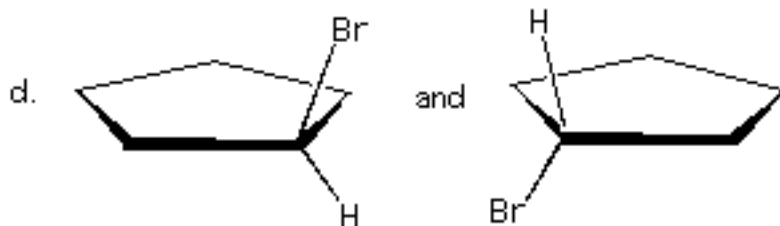
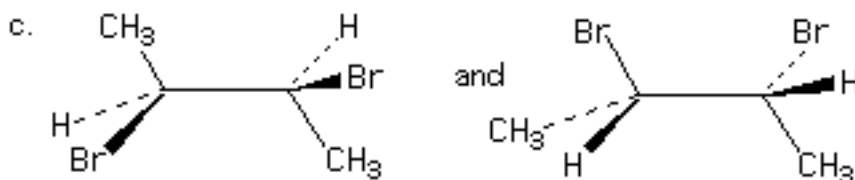
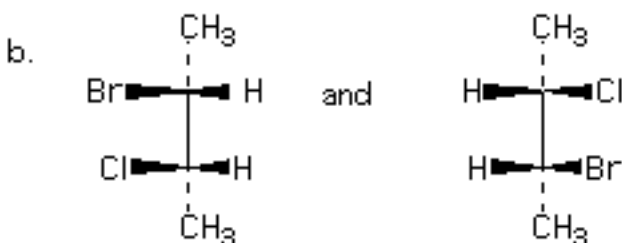
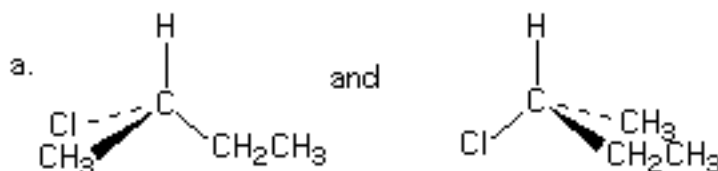


1. Draw the structures and give the names of 7 alkenes with the formula $C_3H_4Cl_2$ (21%)

2. Draw the structures and give the names of 3 cyclopropanes with the formula $C_3H_4Cl_2$. Do not include enantiomers. (9%)

3. In the following pairs of compounds, indicate if they are enantiomers, diastereomers or identical. Name each R or S when possible. (20%)



4. There are 4 possible 3,4-dibromoheptanes. Draw them in 3 dimensions, name them using the R and S convention, and indicate the relationship between each (enantiomeric or diastereomeric). (12%)

5. 1-Bromo-2-chloroethane can exist in 3 stable conformers two of which are enantiomers.

- Draw Newman projections of all three conformers
 - Indicate which two conformers are enantiomers.
 - Indicate which conformer is the most stable and **briefly** explain why
- (14%)

6. a. Draw three dimensional structures of the two stable conformers of chlorocyclohexane.

b. Indicate which conformer is more stable and **briefly** explain why.

c. Are either or both of these conformers chiral? If so, indicate which are chiral.

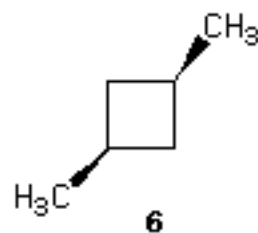
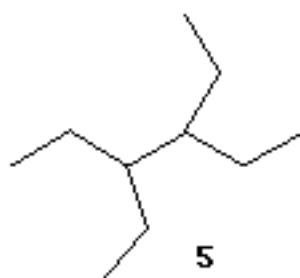
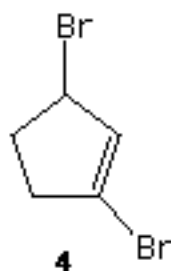
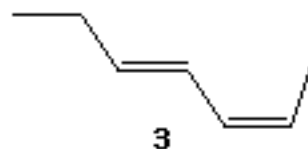
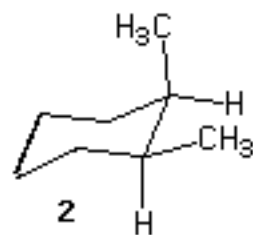
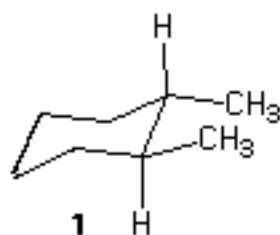
(12%)

7. For the compounds shown below:

a. Name them (for compounds **1** and **2** use either R and S or cis and trans)

b. Indicate how many signals each compound would show in the carbon-13 NMR.

(12%)



Do not write below this line

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Total minus _____

Grade

Name _____