Chem 634
Professor Fox
Exam 1
March 9, 2004
1 hour 15 min

Your Name__**KEY**_____

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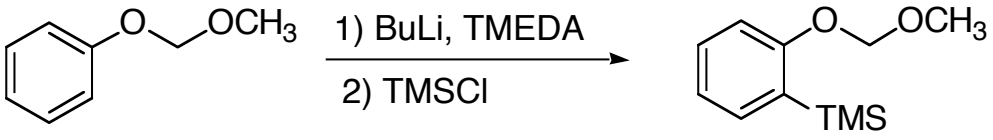
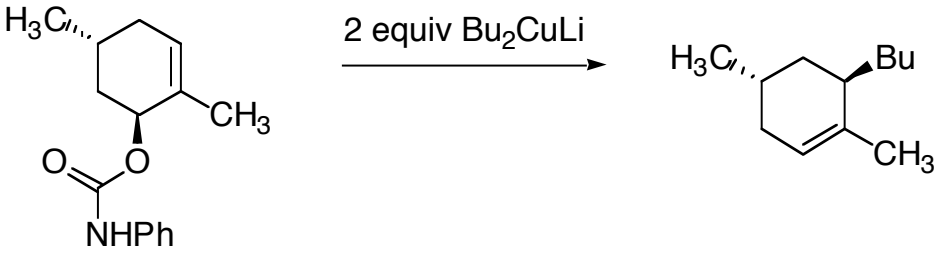
1. Show the products of the following transformations. Mechanistic details are not required, but be sure to indicate relative stereochemistry where necessary (four parts; 5 points each)

a 

b 

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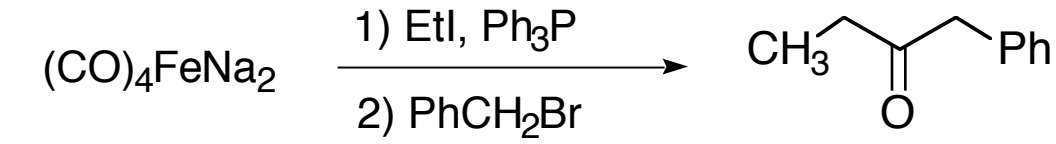
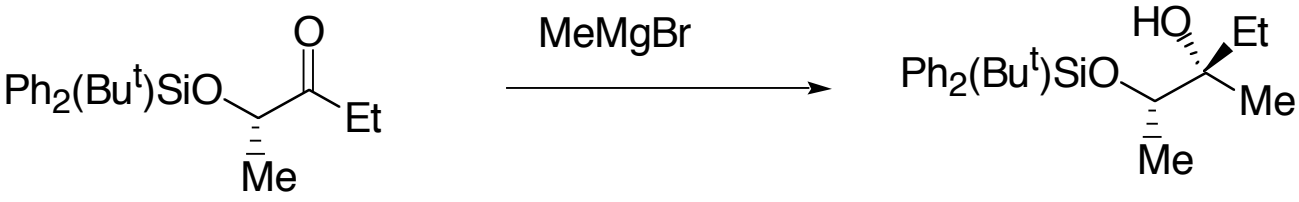
1. (continued)

c 

d 

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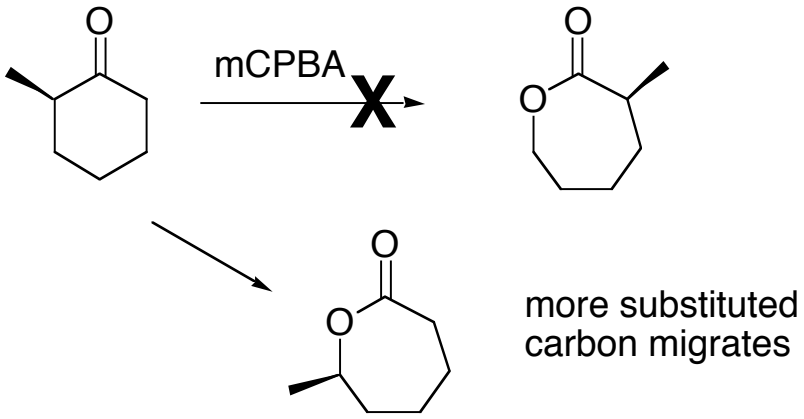
2. The reactions below would not proceed as indicated. Provide a brief but detailed explanation, and indicate the structure of the product(s) that would be formed instead of (or in addition to) the product that is drawn (5 points each).

a



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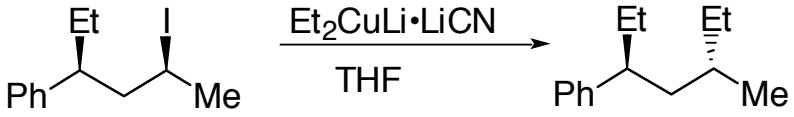
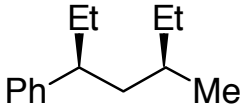


Unlike bromides and tosylates, the reactions of cuprates with alkyliodides typically occurs with stereochemical scrambling. The mechanism is beleived to proceed via electron transfer. Thus, the other <u>diastereomer</u> (shown below) is also formed.



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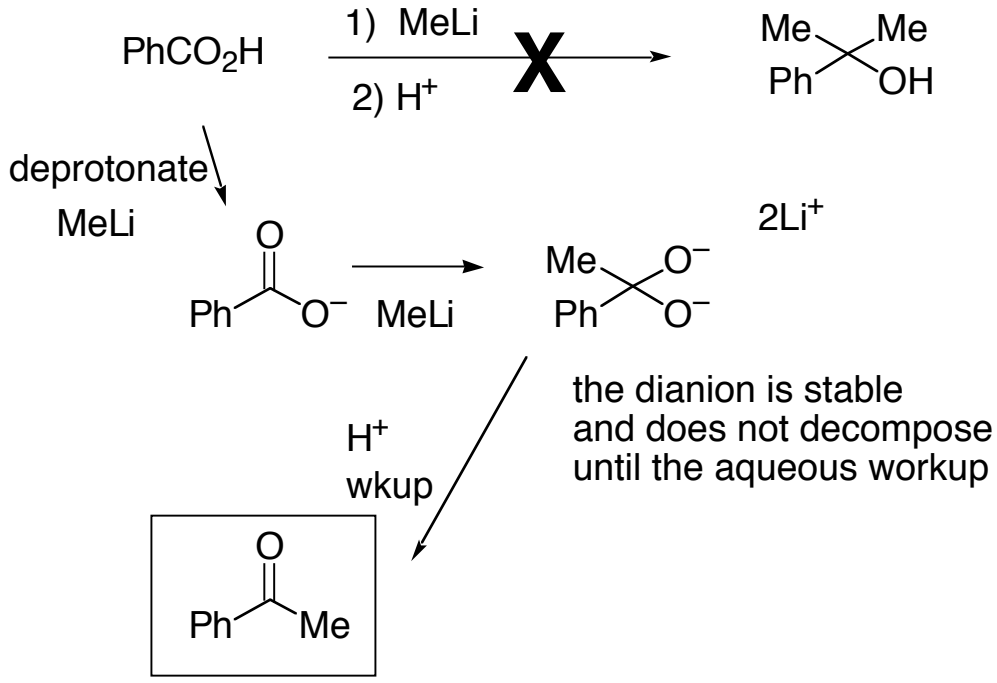
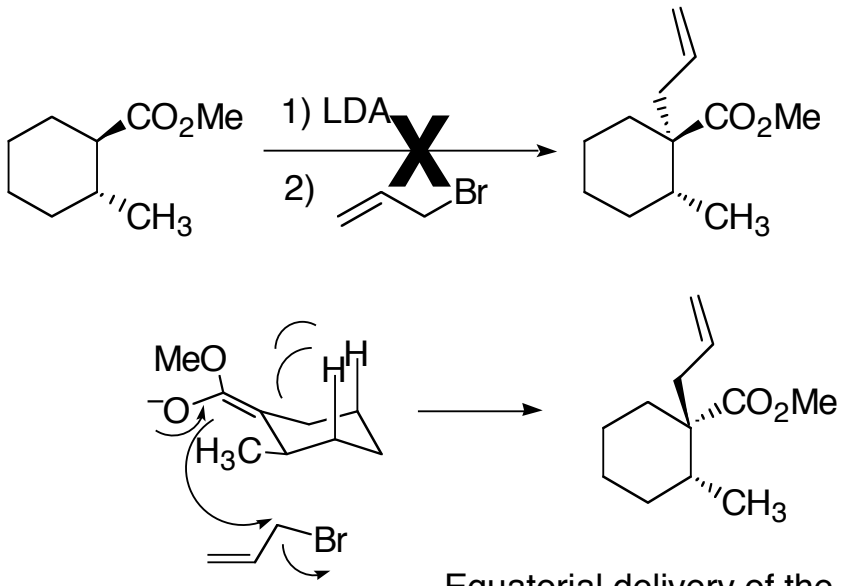
2. (continued).

c



d



Equatorial delivery of the nucleophile. Alkylation of exocyclic enolates is dominated by sterics-- 1,3 Diaxial interactions prevent delivery from the top face

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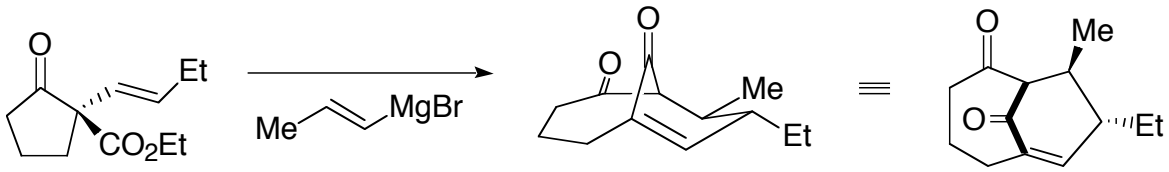
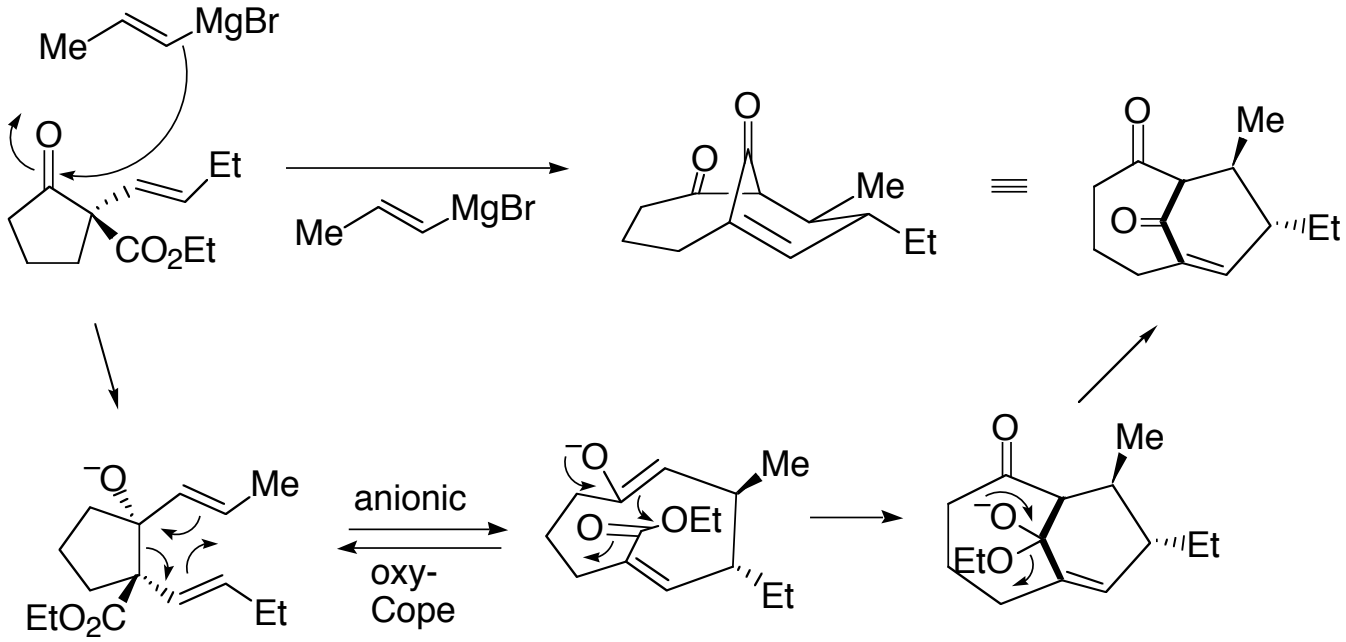
3. This question has two parts, both of which deal with the reaction below:



3a. Provide an arrow pushing mechanism for the reaction above. For this part of the problem, it is not necessary to explain the stereochemical aspects of the reaction. Just push the arrows and show how the final product is formed. (20 points)



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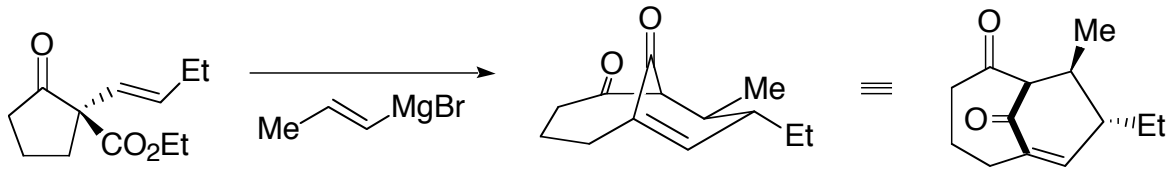
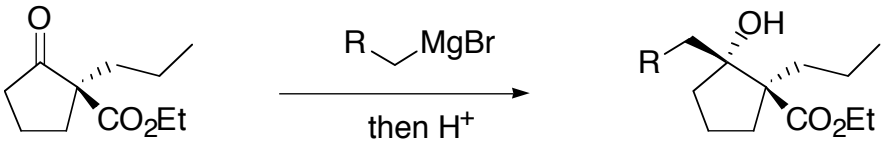
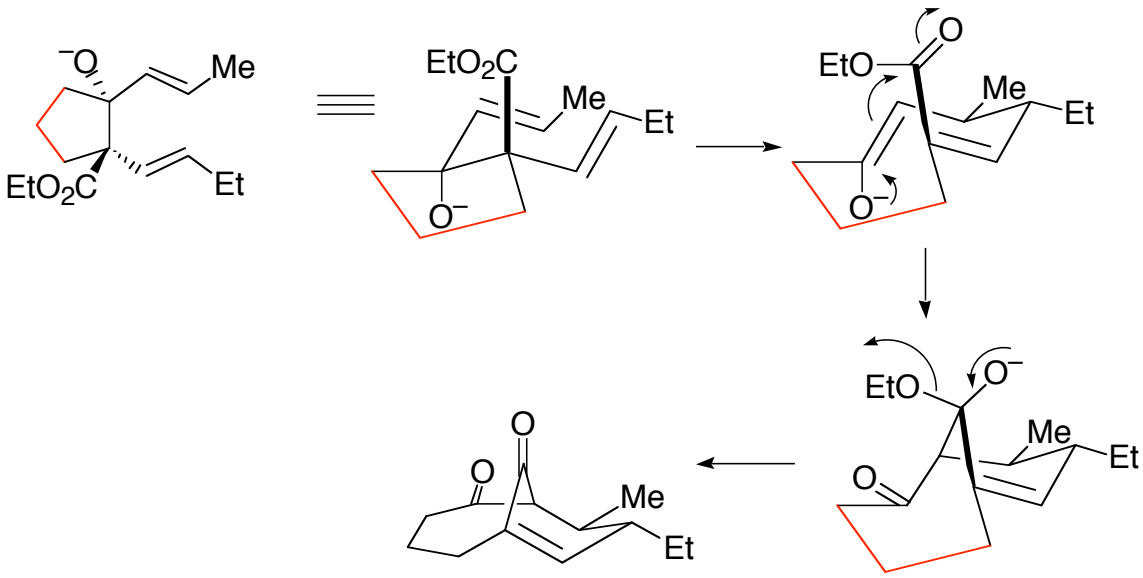
3b. Provide a detailed model with explains all of the stereochemical aspects (stereocenters and alkene stereochemistry). (20 points)



note the stereochemistry of the following transformation when detailing your mechanism. You may consider this to be general for the reactions of Grignard reagents with β -ketoesters





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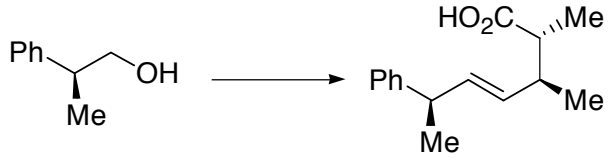
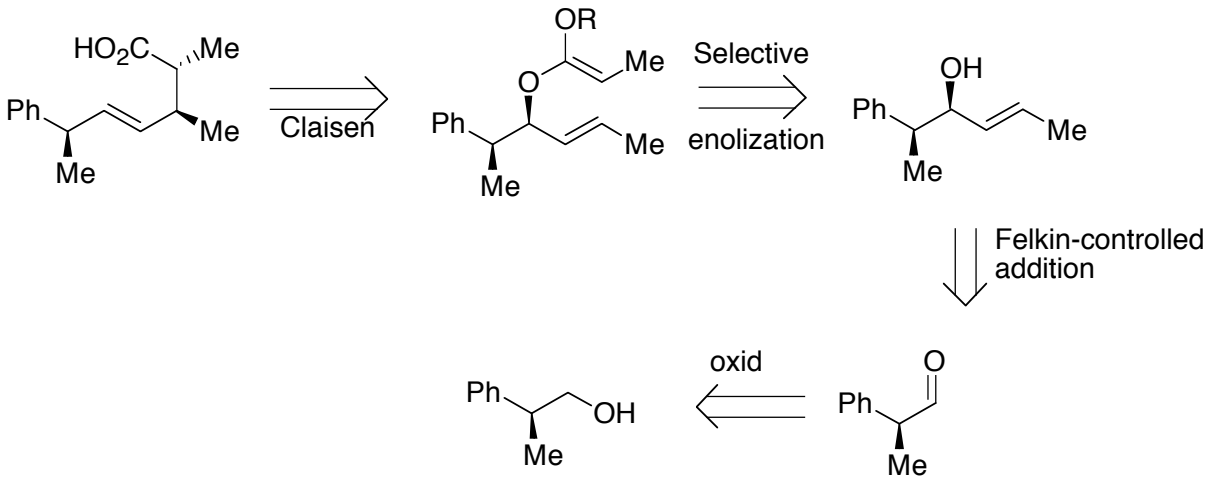
4. Outline a multistep synthesis (20 points)



Retrosynthesis



example of an acceptable Forward synthesis