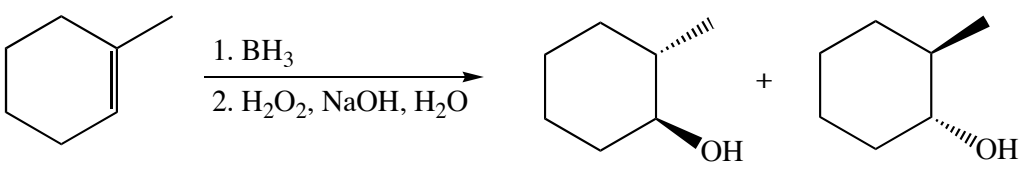

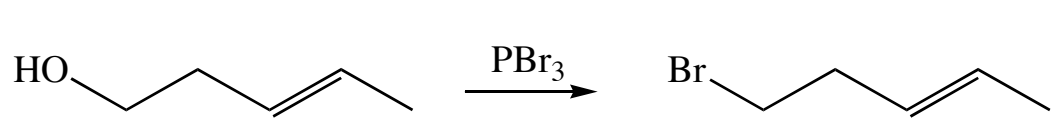
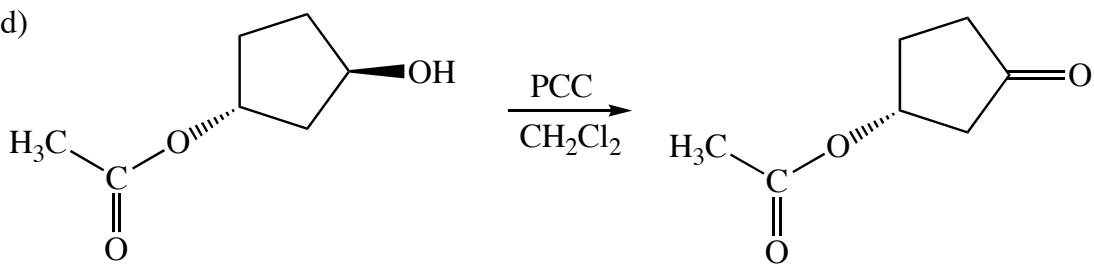
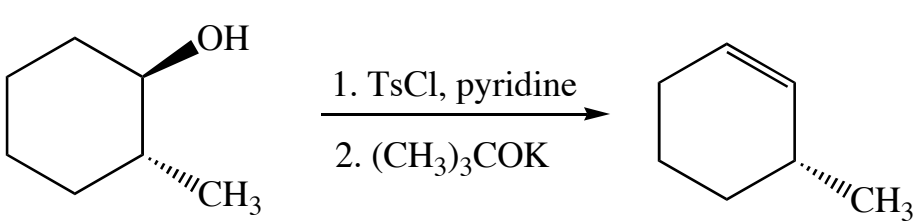
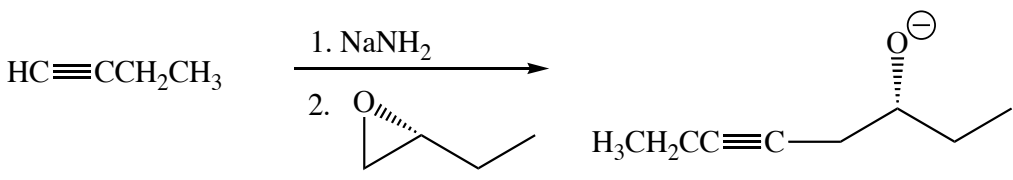
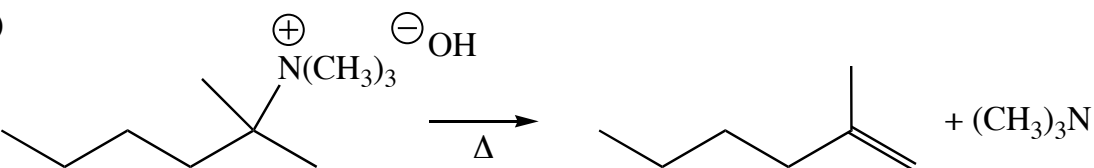


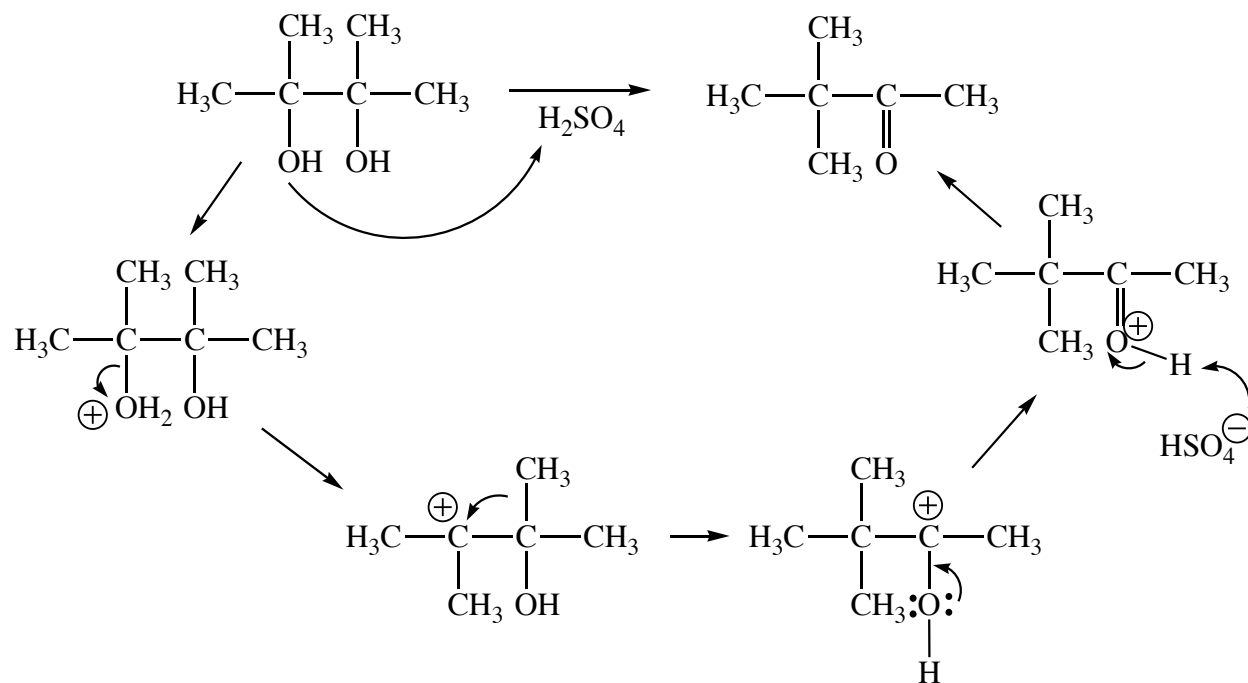
Chemistry 250A -- Exam #3 Answer Key -- November 14, 2008

Show non-zero formal charges for all structures. There are 5 pages.

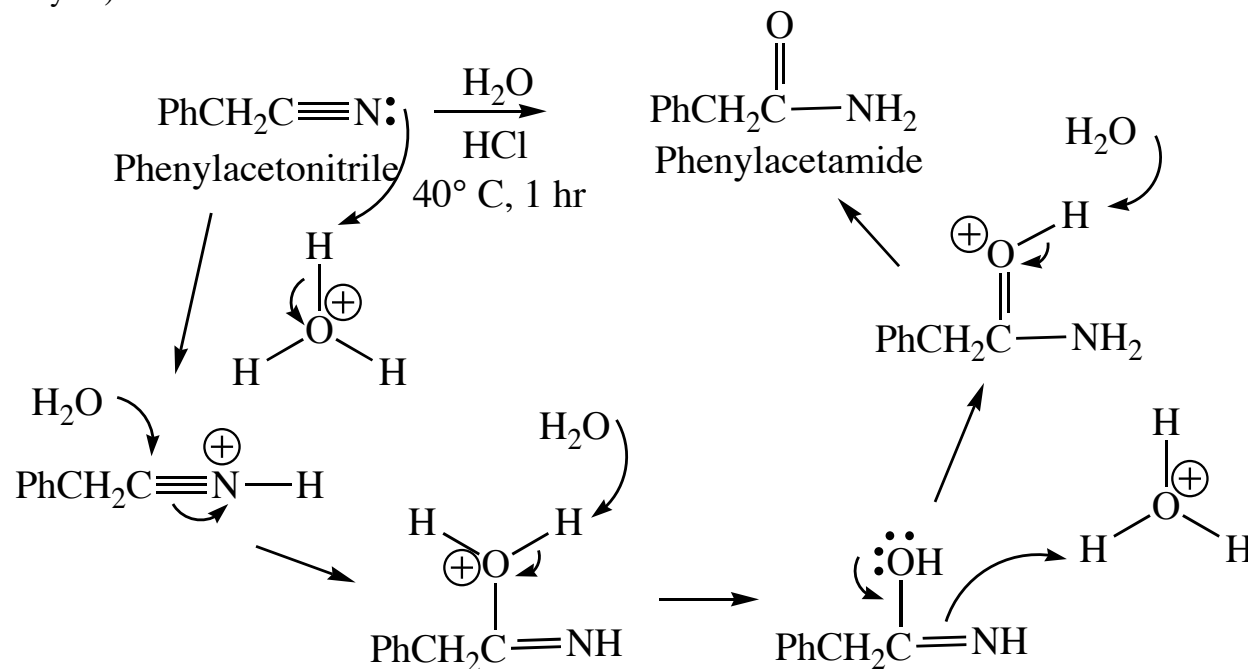
1. (21 pts) Complete the following reactions. (Hint: They all react!) Clearly show the stereochemistry of the products where appropriate.

- a) 
- b) 
- c) 
- d) 
- e) 
- f) 
- g) 

2. (10 pts) The following reaction is known as the "Pinacol Rearrangement". Draw a detailed mechanism (using curved arrows) for this reaction.

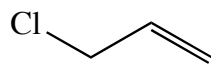


3. (10 pts) Phenylacetonitrile is converted to phenylacetamide if treated with aqueous hydrochloric acid for 1 hour at 40°C (see below). Propose a detailed mechanism (using curved arrows) for this reaction. (Hint: this is nearly identical to the mechanism for hydration of an alkyne.)

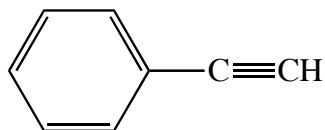


4. (6 pts) Draw structures for the following compounds:

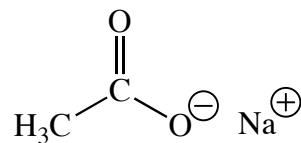
a) Vinyl chloride



b) Phenylacetylene

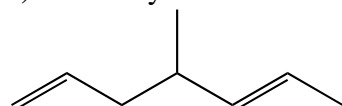
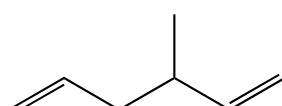
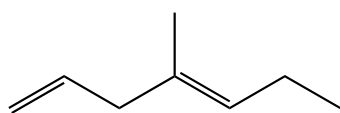
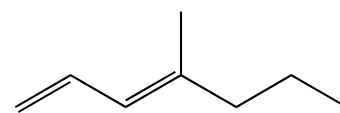
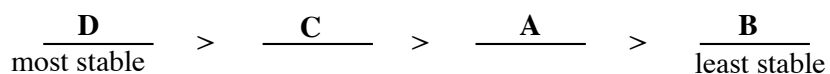


c) potassium acetate

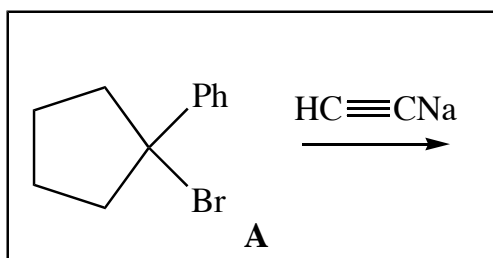
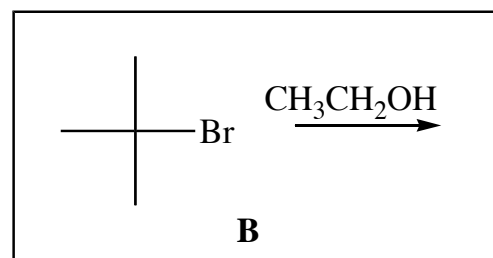
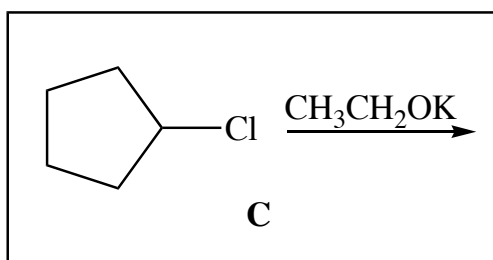
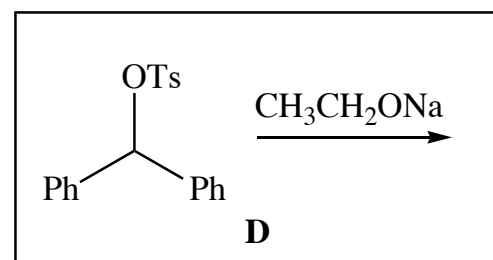
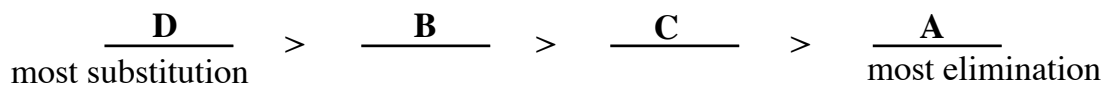


5. (10 pts) Rank the following according to the indicated property:

a) Stability

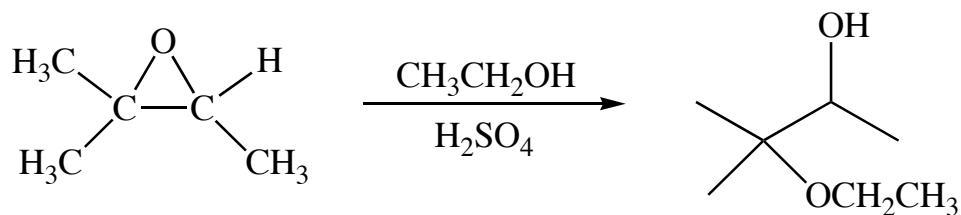
**A****B****C****D**

b) Ratio of Substitution to Elimination products for the following reactions:

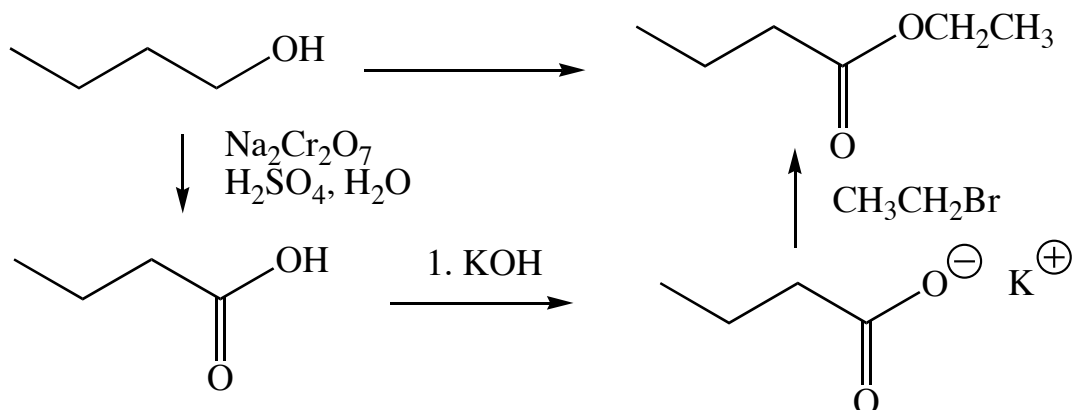
**A****B****C****D**

6. (19 pts) List the reagents necessary to accomplish the following transformations. In addition to the indicated starting material, you may use any molecules of 3 carbons or less as well as any standard reagents. For multistep transformation show the major organic product for each step. (You do **NOT** need to show mechanisms.)

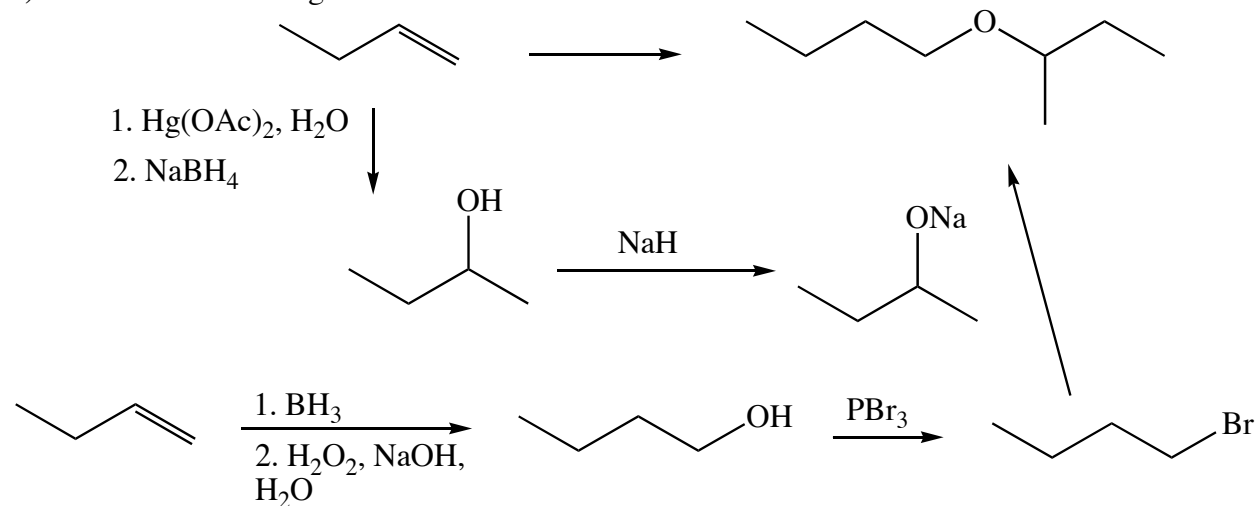
a)



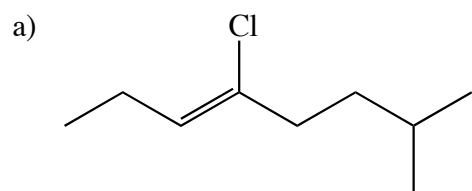
b)



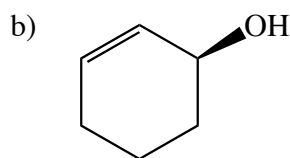
c) Note: Use the starting material twice.



7. (9 pts) Give names for the following compounds. Include stereochemical descriptors when necessary.



Z-4-chloro-7-methyl-3-octene

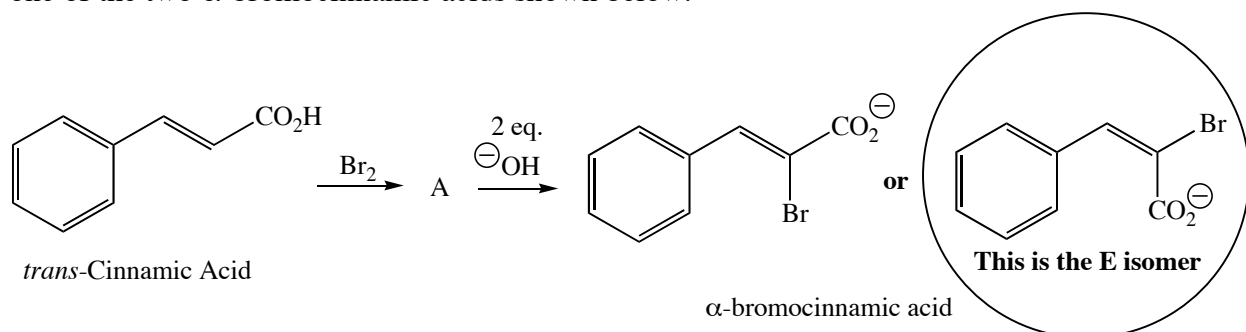


S-2-cyclohexen-1-ol
or **S-cyclohex-2-en-1-ol**



Potassium dichromate

8. (15 pts) In 1952 Grovenstein and Lee reported that treating *trans*-cinnamic acid with bromine, followed by reaction with 2 equivalents of aqueous hydroxide in the cold, gave predominantly one of the two α -bromocinnamic acids shown below.



Draw a **detailed mechanism** (using curved arrows) showing the formation of the major product, clearly illustrating and explaining the **stereochemical** course of the reactions. Circle the major product and label it as either the E or Z isomer.

