E-Z Nomenclature

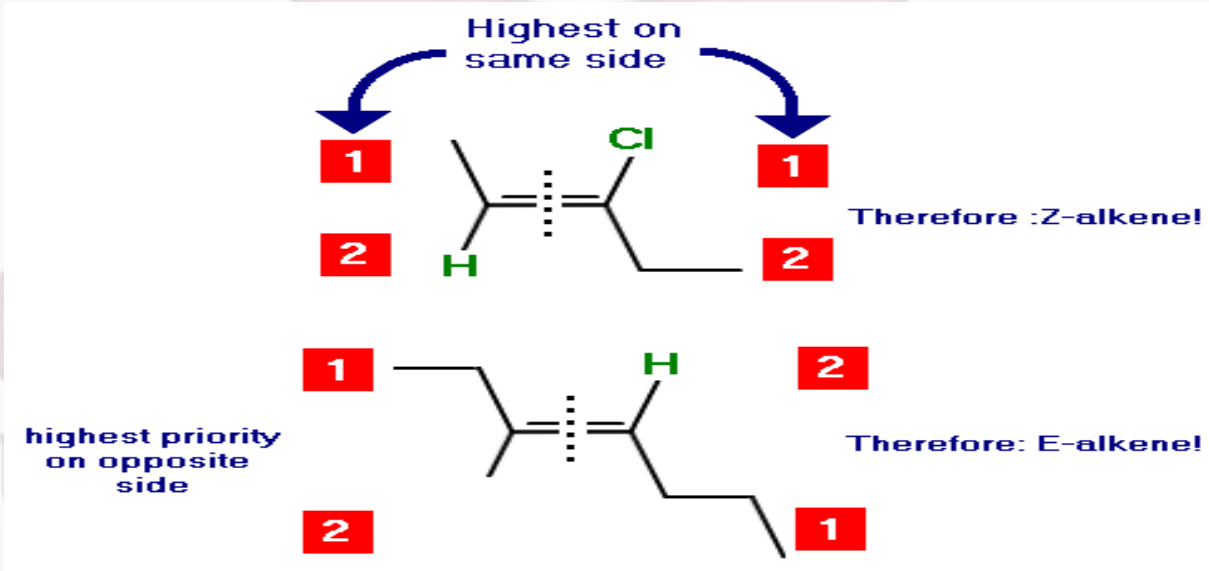
E-Z Nomenclature

- The E-Z nomenclature is for geometrical isomers. The configuration of geometrical isomers can be represented as cis and trans.
- When **two identical atoms or groups** are on the **same side** of the double bond, the isomer is known as **cis** and if they are on the **opposite side**, the isomer is known as **trans**.
- When all atoms or groups attached to doubly bonded carbon atom are **different**, cis-trans designations cannot be applied. A new system of nomenclature of geometrical isomers (E and Z) has been introduced to name such stereo isomers.

E-Z Nomenclature

- The following steps need to be followed for specifying the configuration-

1. The configuration is represented as **Z (German; Zusamman = together or same)** if both the **first priority group are on the same side of the double bond.**
2. The configuration is represented as **E (German; Enteggen = across or opposite)** if the priority group are on **opposite sides of the double bond**.
3. Group of highest priority is determined on each doubly bonded carbon atom in accordance with the sequence rule.

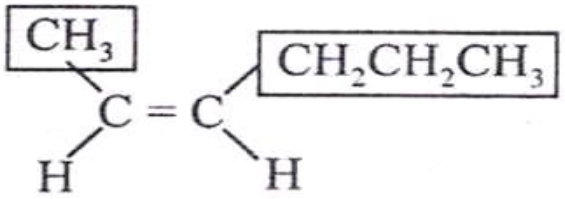


E-Z Nomenclature

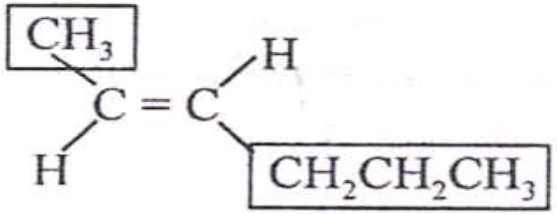
SEQUENCE RULES

Atoms or groups are assigned priority on the basis of the following rule-

1. Assign priority number 1 or 2 to the group on each carbon atom of the double bond.
2. Compare the priority of group (or atom) at one carbon relative to other.
3. A group gets first priority if its atomic number is high.
4. In case of isotopes, atom with higher mass number will have a higher priority.
5. When atom, attached directly to a double bond have same atomic number, second atoms are considered. Priority is given to the group with second atom of higher atomic number.
6. An atom attached with a double or triple bond is equivalent to two or three such atoms.



(Z)-2-hexene
Cis-2-hexene



(E)-2-hexene
trans-2-hexene

E-Z Nomenclature

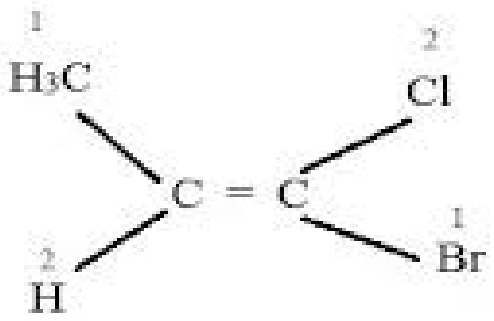


Fig.1: E-Isomer

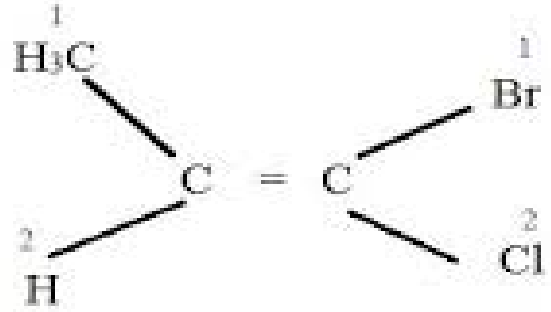
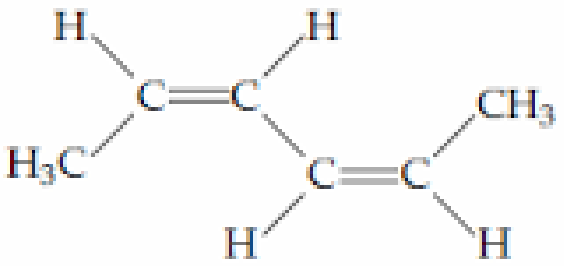
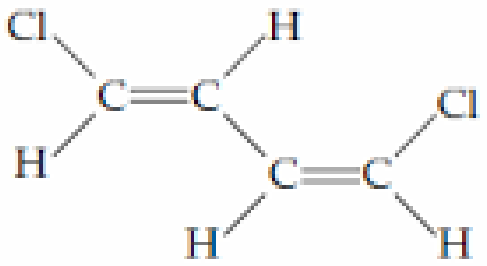


Fig.2 : Z-Isomer



(2Z,4Z)-2,4-hexadiene



(1E,3Z)-1,4-dichloro-1,3-butadiene

R-S Nomenclature

R-S Nomenclature

❖ **CONFIGURATION**

The compounds having different arrangement of atoms or group of atoms in space around chiral or asymmetric carbon atom is known as configuration.

R-S CONFIGURATION

The symbols R and S are derived from the Latin words rectus means right and sinister means left. The configuration of an optically active compound is based upon the nature of the groups attached to an asymmetric centre. The nature of the groups is determined by the priority of the groups which depends upon the following rules-

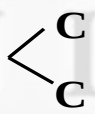
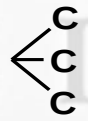
(a) The four different atoms or groups attached to an asymmetric carbon atom or center are arranged in the decreasing order of priority 1,2,3,4.

(b) When four different atoms are attached to an asymmetric carbon atom or center, priority is given according to atomic number. The atom with highest atomic number is given the highest priority.

(c) If isotopes of the same element are attached to an asymmetric carbon atom or center, the isotope with higher mass number is given the higher priority.

(d) If two atoms attached to an asymmetric carbon atom or center are same, the priority is determined by the atomic number of next atom from carbon atom or center.

(e) An atom attached with a double or triple bond is equivalent to two or three such atoms. For examples-

= C is equivalent to and ≡C is  equivalent to 

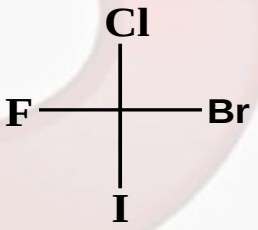
R-S Nomenclature

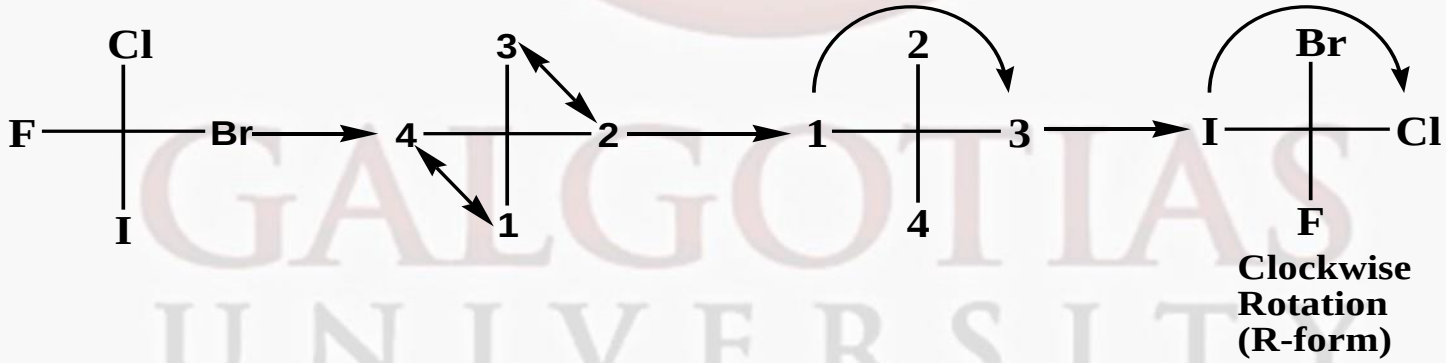
NOTE

After assigning the priority order the group having least priority is rotated towards viewer (at bottom side). Rotation may be 90° or 180°. The same rotation has been done on other groups also. Now viewer is placed at least priority group and allowed to view groups according to their priority. If there are more than two chiral atoms are present then R-S form is assigned on both C-atoms separately.

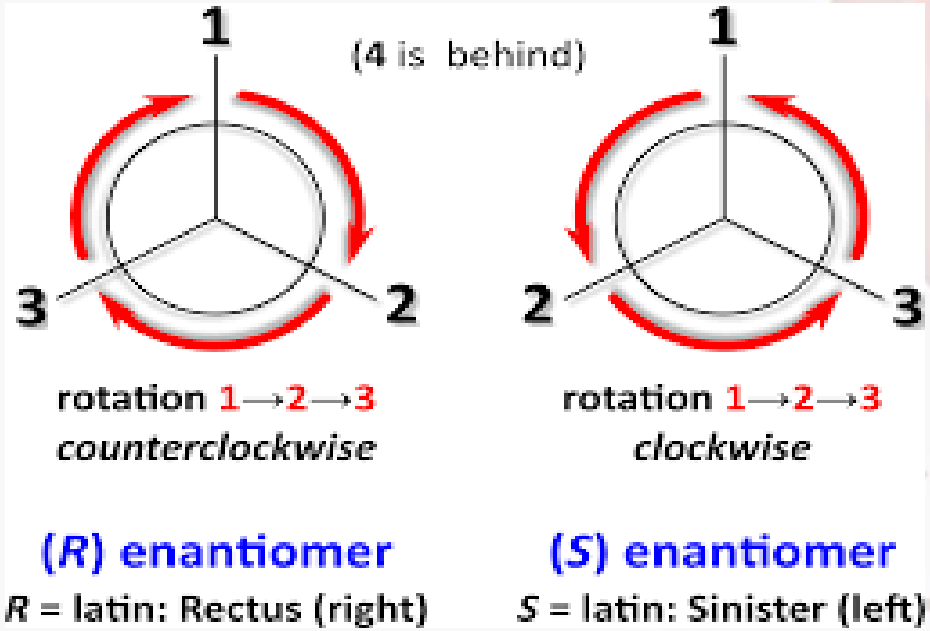
FOR EXAMPLE

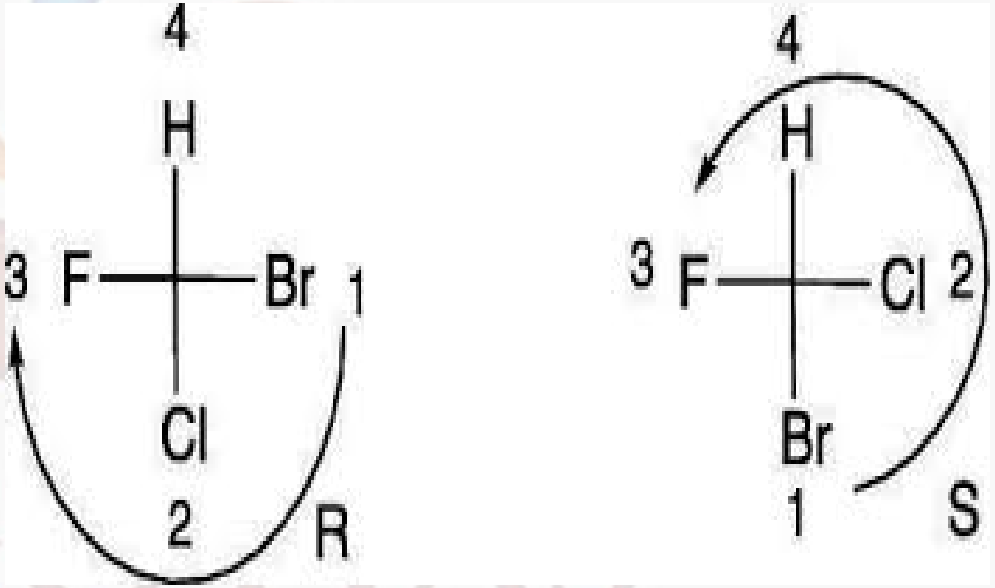
(i) Find R or S in the given compound



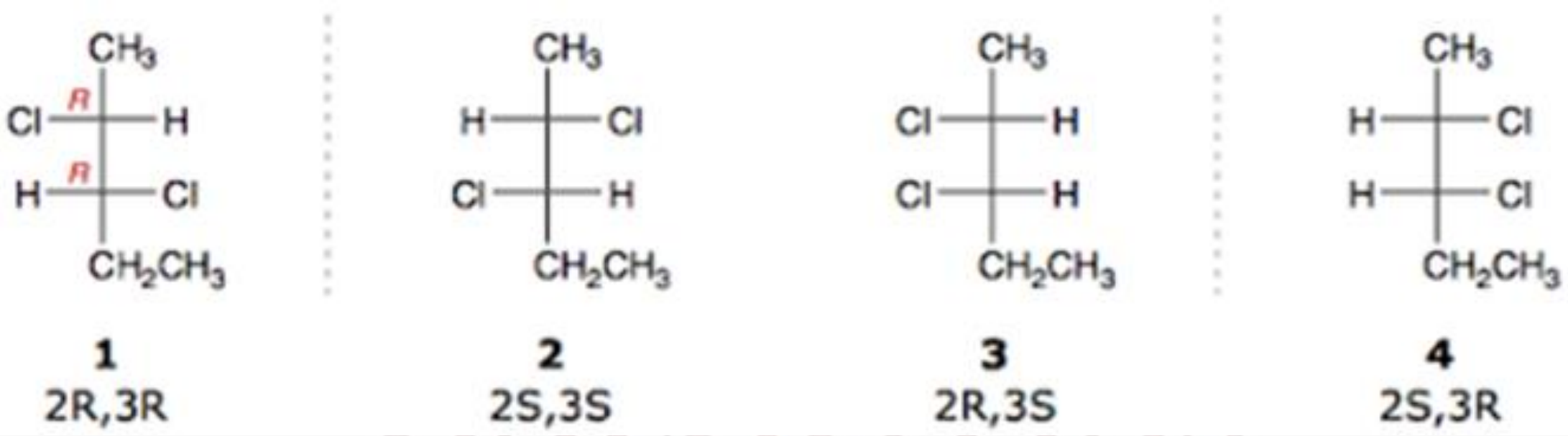


R-S Nomenclature





R-S Nomenclature



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Thank You