

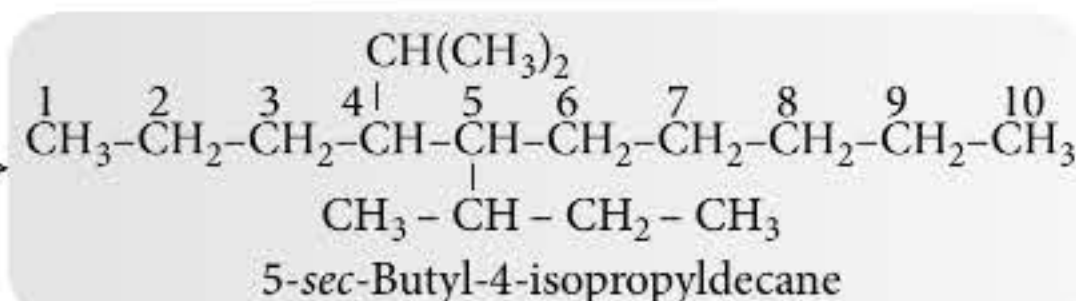
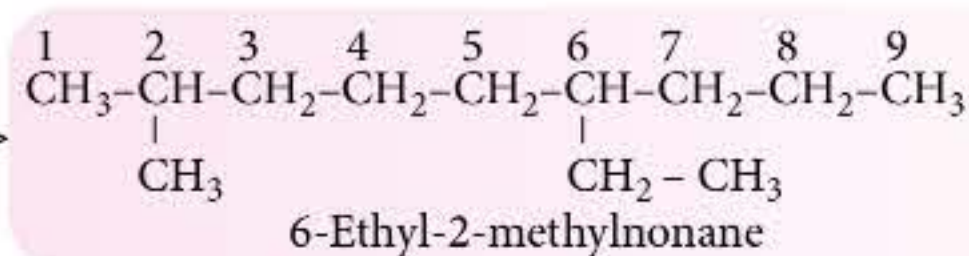
CONCEPT MAP

GENERAL ORGANIC CHEMISTRY

Nomenclature

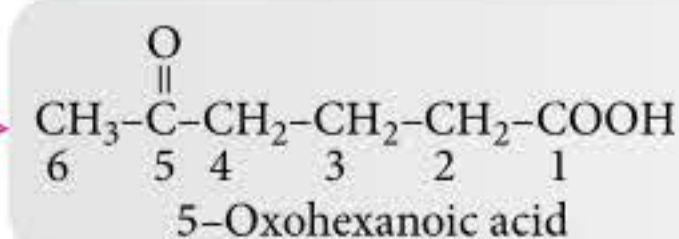
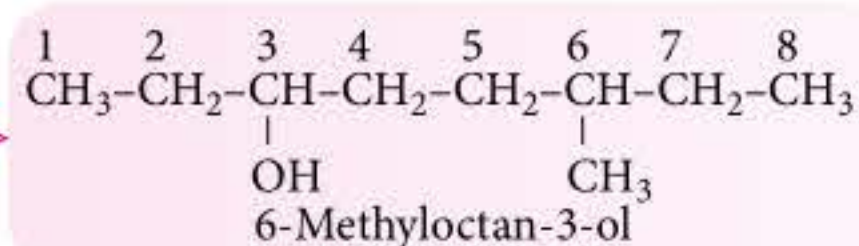
Rules for nomenclature of branched chain alkanes

- First of all, the longest carbon chain in the molecule is identified.
- The numbering is done in such a way that the branched carbon atoms get the lowest possible numbers.
- If the two substituents are found in equivalent positions, the lower number is given to the one coming first in the alphabetical listing.
- While writing the trivial names of substituents in alphabetical order, the prefixes *iso*- and *neo*- are considered to be the part of the fundamental name of alkyl group. The prefixes *sec*- and *tert*- are not considered to be the part of the fundamental name.



Rules for nomenclature of organic compounds with functional groups

- The longest chain of carbon atoms containing the functional group is numbered in such a way that the functional group is attached at the carbon atom possessing lowest possible number in the chain.
- In the case of polyfunctional compounds, one of the functional groups is chosen as the principal functional group and the compound is then named on that basis.
- The order of decreasing priority for some functional groups is :
-COOH, -SO₃H, -COOR (R = alkyl group), -COCl, -CONH₂, -CN, -C≡N, >C=O, -O, -N, -H₂, >C=C<, C≡C



Structural isomerism or constitutional isomerism

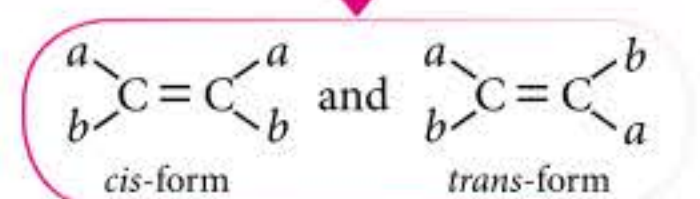
- Different compounds have same molecular formula but different structural formula.
- Compounds have different IUPAC name.

Isomerism

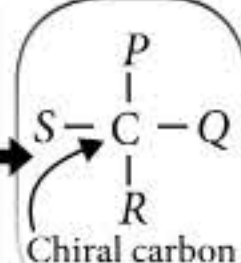
Stereo isomerism

- Different compounds have same molecular formula but different arrangement of atoms in space.
- Compounds have same IUPAC name.

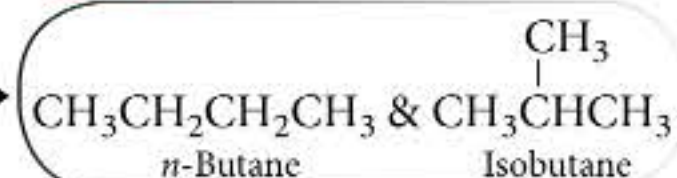
- Geometrical (cis-trans) :** Molecules have identical atomic structures but different geometries.



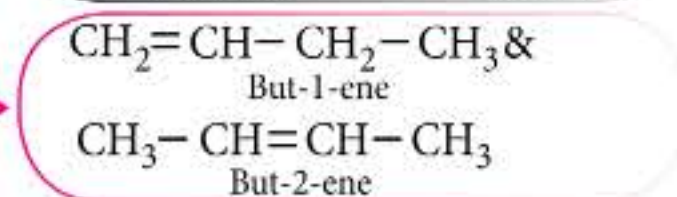
- Optical :** Rotate the plane polarised light. Contain an asymmetric (chiral) carbon atom.



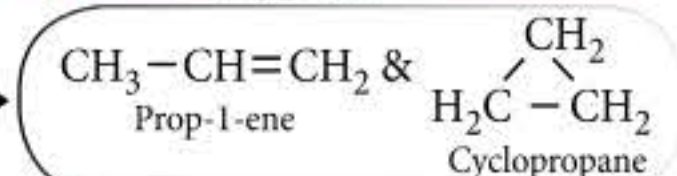
- Chain (Nuclear/Skeleton) :** Difference in the nature of the carbon chain.



- Position :** Difference in the position of the substituent atom/group or an unsaturated linkage in the same C-chain.



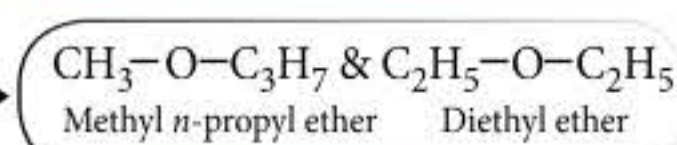
- Ring-chain :** Difference in mode of linkage of C-atoms.



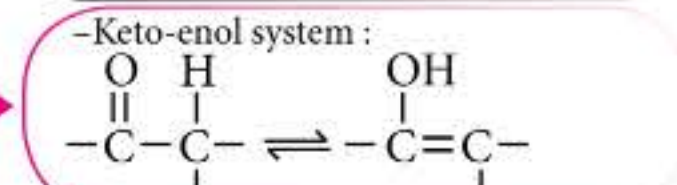
- Functional :** Difference in the nature of functional group.



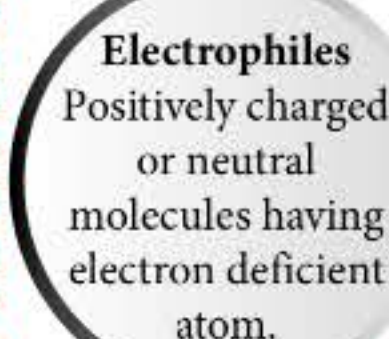
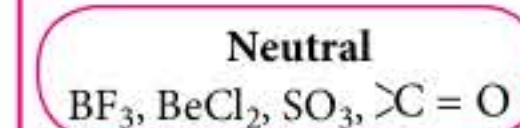
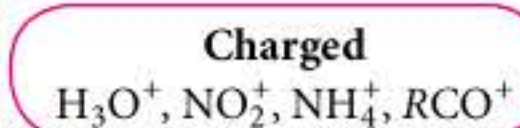
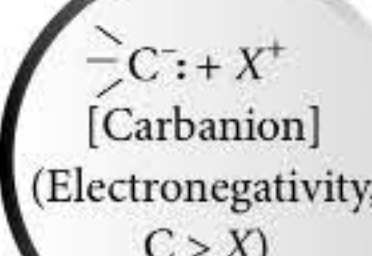
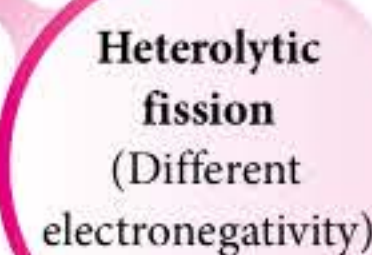
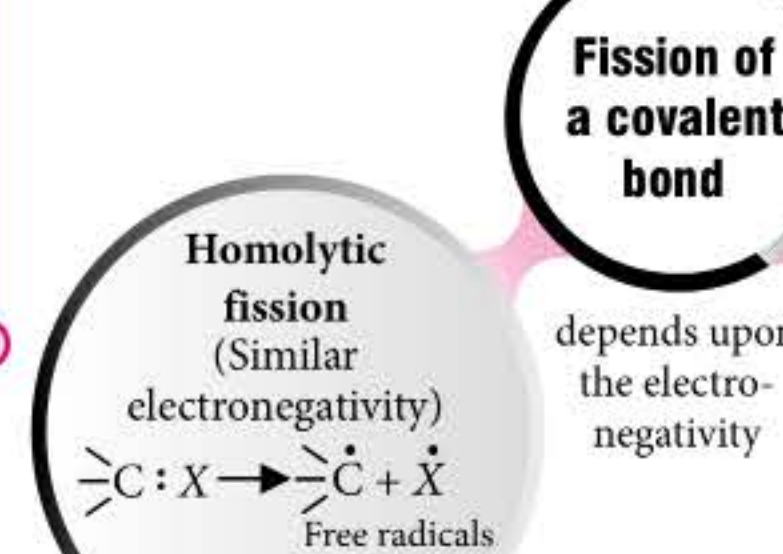
- Metamerism :** Difference in the nature of alkyl groups attached on either side of the same functional group.



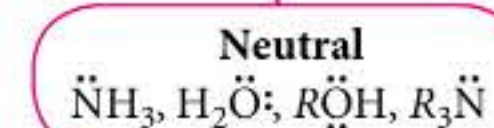
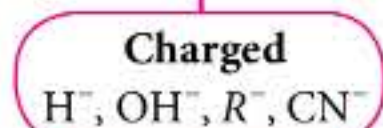
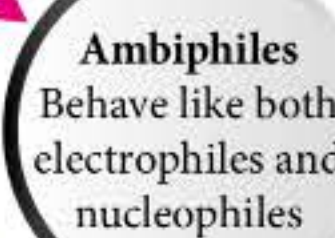
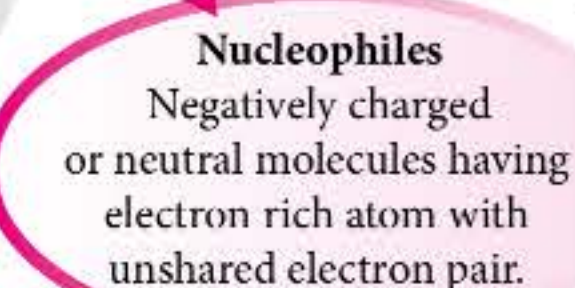
- Tautomerism :** Isomers exist in dynamic equilibrium.



Fundamental Concepts in Organic Reaction Mechanism



Attacking reagent



Electronic displacement

Polarisation effect (permanent)

Polarisability effect (temporary)

Inductive effect : Inductive effect is an electronic effect due to polarisation of σ bonds within the molecular ion. This is typically due to electronegativity difference.

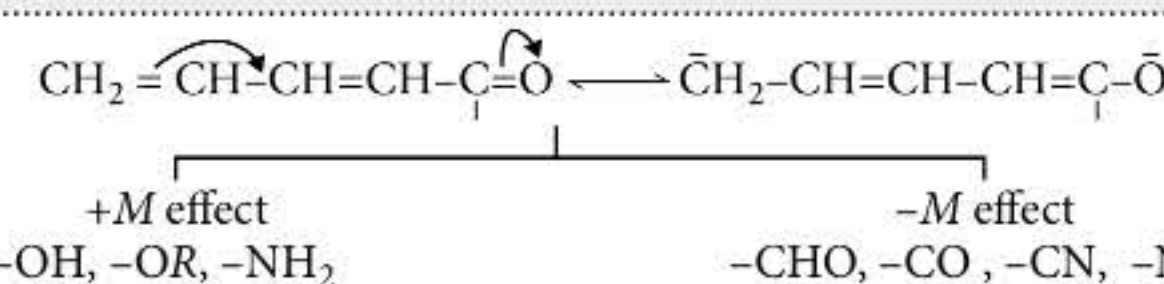
Electron-donating group (Y) exerts a positive inductive effect.

e.g., (CH₃)₃C-, (CH₃)₂CH-, CH₃CH₂-, CH₃-

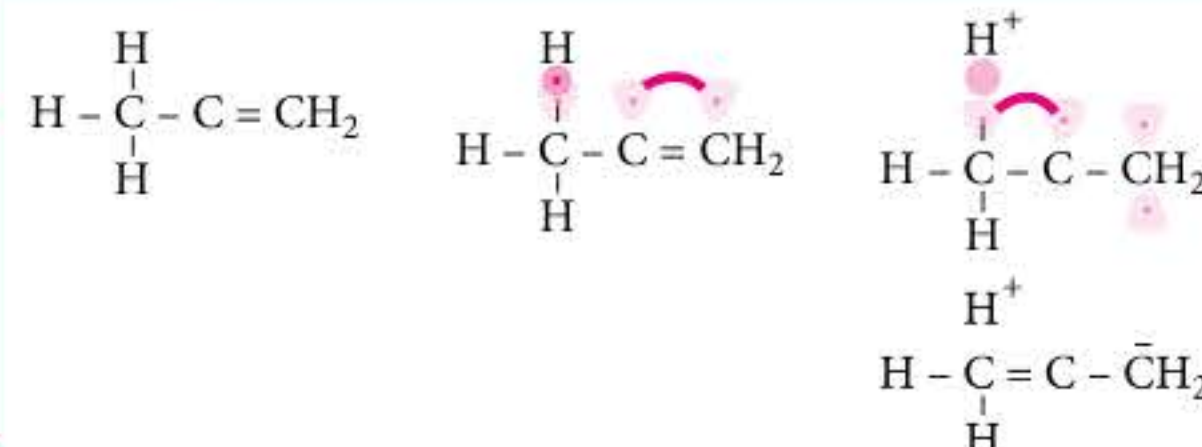
Electron-withdrawing group (X) exerts a negative inductive effect.

e.g., NF₃, NH₃, COOH, F, Cl, Br

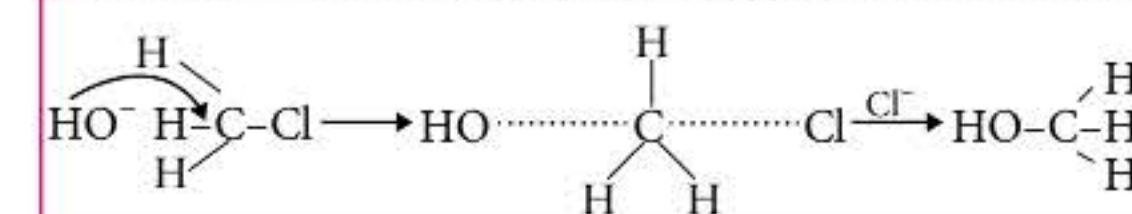
Mesomeric effect : Permanent polarisation of a group conjugated with a π-bond or a set of attached π-bond so that full +ve and -ve charge are developed in the molecule then the effect is known as mesomeric effect.



Hyperconjugative effect (No-bond resonance) : It involves delocalisation of σ-electrons of C-H bond of an alkyl group directly attached to an atom of unsaturated system or to an atom with an unshared p-orbital.



Inductomeric effect : Inductomeric effect is the temporary effect which enhances the inductive effect and it accounts only in the presence of an attacking reagent.



In methyl chloride the -I effect of Cl is further increased temporarily by the approach of hydroxyl ion.

Electromeric effect : Electromeric effect refers to a molecular polarizability effect occurring by an intramolecular electron displacement characterized by the substitution of one electron pair for another within the same atomic octet of electrons.

