

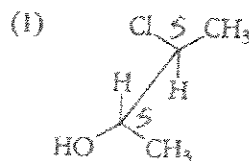
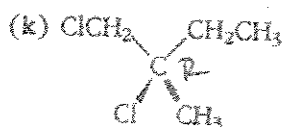
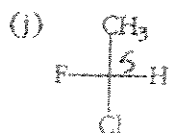
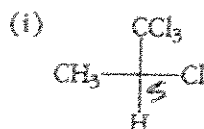
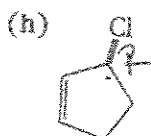
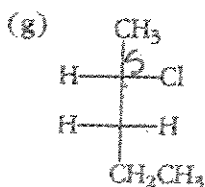
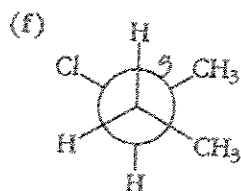
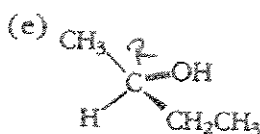
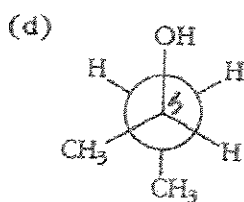
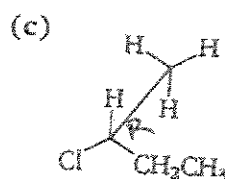
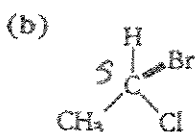
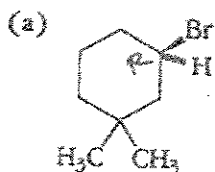
Answer Key  
(+6 to raw  
score)

This take-home test will be weighed as an additional test. Therefore, there will be a total of six examinations during the semester. The fourth exam is on November 17<sup>th</sup>. Check the class syllabus for information on chapters and the date of the fifth exam.

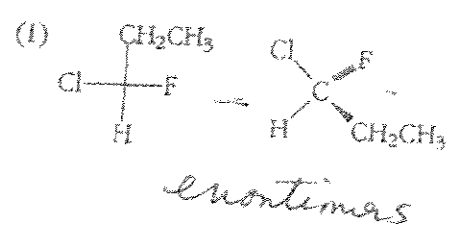
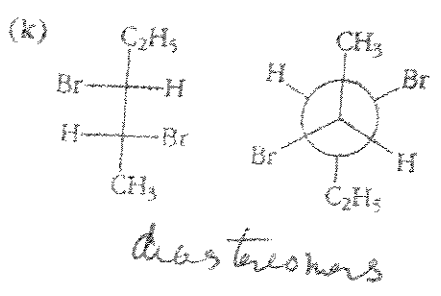
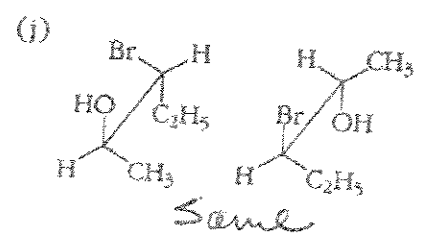
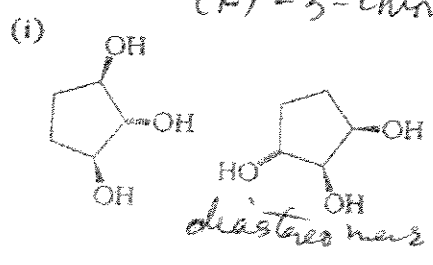
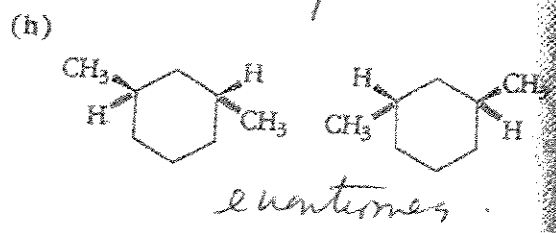
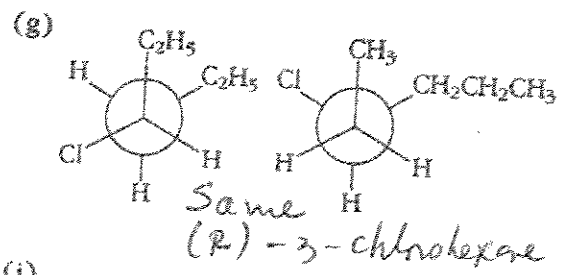
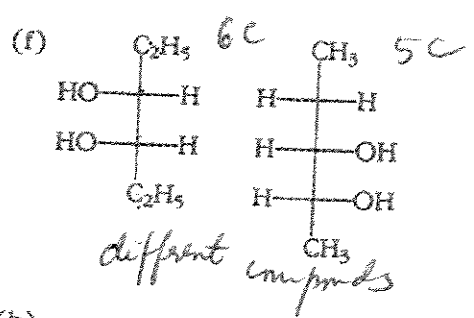
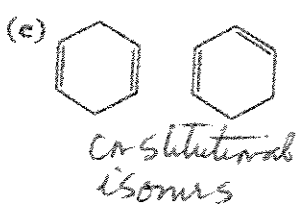
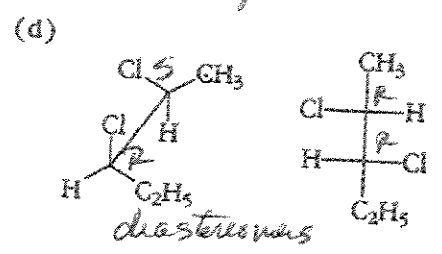
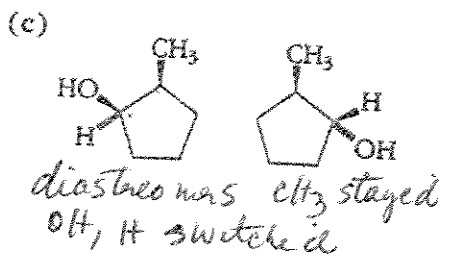
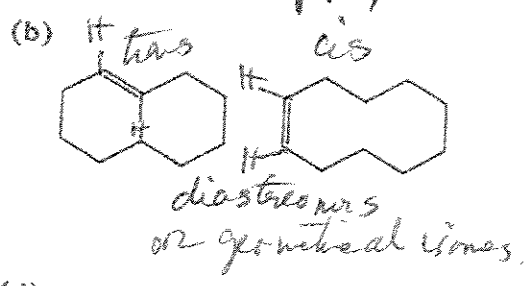
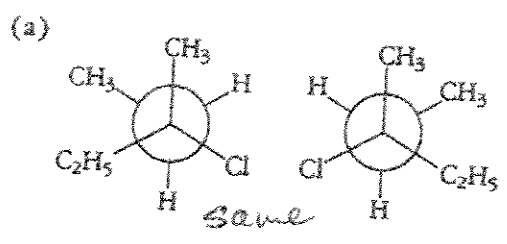
Chapter 9 take-home exam is due on Wednesday November 12<sup>th</sup> at 9:45 am.

1. Label each chiral center as either *R* or *S* in the following structures:

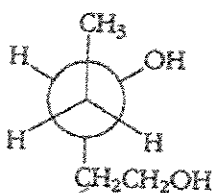
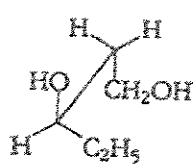
(12 pts)



2 Describe the relationship between each pair of structural formulas as that of constitutional isomers, enantiomers, two drawings of the same compound (although perhaps in different conformations), diastereomers, or completely different compounds that are not isomers. (20 pts)

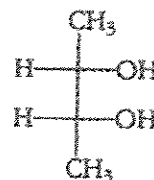
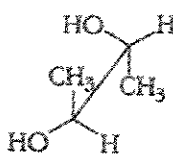


(m)



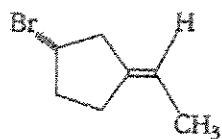
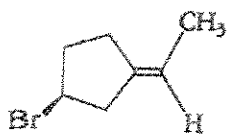
Same (2,1,3-pentenediol)

(n)



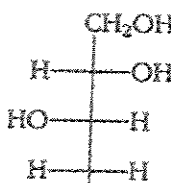
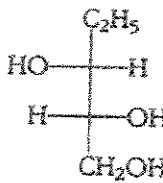
diastereomers

(o)



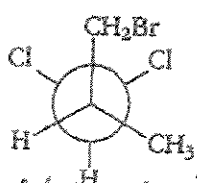
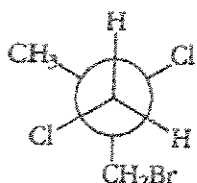
Same

(p)



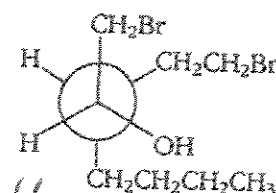
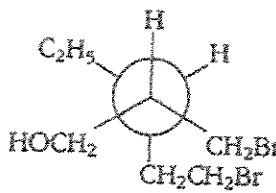
enantiomers

(q)



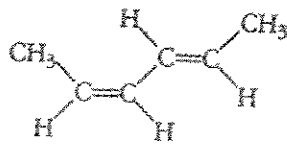
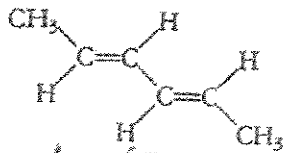
conformational isomers

(r)



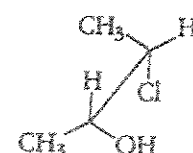
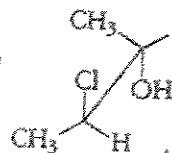
different compounds

(s)



diastereomers

(t)



diastereomers

3. Monochlorination of (*S*)-1-chloro-2,5-dimethylhexane would yield a variety of dichloro products ( $C_8H_{16}Cl_2$ ), which could be separated by distillation. (5pts)

(a) Draw the reactant. Show all stereochemistry.

(b) Draw the products of the reaction. Show all stereochemistry.

(c) Label all chiral centers in your drawings as *R* or *S*.

(d) Name each product.

(e) For each product you draw, state clearly: (1) whether or not the molecule is chiral; and (2) whether or not the product would be obtained in optically active form.

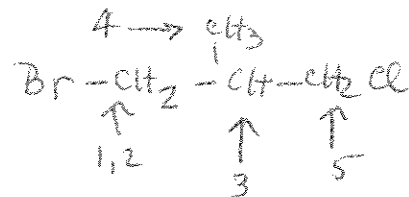
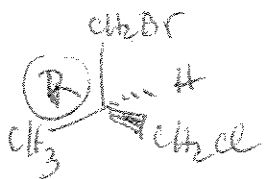
4. Answer Problem 6.3 for the chlorination of (*R*)-1-bromo-3-chloro-2-methylpropane to yield  $C_4H_7BrCl_2$  isomers. (5pts)

5. Answer Problem 6.3 for the chlorination of (*S*)-1-chloro-2,4,4,6-tetramethylheptane to yield  $C_{11}H_{22}Cl_2$  isomers. (5pts)

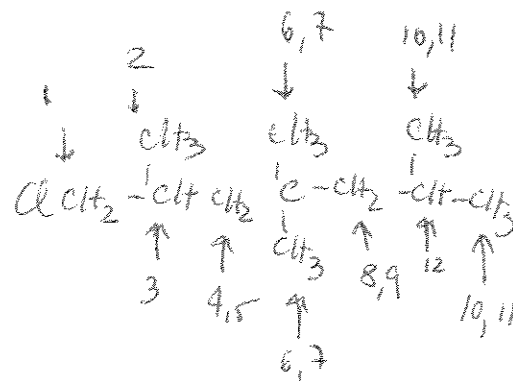
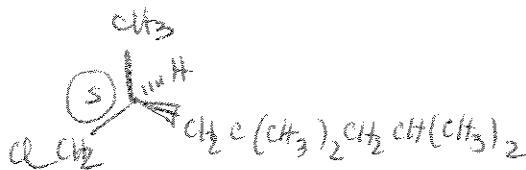
6. Explain why it is not possible to assign the configuration of a carbon atom as either *R* or *S* if the carbon atom is not chiral. (1pt)



# 4 (R)-1-bromo-3-chloro-2-methylpropane



# 5 (S)-1-chloro-2,4,4,6-tetramethylheptane



# 6 When 2 substituents are the same, priorities cannot be assigned so there is no directivity required to determine S, or R configuration