Stereochemical Nomenclature

M.MINCY,

ASST.PROF.OF CHEMISTRY,

J.A.COLLEGE,

PERIYAKULAM.

Stereohchemical Nomenclature is used to define the **stereo isomerism** of a chemical compound, that is when there is isomerism due to the different arrangemant of **atoms or groups** in space.

The following methods are followed to explain the configuration of the isomers.

1. D and L system
2. R and S system

R-S system

- It is proposed by R.S.Cahn, C.K.Ingold, V.Prelog.
- It is also known as Cahn-Ingold-Prelog System.
- It is Based on the three dimensional or tetrahedral structure of the compound.
- An Asymmetric carbon C abde, the group abde are firs assigned in order of priority, determined by sequence rules is assigned.
- The order of priority may be stated as

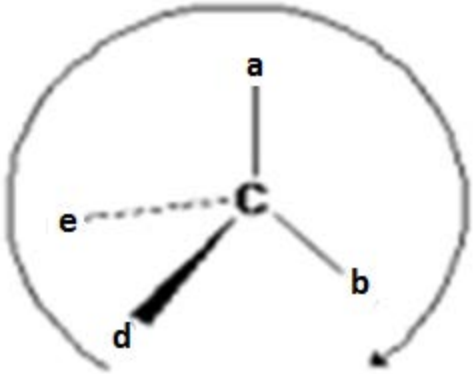
a > b > d > e

- 'e' - lowest priority

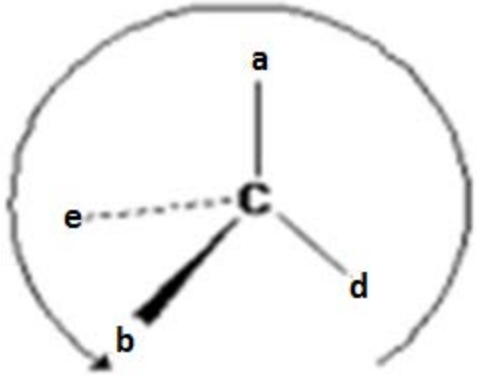
  'a' - highest priority

➢ The sequence of priority follows clockwise direction or right hand direction, the configuration is designed as R.

➢ The sequence of priority follows anticlockwise direction or left hand direction, the configuration is designed as S.



R-configuration clockwise deirection



S-configuration anticlockwise deirection

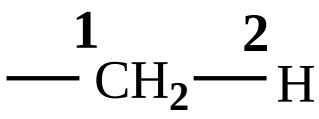
Rules for Priority

1. The atoms or groups to the asymmetric carbon are arranged in order of decreasing atomic number.

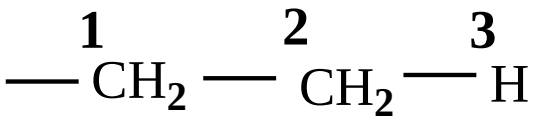
Eg. Cholorobromofluoromethane (CHClBrF) where the order of priority is

Br	>	Cl	>	F	>	H
(At.No. 35)		(At.No. 17)		(At.No. 9)		(At.No. 1)

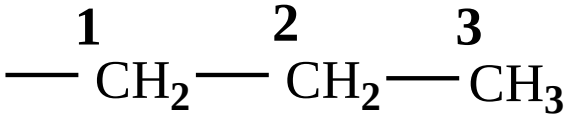
2. When two or more groups have identical first atoms which are attached an asymmetric carbon, the priority is determined by considering the atomic number of the second atom and if the second atom is also identical, the third atom is considered.



Methyl



Ethyl



N-propyl

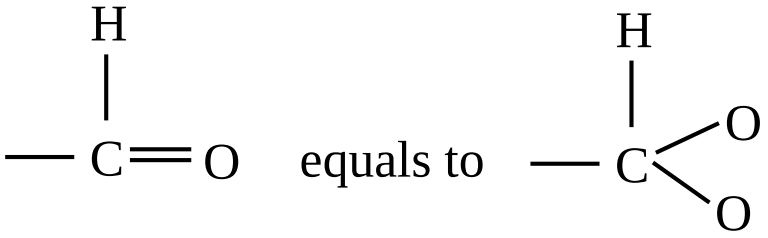
In methyl and ethyl the first atom is carbon and hence atomic number of the second atom is considered in methyl and ethyl, which is **H** (At.No. 1) and **C** (At.No.6) respectively.

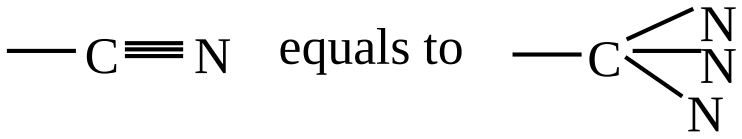
Hence ethyl>methyl and priority sequence is ethyl > methyl. Between ethyl and n-propyl the second atom is also identical, hence the third atom is considered which is H in ethyl and C in propyl and hence n-propyl > ethyl and n-propyl is given greater priority than ethyl.

If the first atoms of the two groups have some substituents with higher atomic number, the one with more substituents gets the priority.

Eg: $CHCl_2$ gets a higher priority than CHCl as **$CHCl_2$** has two chlorine atoms i.e., it has more number of the substituents with higher atomic number.

A doubly or triply bonded atom present in a group attached to an asymmetric carbon is considered equivalent to two or three singly bonded groups respectively.





The (R) – (S) system is used for specifying the configuration in chemical names of drugs.

e.g., adrenaline.

It is an adrenergic drug and is named as (R) -1-(3,4 dihydroxy phenyl)-2-methyl amino ethanol.


THANK YOU