

From stereoisomerism

RS system of nomenclature of optical isomers

The R/S system is an important nomenclature system for denoting enantiomers. This approach labels each chiral centre as R or S.

1) The actual 3-D arrangement of groups in a chiral molecule is called its absolute configuration.

→ The configuration can be specified by using R-S system or

Cahn - Ingold - Prelog system

(CIP system)

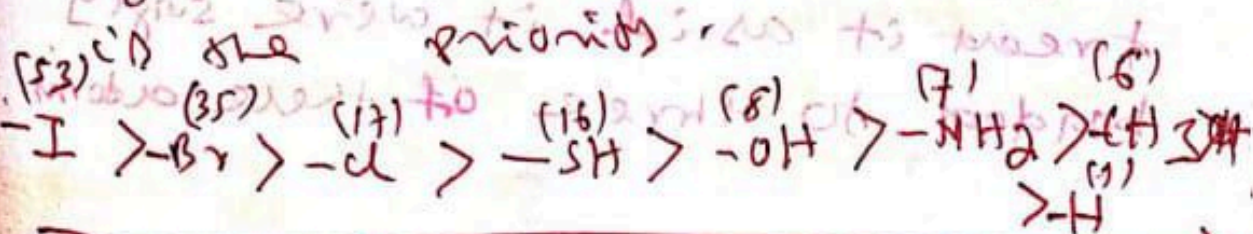
9) In the R-S system, we arrange the four groups attached to the chiral carbon in decreasing order of priority (1, 2, 3, 4) by

applying the rules given below

Rule - 1

(based on atomic no.)

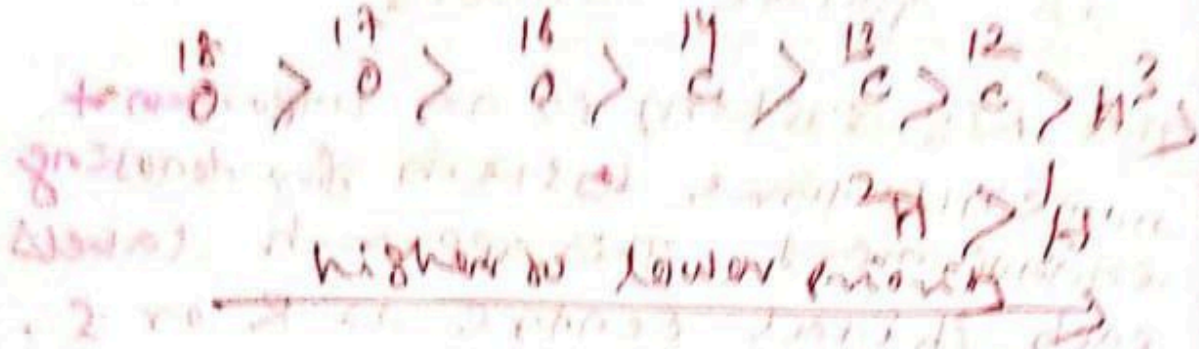
Higher is the atomic no. higher



higher to lower priority. →

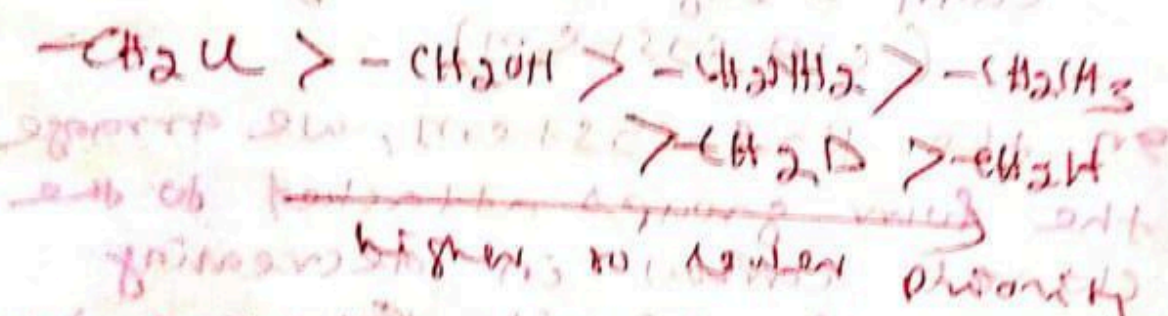
Rule-2 (For numbers)

Higher the atomic number, higher the priority



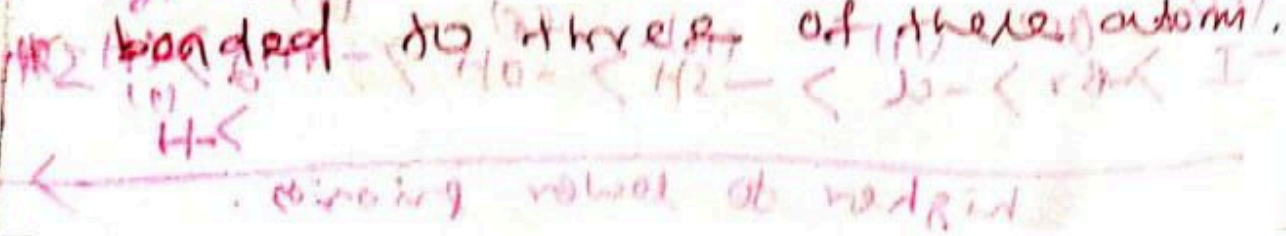
Rule-3

When two or more atoms directly attached to a stereocenter are same, the order of priority depends on the next atom along the chain, e.g.

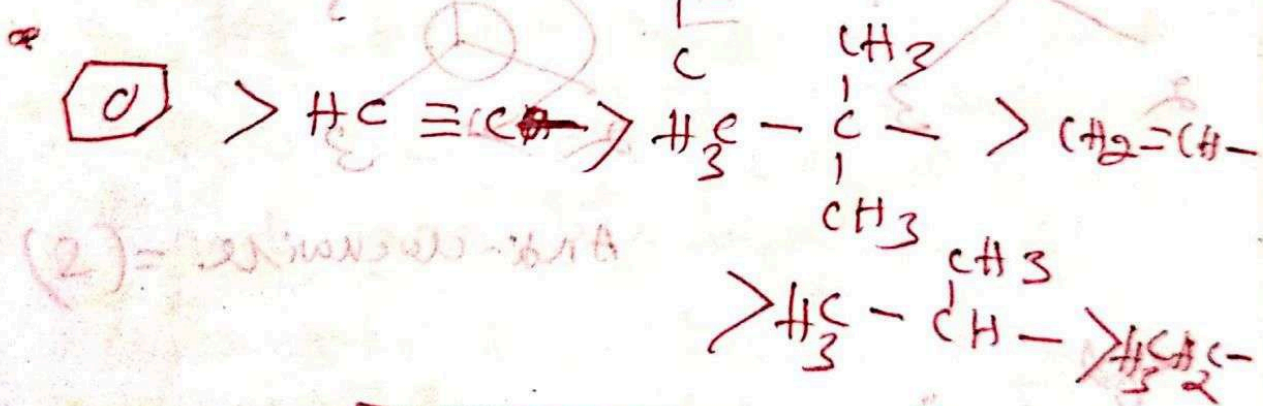
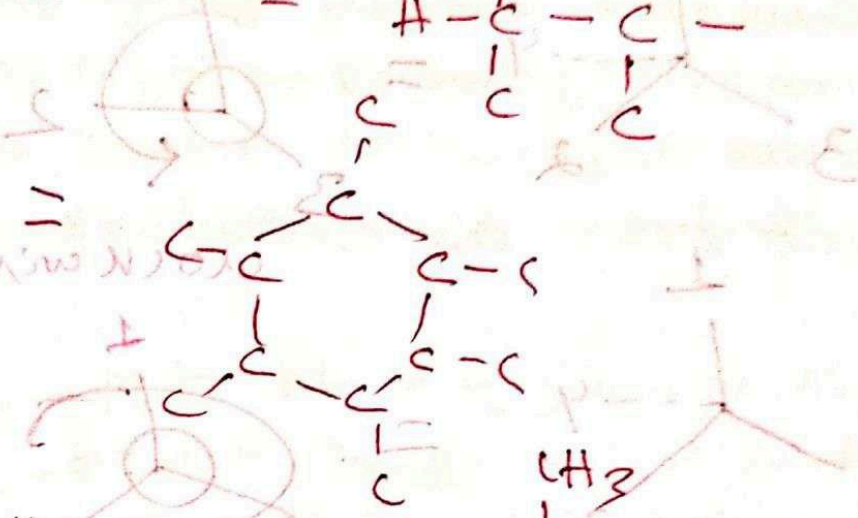
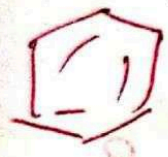
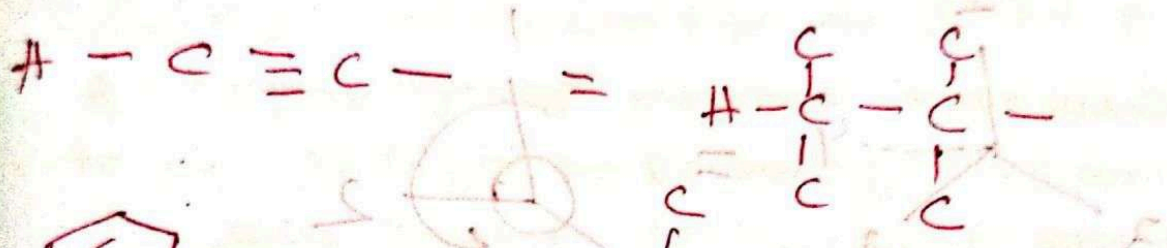
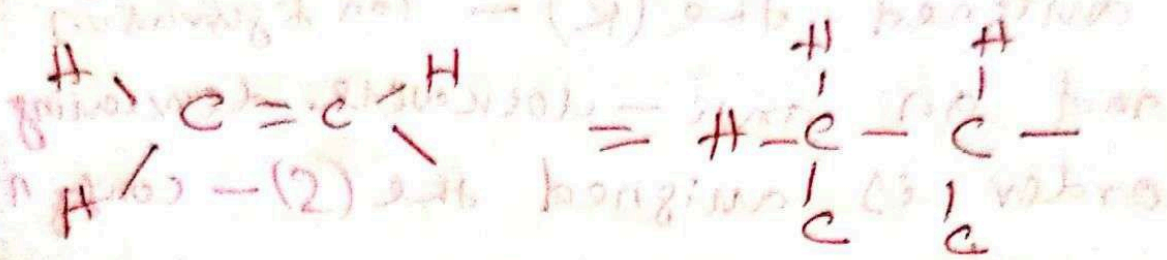


Rule-4

If an atom is double bonded to another atom, treat it as if it were singly bonded to two of those atoms. If an atom is triple bonded to another atom, treat it as if it were singly bonded to three of those atoms.



convert the unsaturated group directly attached to the stereocenter into saturated group to decide order of priority. eg,

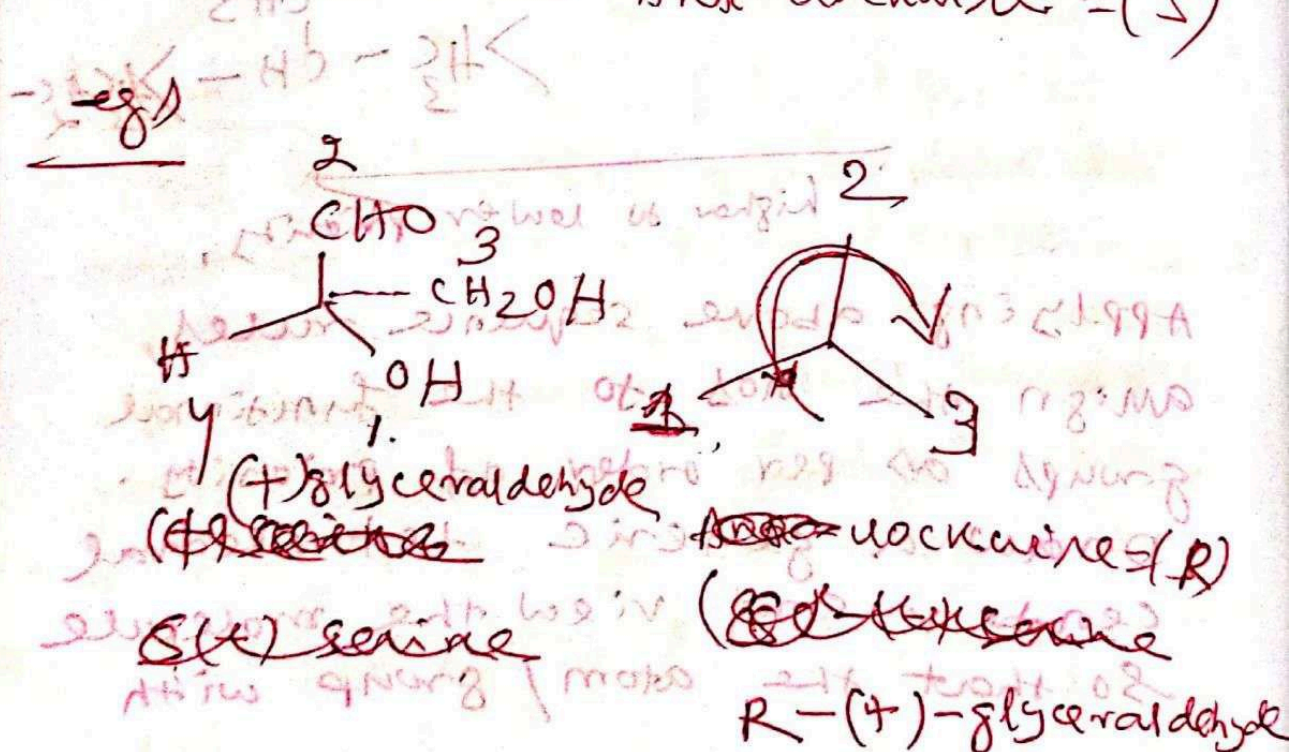
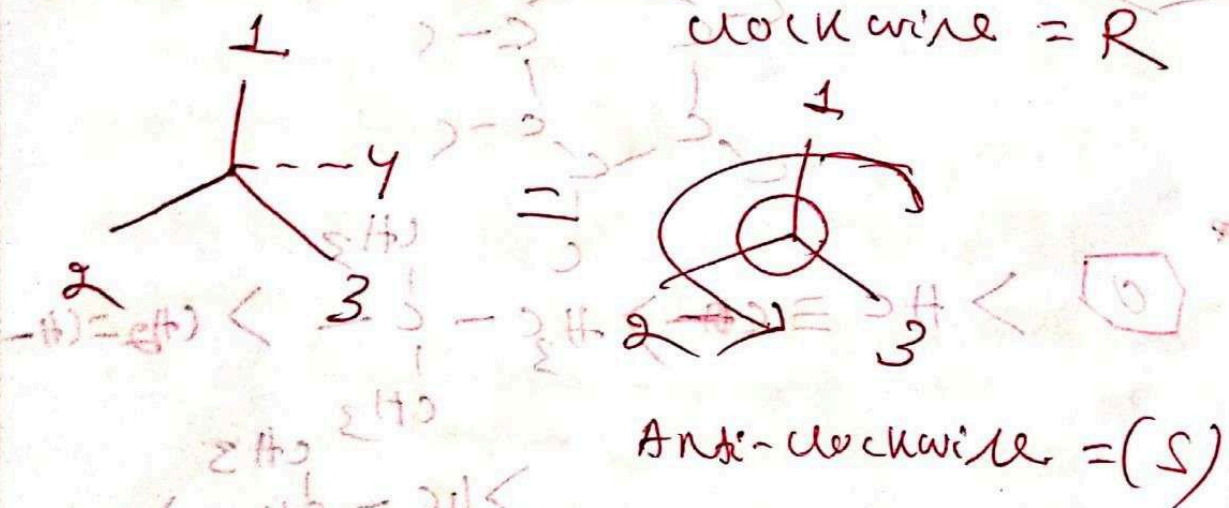
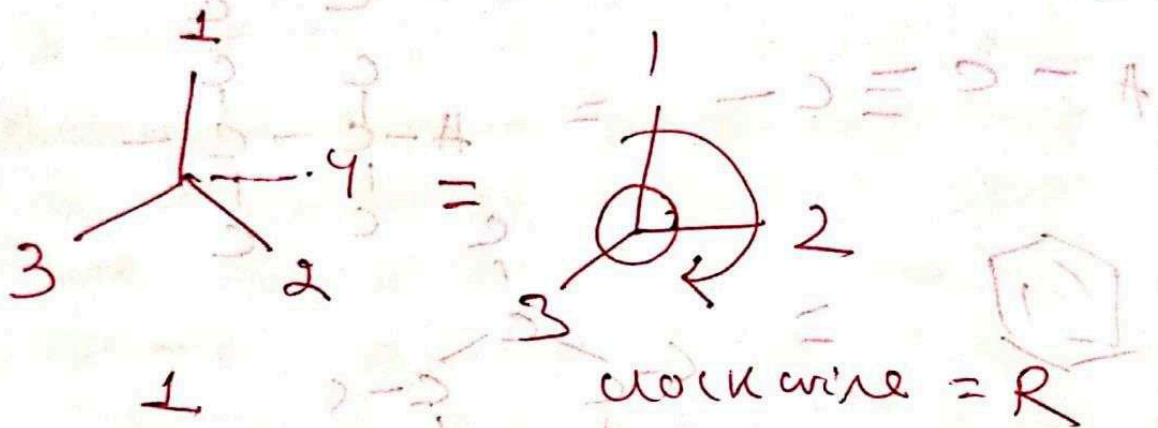


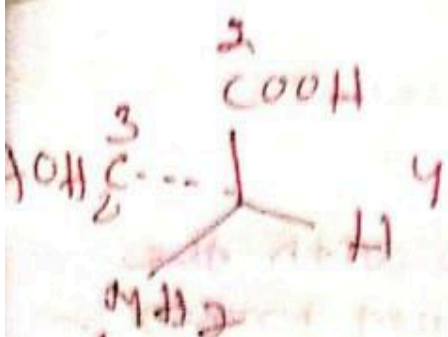
higher to lower priority

Applying above sequence rules, assign the nos to the functional groups as per order of priority.

Draw a generic tetrahedral center and view the molecule so that the atom/group with

lowest priority should project maximum away in space.
 A clockwise decreasing order is assigned the (R) - configuration and an anti-clockwise decreasing order is assigned the (S) - config.





(-)-serine
 (S)-(-)-serine



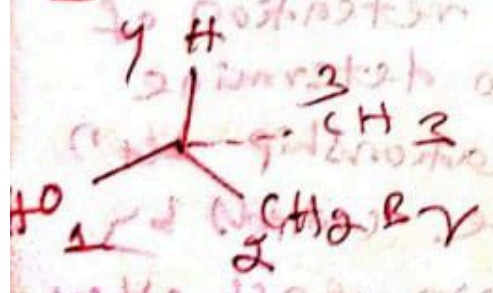
Anti-clockwise = (S)
 (S)-(-)-serine

rule - 5

A longer group may not necessarily have a higher priority over another smaller group eg -CH₂Cl has a higher priority than -CH₂(CH₂)₂H

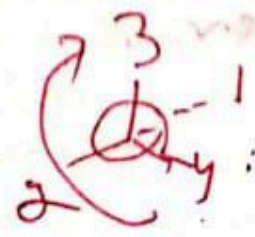
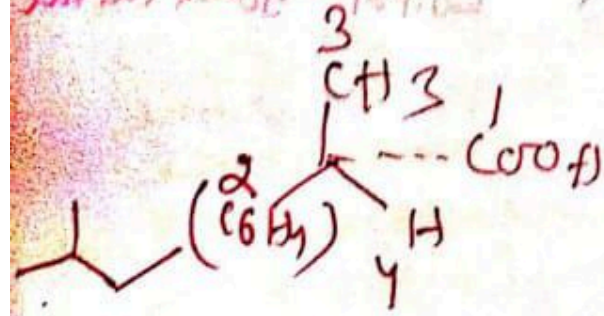
rule - 6

If a lowest priority group is in the front of the plane of the molecule then the assignment is reversed i.e. clockwise is (S) and anticlockwise is (R)



Anticlockwise

(and) R-configuration



clockwise = (R)
 (R)-(+)-phenylalanine