Classification

Organic Compound

- Acyclic or open chain
- Cyclic or Closed chain
  - Homocyclic Compounds
    - Alicyclic Compounds
    - Aromatic Compounds
      - Benzenoid compounds
      - Non-benzenoid compounds
  - Heterocyclic Compounds

Structural Isomerism

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

Ring chain isomerism

but - 1 - ene and cyclobutane

Position Isomerism

Propane - 1 - ol

Propan - 2 - ol

Tautomerism

$CH_3 - \overset{O}{\overset{\|}{C}} - H \rightleftharpoons CH_2 = \overset{OH}{\overset{|}{C}} - H$

Keto form — enol form

Metamerism

Methoxy propane

Ethyoxyethane

Functional Isomersim

Propanone

Propanal

Chain Isomerism

Pentane

2 - Merthylbutane

2.2 - Dimethyl propane

Parts of IUPAC Name

- Prefix
- Root word
- Primary Suffix
- Secondary Suffix

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 sun rule — If first substituent gets same number from all side then chain selected should have lowest sum of all subtituend numbering.

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

Rule 5 : It the molecule have more than one functional group, the functional group with highest prriority reievers the lowest number.

Purification Methods

- Distillation
- Differential Extraction
- Crystallisation
- Chrmatiography
- Sublimation

Qualitative Analysis

Halogens

Sodium Extract is acidified with conc. HNO_3 and treated with Silver Netrate.

Sulphur

Sodium Exract is acidified with acctic acid and lead acctate is added

Nitrogen

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

Phosphorous

Compound is traated with onidising agent, then boild with HNO_3 and ammonium rnolybdate.

Carbon & Hydrogen

by heating with copper (II) oxide

Quantitative Analysis

Carbon and Hyolrogen

$\%C = \frac{12 \times M_2 \times 100}{44 \times M}$ $\%H = \frac{2 \times M_1 \times 100}{18 \times M}$

M-Mass of org. Compound
M_1-mass of CO_2 produced
M_1-mass of H_2 produced

Nitrogen

Carius method $\%N = \frac{28 \times V \times 100}{22400 \times M}$

Kjelalahes method $\%N = \frac{1.4 \times N \times V}{M}$

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

Hologen

Carius method

$\%halogen = \frac{at.mass\ of \times M_1 \times 100}{molar\ mass\ of\ AgX \times M}$

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 $Mg_2P_2O_7$ formed

Organic Chemistry : Some Basic Principles and Techniques

Organic Reaction

Types

- Addition reaction
- Substitution reaction
- Elimination reaction

Bond Fission

- Homolytic free radicals are fomed
- Heterolytic Casbocation and carbanion is formed

Electromeric displacement Effect

Hyperconfugation Effect

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

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: $-CN$, $-COOH$, etc

Electromeric Effect

In the presence of neagent, the doubuor triple bond get broken. It is a temperory effect.

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, -OH, OR

-R effect: -COOH, -CHO, -CN

ISOMERISM

Stereo Isomerism

Compounds that havesame chemical formula and sequence of covalent bonds but differ in spatial arrangement are called Stereo isMers

- Geometrical Isomerism
- Optical Isomerism

Electrophile

Electron deficient species.
Leur's acid
Example- Cl^+, Br^+, NO_2, CH_3, $AlCl_3$, etc.

Nucleophile

Electron rich Species
leur's acid
Example- H_2O, NH_3, OH^-, Cl^-, F^-, CH_3^-.

Attacking Reagent

Organic molecule → Intermedite → Product(s)

Carbocation

- Carbon atom having a positive change with only Six electron is its valence shell.
- Carbocation carbon is sp^2 hybridisod.

$-\overset{|}{\overset{\oplus}{C}} > -\overset{|}{\overset{\oplus}{C}}H > -CH_2^+ > CH_3^+$

Carbonion

- Carbon atom having a Negative charge on it.
- Carbonion carbon is sp^3 hybridised.

$CH_3^- > -CH_2^- > -\overset{|}{\overset{\ominus}{C}}H > -\overset{|}{\overset{\ominus}{C}}$

Free Radical

- Carbon atom having 7 electron in the valance Shell is called carbon free radical.
- Carbon of free radical is sp^2 hybridised.

$-\overset{|}{\overset{\bullet}{C}} > -\overset{|}{\overset{\bullet}{C}}H > -CH_2^\bullet > CH_3^\bullet$