

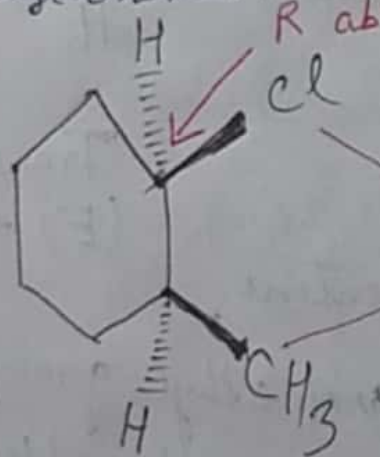
M.Sc. Sem. I.  
Organic Chemistry.

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CC - III

Relative Configuration  
and Absolute Configuration.

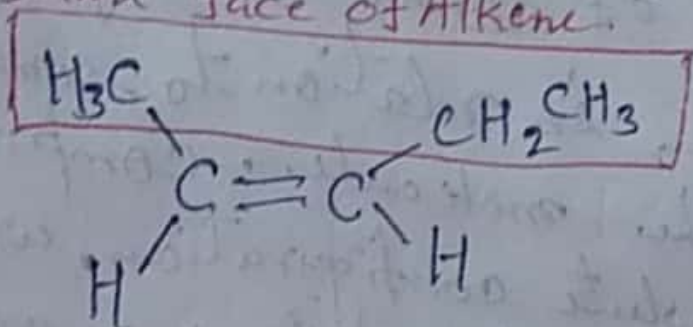
Relative Configuration: The position of atoms or groups in space in relation to something else in the molecule. Compare with absolute configuration, which is independent of atoms or groups elsewhere in the molecule.



Relative to the position of the methyl group, the chlorine atom is on the same face of the cyclohexane ring.

The stereocenter bearing the chlorine atom has an R absolute configuration (does not involve or depend on positions elsewhere in the molecule.) Hence this molecule is *Cis*-1-chloro-2-methylcyclohexane.

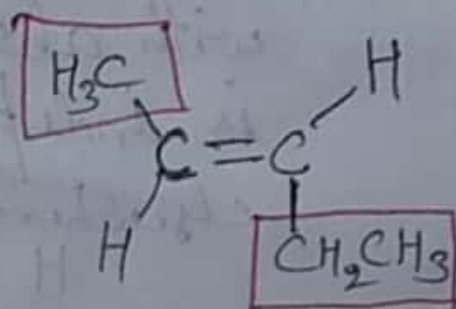
Same face of Alkene.



*Cis*-2-pentene

(*Z*)-2-pentene

Opposite face of Alkene.



*Trans*-2-pentene

(*E*)-2-pentene

In *cis*-2-pentene,

the methyl and ethyl groups are on the same side of the alkene.

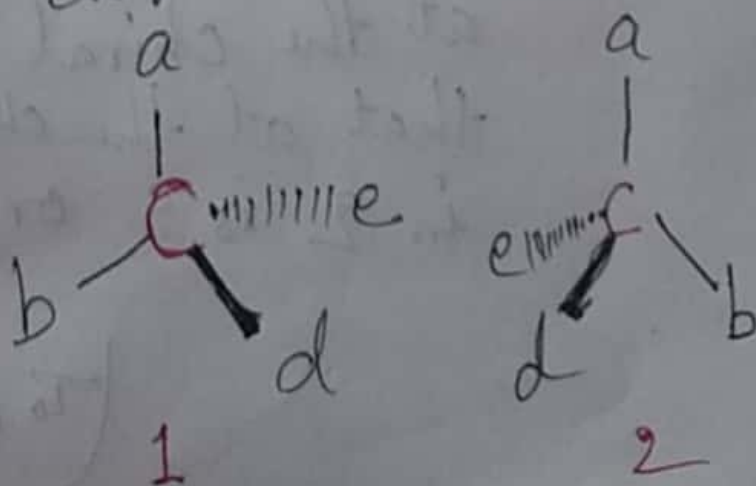
The groups with highest Cahn-Ingold-Prelog priority are on the same face of the alkene so this is also (*Z*)-2-pentene.

In trans-2-pentene also named (E)-2-pentene the methyl and ethyl groups are on opposite faces of the alkene.

Cis, trans, E, and Z are all designations of relative configuration.

### Absolute configuration :

The absolute configuration at a chiral center in a molecule is a time-independent and unambiguous symbolic description of the spatial arrangement of ligands (groups) bonded to the chiral center.



The chiral centers in 1 and 2 bear the same ligands: a, b, d and e. However, 1 and 2 are not superimposable on each other, meaning that the arrangement of ligands around the chiral center in 1 is the exact opposite of that in 2. Chiral centers in 1 and 2 are said to have opposite absolute configurations.

According to R, S convention, if the absolute configuration at the chiral center in 1 is R, that at the chiral center in 2 is S or vice versa.

To be continued.....