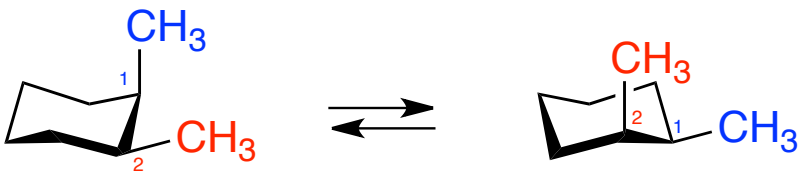
## CHAPTER 4: CYCLOALKANES (continued)

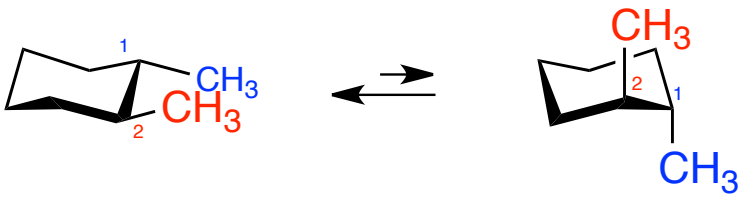
The first structure, shown below, is *cis*-1,2-dimethylcyclohexane and the structure beneath it is the *trans*-isomer. On the four structures, draw the hydrogens on carbons 1 and 2. Don't forget, these are tetrahedral carbons - do not draw 90° angles. Calculate the total strain energy for each molecule.

Strain Energy: _____ kJ/mol




Strain Energy: _____ kJ/mol

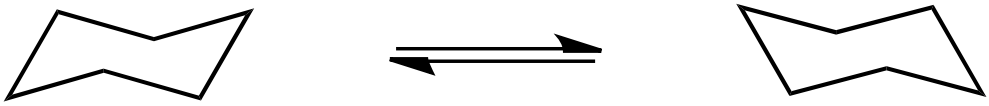
Strain Energy: _____ kJ/mol



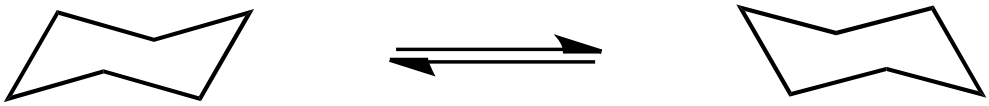

Strain Energy: _____ kJ/mol

On the blank chairs drawn for you below (and on next page), draw the chair conformations for the *cis* and *trans* isomers of 1,3-dimethylcyclohexane and 1,4-dimethylcyclohexane. Then calculate the total strain energy for each conformation. As before, when you draw a methyl (or any other) substituent, please also draw the hydrogen that is attached to that carbon. This helps me out when I'm trying to decide if you've drawn something axial or equatorial.

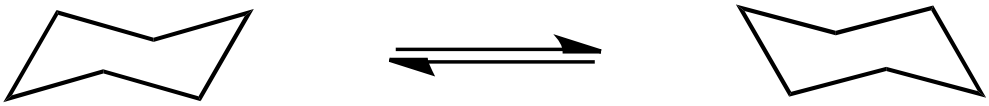
*cis*-1,3-dimethylcyclohexane



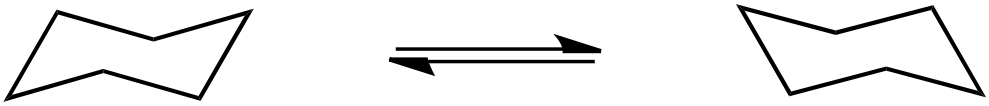
*trans*-1,3-dimethylcyclohexane



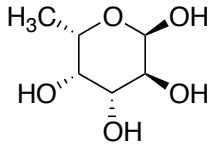
*cis*-1,4-dimethylcyclohexane



*trans*-1,4-dimethylcyclohexane

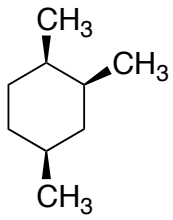


L-Fucose is a sugar component of the determinants of the A, B, O blood group typing. Draw the two chair conformations of L-Fucose and identify which is most stable:




L-Fucose

Draw the most stable chair conformation of 1,2,4-trimethylcyclohexane and calculate the difference in energy between each of the two chair-flip conformers.




1,2,4-trimethylcyclohexane

| Interaction | Energy (kJ/mol) |
|---|---|
| Me-Me gauche | 3.8 |
| Me-H 1,3-diaxial | 3.8 |
| Me-Me 1,3-diaxial | 11.4 |