Chem 634
Exam 2
December 8, 2006
3 hours
Prof. Fox

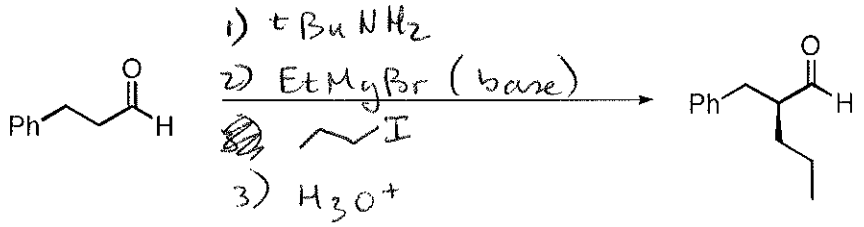
Your Name KEY

Key

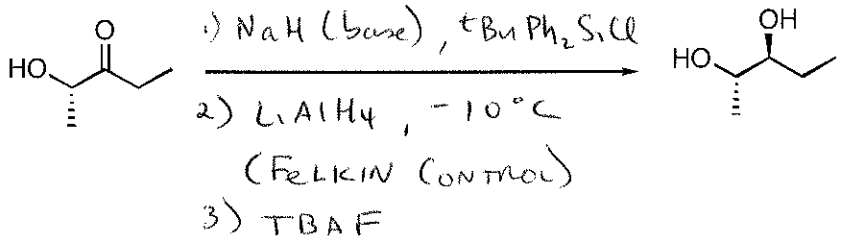
1. Provide reagents for the following transformation. More than one step may be required. Do not write mechanisms.

8 parts, 2 points each

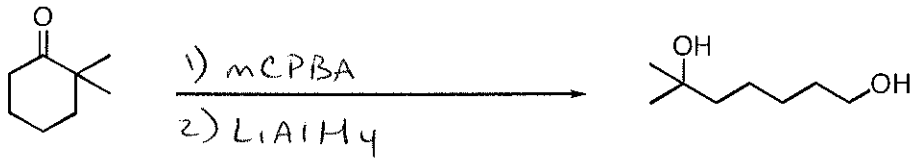
a



b



c



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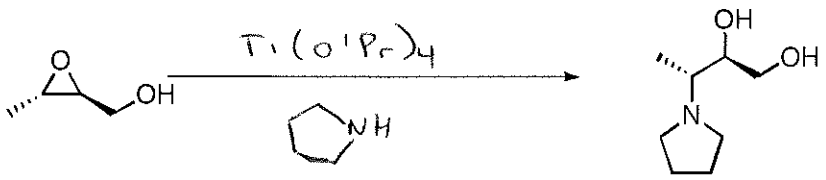
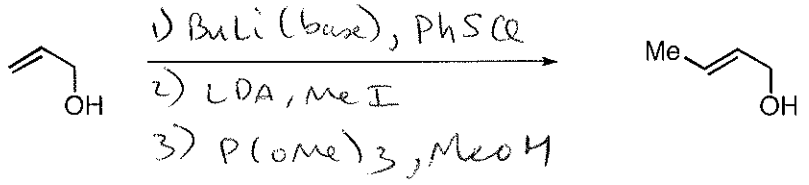


Question 1 continued

e



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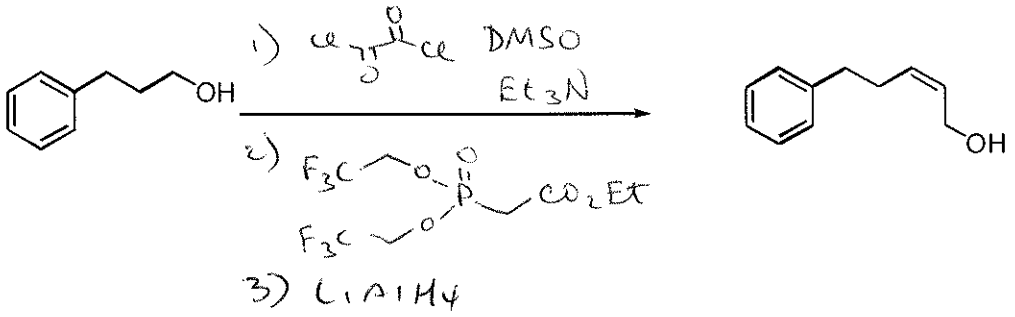
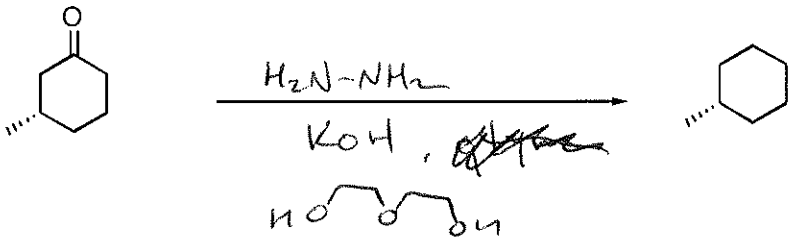
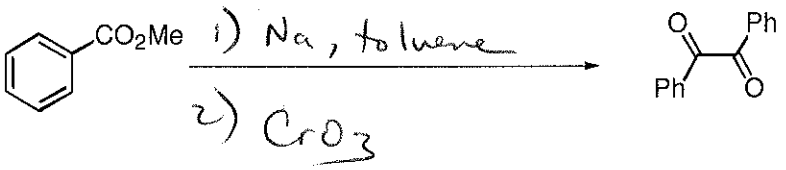


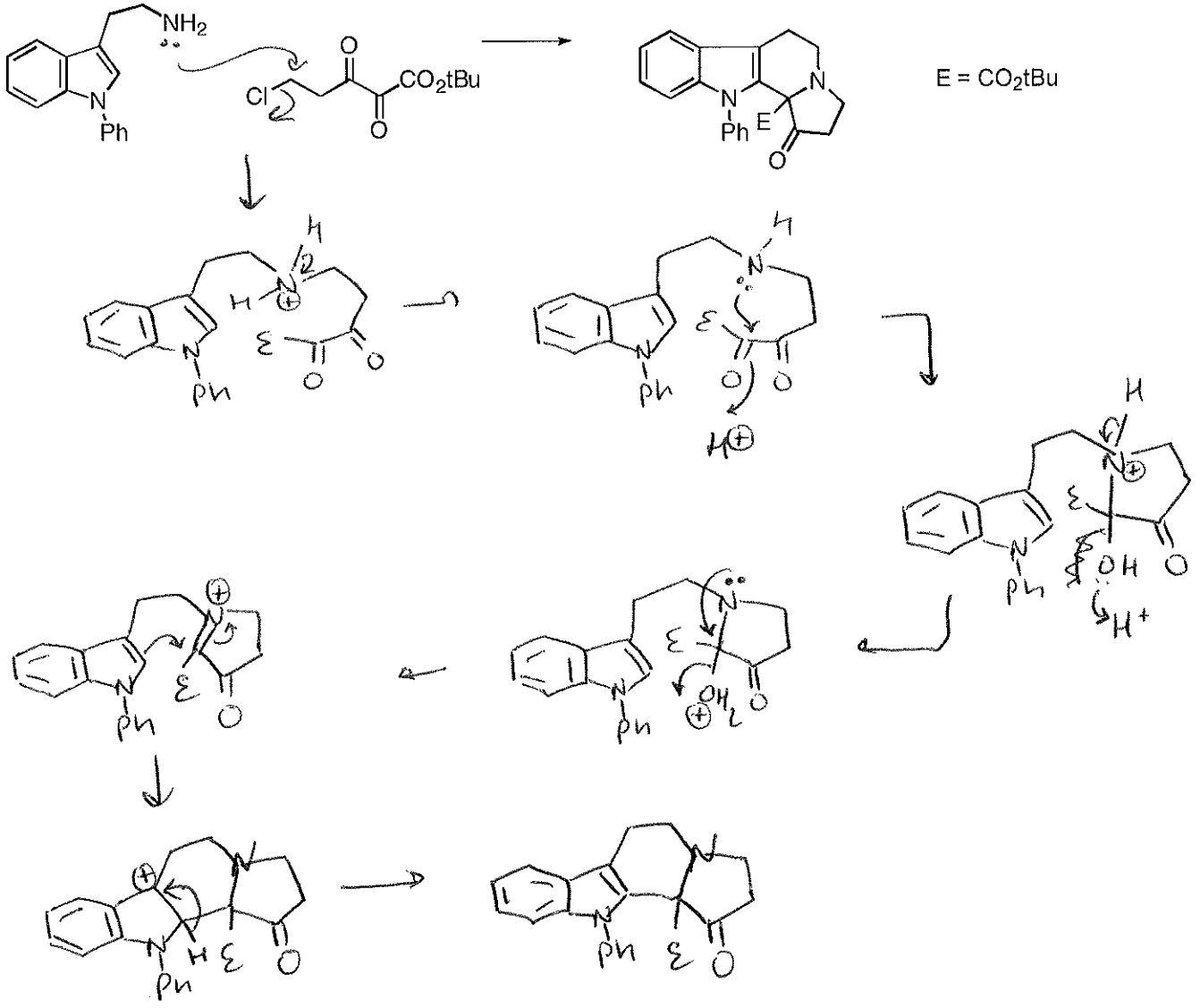
g



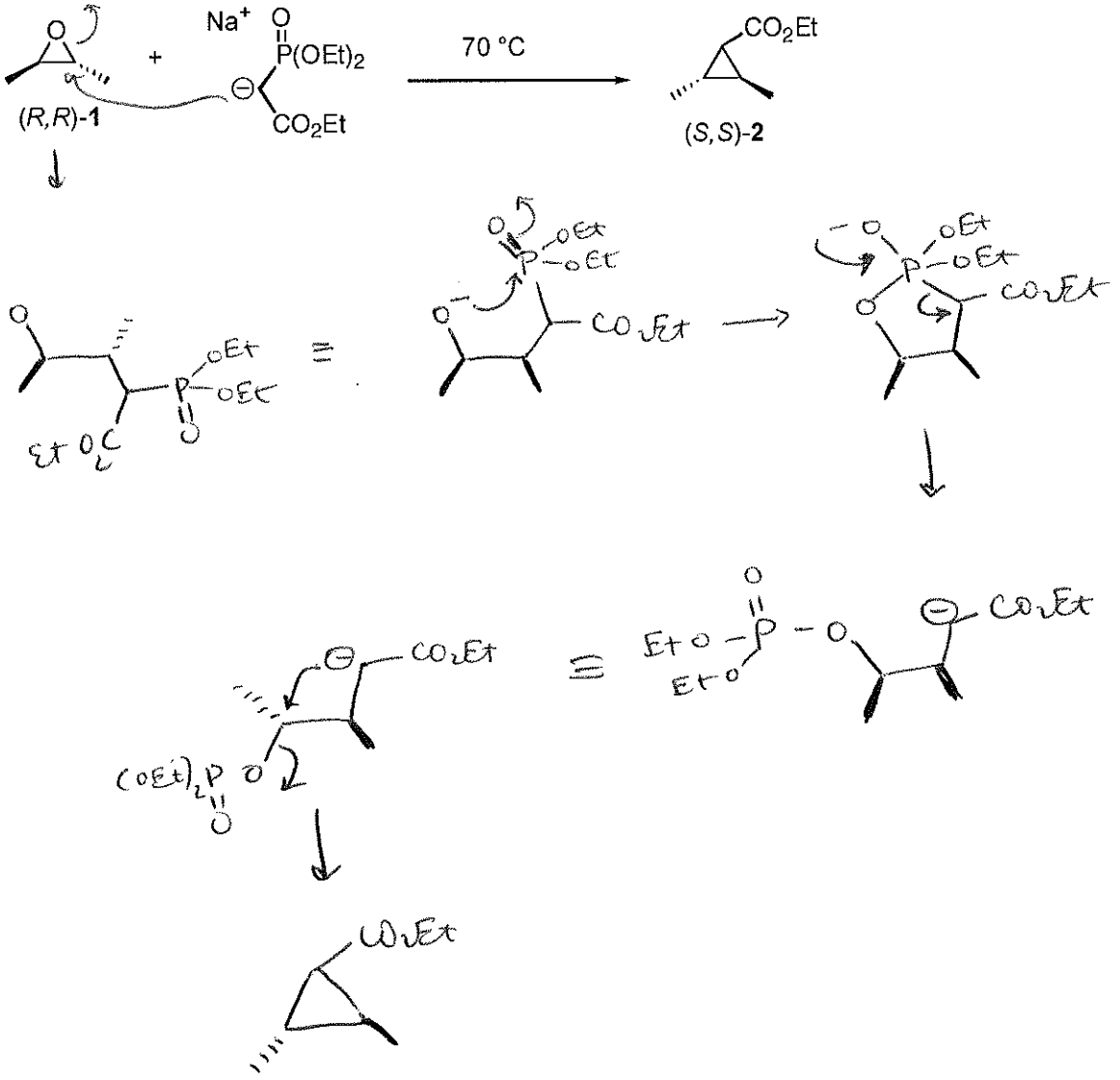
h



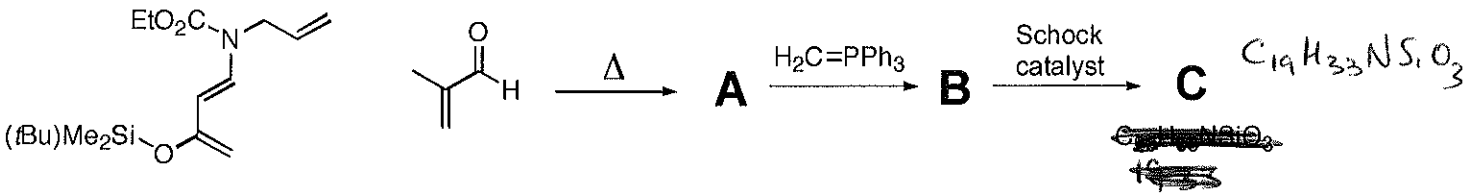
2. Provide an arrow pushing mechanism 16 points

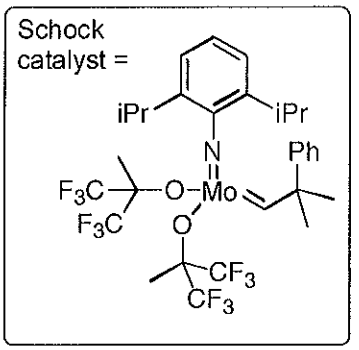


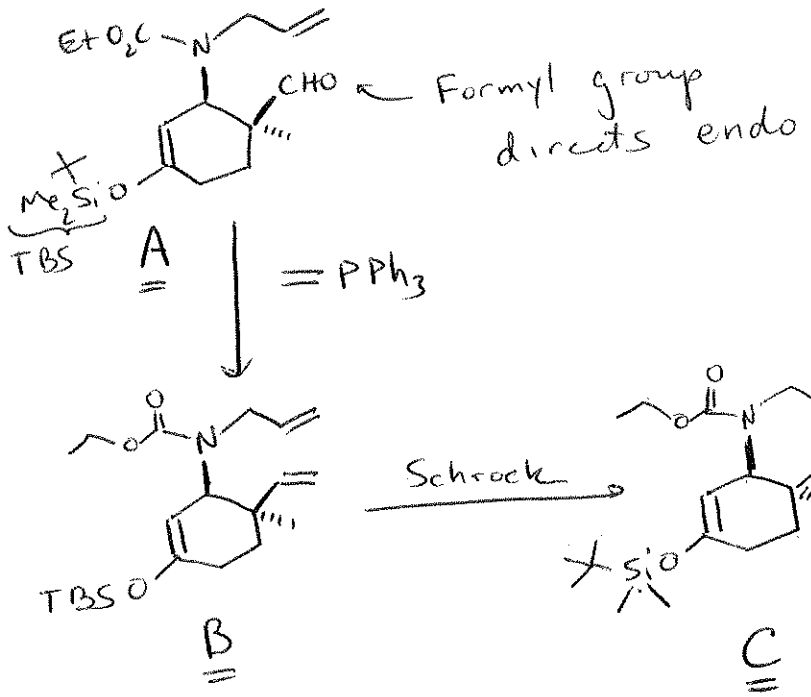
3. Provide an arrow pushing mechanism for the conversion of (*R*,*R*)-**1** into (*S*,*S*)-**2**. Your answer must explain the stereospecificity of the transformation. 16 points



4. Provide structures for compounds **A**, **B** and **C**. Arrow pushing mechanisms are not necessary. However, be sure to indicate the relative stereochemistry. 16 points

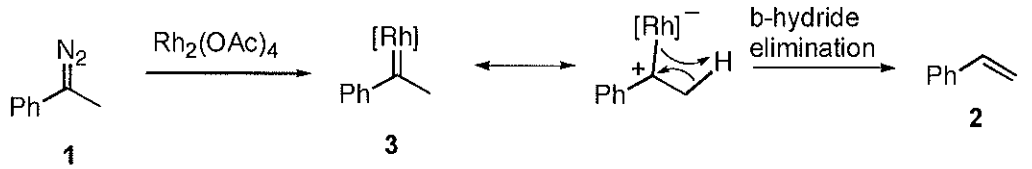


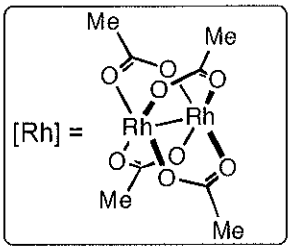




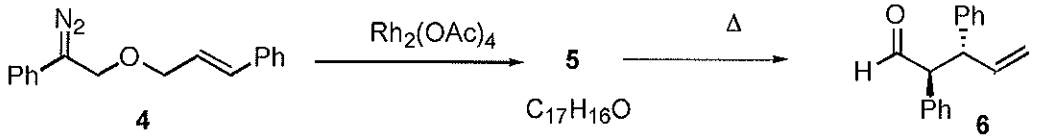
20 points

5. The reaction of **1** with catalytic amounts of $Rh_2(OAc)_4$ produces styrene (**2**), presumably via the rhodium carbene intermediate **3**. A plausible mechanism is shown:



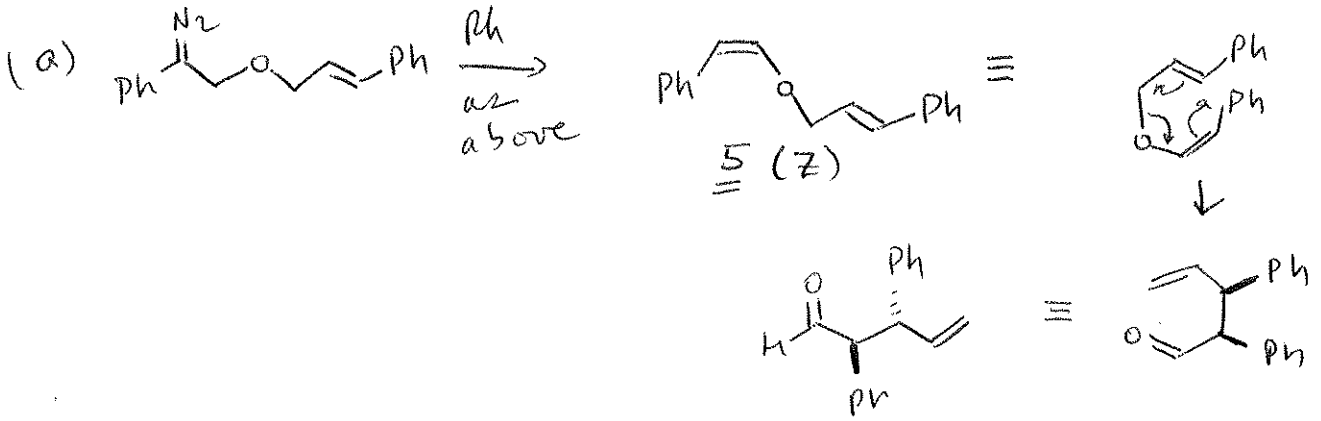


The reaction of **4** with $Rh_2(OAc)_4$ produces an intermediate **5** which rearranges to **6**.

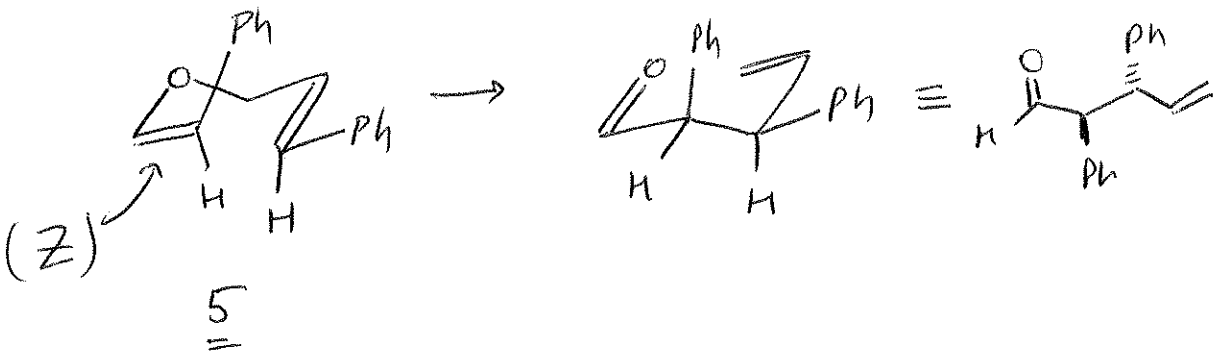


(a) Provide an arrow pushing mechanism for the transformations.
(b) Assign the stereochemistry of **5** as (*E*)- or (*Z*). Formulate your answer by assuming that the transformation of **5** into **6** is stereospecific. Provide a model for the tranformation of **5** to **6** that explains the stereochemistry of **5**.

(a)



(b) Z-stereochemistry is required to produce the correct diastereomer in a chair T.S.



6. Suggest a multistep synthesis

16 points