تفريغ المحاضرة السادسة

دكتور جلال زهرة

نور سلامة

(2-8): CONFORMATIONS OF ALKANES

A sample of molecule like ethane, for example, can have an infinite number of shapes as a consequence of *rotating* one carbon atom and its attached hydrogen with respect to the other carbon atom (fixed atom). These arrangements are called *conformations*.

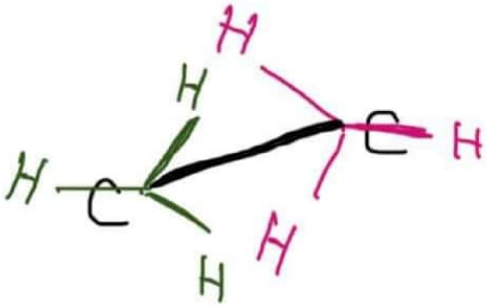
NOTE: different shapes of the same molecule that are interconvertible by rotation around a single bond are called CONFORMERS OR ROTAMERS.

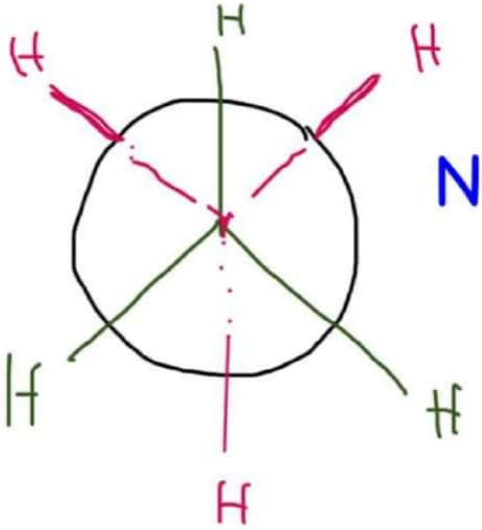
NOTE: conformers are STEREOIMERS , isomers with the same atom connectivity but different spatial arrangements of atoms.

=there are two common conformations

(1) STAGGERED

For ethane: each C-H bond in one carbon bisects an H-C-H on the other carbon.

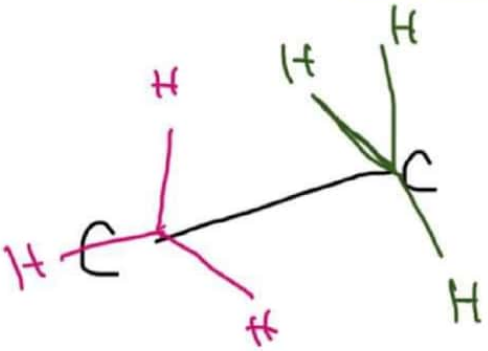


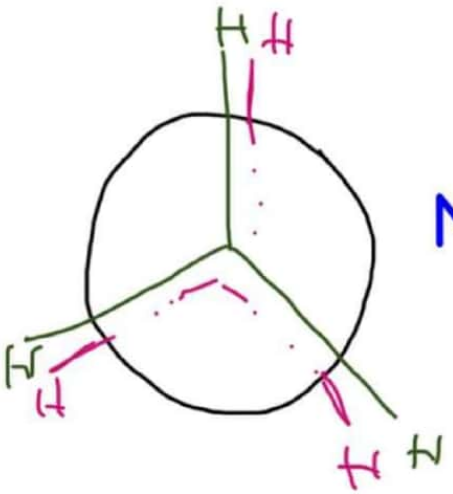


Newman

(2) ECLIPSED

For ethane: C-H bons on the front and back carbons are aligned.





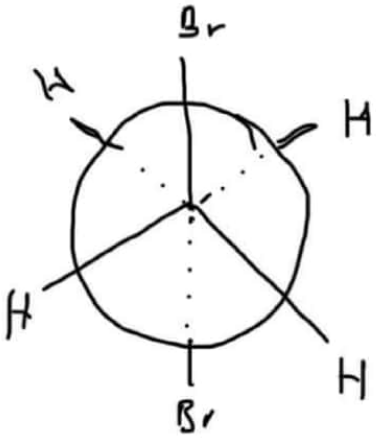
Newman

****Both shapes are not equally stable. The staggered is the most stable (low potential energy), while the eclipsed is the least stable (high potential energy).

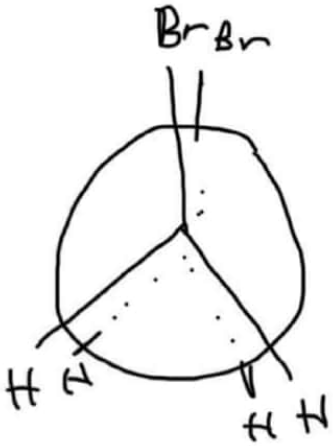
draw the most and the least stable conformers for 1,2-dibromoethane

9-2 حل

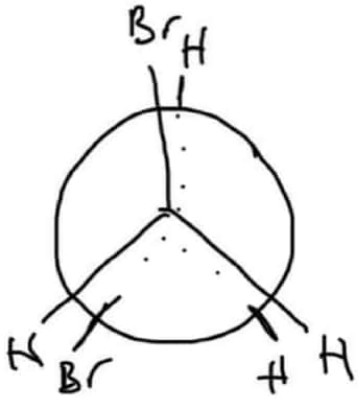
Page(85)



the most stable conformer



the least stable conformer



the most stable(eclipsed)conformer

NOTES:

(1) by rotating one carbon 60 degree with respect to the other, we can interconvert staggered and eclipsed conformations.

(2) such rotation about single bond occurs easily.

(3) there is enough energy available at room temperature for the staggered and eclipsed conformers of ethane to interconvert rapidly.

(4) the most important thing to remember about conformers is that they are just different forms of a single molecule that can be interconvert by rotational motion about single(sigma) bonds.