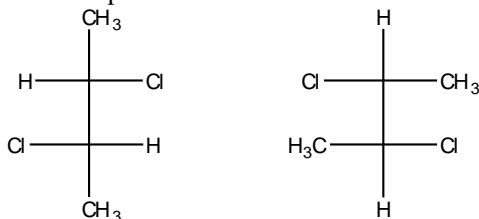
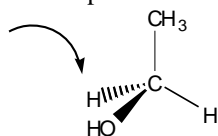


Part 1. Multiple Choice (4 points each). Choose the one best answer, and clearly mark it on the test below.

1. Which term best describes the relationship between the two structures shown?

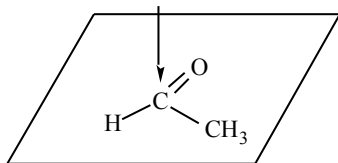


- a) constitutional isomers
b) enantiomers
c) diastereomers
d) identical, but not meso
e) meso, and identical
2. How many stereoisomers of 2,3,4-tribromohexane exist?
a) 2
b) 3
c) 4
d) 6
e) 7
f) 8
3. Consider the reaction of (E)-3-hexene with Br_2 in CH_2Cl_2 . Which statement concerning this reaction is correct?
a) The product is optically active because it possesses two chirality centers.
b) The product is optically inactive because it is a racemic mixture of enantiomers.
c) The product is optically inactive because it is meso.
d) The product is optically inactive because it does not possess any chirality centers.
e) The product is optically inactive because it is a racemic mixture of diastereomers.
f) The product is optically active because it is an unequal mixture of diastereomers.
4. How many stereoisomers of 1,2-dimethylcyclohexane exist?
a) 1
b) 2
c) 3
d) 4
e) 5
5. Give the correct stereochemical description of the indicated hydrogen in the following molecule:



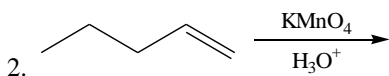
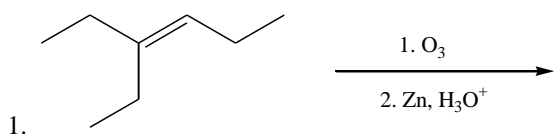
- a) R
b) S
c) re
d) si
e) pro-R
f) pro-S
g) none of these

6. Give the correct stereochemical description of the indicated face in the following molecule:

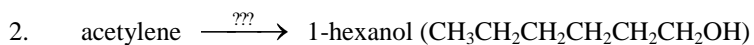
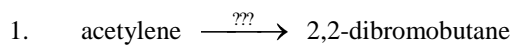


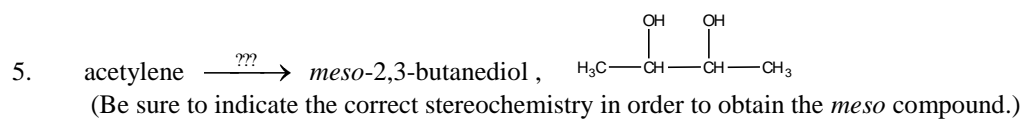
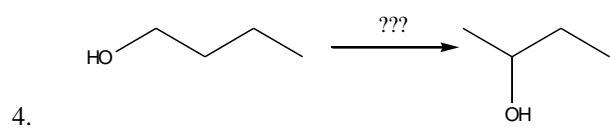
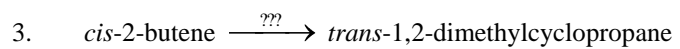
- a) R
- b) S
- c) re
- d) si
- e) pro-R
- f) pro-S
- g) none of these

Part 2. Reactions (5 points each). Draw the product or products of the reactions below.

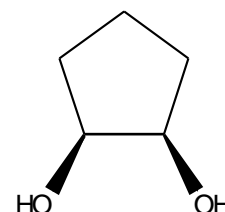
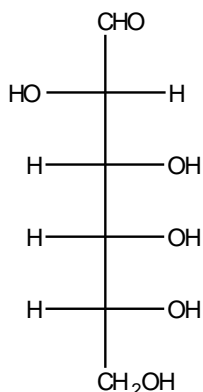
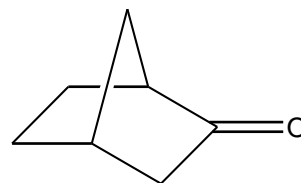
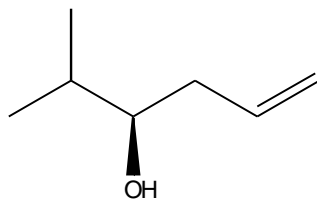
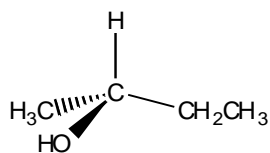


Part 3. Syntheses (6 points each). Show how the following syntheses could be performed. More than one step may be required. Show all reagents and all intermediate compounds in your synthetic scheme.

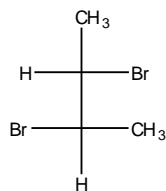




2. (12 points) Put an asterisk next to each chirality center in each structure below, and indicate the appropriate stereochemical configuration of each chirality center using R and S.



3. (2 points) Write the complete IUPAC name for the compound below.



4. (2 points) Draw the Fischer Projection of (2R,3S)-2-bromo-3-chloropentane.

5. (2 points) Draw a three dimensional structure, using dashes and wedges, of (S)-2-bromobutane.

6. (6 points) Compound **A**, C_7H_{12} , is optically active. On catalytic hydrogenation over a palladium catalyst, it absorbs two equivalents of hydrogen to form Compound **B**, C_7H_{16} , which is also optically active. When Compound **A** is treated with potassium permanganate in an acidic solution, then the products are acetic acid and Compound **C**, $C_5H_{10}O_2$, which is an optically active carboxylic acid. Draw the structures of compounds **A**, **B**, and **C**.