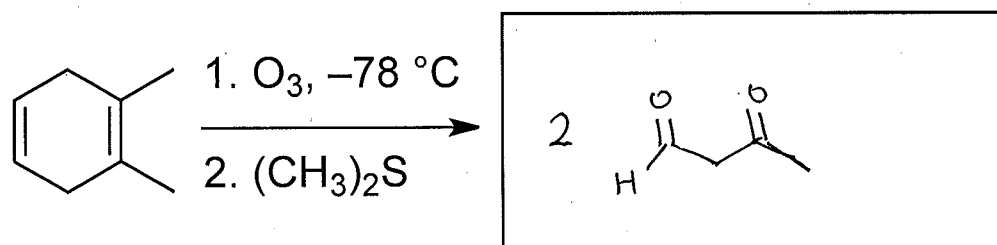
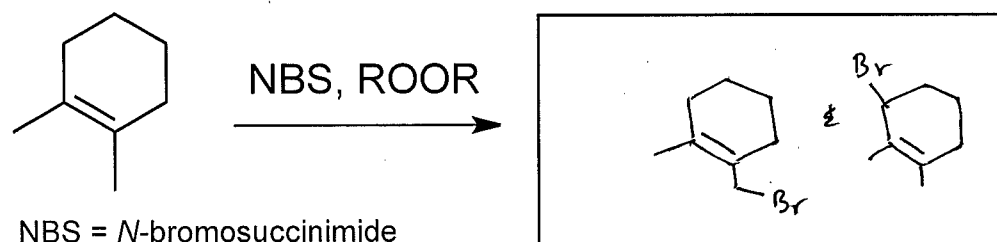
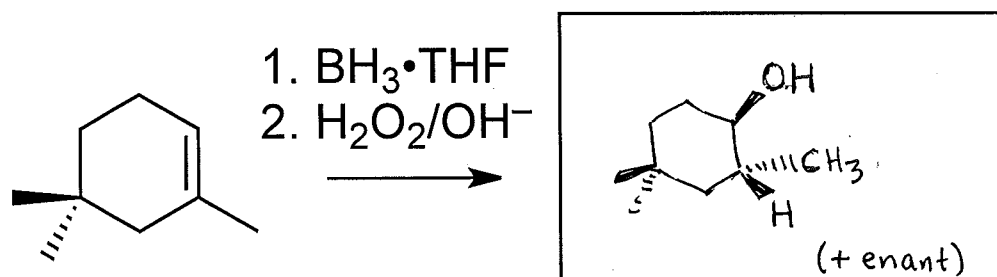
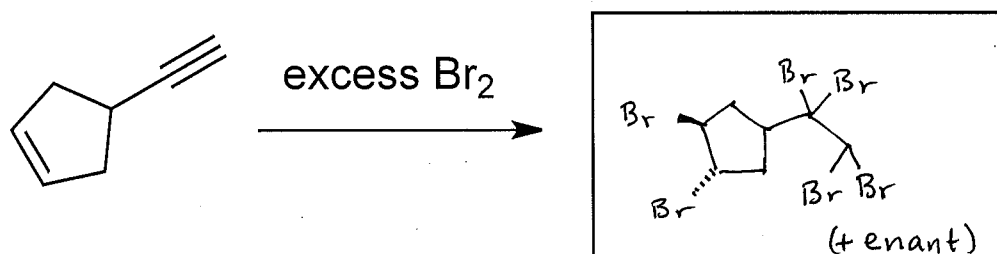
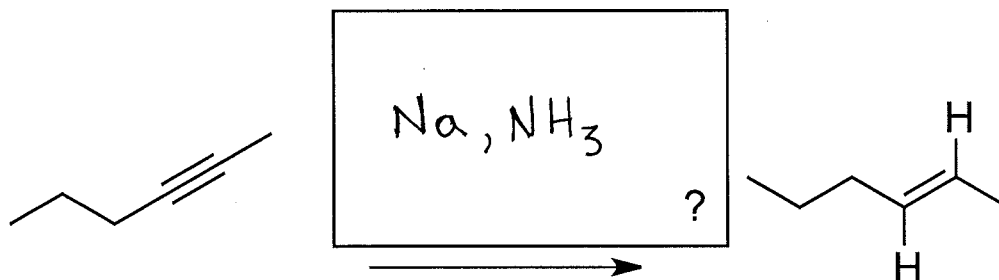
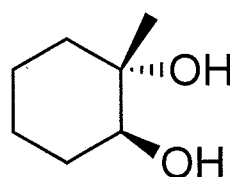
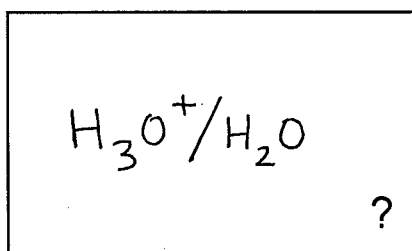
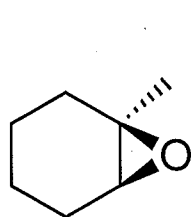
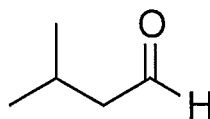
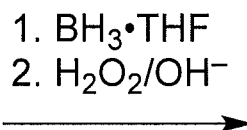
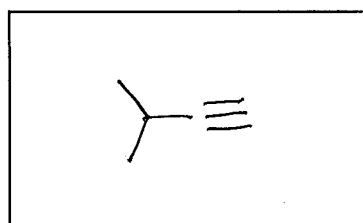


301. Please provide the missing reagent or product. All are single-step unless stated otherwise. *This problem extends over three pages. Room for work is at the bottom of each page. Only answers in boxes are graded! IT IS IMPORTANT TO DESIGNATE STEREOCHEMISTRY*

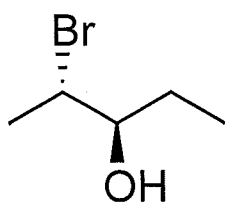
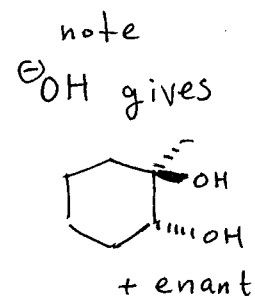


IT IS IMPORTANT TO DESIGNATE STEREOCHEMISTRY

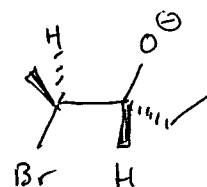
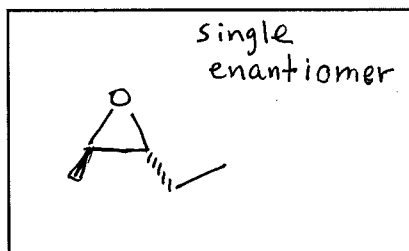
Question 1, continued.

IT IS IMPORTANT TO DESIGNATE STEREOCHEMISTRY

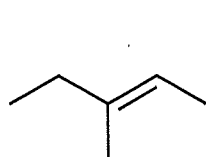
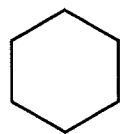
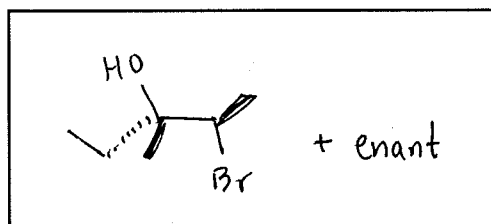
and enant.



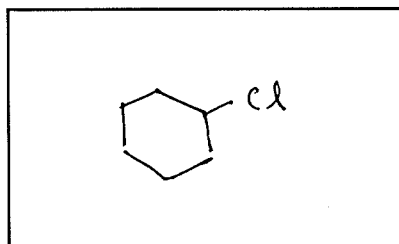
LDA



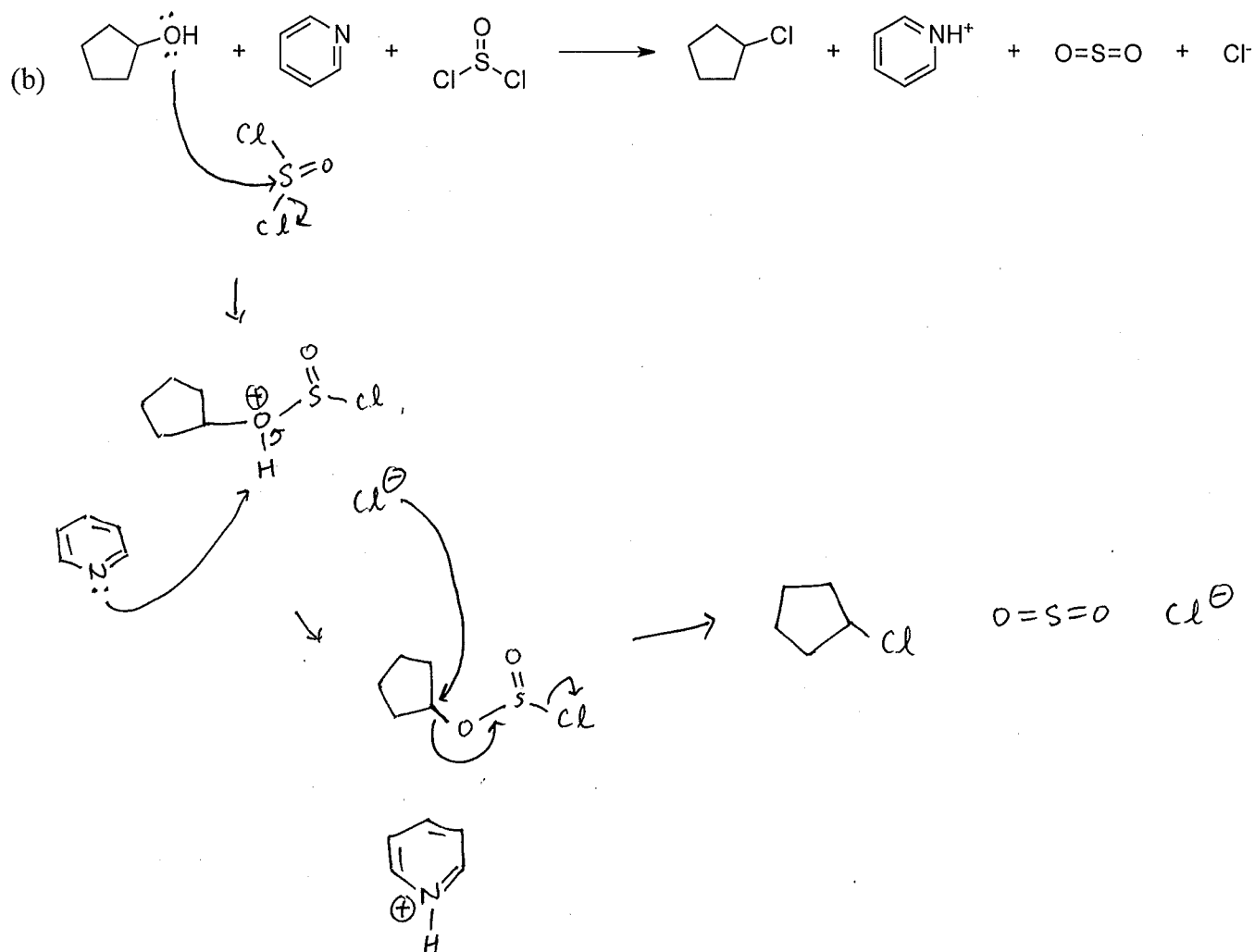
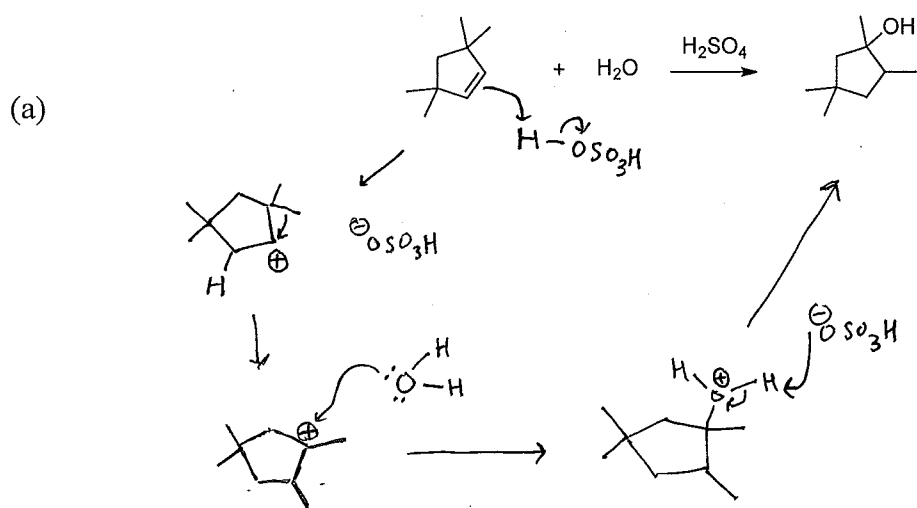
LDA = lithium diisopropylamide

 $\text{Br}_2/\text{H}_2\text{O}$ + 1 Cl_2

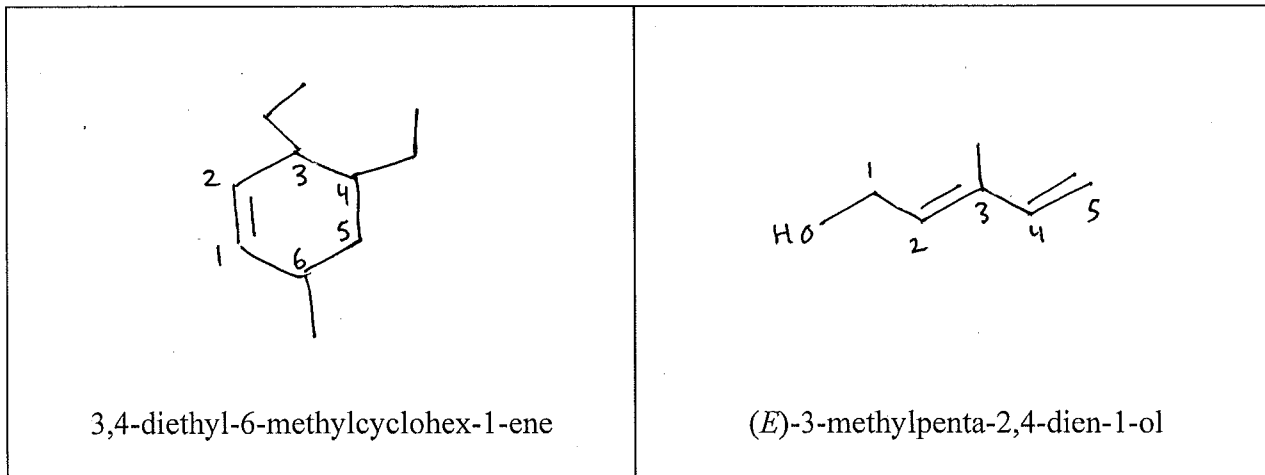
light

**IT IS IMPORTANT TO DESIGNATE STEREOCHEMISTRY**

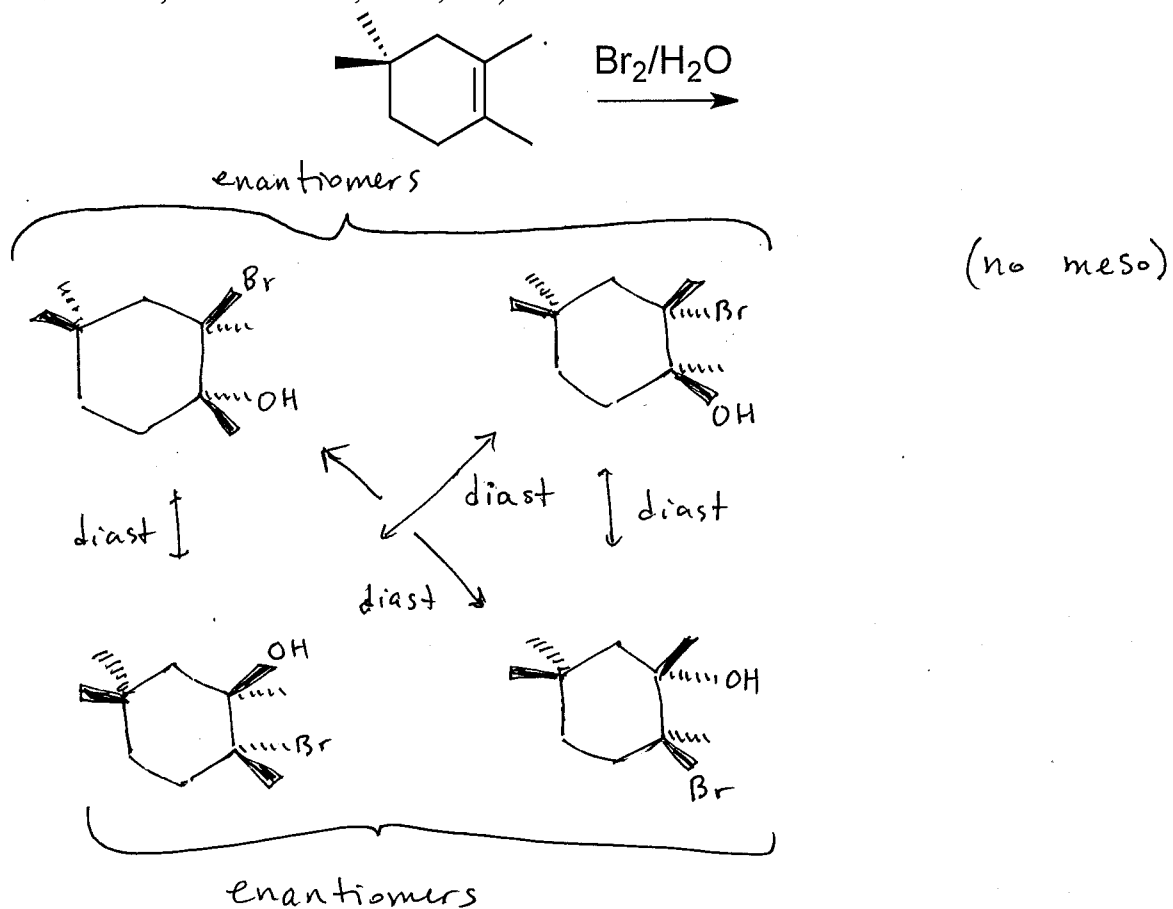
162. Please provide the step-by-step electron-pushing mechanism for:



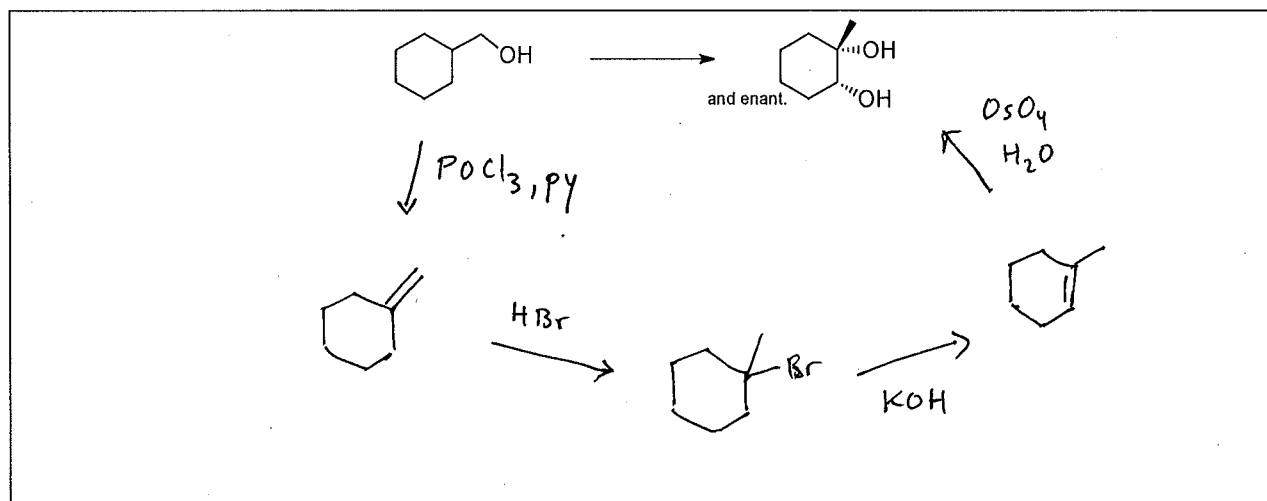
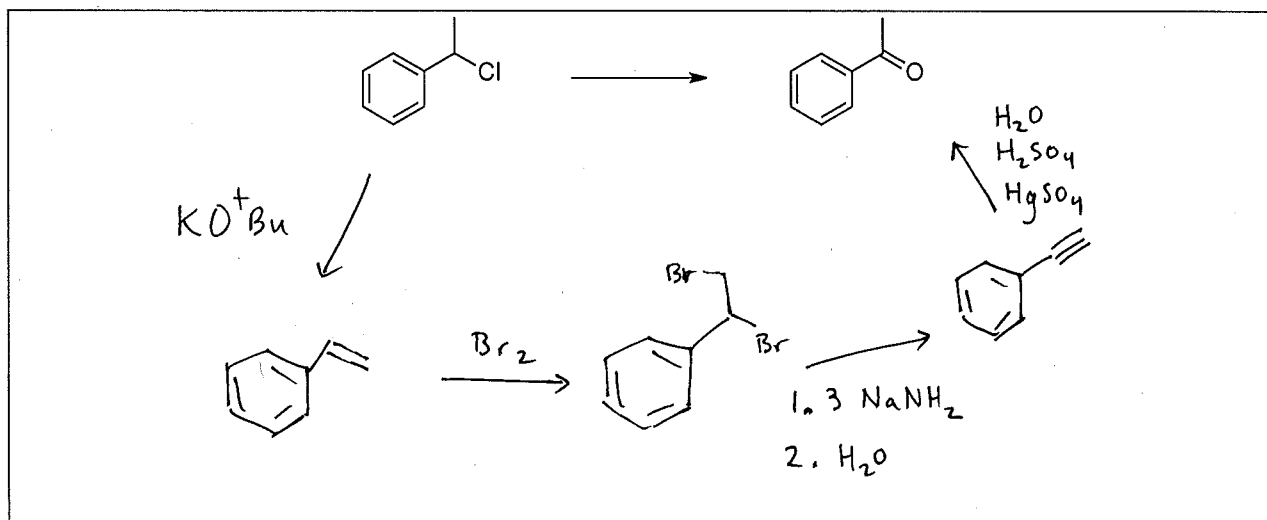
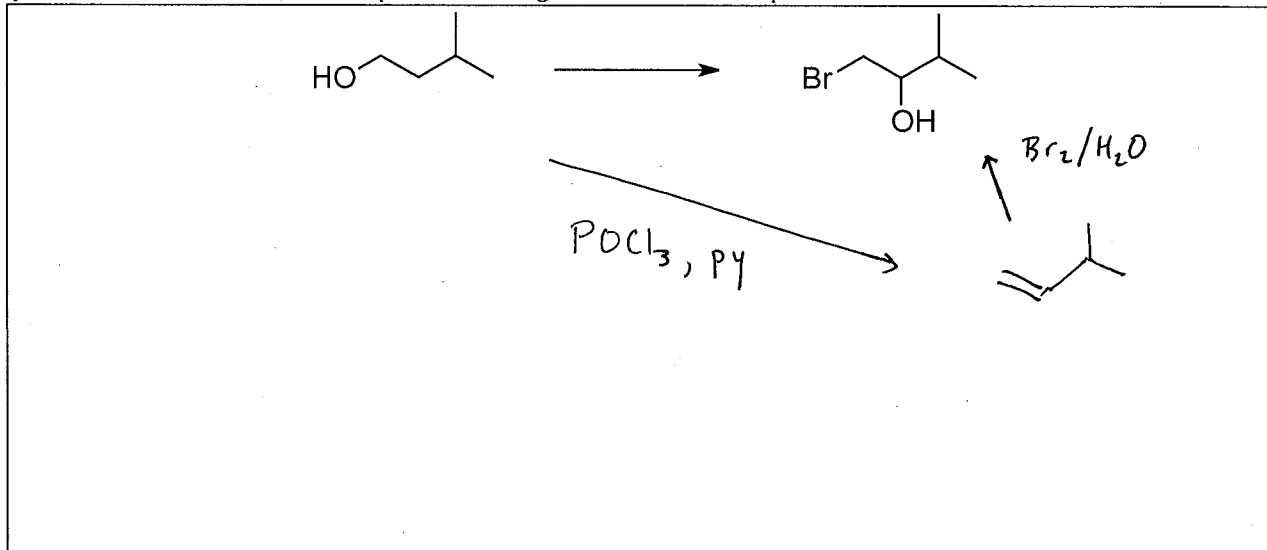
43. Please give a structure for each name shown.



104. For the reaction shown below, draw all of the products, and show relationships among all products (e.g. enantiomers, diastereomers, meso, etc.).



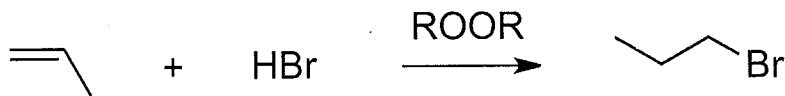
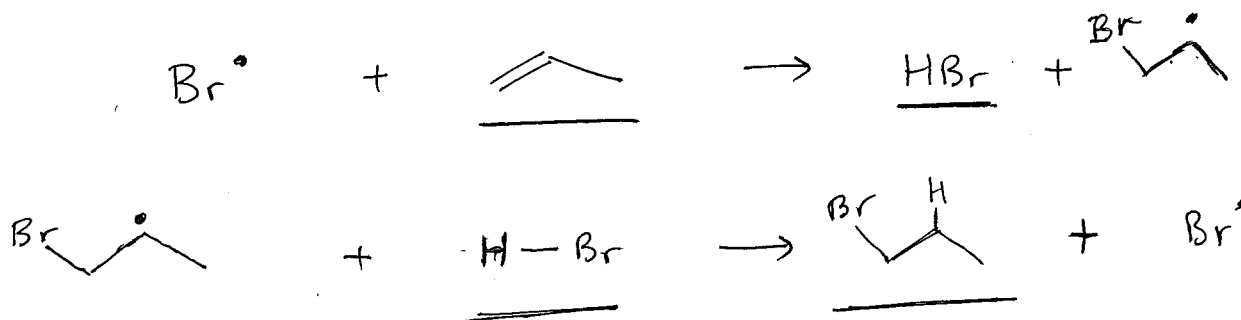
165. Outline a synthesis of the following compounds starting with the given reactant and any reagents as needed. Carbons must come from the given reactants. **CHOOSE ANY TWO (2) OF THE THREE (3) PROBLEMS.** If you designate which 2 you want graded for regular credit, AND you have not left any questions blank on the exam, the third problem will be graded for as much as 4 points of extra credit.



86. The following reaction is a radical chain that begins with the generation of the bromine radical ($\text{Br}\cdot$) by a series of two initiation steps (not shown).

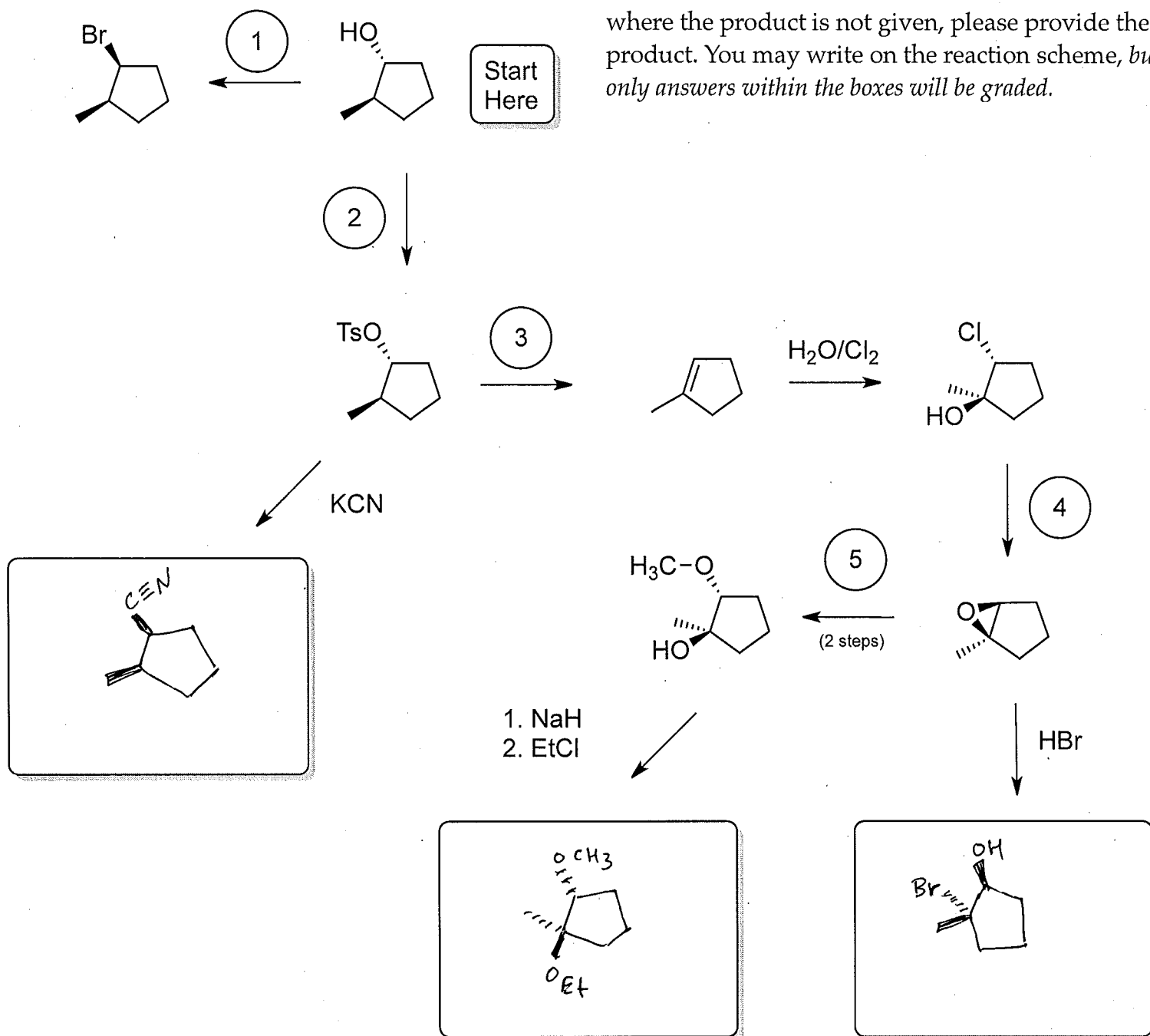
Write the propagation steps for the mechanism of the reaction. Show that the steps added together give the overall reaction.

Don't include initiation or termination steps.



167.

For the steps labeled 1 through 5, give the reagent needed for the transformation. For the reactions where the product is not given, please provide the product. You may write on the reaction scheme, *but only answers within the boxes will be graded.*

(1) PBr_3 (not HBr)(2) TsCl, py ($\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$, py)(3) OEt^- (strong base)(4) OH^- or other strong base(5) 1. CH_3O^-
2. H_2O