Chem 634
Exam 1
Fall 2005
Prof. Fox
Open book, open notes
Models are permitted
No electronic devices

Name Key.

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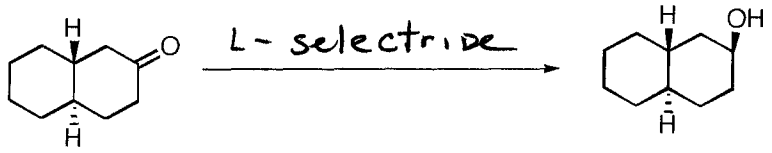
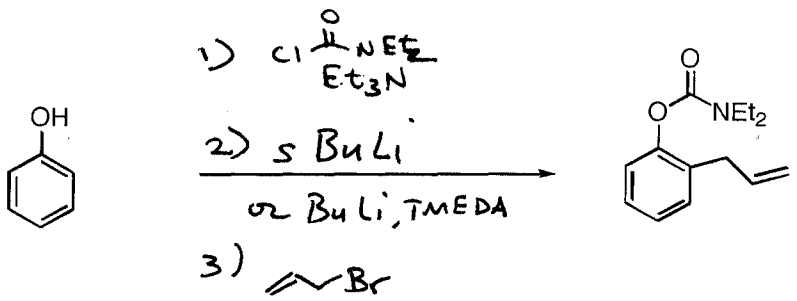
1. Provide reagents for the following transformations. More than one step may be required. Mechanistic details are not needed.

(5 points each)

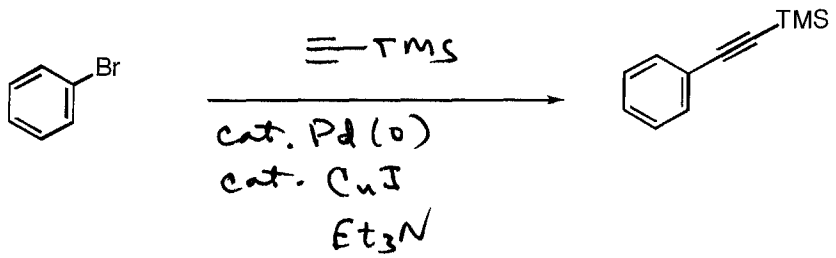
a



b



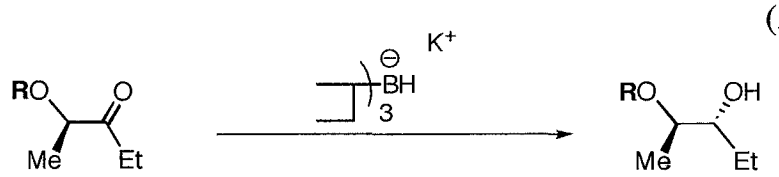
c



Name KEY.

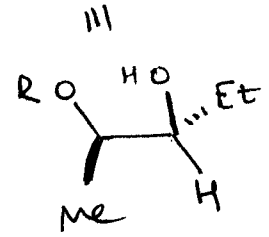
2. Provide a structure for the **R** -group that would give the diastereoselectivity shown

(5 points)



Felkin selectivity will be highest for a bulky, non-coordinating OR.

e.g. R = $SiPh_2tBu$

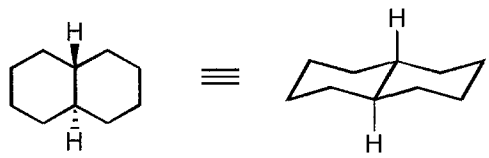


Felkin selectivity

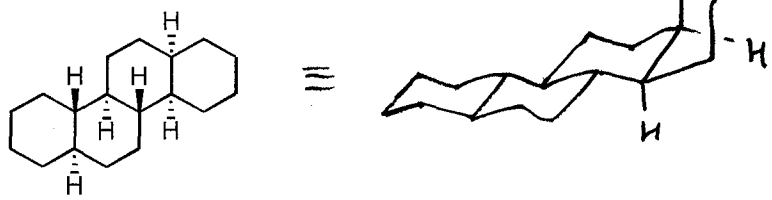
3. Draw 3-dimensional representations of the structures below

(5 points each)

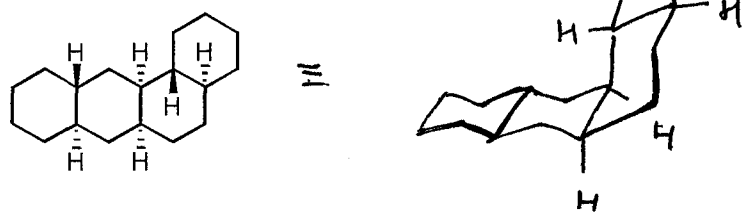
e.g.



a

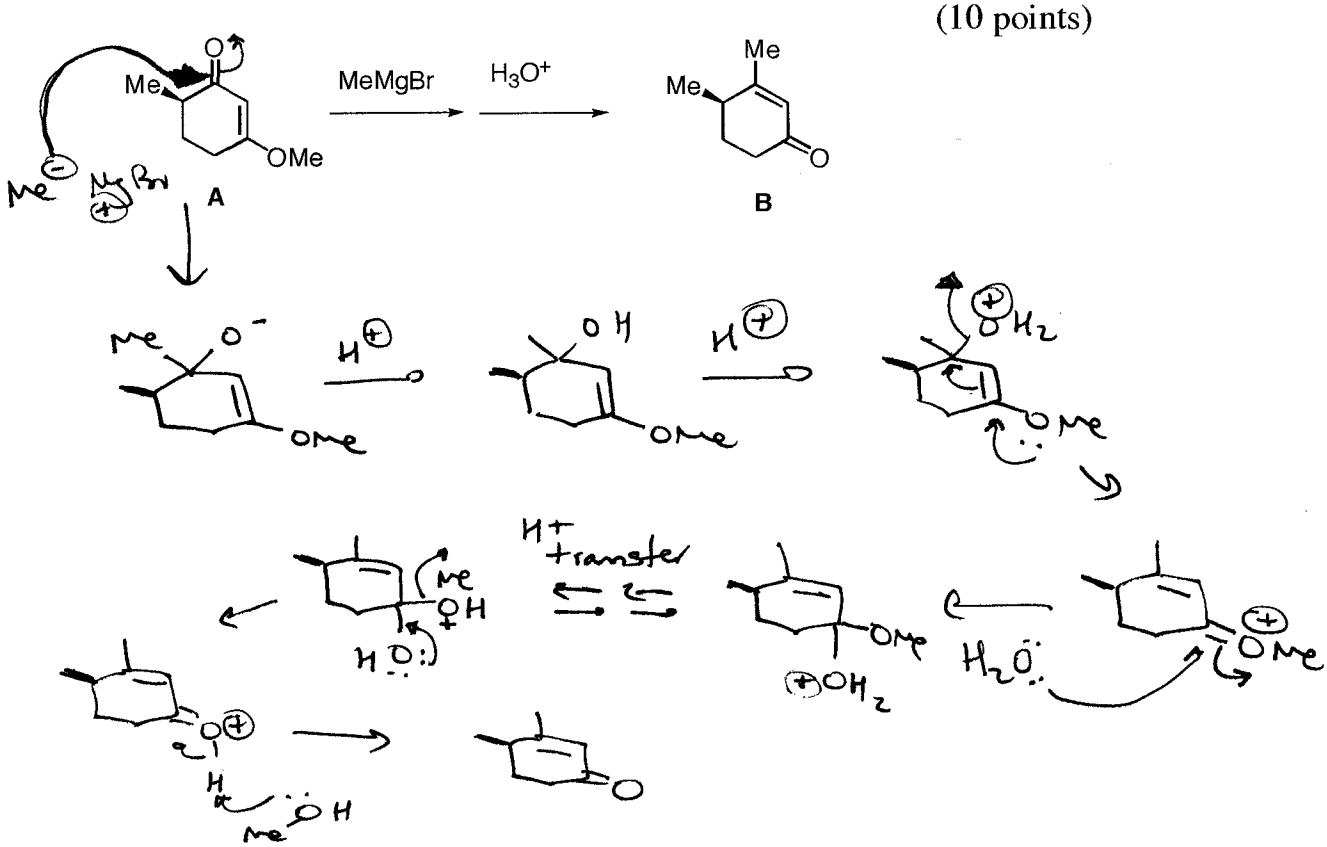


b

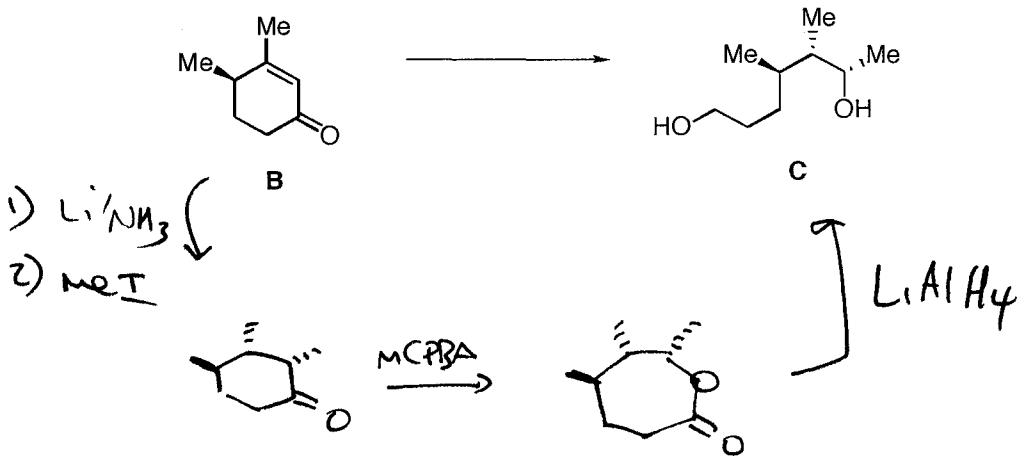


Name Key

4. Provide a mechanism for the formation of **B** from **A** (10 points)

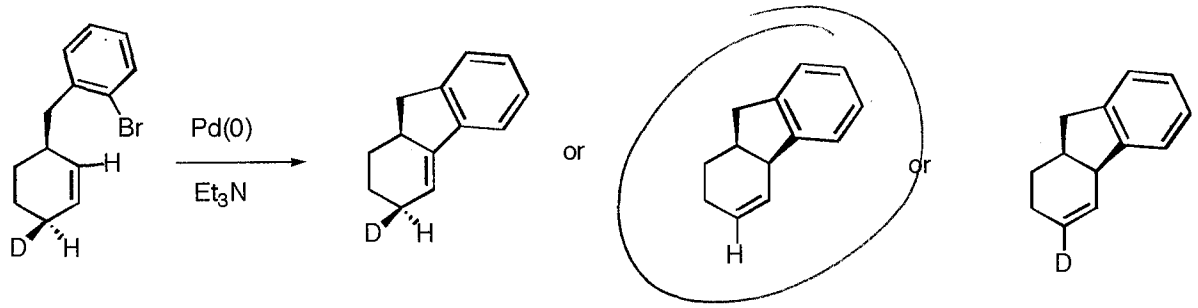


5. Propose a multistep synthesis of **C** from **B**. (15 points)

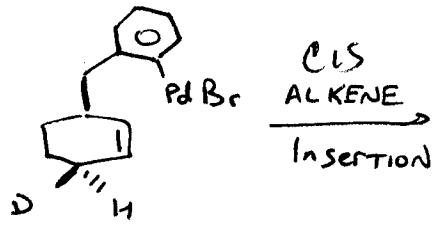


Name Key

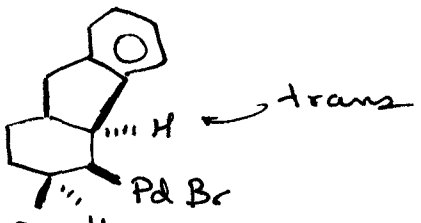
6. Circle the correct product. Provide a mechanistic rationale. (12 points)



↓ Pd(0) ox. ADD



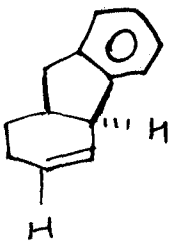
cis ALKENE Insertion



cis → ← trans

↓ cis-β hydride elimination

β-hydride ELIMINATION ONLY OCCURS WITH cis Hydrogen (or Deuterium).



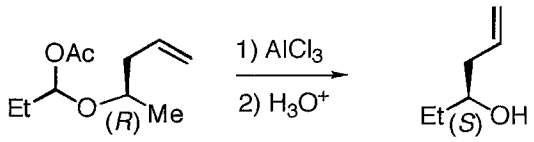
+ Pd(D)(Br)

↓ Et_3N

$Pd(0) + Et_3\overset{+}{N}D\ Br^{\ominus}$

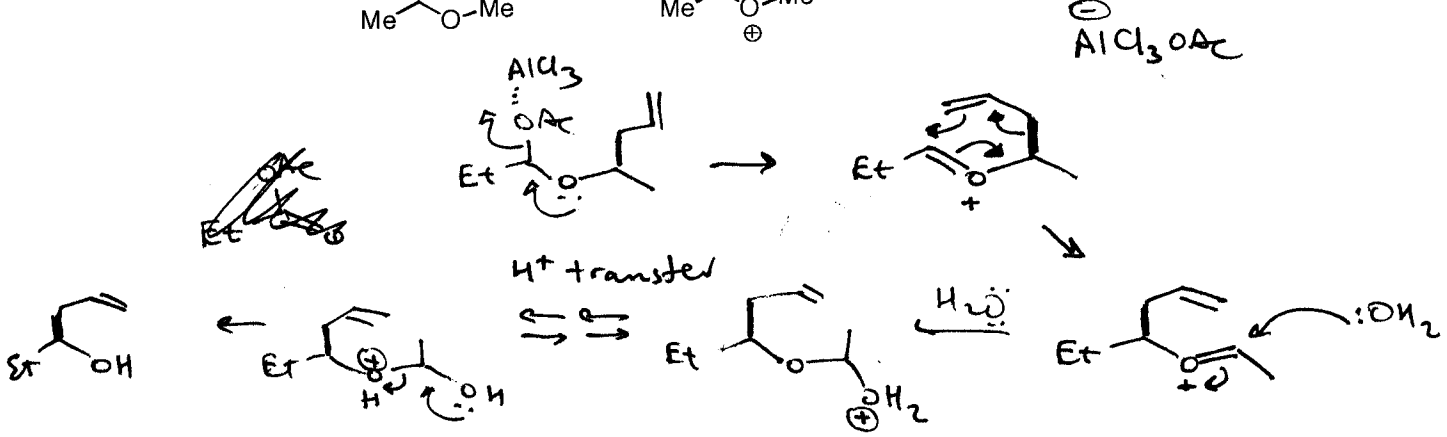
Name Key

7. Consider the reaction below

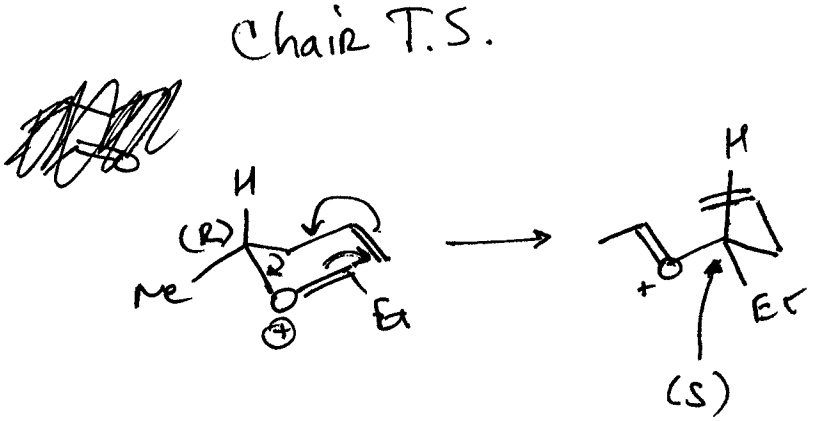


a. Provide an arrow pushing mechanism. (6 points)

Hint:



b. Provide a transition state model that explains the stereospecificity of the reaction (10 points)



Name Key

8. Provide an arrow pushing mechanism. (17 points)