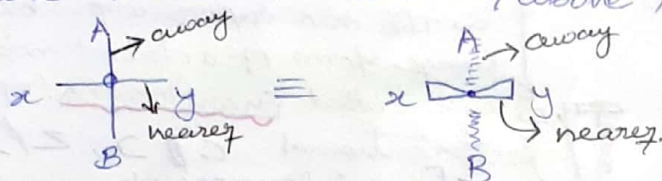


Stereo-chemistry: Study of properties of molecule with respect to special arrangement of gps, atoms in a molecule in 3D is called Stereochemistry.

Representation of 3D structure:-

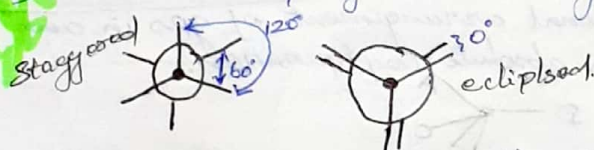
1) **Fischer-Representation** (Flat-projection).

Rules:- 1) Project a molecule in a cross manner (+), 2) Arrange maximum no. of carbons on vertical lines. 3) Keep high oxidised carbon gps at top. 4) Gps on vertical line → away from observer (or) below the plane, Gps on horizontal line → near to observer/above the plane.



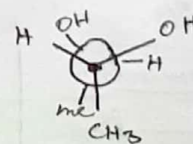
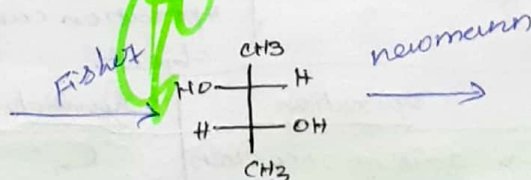
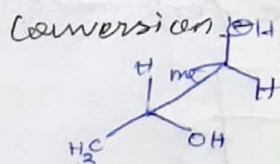
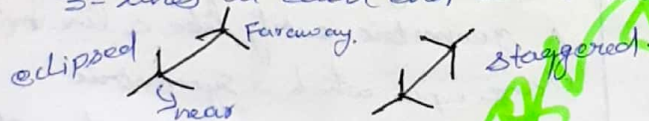
2) **Newman's Projection**:-

Rules:- 1) See the molecule along C-C bond axis, 2) Show front carbon as DOT and back carbon as circle. 3) Keep lines on front/back carbon with 120° separation. 4) Newman projection may be eclipsed, Gauche, Staggered.



3) **Saw-Hore projection**:-

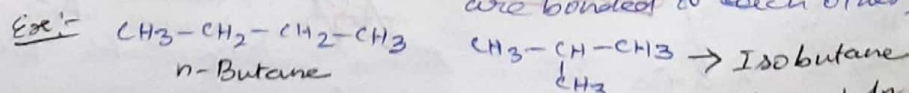
Rules:- 1) See the molecules in side way 2) Show C-C bonding in a diagonal manner 3) on diagonal bottom end → near to observer and upper end → away from observer. 4) Keep 3-lines at each end with 120° separation.



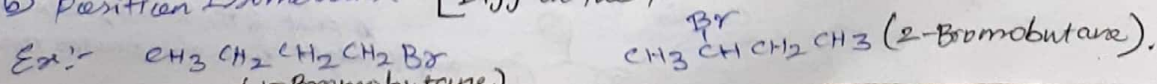
814-5102 **Isomerism** → 1) Structural 2) Stereo

1) **Structural Isomerism**:- Isomers are compounds that have the same molecular formula but diff. structural formulae.

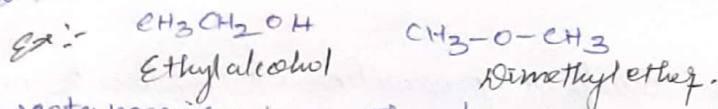
a) **Chain Isomerism**:- [different in order in which carbon atoms are bonded to each other].



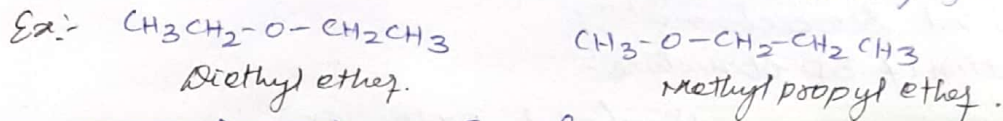
b) **Position Isomerism**:- [Diff in the position of fn gp on the chain].



(c) Functional isomerism:- [Diff in fun gps]



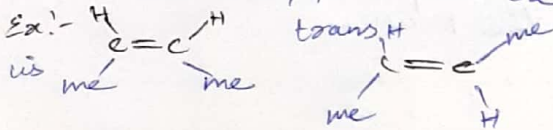
d) Metamerism:- \rightarrow This type of isomerism is due to unequal distribution of carbon atoms on either side of fun gps.



2) Stereoisomerism:- [It have same structural formula but differ in arrangement of atoms in space]

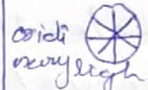
Cis-trans

Cis isomers is one in which two similar gps are on the same side, and trans is opposite side.



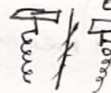
Optical isomerism

[It have the ability to rotate the plane polarise light]



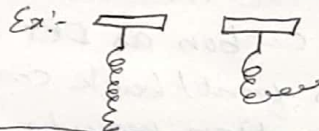
a) The non super imposable mirror image form of a chiral molecule are called Enantiomers (opposite)

Ex:- hand C/D , Z/E
 [non superimposable, mirror images]



b) Diastereomers:-

[non superimposable, non mirror image]



5/5 SLO-1
Configuration, Symmetry and chirality

Configurations:-

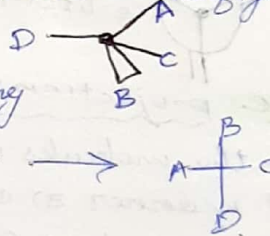
Absolute configuration:-

The actual three-dimensional arrangement of gps in an asymmetric molecule is called its absolute configuration.

Relative configuration:-

For the convenient of writing

in 2D structure of the molecule is called Relative configuration.



Symmetry:-

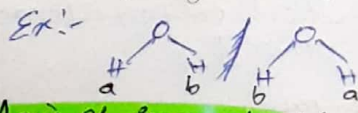
A molecule is indistinguishable from any direction from wherever we see it.

Symmetry elements

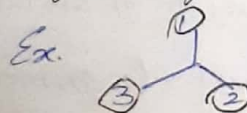
A geometric entity like a line (or) Plane upon which a symmetric operation can be performed on the object.

Elements	operation	Symbol.
— line	\rightarrow axis of rotation	C_n
plane	\rightarrow Reflection	$\sigma \rightarrow \sigma_h, \sigma_d$
• point	\rightarrow Inversion	

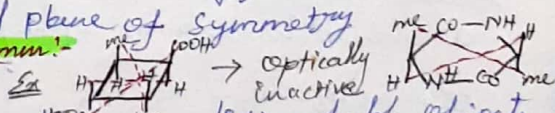
1) Plane of Symmetry:- A plane which divides an object into two halves is called plane of symmetry



2) Axis of Symmetry:-

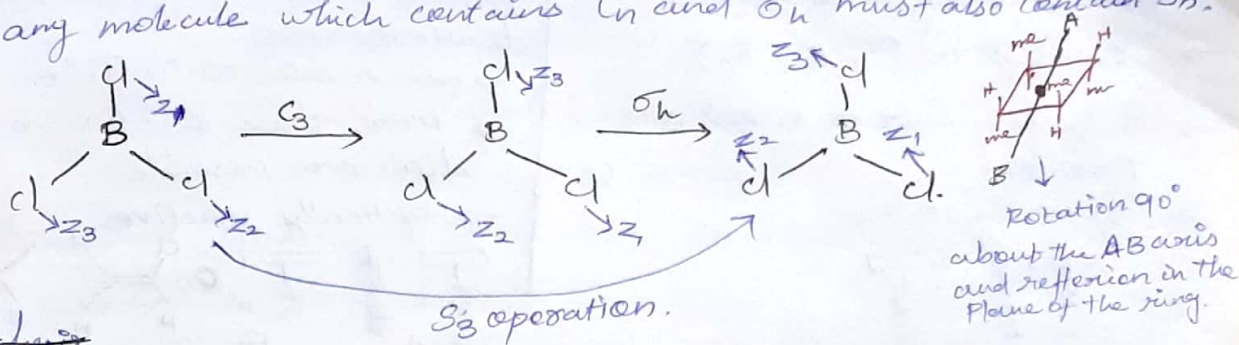


Centre of Symm:- A point in the object, through which any straight line also passes through two indistinguishable objects



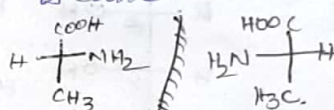
③ Alternating axis of symmetry: (S_n).

A operations are rotation followed by reflection in a \perp plane is called alternating axis of symmetry. Therefore any molecule which contains C_n and σ_h must also contain S_n .



chiral:-

A molecule contain different groups. (or) it gives non-superimposable mirror image is called chiral. it always optically active.



SLO-2

R and S configurations:- (Absolute nomenclature).

[Cahn, Ingold, Prelog]

Rules:-

CIP-nomenclature.

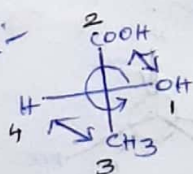
- 1) Identify chiral centre in molecules
- 2) Give priority for groups or atoms attached to chiral centres based on Atomic numbers.
- 3) After giving the priority keep least priority group/atom away from the observer.
- 4) see the priority direction of other groups. If the priority direction is clockwise \rightarrow (R)
Anticlockwise \rightarrow (S)

on Fisher projection:-

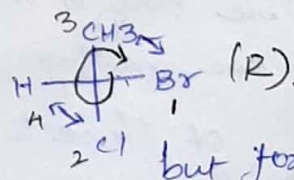
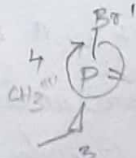
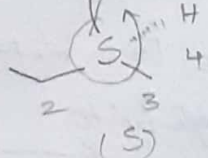
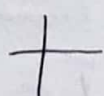
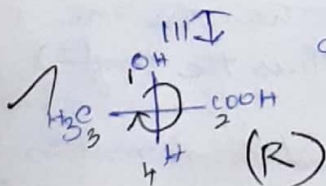
If least priority group on horizontal line $(-)$.
take opposite configuration.

by doing mutual exchange of two pairs of groups bring least priority group on vertical line (1).

Ex:-



here H atom is least
so conf S originally
but take R is correct.
(or) Interchange the atoms
and give the name



but for this
(S) config
is correct
beZ H present
in horizontal
line.

points on the edge of the figure at the same distance from the centre but on opposite side.