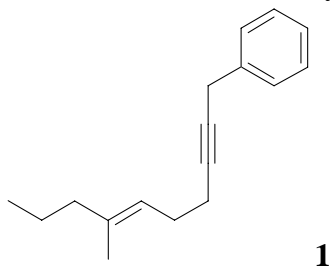


**U. of Kentucky Chemistry 535 Synthetic Organic Chemistry Spring 2004  
Midterm Exam**

**REMEMBER RETROSYNTHESES USE SYNTHONS**

1. (15 pts.) Devise a stereocontrolled, convergent route to ene-yne **1**. Show a retrosynthetic analysis that leaves no doubt for the reader that you can make the molecule. You may start with molecules containing no less than seven carbon atoms.



2. (10 pts.) Explain how you are controlling the stereochemistry above in the synthesis of **1** with a few words.

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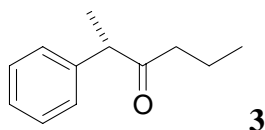
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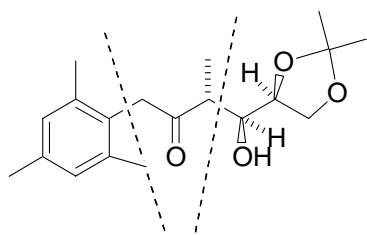
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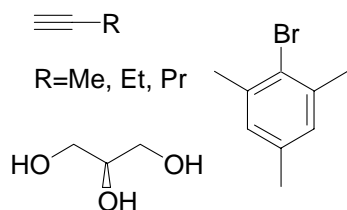
3. (15 pts.) Predict the major product of the reaction of compound **3** with LDA at -40 °C. Stereochemistry is important in your answer.

answer to problem 3

**4**

4. (20 pts.) Sketch out a forward *enantiospecific* synthesis of **4** that constructs the bonds indicated by the dotted lines. If you don't know how to do a certain step, use descriptions instead of reagents over the arrows, but be as specific as possible. For example words like 'oxidation' or 'resolution' above an arrow might win you points.

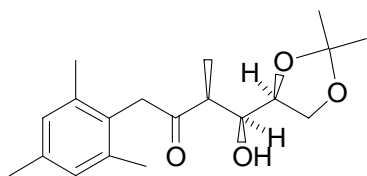
If there are rough spots in your synthesis make little notes at these points to let me know what you are worrying about.



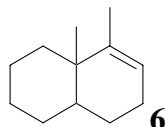
The starting materials at left are hints for problem 4. You also might want to consider the following possibilities: Sonogashira coupling, enolate alkylation, diol protection, aldol reaction, resolution of enantiomers, hydroboration/oxidation of alkynes.

CH<sub>3</sub>I

If you see other possibilities to synthesize **4**, feel free to try them; however, you must form the bonds indicated.

**5**

5. (10 pts.) How would your answer to problem 4 change if you were asked to construct the epimer of **4** shown in structure **5**?

**6**

6. (10 pts.) Consider the carbon skeleton of the molecule above and outline a retrosynthesis for it using a cationic cyclization approach. All you need is one retroarrow and a suggested starting material. This was a homework problem.