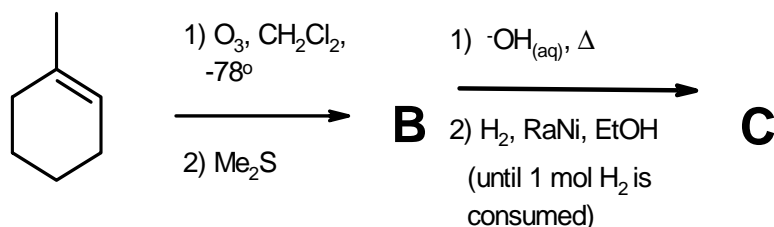


2. Indicate the structure of the expected major product from each of the following reactions. Include stereochemistry where it is relevant. Mechanisms are *not* necessary, but showing your work is likely to be a help. (5 for each letter, 40 marks total)

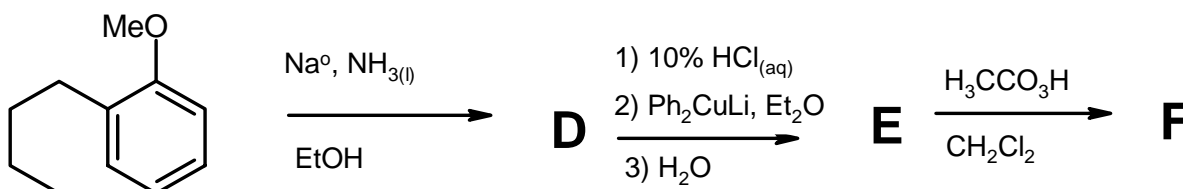
a)



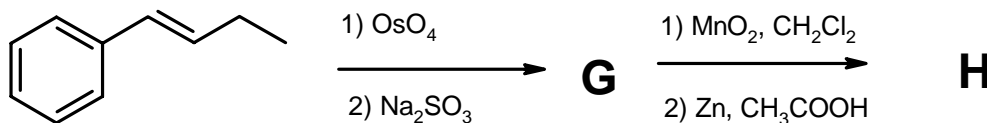
b)



c)

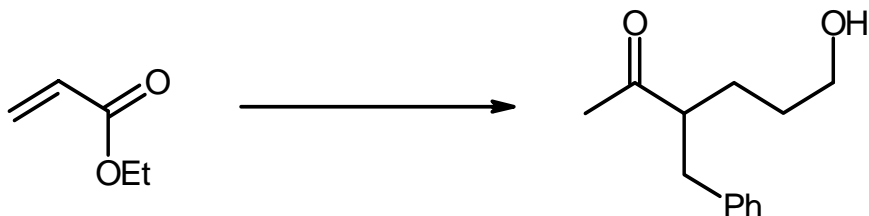


d)

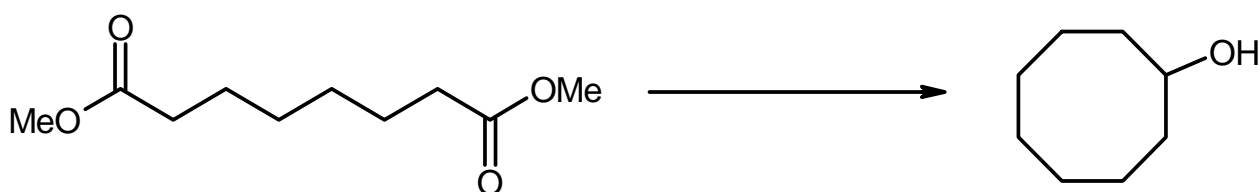


3. Show by equation how you would prepare the products illustrated below from the indicated starting material. You may use *any* other reagents you deem to be fit. Show all reagents, conditions, and *intermediates that could be isolated*. Mechanisms are not necessary, but showing your work may be a help.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

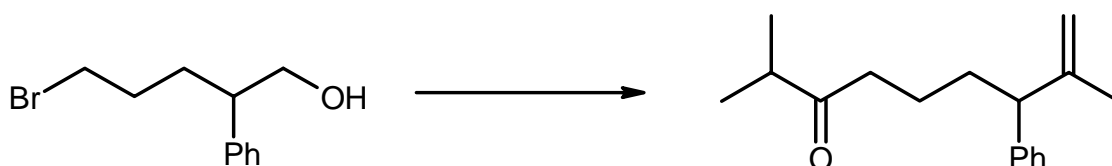
a)



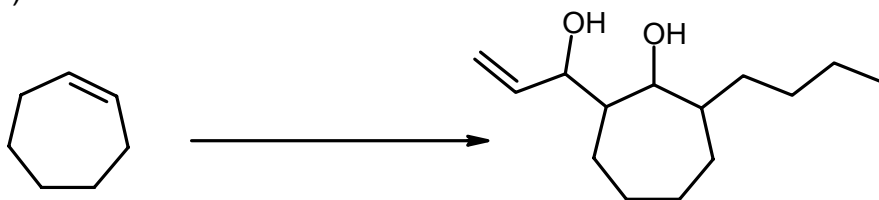
b)



c)



d)



**Bonus** A way of converting a ketone or aldehyde to an alkene, that is related to material presented in this course, is called the Shapiro reaction. The critical part of this reaction involves a tosyl hydrazone with 2 equivalents of a strong base. Given the hint that  $\text{Ts}^-$  is also a good leaving group (you have seen  $\text{TsO}^-$ ), propose a reasonable mechanism for the Shapiro. Show any small molecules evolved.

