

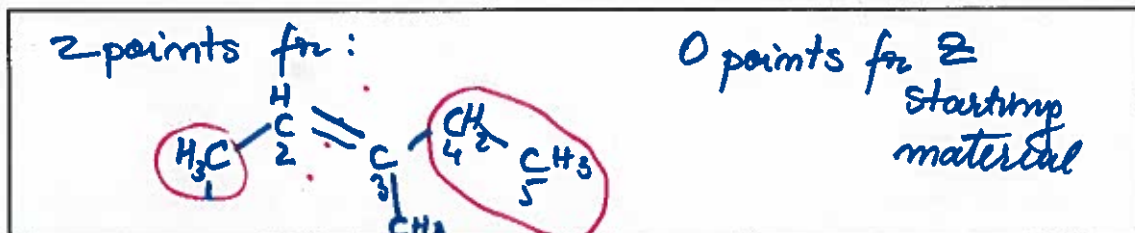


Name Key

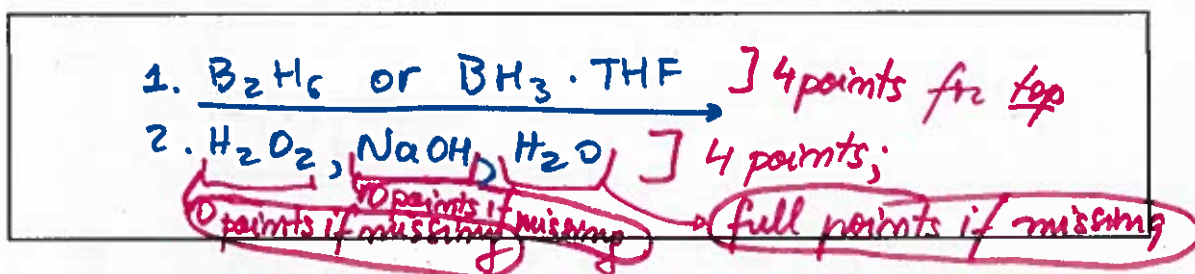
1. (20 points total)

Write the starting material, reagents and a MAJOR product for the reaction of hydroboration/oxidation of (E)-3-methyl-2-pentene. Clearly indicate whether the addition product is syn or anti and assign the absolute stereochemistry for the product drawn.

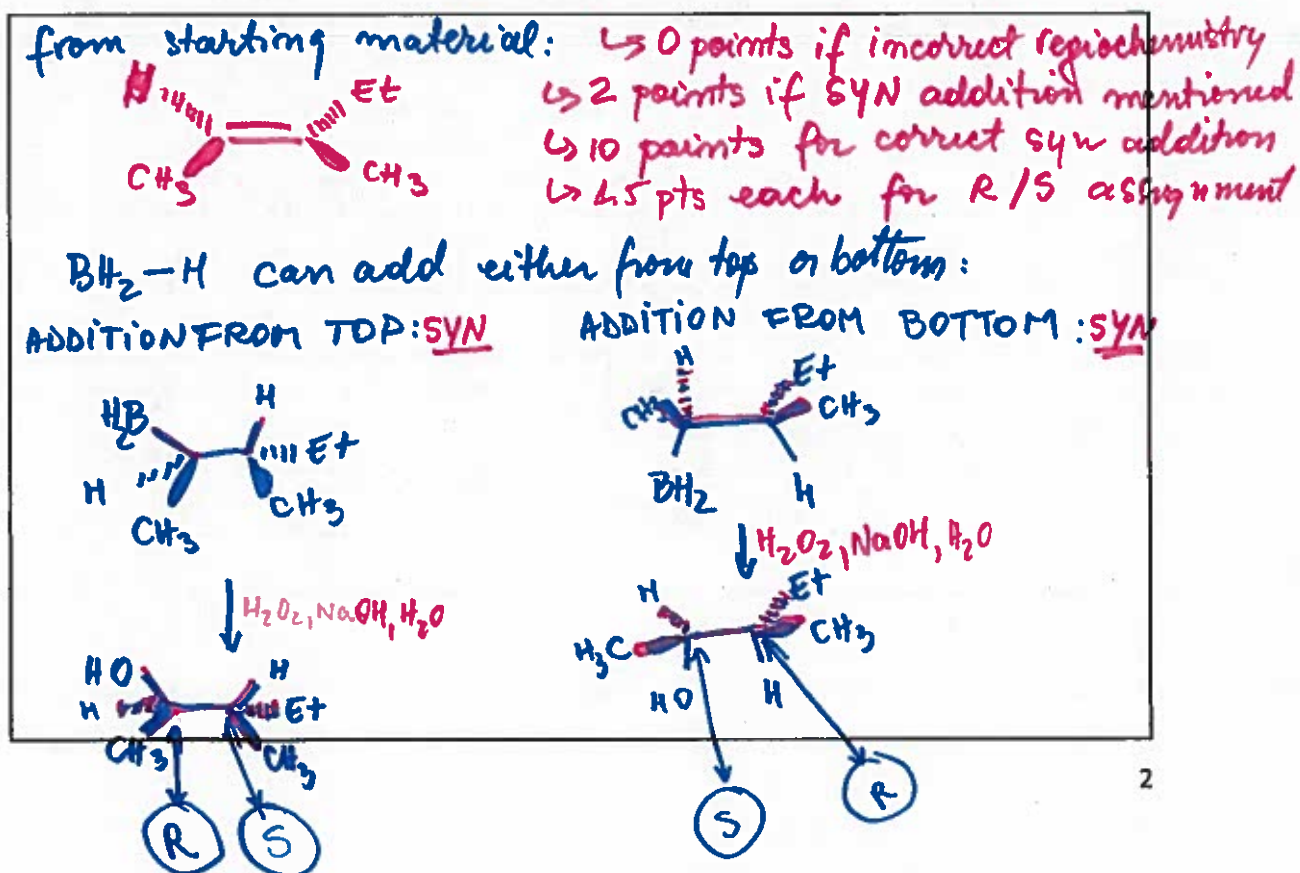
Starting Material (2 points)



Reagents (8 points)



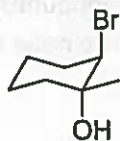
Product (15 points)



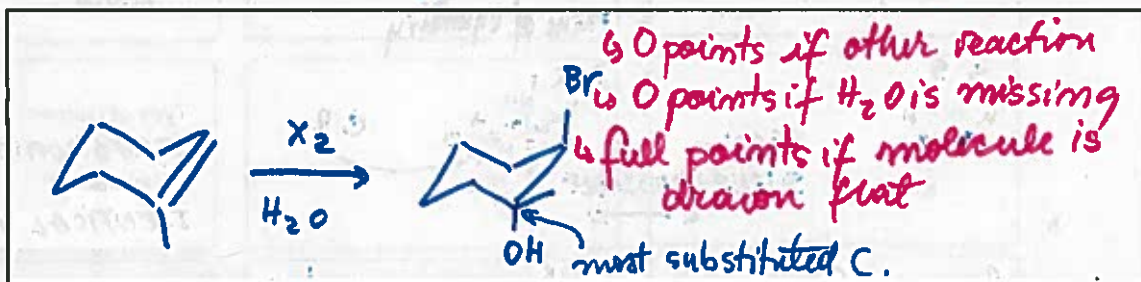
Name Key

2. (20 points total)

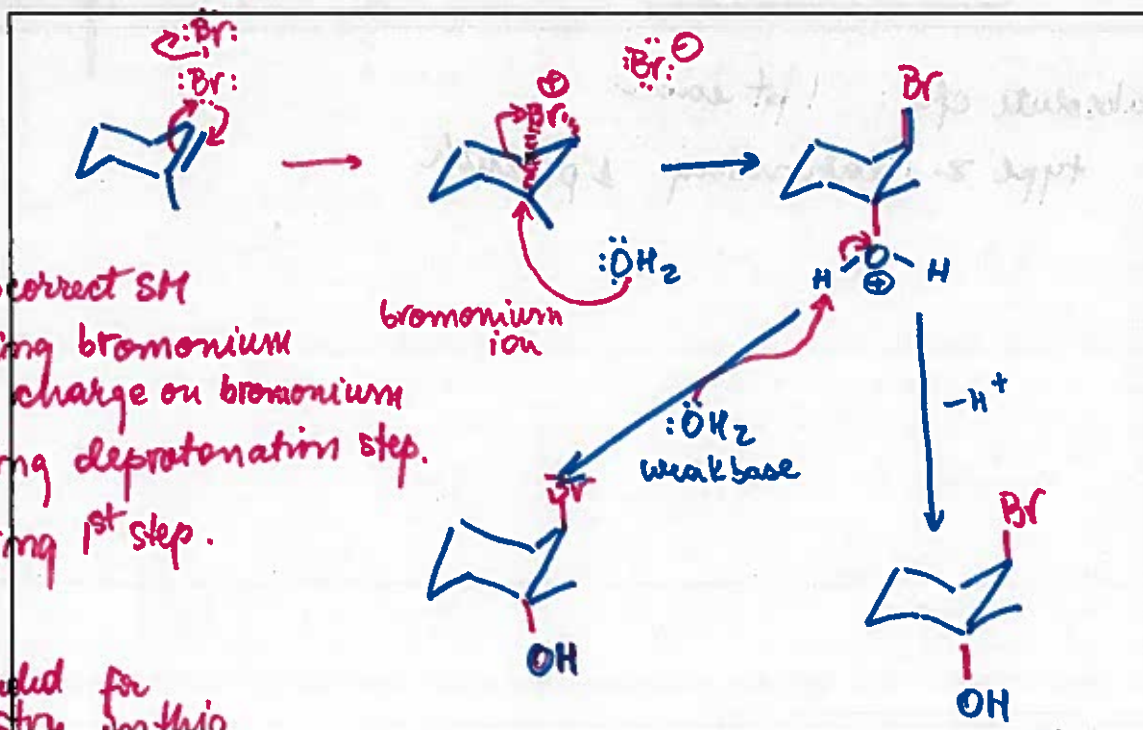
Propose a one-step synthesis for the molecule below from a molecule with the same number of carbon atoms. Please write your answers in the boxes below for steps a and b.



a. Show a summary of the reaction clearly indicating the starting materials, the reagents and reaction conditions. (5 points)



b. Show a detailed mechanism for the formation of the product shown. (15 points)



No points awarded for stereochemistry in this question.

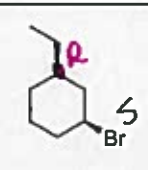
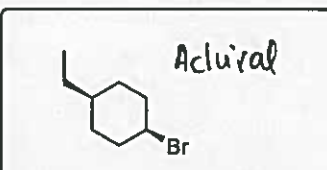
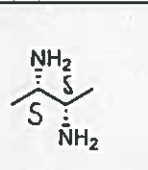
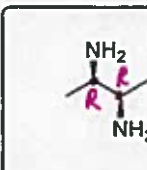
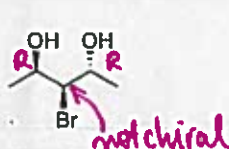
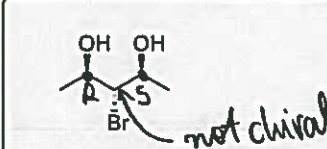
both correct; full points



Name \_\_\_\_\_

3. (20 points total)

For the structures shown below indicate the absolute configuration for each of the stereocenters (14 points) next to each of the stereocenters. In the right-hand box, clearly indicate what types of isomers they are and whether the compounds are enantiomers, diastereomers or identical where such relationship can be applied. Write none if no such relationship is applicable. (6 points).

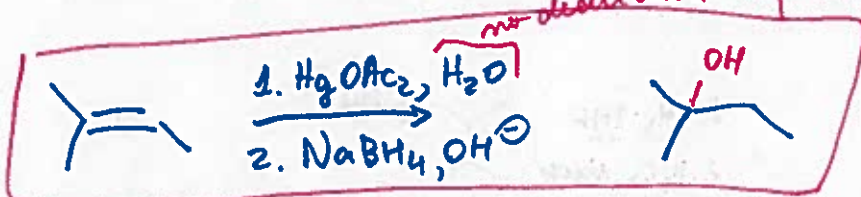
a.			<p>Type of Isomer: CONSTITUTIONAL Relationship: NONE</p>
b.			<p>Type of Isomer: STEREISOMER Relationship: ENANTIOMER</p>
c.			<p>Type of Isomer: STEREISOMER Relationship: DIASTEREOMER</p>

4. (20 points total)

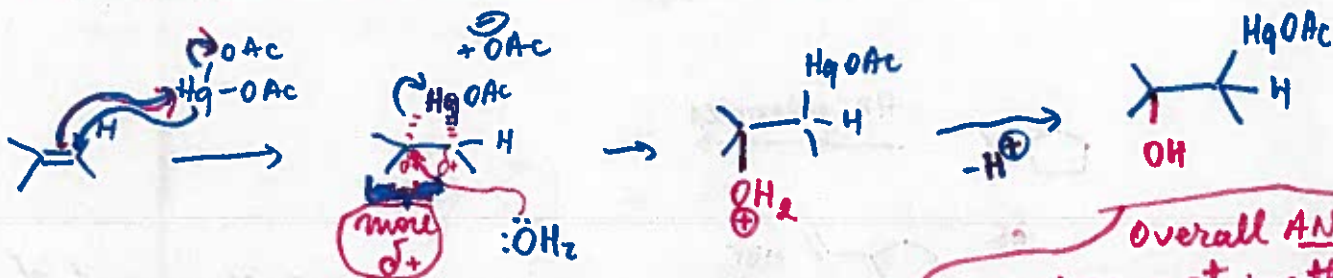
Give an example of an alkoxymercuration/reduction reaction on a trisubstituted alkene. Clearly indicate your starting material, reagents for each of the steps and products (4 points). In addition, emphasize the regio- and stereochemical outcome (syn/anti) of the addition (4 points) and provide a detailed mechanism for this reaction (no detailed mechanism required for the reduction step) (12 points).

↳ but the step must be shown

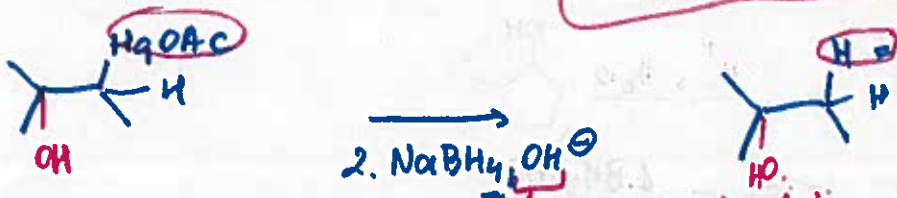
{ 1 point for wrong starting material (other than trisubstituted); 2 points for correct SM.  
2 points for reagents & products (1 each)



Step 1



Step 2

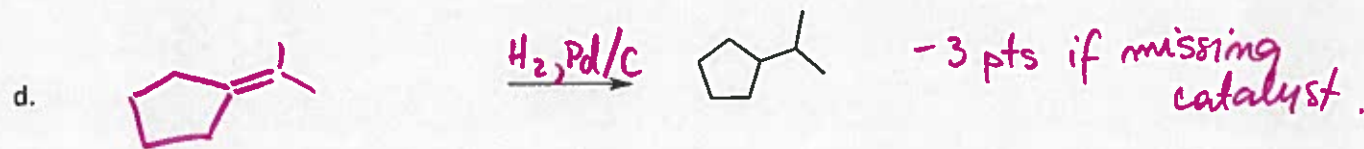
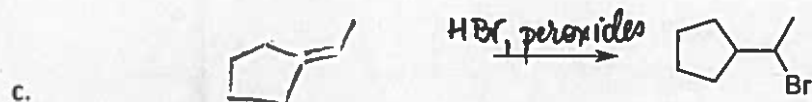
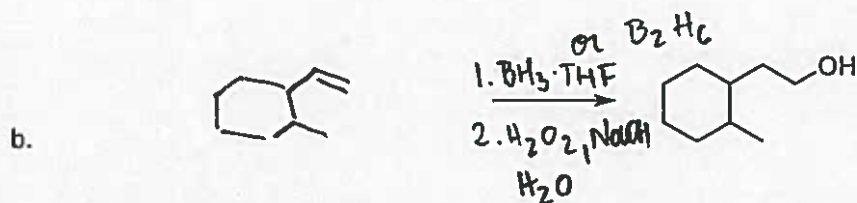
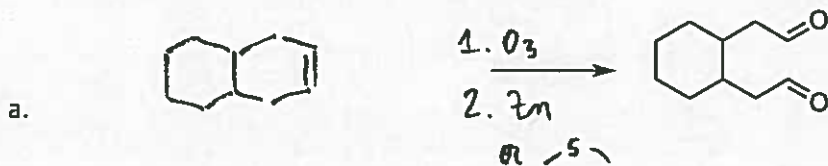


In order of priority:

- 6 points if wrong product regiochemistry
  - 4 points if no mercuronium or if no  $\oplus$  charge or if missing acetate in or if CATION on CARBON or if missing acetate in
  - 2 points if missing deprotonation step at end of step 1 or any other steps, as applicable.
- ↳ deductions may apply to incorrect arrows, incorrect bond connectivities and incorrect intermediates.

5. (20 points total, 5 points each)+ (10 points bonus question)

Using reactions covered in class, propose a synthesis for the compounds shown below. The compounds need to be major products of the reactions shown. Write your starting material before the arrow, and the other reagents above or below the arrow and explicitly indicate the various steps.



(10 points bonus question)

Propose the synthesis of the compound below using a reaction that includes a 1,2-hydride shift step:

still major product!

