

# STEREOCHEMISTRY

Degree-II (H) , Paper-IV, Group-'B'

## Introduction

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\* The isomers which differ in their three-dimensional structures (ie; different relative arrangement of atoms or groups in space around the carbon atom) are known as stereoisomers.

Or, stereoisomers and the phenomenon are known as stereoisomerism.

\* The spatial arrangement of atoms or group is also referred to as configuration of the molecule and thus we can say that the stereoisomers have the same structural formulae but different configuration.

\* Thus, stereochemistry may be defined as that part of chemistry which deals with the three-dimensional structure of the molecule and its effects on chemical behaviour.

## Types of Stereochemistry

Stereoisomerism can broadly be classified into two

- classes :-
- 1) Configurational isomerism.
  - 2) Conformational isomerism.

# Configurational Isomerism

## 2.

The stereoisomers which are non-superimposable and non-interconvertible by rotation around single bonds are known as configurational isomers and the phenomenon is known as Configurational isomerism. The configurational isomers can be interconverted only by breaking and making of bonds.

These isomers may further be of two types:-

i) Enantiomers (Optical isomers):-

- \* When the two isomers are the mirror image of each other, these are known as enantiomers.
- \* This is also known as inversional isomerism.

ii) Diastereomers: - When the configurational

isomers are not mirror image of each other, these are known as diastereomers.

- \* This also includes geometrical isomers.

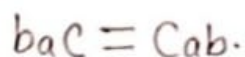
# Conformational Isomerism

3.

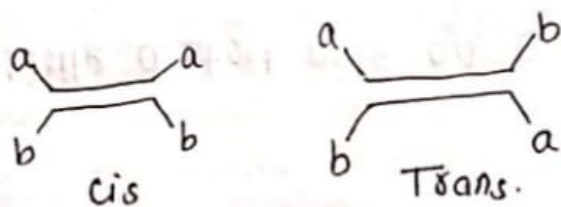
- \* The stereoisomers which are non-superimposable but easily interconvertible by rotation about single bonds are known as conformational isomers or conformers.
- \* This type of isomerism is found in alkanes and cycloalkanes.

## GEOMETRICAL ISOMERISM

In 1875, Van't Hoff and Le Bel recognised a type of stereoisomerism in organic molecules having two differently substituted atoms attached to each other by means of a double bond, viz.



- \* The presence of a double bond hinders the free rotation of the molecule.
- \* If such a molecule is having different groups on each carbon atom then the following two types of spatial arrangement are possible



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