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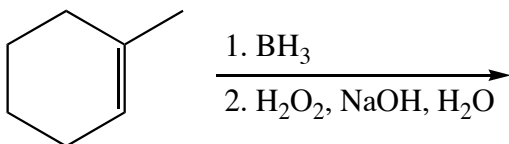
1

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

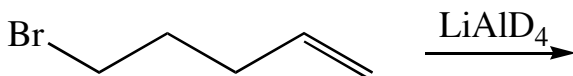
Show non-zero formal charges for all structures. There are 5 pages.

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

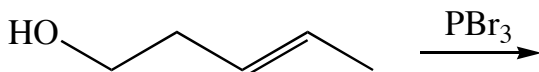
a)



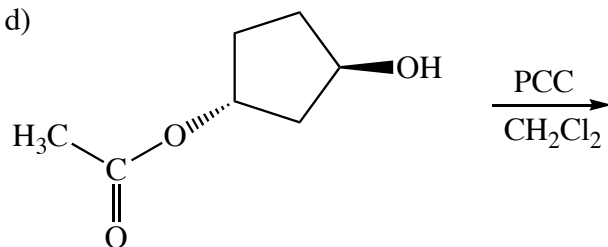
b)



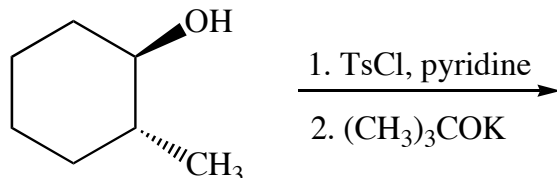
c)



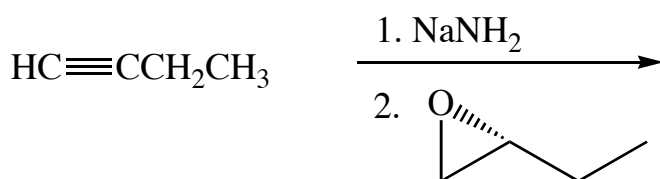
d)



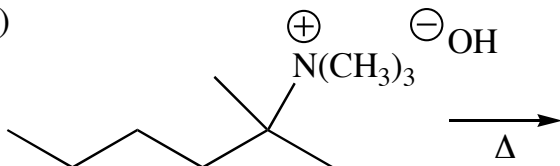
e)



f)



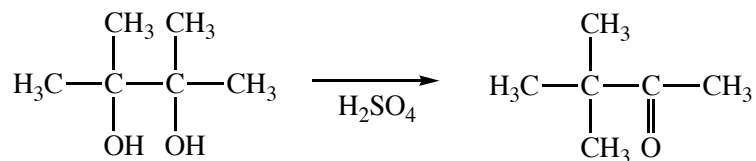
g)



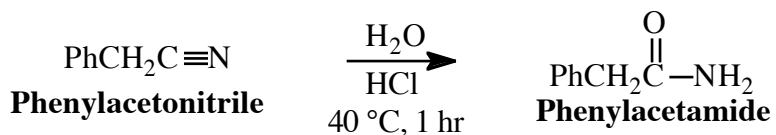
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2. (10 pts) The following reaction is known as the "Pinacol Rearrangement". Draw a detailed mechanism (using curved arrows) for this reaction.



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.)

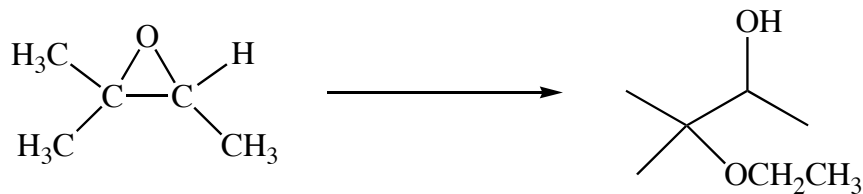


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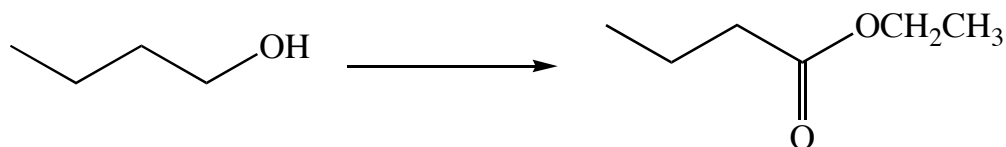
4

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.)

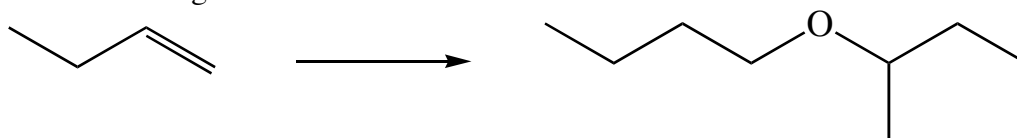
a)



b)

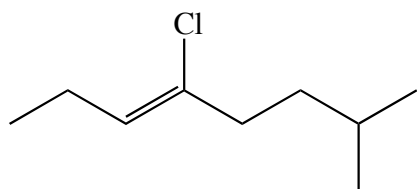


c) Note: Use the starting material twice.

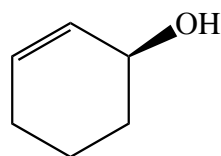


7. (9 pts) Give names for the following compounds. Include stereochemical descriptors when necessary.

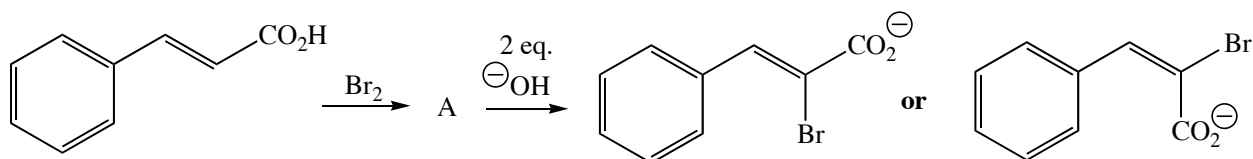
a)



b)

c) $\text{K}_2\text{Cr}_2\text{O}_7$

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.



trans-Cinnamic Acid

α -bromocinnamic acid

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.