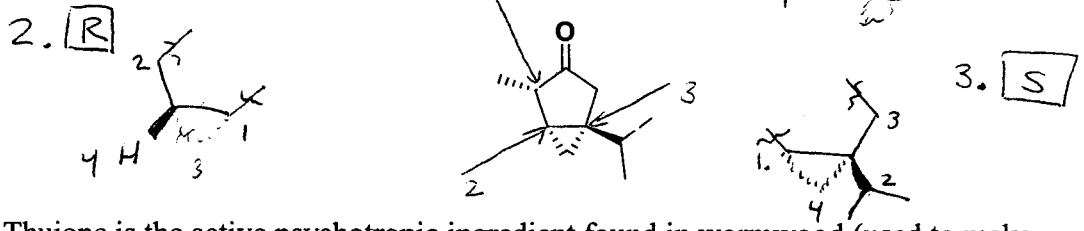
KEY

Chem 30A- Week 4

Warm-up Exercise (5 min.)

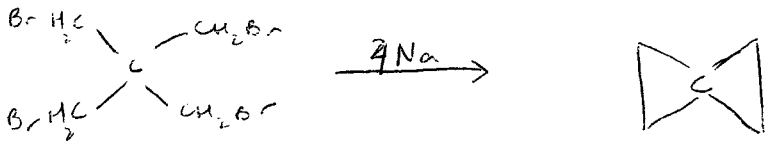


Thujone is the active psychotropic ingredient found in wormwood (used to make absinthe).

How many chiral centers 3
Provide priorities to each substituent on each chiral center
Draw the enantiomer
Draw a diastereomer

Class Exercise

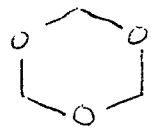
1. Cyclopropane was first prepared by reaction of 1,3-dibromopropane with sodium metal. If that is true- what would you predict was the product of 1,3-dibromo-2,2 -(bromomethyl) propane with sodium metal?



What is the geometry of the product? Draw the structure in three dimensions.

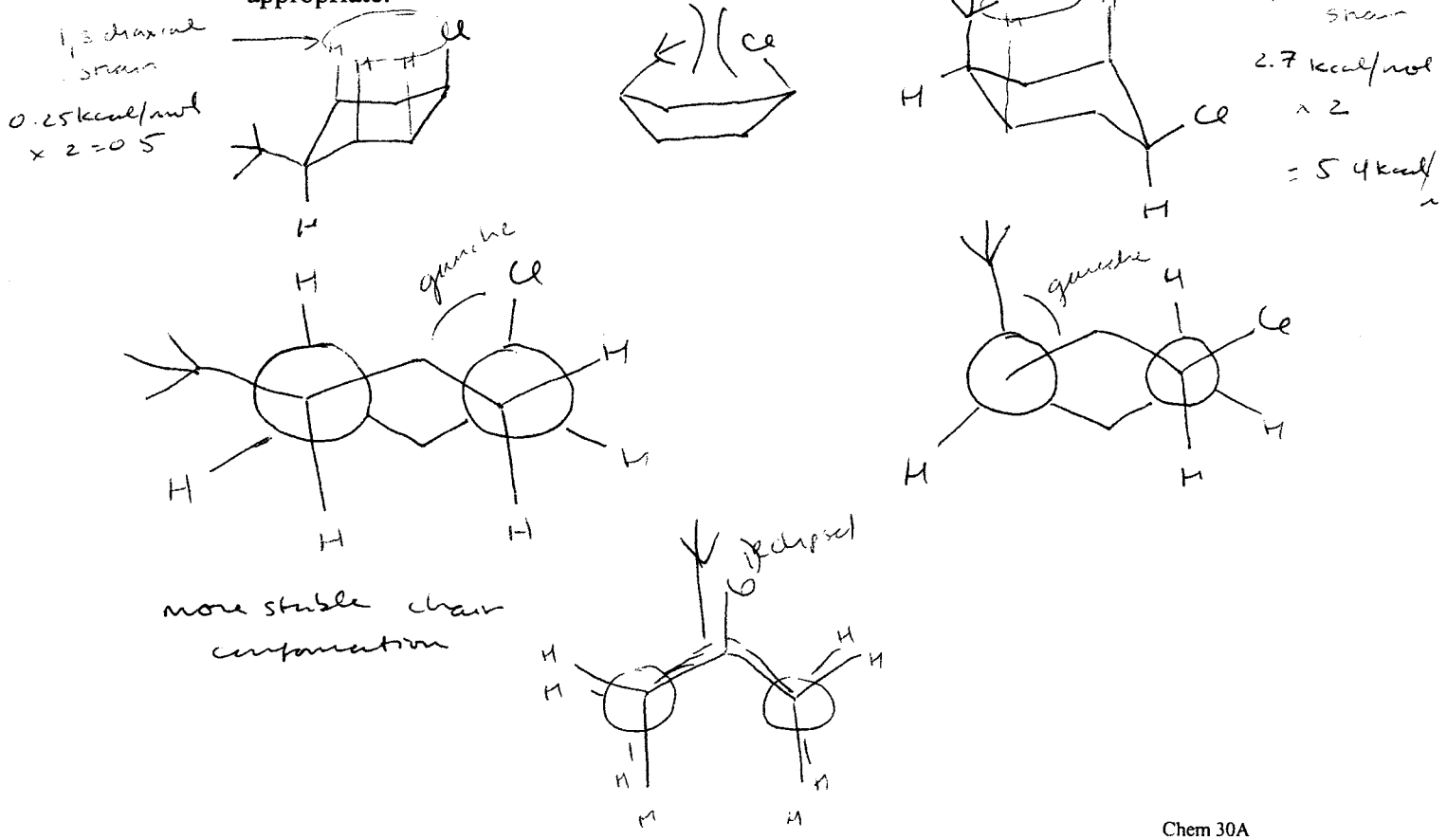
2 rings are perpendicular to try to keep the geometry of the central carbon as close to tetrahedral as possible

2. Formaldehyde, $H_2C{=}O$, is a common chemicals used as a preservative in biology. When pure, formaldehyde trimerizes to give trioxane, $C_3H_6O_3$. Trioxane, surprisingly enough, has no carbonyl groups. Only one monobromo derivative of trioxane is possible (bromonation reactions are when bromine replaces a hydrogen in the molecule). Propose a structure that fits these data.

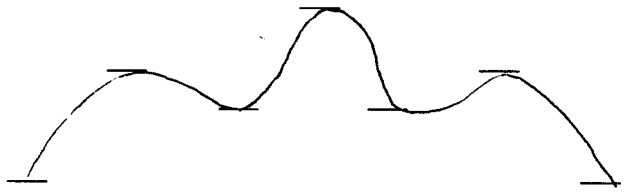
Trioxane 

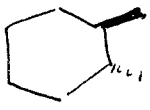
Because only one monobromo derivative is possible, we know that there can only be one type of hydrogen in trioxane.

3. Draw the ring flip for the possible chair conformations for cis-1-*tert*-butyl-4-chlorocyclohexane (show both chairs and a boat conformation). Which is more stable? Why? Draw the Newman projections. Label interactions as gauche, syn-periplanar, anti-periplanar, eclipsed, staggered , 1,3-diaxial strain where appropriate.

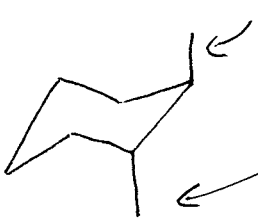


4. The energy diagram below describes which of the following molecules: trans-1,2- dimethylcyclohexane or 1,2-dichloroethane. Support your answer.





trans -1,2 - dimethylcyclohexane

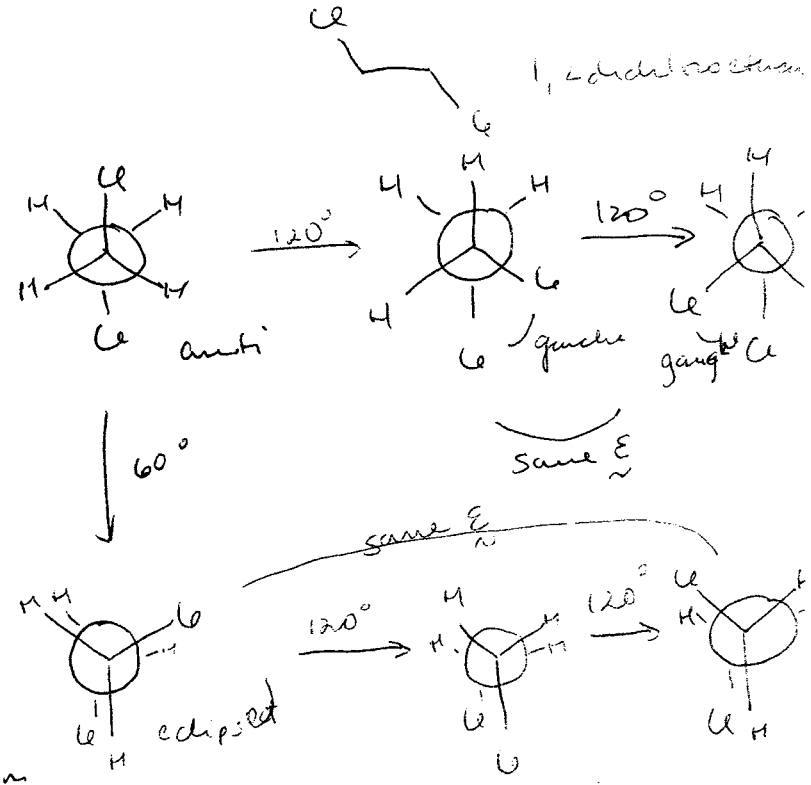


there is 1,3 diaxial strain and gauche interactions w/ these axial groups

ring flip

no 1,3 diaxial strain - but there is a gauche interaction btwn the methyls - you may have to redraw it to see them.

more stable chair - both methyls are equitorial



∴ the two "most stable" conformations - i.e. the 2 chairs do not have equal stability, and would be at different energy levels - so can not be represented in the above energy diagram.

represented by the energy diagram above.