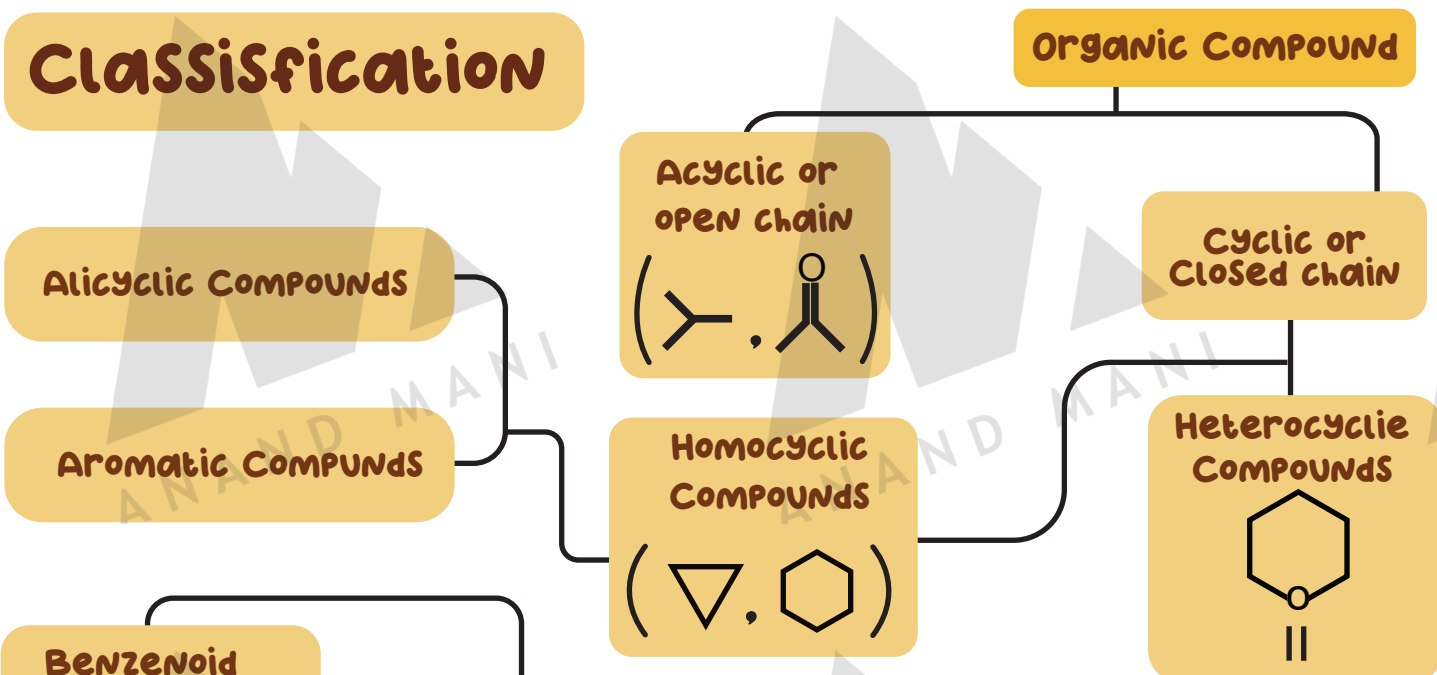


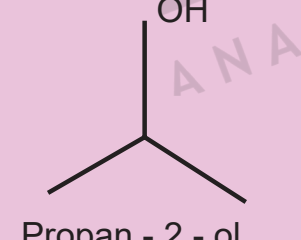
Classification



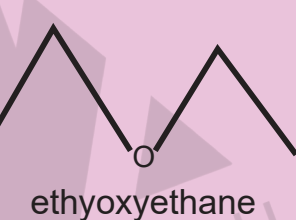
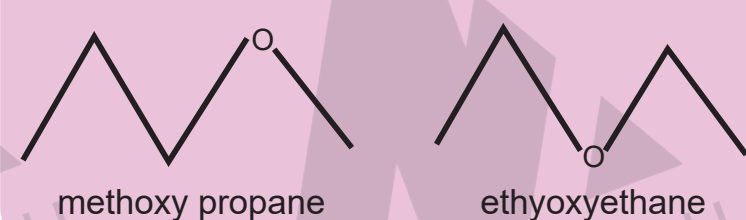
Structural Isomerism

Compounds that have same chemical formula but different chemical bond arrangement are called structural isomers.

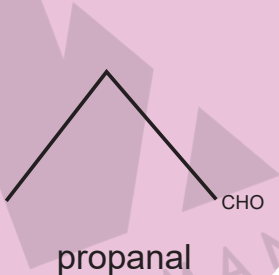
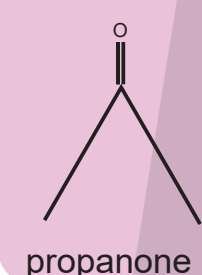
Position Isomerism



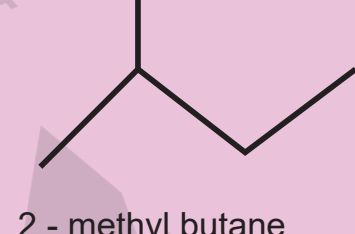
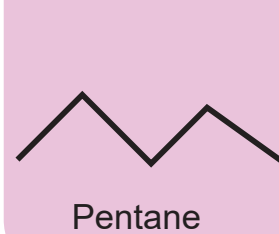
Metamerism



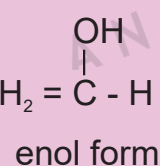
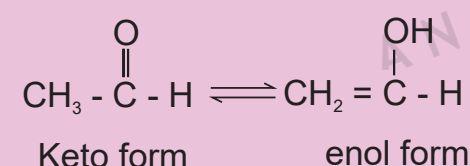
Functional Isomerism



Chain Isomerism



Tautomerism



Purification Methods

Distillation

Differential Extraction

Crystallisation

Chromatography

Sublimation

Qualitative Analysis

Halogens

Sodium Extract is acidified with conc. HNO_3 and treated with silver nitrate.

Sulphur

Sodium Extract is acidified with acetic acid and lead acetate is added

Nitrogen

Sodium extract is boiled with iron (III) sulphate, then acidified with conc. H_2SO_4

Phosphorous

Compound is treated with oxidising agent, then boiled with HNO_3 and ammonium molybdate.

Carbon & Hydrogen by heating with copper (III) oxide

Quantitative Analysis

Carbon and Hydrogen

$$\%C = \frac{12 \times m_2 \times 100}{44 \times m} \quad \%H = \frac{2 \times m_1 \times 100}{18 \times m}$$

m-Mass of org. Compound
 M_2 -mass of CO_2 produced
 M_1 -mass of H_2O produced

Nitrogen

Dumas Method $\%N = \frac{28 \times V \times 100}{22400 \times m}$

Kjeldahl's Method $\%N = \frac{1.4 \times N \times V}{m}$

m-Mass of org. Compound
 N -Normality of acid
 V -Volume of acid

Halogen

Carius method $\% \text{halogen} = \frac{\text{at.mass of } \times M_1 \times 100}{\text{molar mass of Ag} \times m}$

m-Mass of org. Compound
 M_1 -mass of AgX formed

Sulphur

Carius method $\%S = \frac{32 \times m_1 \times 100}{233 \times m}$

m-Mass of org. Compound
 M_1 -mass of BaSO_4 formed

Phosphorus

$$\%P = \frac{62 \times m_1 \times 100}{222 \times m}$$

m-Mass of org. Compound
 M_1 -mass of $\text{Mg}_2\text{P}_2\text{O}_7$ formed

Organic Reaction

Types

Addition reaction

Substitution reaction

Elimination reaction

Bond Fission

Homolytic
free radicals are formed.

Heterolytic
Carbocation and carbanion is formed.

Electrophile

Electron deficient species.
 Lewis acid.
 Example- Cl^+ , Br^+ , NO_2^+ , CH_3^+ , AlCl_3 , etc.

Nucleophile

Electron rich species
 Lewis base.
 Example- H_2O , NH_3 , OH^- , Cl^- , F^- , CH_3^-

Attaching Reagent

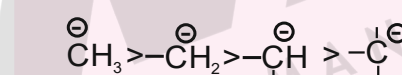
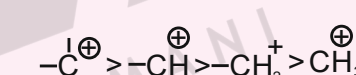
Organic molecule

Intermediate

Product(s)

Carbocation

Carbon atom having a positive charge with only six electrons in its valence shell.
 Carbocation carbon is sp^2 hybridised.



Free Radical

Carbon atom having 7 electrons in the valence shell is called carbon free radical.
 Carbon of free radical is sp^2 hybridised.



Organic Chemistry : Some Basic Principles and Techniques

Electronic displacement Effect

Inductive Effect

Partial displacement of sigma electrons towards more electronegative atom/group. It is a permanent effect

+I Effect

CH_3 , C_2H_5 , etc.

-I Effect

$-\text{CN}$, $-\text{COOH}$, etc.

Resonance Effect

When a molecule can be represented by two or more structures which have same arrangement of atoms but differ in distribution of electrons is called resonance.

+R Effect
halogen, $-\text{OH}$, OR

-R effect
 $-\text{COOH}$, $-\text{CHO}$, $-\text{CN}$

Electromeric Effect

In the presence of reagent, the double or triple bonds get broken double or it is a temporary effect.

Hyperconjugation Effect

delocalisation of σ electrons of C-H bond of an alkyl group directly attached to an atom with unshared p-orbital.

ISOMERISM

Stereo Isomerism

Compounds that have same chemical formula and sequence of covalent bonds but differ in spatial arrangement are called stereo isomers

Geometrical Isomerism

Optical Isomerism

RULES for IUPAC Naming

RULE 1 : Select the longest possible carbon chain.

RULE 2 : Numbering of parent chain is done from that side where functional group, multiple bond and substituent get the lowest number.

RULE 3 : Lowest sum rule — If first substituent gets same number from all side then chain selected should have lowest sum of all substituent numbering.

RULE 4 : Alphabet rule — Naming should be done in alphabetical order if the numbering of all substituent is same.

RULE 5 : If the molecule have more than one functional group, the functional group with highest priority receives the lowest number.