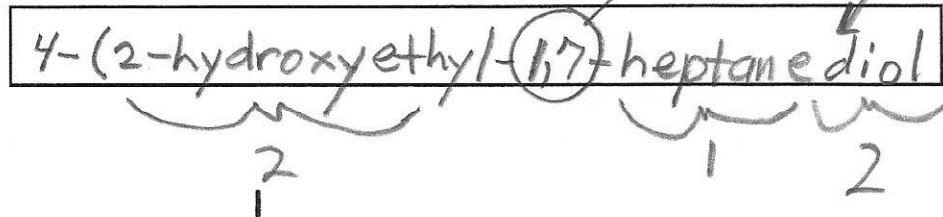
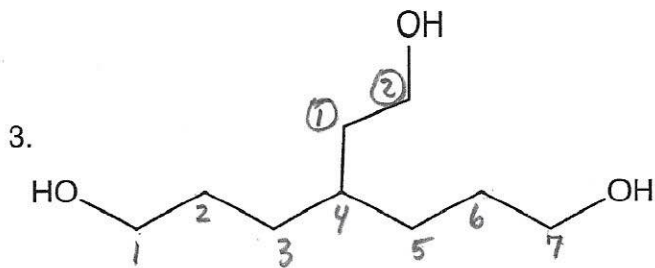
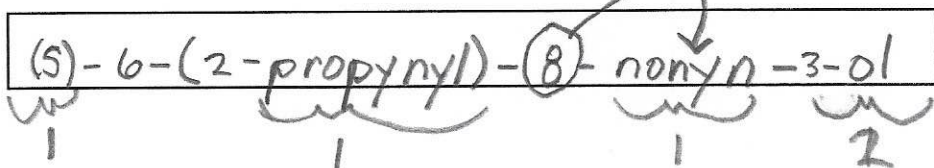
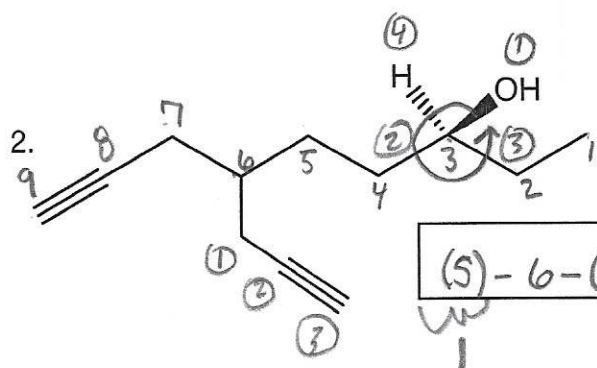
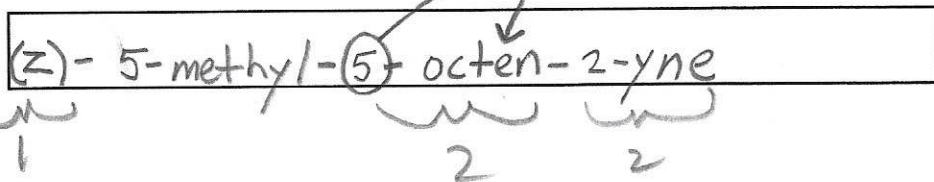
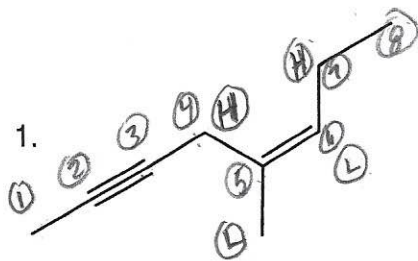


Exam 3B Fall Key

A. Nomenclature: (15 points)

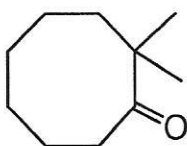
Give an acceptable IUPAC name for each of the following compounds. Be sure to include the **stereochemistry** when indicated and appropriate.

⊖ For incorrect numbering

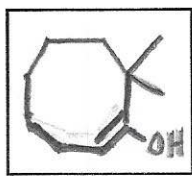


B. FACTS: Total = 25 points

1. Draw the tautomer of the compound below. (3 points)

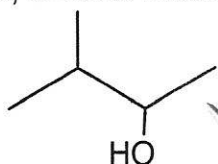


keto



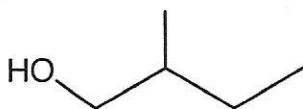
enol

2. Place the alcohols in order of increasing reactivity in an acid catalyzed dehydration. (1=least reactive, 3=most reactive) (6 points)



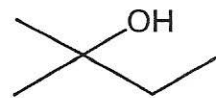
2

2° ct



1

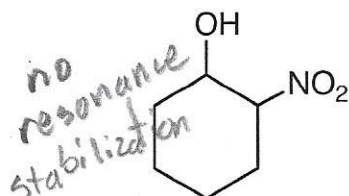
1° ct



3

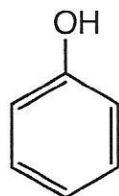
3° ct

3. Place the compounds in order of increasing acidity. (1=least acidic, 3=most acidic) (6 points)



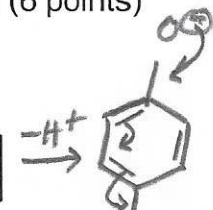
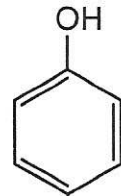
no resonance stabilization of anion

1



resonance stabilized

2



more delocalized charge

3

4. Although the product of an alkene and HBr/peroxide is described as a non-Markovnikov product, the reaction follows the general principle of Markovnikov's rule. Explain. (4 points)

(The bromine radical is the electrophile.) (1pt) (It adds to the less substituted carbon) (1pt) to generate the more stable radical) (1pt) on the more substituted carbon atom. (1pt)

5. List three methods for converting an alcohol functional group to a good leaving group in SN2 or SN1/E1 reactions. (6 points)

2pts 1. Protonation of OH to give H₂O L.G.

2pts 2. Convert to tosyl group

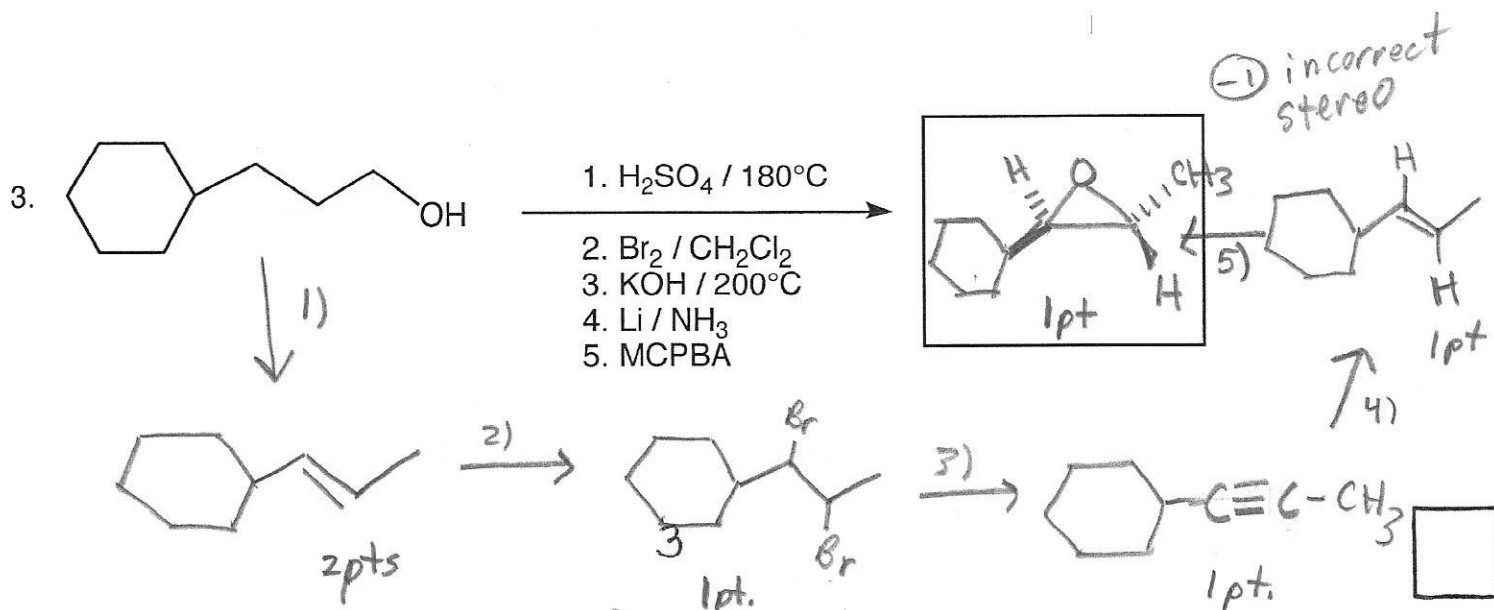
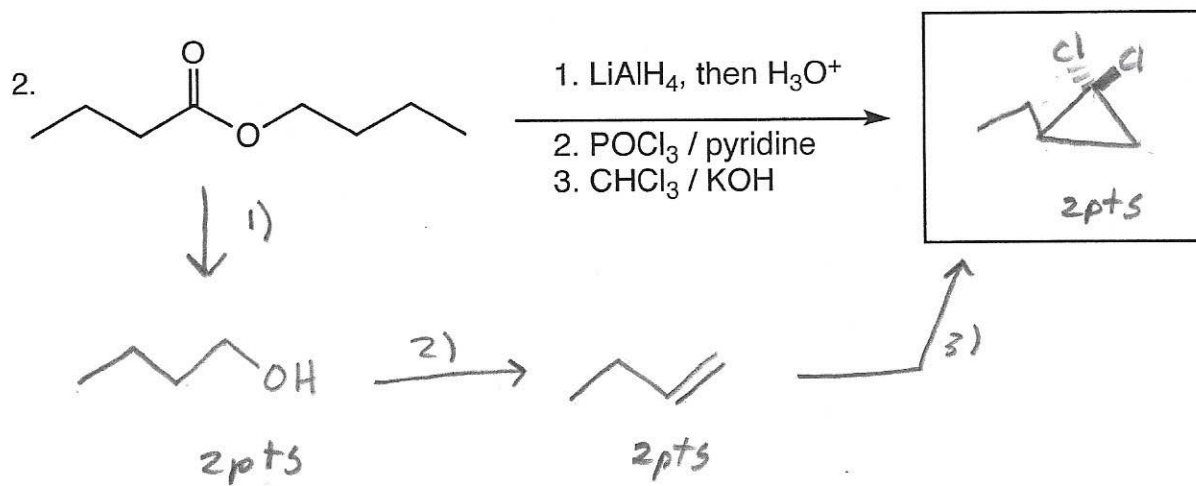
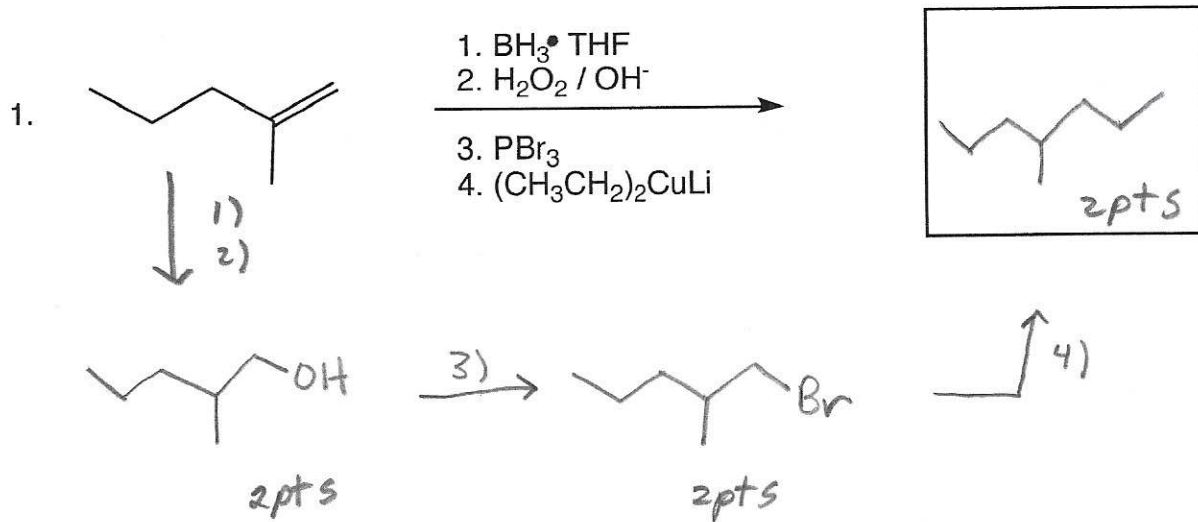
2pts 3. Convert to halide (Note: PBr₃, PCl₃, SOCl₂, PI₃ are all the same method.)

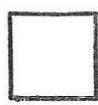
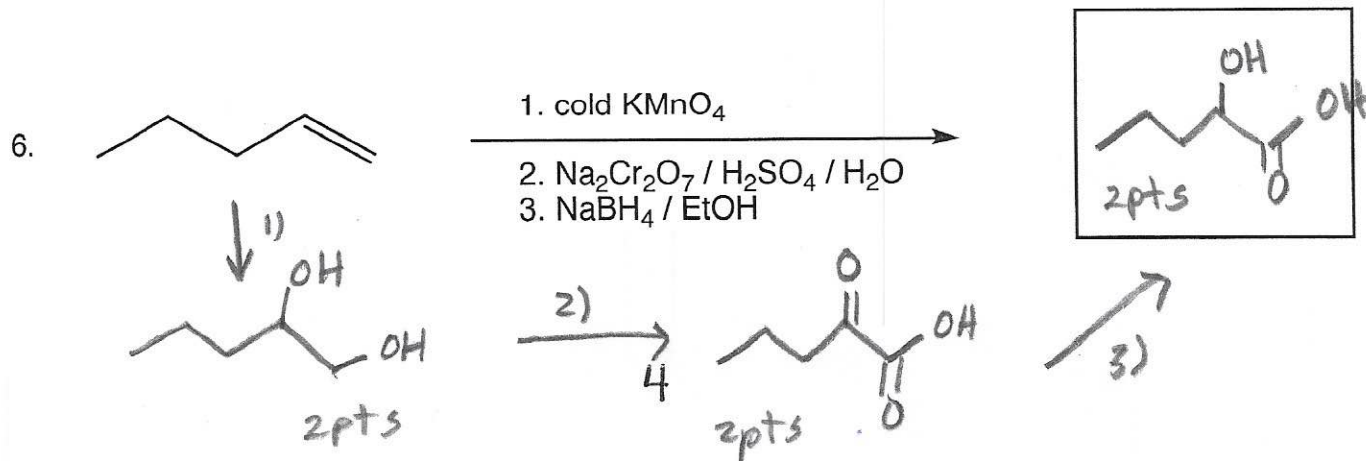
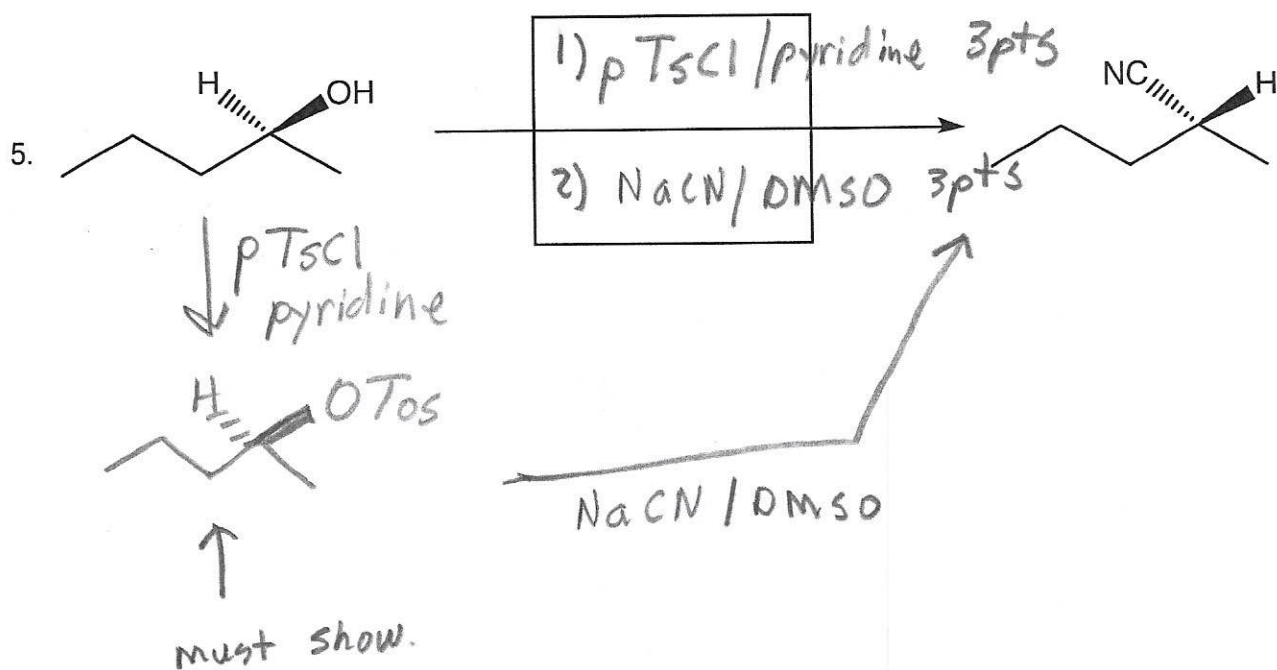
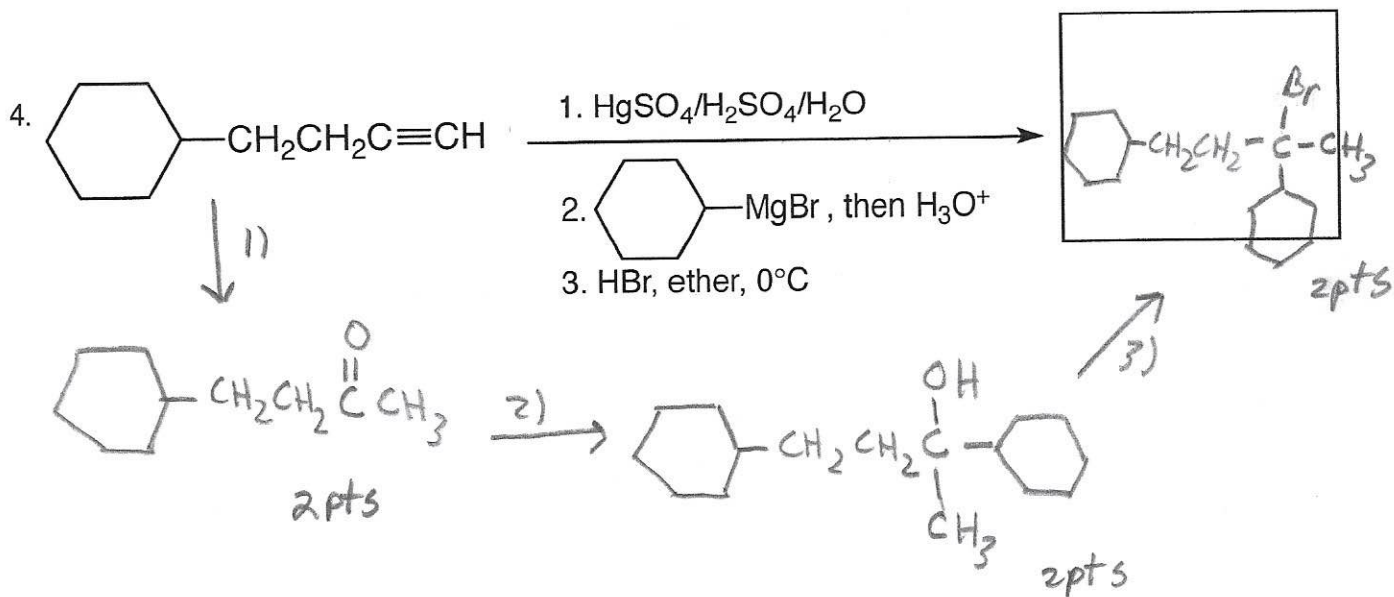
2



C. Reactions: Total = 36 points, 6 points each

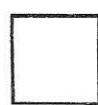
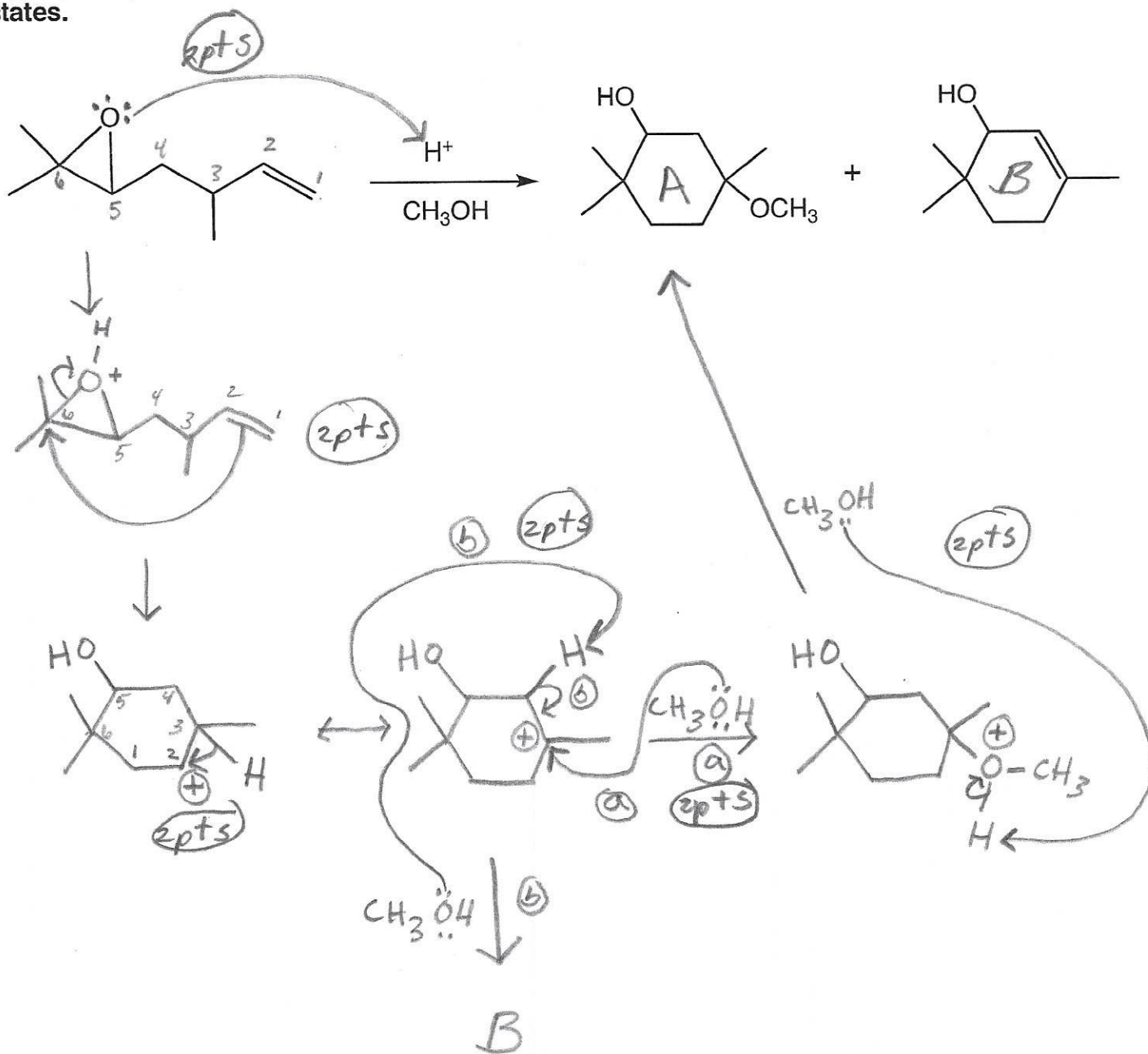
Please provide the major product or the reagents in the answer box. Indicate **stereochemistry** if applicable. **Full credit is awarded only when the product of each step in a multi-step reaction is shown below the reaction.**





D. Mechanisms: (12 points)

The reaction below produces a mixture of products. Provide a clear mechanism to explain the formation of the products shown. Use curved arrows to indicate "electron flow". Remember to show only one step at a time. Show all intermediates and all formal charges. Do not show transition states.



E. Synthesis: (12 points)

Synthesize the molecule below from **cyclohexanol** and alcohols or alkynes of **three carbons or less**, any peroxyacids, any oxidizing or reducing agents, and any other inorganic reagents. The **stereochemistry** of the final product is important. (Please do not include mechanisms.)

