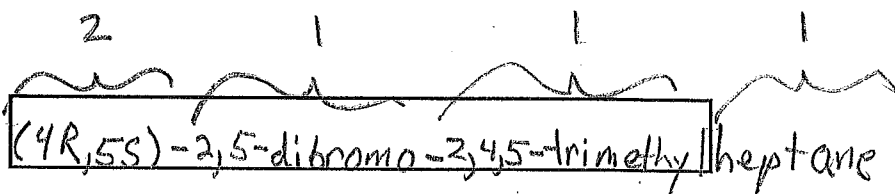
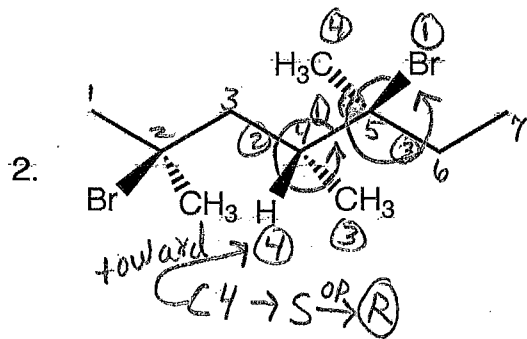
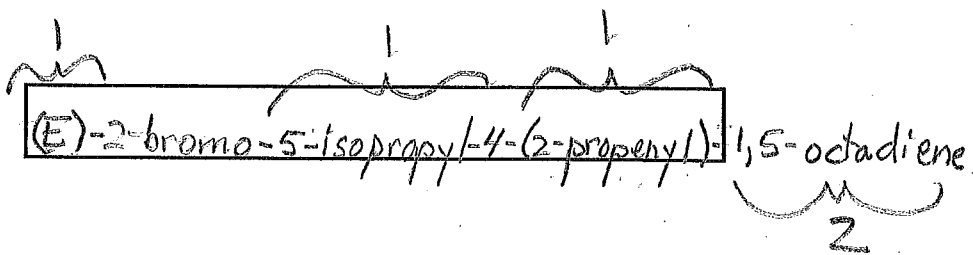
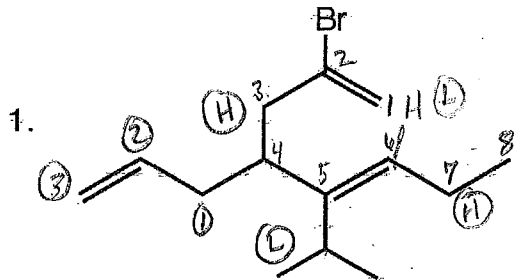


# Exam 2, F24

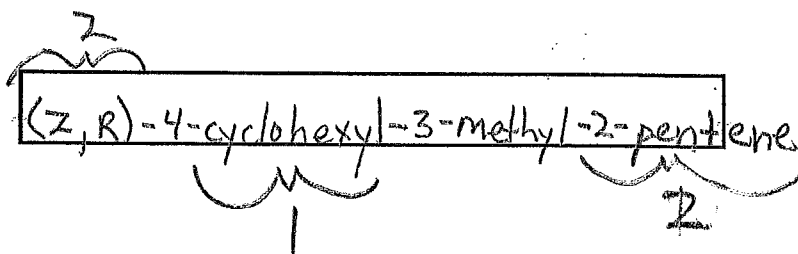
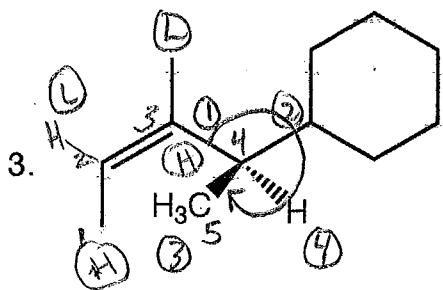
## A. Nomenclature: (15 points)

Give an acceptable IUPAC name for each of the compounds. Be sure to indicate the stereochemistry where appropriate.

(-1) for incorrect numbering

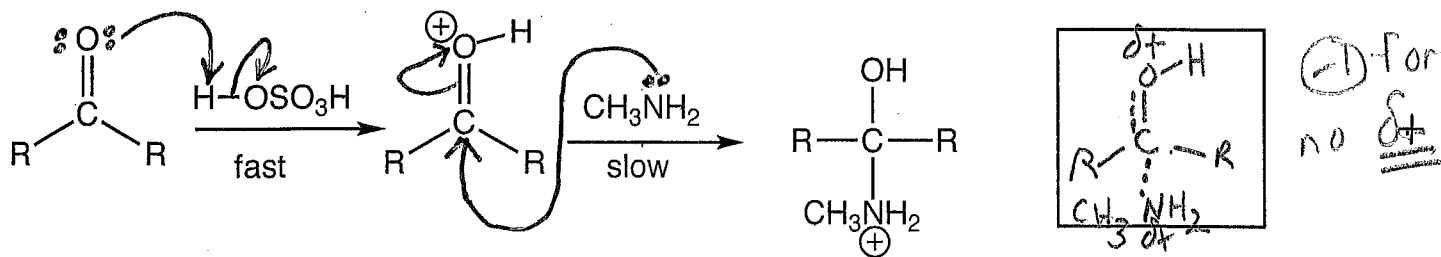


#4 away  $\rightarrow$  C5  $\rightarrow$  (S)

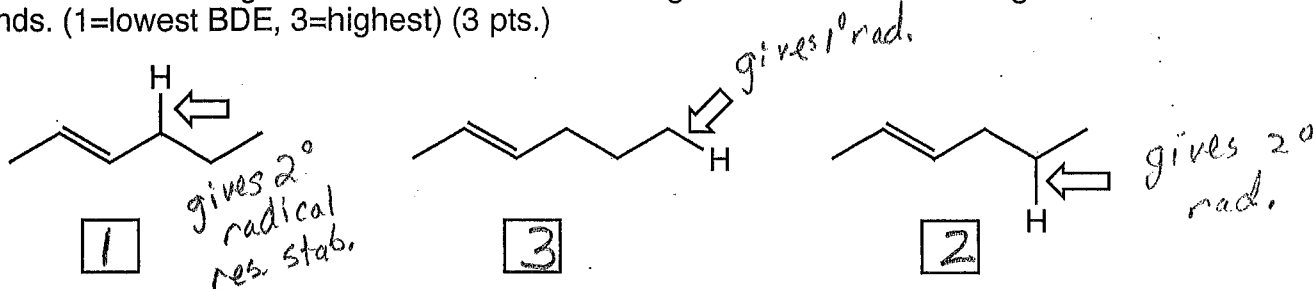


Facts: Total points = 29

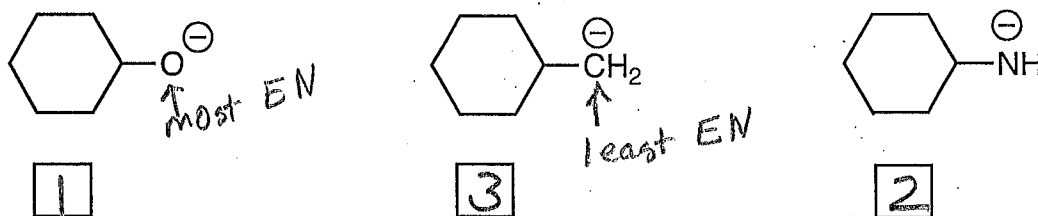
1. When reacted with a 1° amine, an aldehyde or ketone forms an imine. The first two steps of this process are shown below. Draw the structure of the higher energy transition state in the box provided. (4 pts)



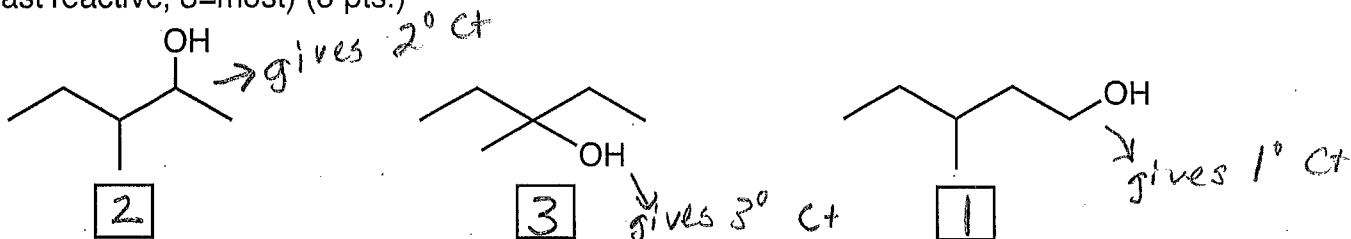
2. Place the following alkenes in order of increasing bond dissociation energies of the indicated bonds. (1=lowest BDE, 3=highest) (3 pts.)



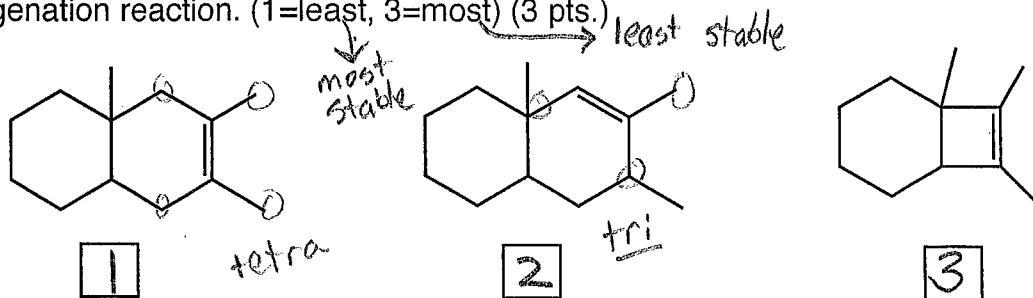
3. Place the anions in order of increasing nucleophilicity. (1=least nucleophilic, 3=most) (3 pts.)



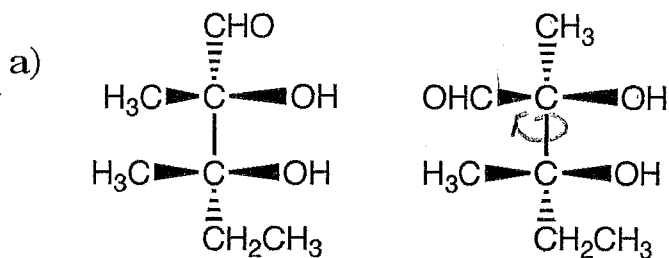
4. Place the following alcohols in order of increasing reactivity in an acid catalyzed dehydration. (1=least reactive, 3=most) (3 pts.)



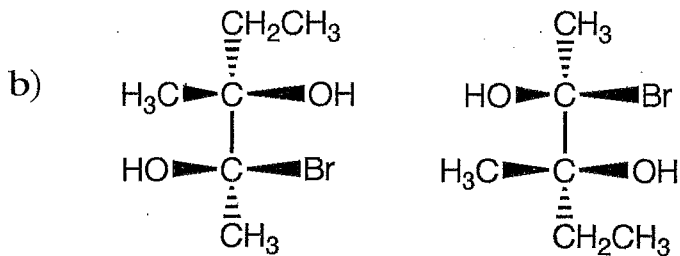
5. Place the following alkenes in order of increasing amount of heat evolved in a catalytic hydrogenation reaction. (1=least, 3=most) (3 pts.)



6. Label each of the following pairs as identical, structural isomers, enantiomers or diastereomers. (6 pts.)

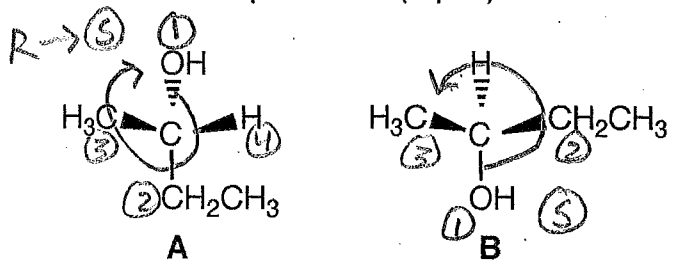


diastereomers



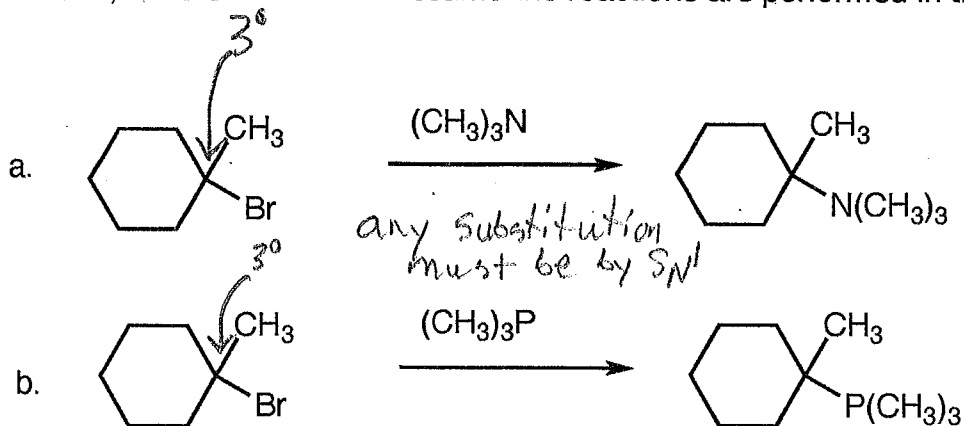
enantiomers

7. Compare structures A and B. If structure A has a specific rotation of  $-13.52^\circ$ , what is the specific rotation of Compound B? (3 pts.)



Must be  $\ominus$   
 $-13.52^\circ$   
 NO partial credit

8. In the box provided, place the letter of the substitution reaction with the faster rate. If the rates are the same, write S in the box. Assume the reactions are performed in the same solvent. (4 pts.)



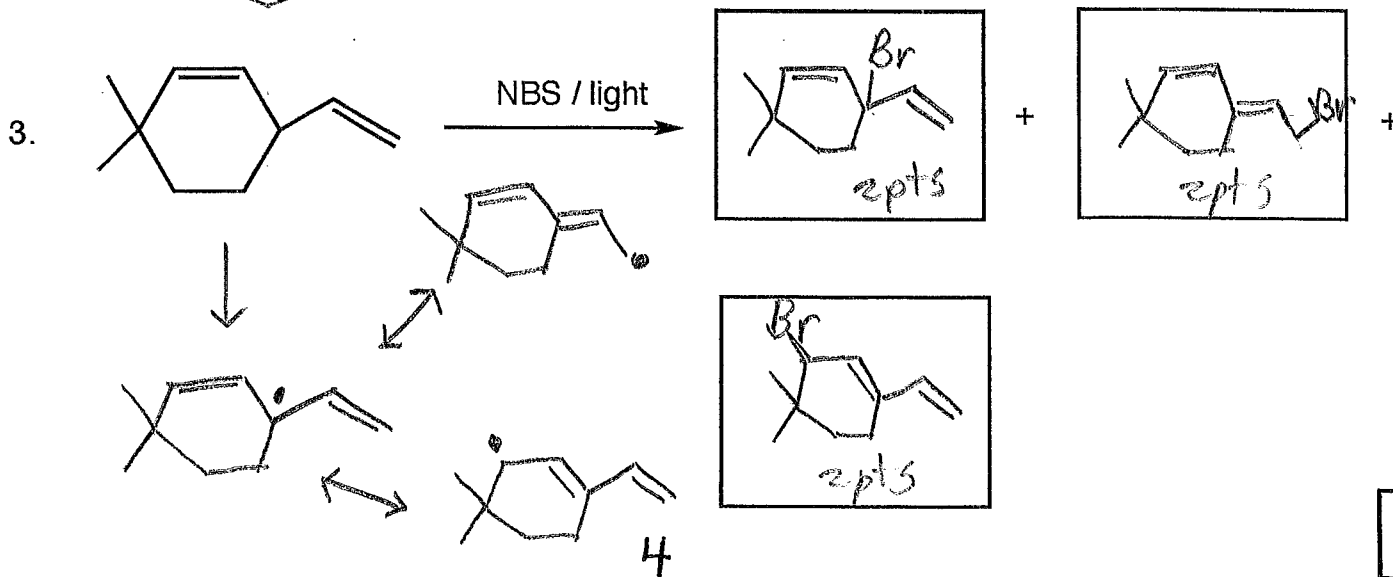
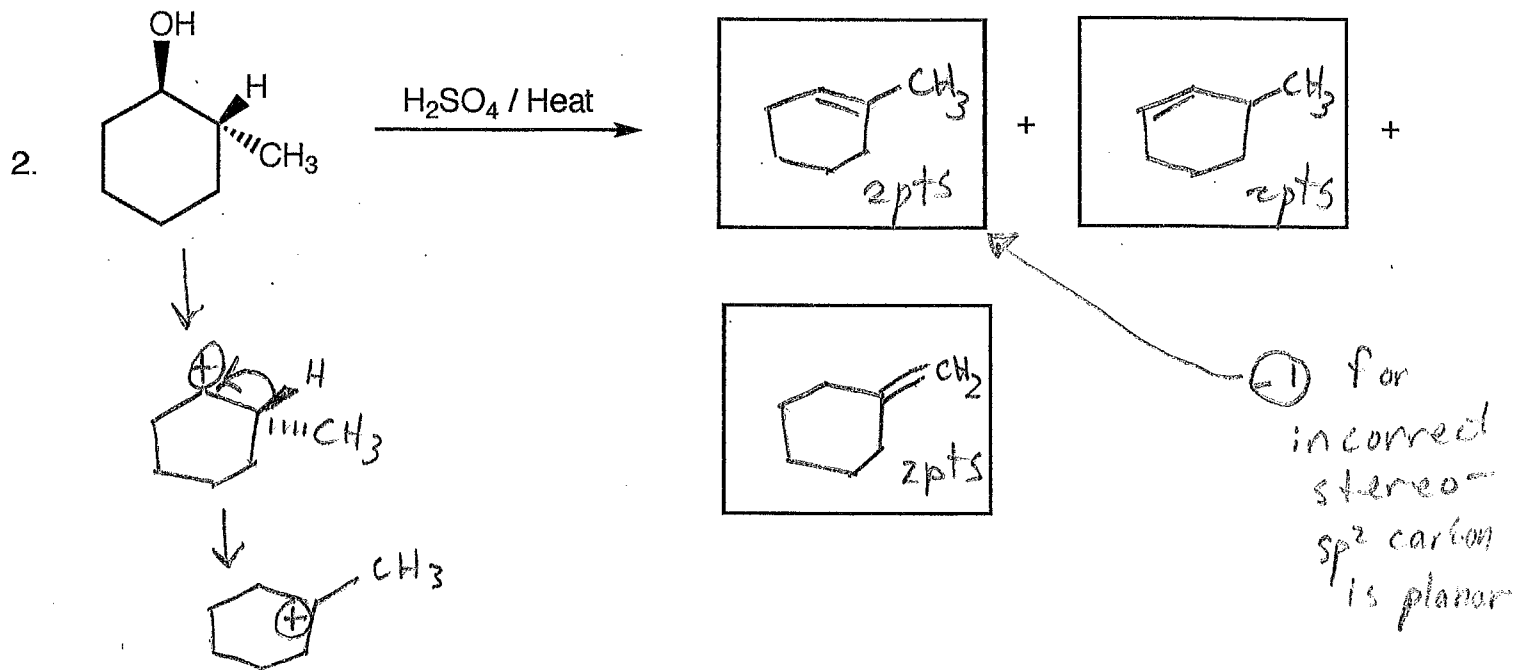
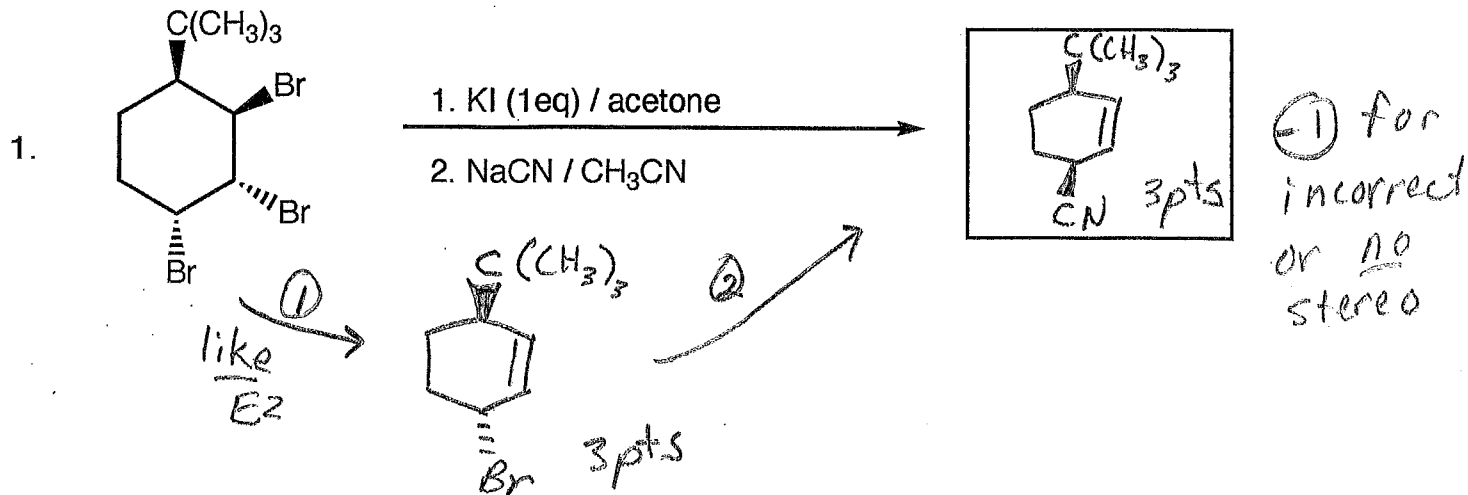
S

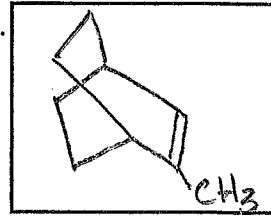
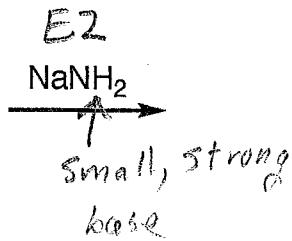
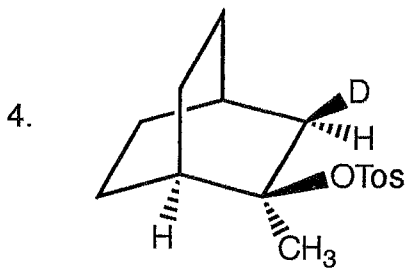
RDS does not involve Nu.



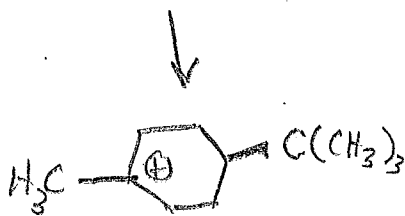
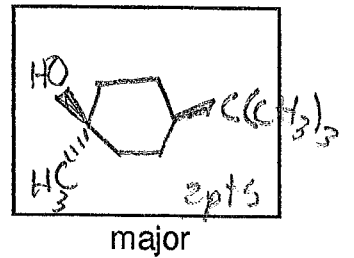
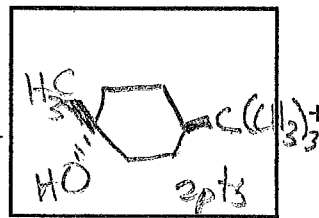
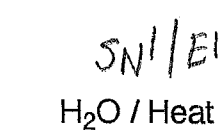
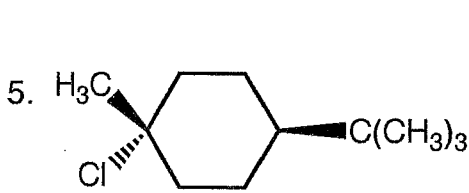
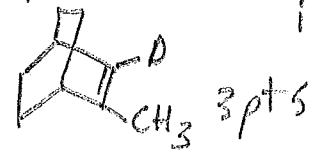
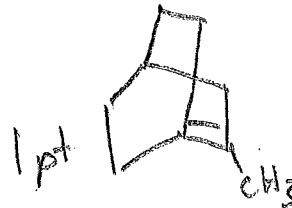
**C. Reactions:** Total = 36 points, 6 points each

Please provide an organic product in each answer box. If only one box is provided, give the major product. 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.**

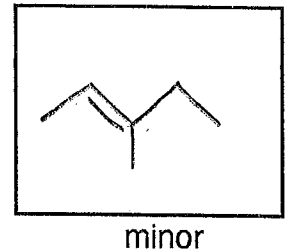
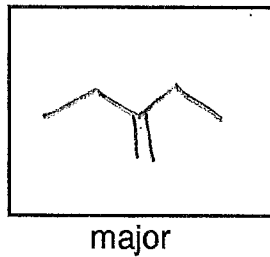
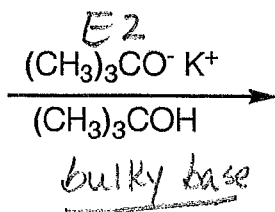
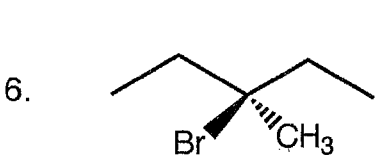
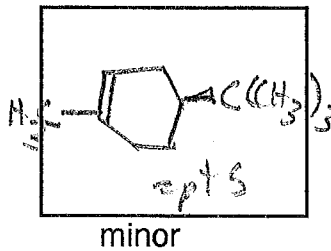




⊖ for incorrect stereo!  
 $sp^2$  carbon is planar



⊖ incorrect or NO stereo

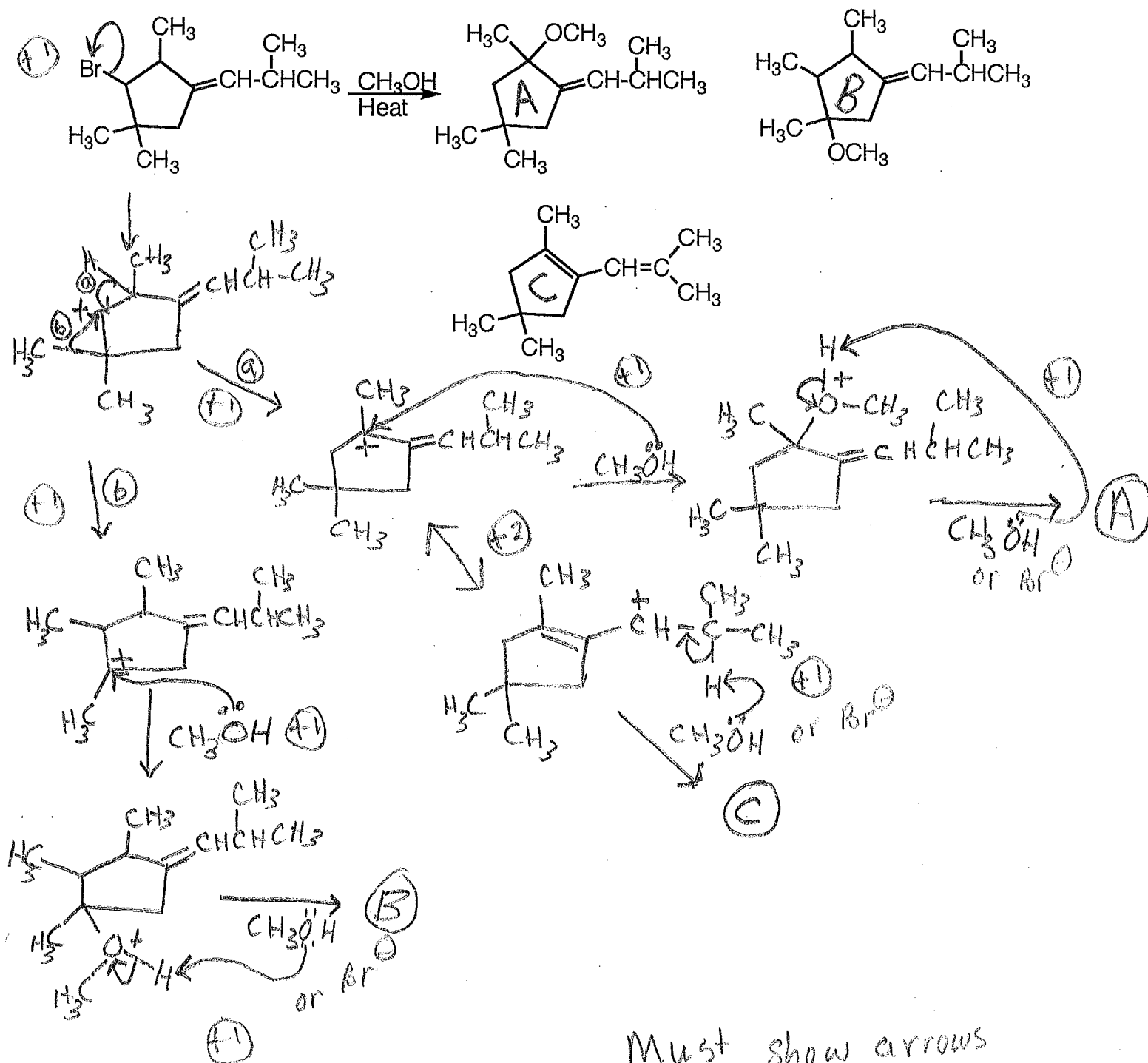


⊖ 2 pts if reversed major/minor



**D. Mechanism: (10 points)**

The reaction presented below produces several products. Provide clear mechanisms to explain the formation of the three 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. Please do not show transition states.

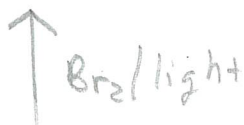
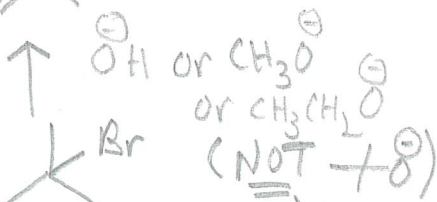
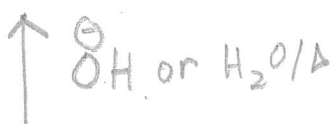
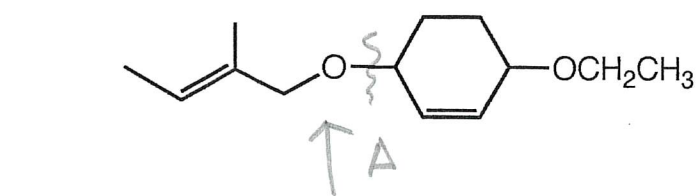


Must show arrows  
and charges



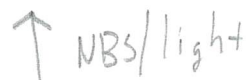
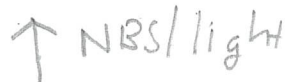
**E. Synthesis:** (10 points)

Synthesize the molecule below from cyclohexene, 2-methylbutane, ethane, and any inorganic reagents. (Please do not include mechanisms.)

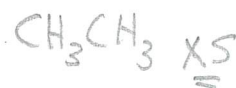
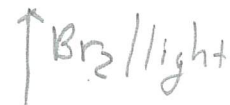
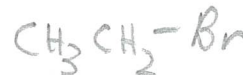
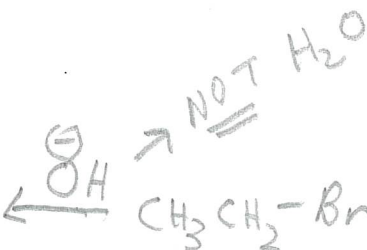


XS

allowed:



⊗ penalized for starting materials that are not in the list



XS

gives less subst. alkene

