CHEMISTRY STUDY MATERIALS FOR CLASS 10
(NCERT Based notes of Chapter -04)

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CARBON AND ITS COMPOUND

Alkynes: *General formula:* C_nH_{2n-2} *Suffix:* yne

The hydrocarbons containing carbon to carbon triple bond are called ***alkynes***. Alkynes are named in the same way as alkenes i.e., by replacing suffix **ane** of alkane by **yne.** In higher members, the position of triple bond is indicated by giving numbers 1, 2, 3, 4, ….to the carbon atom in the molecule.

Alkyne	Common name	IUPAC name
$HC \equiv CH$	Acetylene	Ethyne
$H_3C - C \equiv CH$	Methyl acetylene	Propyne
$H_3C - C \equiv C - CH_3$	Dimethyl acetylene	But–2-yne
$H_3C - CH_2 - C \equiv CH$	Ethyl acetylene	But–1–yne

HOMOLOGOUS SERIES

A homologous series is a group or a class of organic compounds having similar structure and similar chemical properties in which the successive compounds differ by a CH_2 group.

Characteristics of homologous series

- Each member of the series differs from the preceding or succeeding member by a common difference of CH_2 and by a molecular mass of 14 amu (amu = atomic mass unit).

- All members of homologous series contain same elements and the same functional groups.
- All members of homologous series have same general molecular formula.

  e.g **Alkane = C_nH_{2n+2}**

  Alkene = C_nH_{2n}

  Alkyne = C_nH_{2n-2}

- The members in homologous series show a regular gradation in their physical properties with respect to increase in molecular mass.
- The chemical properties of the members of the homologous series are similar.
- All members of homologous series can be prepared by using same general method.

IMPORTANCE OF HOMOLOGOUS SERIES

- It helps to predict the properties of the members of the series that are yet to be prepared.
- Knowledge of homologous series gives a systematic study of the members.
- The nature of any member of the family can be ascertained if the properties of the first member are known.

FUNCTIONAL GROUP

Functional group may be defined as an atom or group of atoms or reactive part which is responsible for the characteristic properties of the compounds.

The chemical properties of organic compounds are determined by the functional groups while their physical properties are determined by the remaining part of the molecule.

CLASSIFICATION OF ORGANIC COMPOUNDS BASED ON FUNCTIONAL GROUP

1. ALCOHOLS

Alcohols are carbon compounds containing –OH group attached to alkyl group. The general formula of alcohol is R-OH where 'R' is an alkyl group and –OH is the functional group.

Molecular formula	Common name	IUPAC name
CH_3OH	Methyl alcohol	Methanol
CH_3-CH_2-OH	Ethyl alcohol	Ethanol
CH_3- CH_2-CH_2-OH	n-Propyl alcohol	1-Propanol
CH_3-CH-CH_3 I OH	Isopropyl alcohol or secondary propyl alcohol	2-Propanol
CH_3- CH_2-CH_2-CH_2-OH	n-Butyl alcohol	1-Butanol
CH_3-CH-CH_2-OH I CH_3	Isobutyl alcohol	2-Methyl-1-propanol

The IUPAC name of alcohol is derived by replacing –**e**, in the word **alkane,** by the suffix –**ol**. Hence we get the name **alkanol**.

2. ALDEHYDES

Aldehydes are carbon compounds containing -**CHO** group attached to alkyl group or hydrogen atom. The general formula of aldehydes is **R – CHO** where **'R'** is an **alkyl group** or **hydrogen atom** and – **CHO** is the **functional group**.

The IUPAC name of aldehyde is derived by replacing –**e**, in the word alkane, by the suffix –**al**. Hence we get the name **"alkanal"**.

Molecular formula	Common name	IUPAC name
HCHO	Formaldehyde	Methanal
CH_3- CHO	Acetaldehyde	Ethanal
CH_3- CH_2- CHO	Propionaldehyde	Propanal
CH_3- CH_2-CH_2- CHO	Butyraldehyde	Butanal

3. KETONES

Ketones are carbon compounds containing carbonyl – **CO** – group attached to two alkyl groups. The general formula of ketone is **R-CO-R'** where **R** and **R'** are **alkyl groups** and – **CO** – is the **functional group**.

The IUPAC name of ketone is derived by replacing –**e**, in the word alkane, by the suffix -**one**. Hence we get the name **"alkanone"**.

Molecular formula	Common name	IUPAC name
CH_3COCH_3	Dimethyl ketone (Acetone)	Propanone
$CH_3COCH_2CH_3$	Ethyl methyl ketone	Butanone
$CH_3CH_2COCH_2CH_3$	Diethyl ketone	3-Pentanone

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