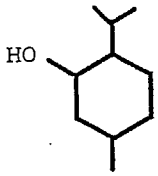
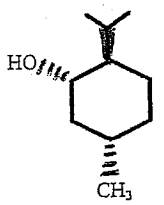
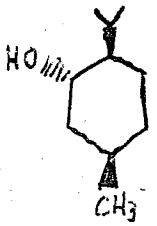
1) There are four cis, trans isomers of 2-isopropyl-5-methylcyclohexanol. One of them is menthol, which is shown below in (a)



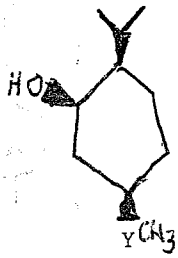
a) Using planar hexagon representatation for the cyclohexane ring and wedges/dashed lines for the sustitu draw structural formulas for the other cis, trans isomers of 2-isopropyl-5-methylcyclohexanol.

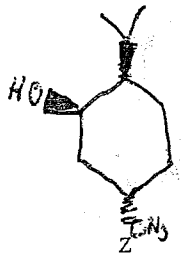


MENTHOL

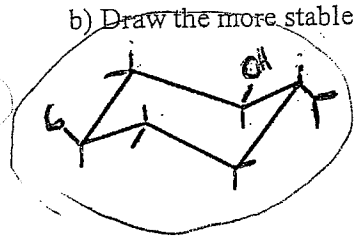


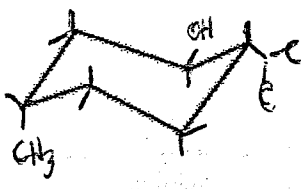
X

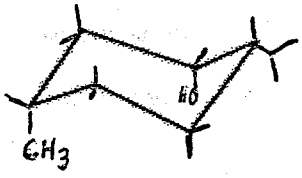


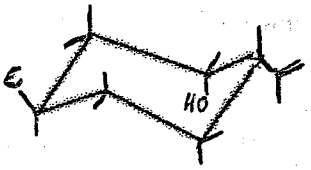


b) ~~Draw the more~~ stable chair conformer for each of your answers in part (a)





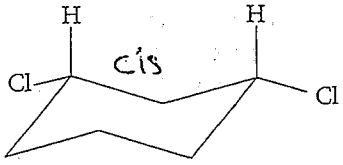


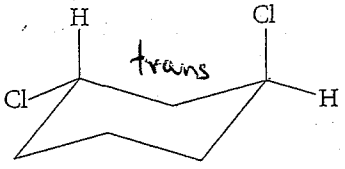


c) Circle the chair representation of the one isomer that is the most stable.

2) Name the following *cis–trans* pairs:

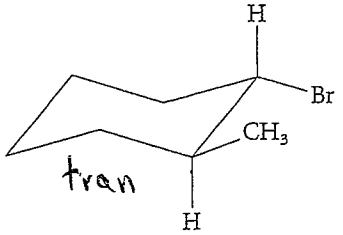
a.

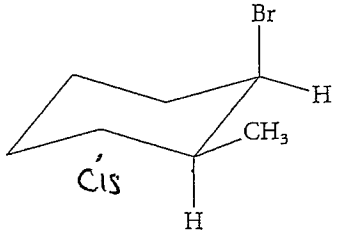




1,3-dichlorocyclohexane

b.

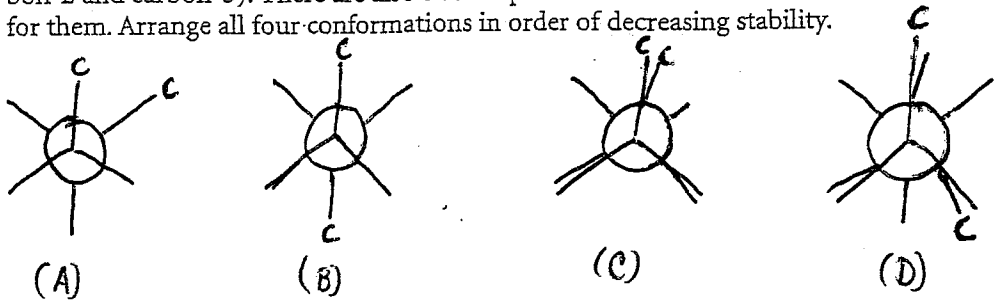




1-bromo-2-methylcyclohexane

C-C-C-C

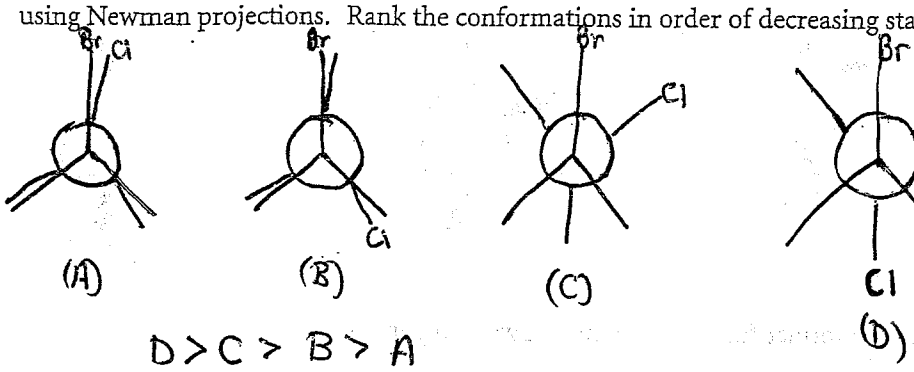
(3) DRAW THE two staggered conformations of butane (looking end-on down the bond between carbon-2 and carbon-3). There are also two eclipsed conformations around this bond. Draw Newman projections for them. Arrange all four conformations in order of decreasing stability.



B > A > D > C

(4) Draw all possible staggered and eclipsed conformations of 1-bromo-2-chloroethane using Newman projections. Rank the conformations in order of decreasing stability.

Br-C-C-Cl

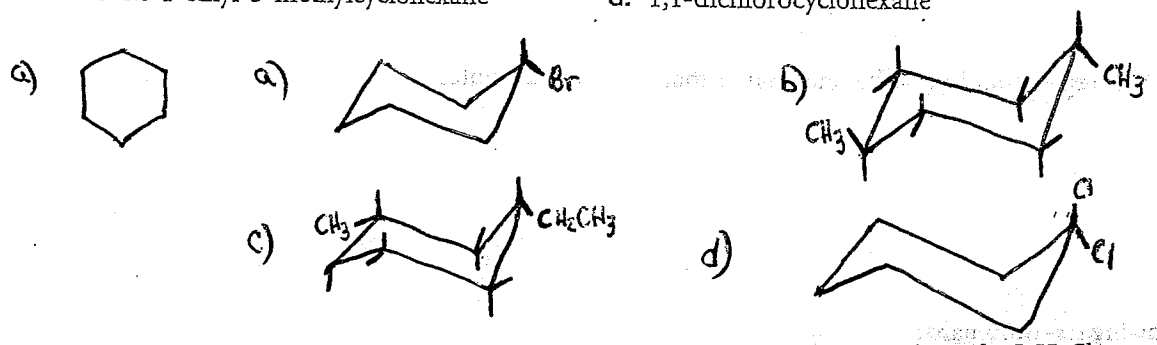


D > C > B > A

Conformations of Cycloalkanes; *Cis–Trans* Isomerism

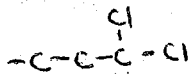
(5) Draw the formula for the preferred conformation of

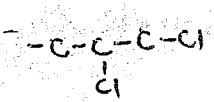
a. bromocyclohexane
b. *trans*-1,4-dimethylcyclohexane
c. *cis*-1-ethyl-3-methylcyclohexane
d. 1,1-dichlorocyclohexane

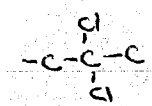


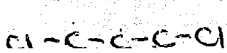
(6) From the dichlorination of propane, four isomeric products with the formula $C_3H_6Cl_2$ were isolated and designated A, B, C, and D. Each was separated and further chlorinated to give one or more trichloropropanes, $C_3H_5Cl_3$. A and B gave three trichloro compounds, C gave one, and D gave two. Deduce the structures of C and D. One of the products from A was identical to the product from C. Deduce structures for A and B. (*Hint:* Start by drawing the structures of all four dichlorinated propane isomers.)

trichloro

B  3

A  3

C  1

D  2

$CH_3CH_2CH_3 + Cl_2 \rightarrow C_3H_6Cl_2$

4 isomers

C_3H_8 = alkane and Cl has 1 bond like H, so no pts of unsatr. on structure