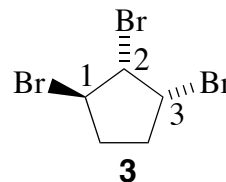
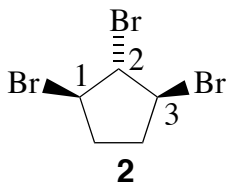
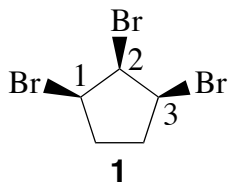


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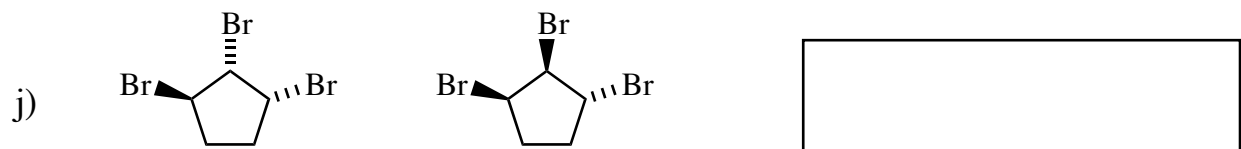
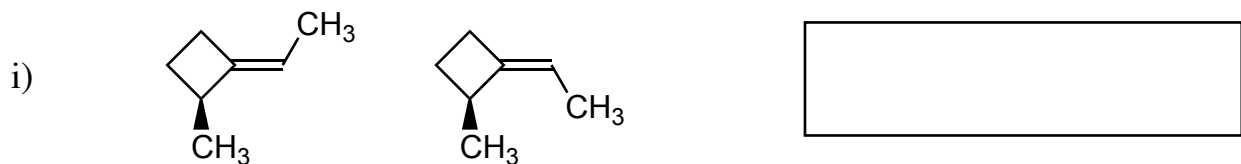
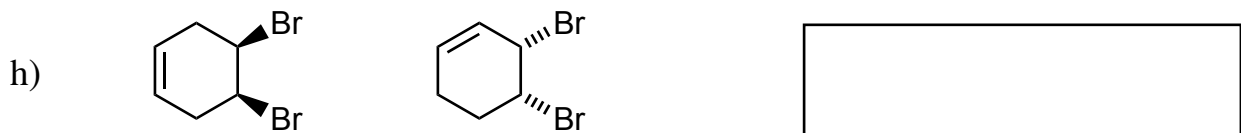
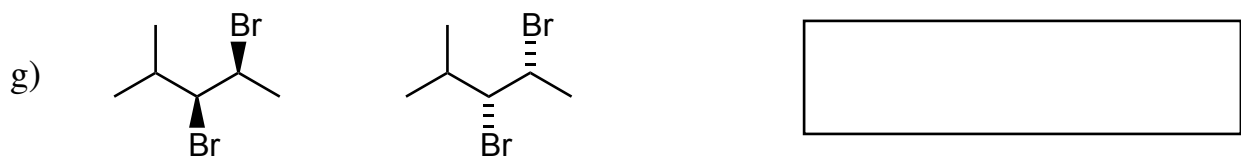
1A) (20 pts) Answer the following questions (yes or no) regarding the tribromocyclopentanes 1, 2, and 3. Please put your answers in the boxes.



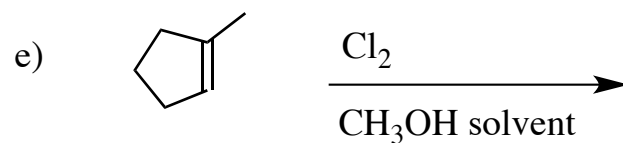
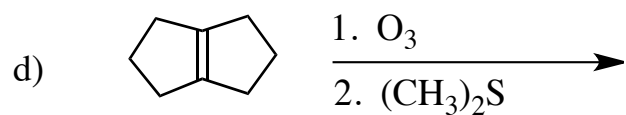
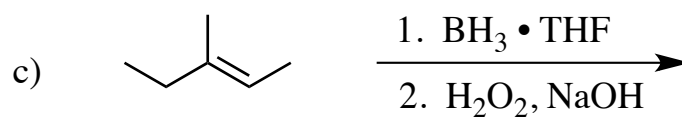
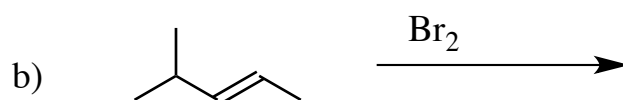
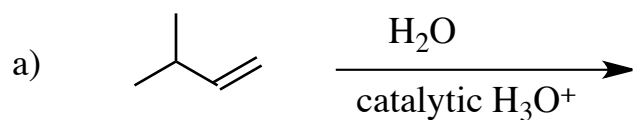
- | | | | |
|--------------------------|----------------------|--|----------------------|
| a) Is compound 1 chiral? | <input type="text"/> | d) Is C2 of compound 1 a stereocenter? | <input type="text"/> |
| b) Is compound 2 chiral? | <input type="text"/> | e) Is C2 of compound 2 a stereocenter? | <input type="text"/> |
| c) Is compound 3 chiral? | <input type="text"/> | f) Is C2 of compound 3 a stereocenter? | <input type="text"/> |

1B) Describe the relationship between each of the following pairs of structures using one of the following descriptors: homomers; constitutional isomers; enantiomers, or diastereomers.

Please put your answers in the boxes

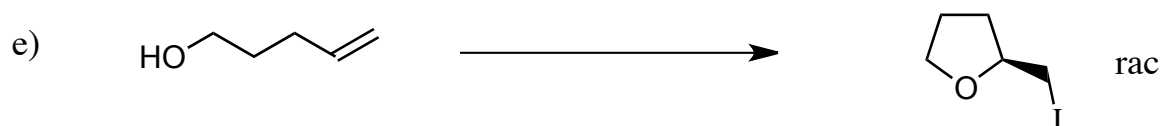
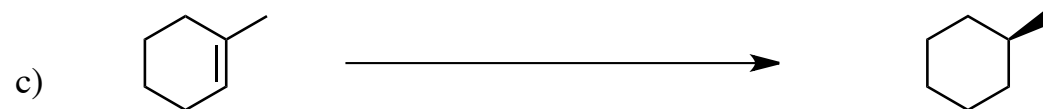
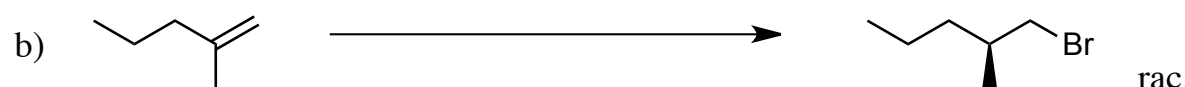
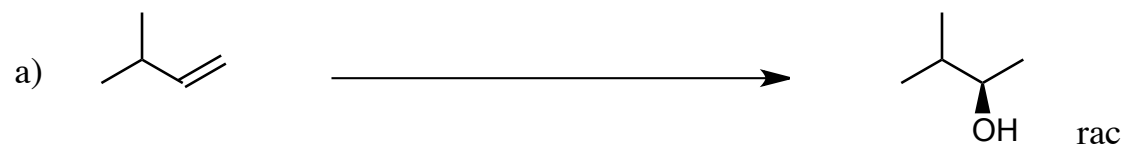


2) (20 pts) Give the single major product of each of the following reactions, carefully showing stereochemistry using wedges and dashes. If a racemate is formed, show only one enantiomer of the product, and label it "rac."



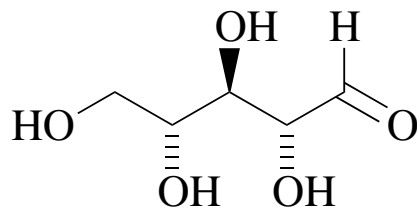
Printed Name: _____

3 (20 pts) Propose reagents for accomplishing each of the following reactions. Make your reaction efficient (i.e. the target product should be the major product). Two step reaction sequences may be required. Be careful to indicate the separate steps in the sequence.

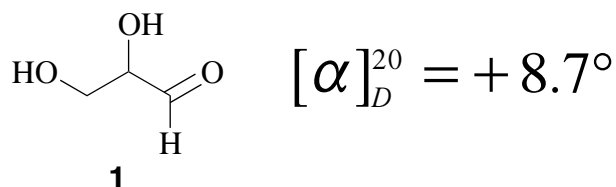


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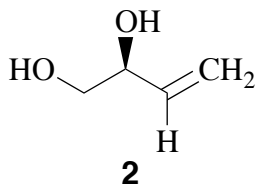
4) (20 pts) a) Ribose is the naturally occurring sugar component of RNA. The structure of natural ribose, showing the absolute configuration at all of the stereocenters, is given below. Carefully and clearly label each of the stereocenters using the R/S convention.



Glyceraldehyde (**1**) is a very important sugar. When isolated from a natural source, glyceraldehyde is optically active, with a specific rotation of $+8.7^\circ$, as indicated below.



In order to determine the absolute configuration of (+)-glyceraldehyde, you buy an enantiomerically pure sample of 3-butene 1,2-diol (**2**), which is commercially available.



b) How many stereocenters does structure **2** possess?

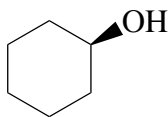
c) Indicate the absolute configuration of diol **2** using the R/S convention.

d) You perform an ozonolysis reaction on diol **2** using the Me_2S workup, and find that one of your products is optically inactive, and the other product is optically active, with a specific rotation of $+8.7^\circ$. Draw the structure of the naturally occurring glyceraldehyde showing the absolute configuration using wedges and dashes. **Label the stereocenter(s) of your structure using the R/S convention.**

Printed Name: _____

4. - continued

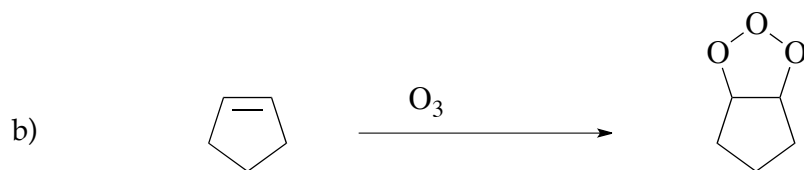
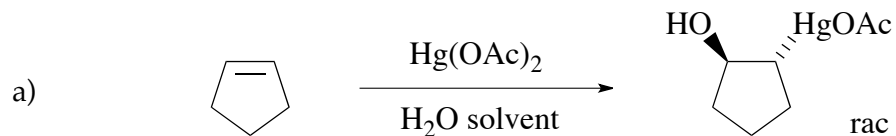
4e) Carefully draw the two perspective chair (flip-chair) conformations for cyclohexanol (**3**), **and circle the more stable conformation**. Please show all the hydrogens as well as the OH group in your drawings.



3

Printed Name: _____

5) (20 pts) Propose arrow-pushing mechanisms for each of the following transformations. Show **all** intermediates in your mechanisms, but do not show transition states. Be sure structures are complete, including all lone pairs.



5) - continued

