Organic Compounds

PAGE NO : 247

Solution 1:

Urea was the first organic compound synthesized in laboratory by Friedrish Wohler.

Solution 2:

As the general formula of the homologous series is C_nH_{2n-2} so they represent Alkynes.

Third member: C_4H_6

Fifth member: C_6H_{10}

Solution 3:

C_3H_6, C_4H_8 belong to same Homologous series.

Solution 4:

(a) C_3H_8 : Zero isomers. Alkanes with more than three carbon atoms form isomers.

(b) C_4H_{10}:- Two isomer

Solution 5:

Natural gas and Petroleum are one of the major sources of organic compound.

Solution 6:

S.No.	Organic Compounds	Inorganic Compounds
1.	Occurs in living matter i.e. animals and plants	Found from Non-living matter i.e. Minerals.
2.	They have low melting and boiling points.	They have high melting and boiling points.
3.	Insoluble in water	Soluble in water
4.	They are generally volatile and inflammable.	They are generally non-volatile and non-combustible.

Solution 7:

(i) Organic compounds are essentially carbon compounds. They show chemical Reaction and their rates are slow.

(ii) One of the products of combustion of organic compounds is always carbon dioxide.

(iii) More than 90% of the known organic compounds are synthesised.

(iv) Vital force theory was discarded by the synthesis of Urea in laboratory.

Solution 8:

Organic compounds are large in number due to the following unique properties of Carbon atom:

a) Tetra covalency of carbon: Carbon has four valence shell electrons .Thus it always forms covalent bonds by sharing electrons with other atoms.

b) Catenation: It is the property of combining any number of carbon atoms to form straight chains, branched chains and rings of different sizes.

c) Formation of multiple bonds: Due to small size carbon atom can form multiple bonds with not only carbon but with atoms of other elements like oxygen, nitrogen etc.

d) Isomerism: it forms large number of compounds due to isomerism by means of which compounds having same molecular formula can have different structural formula.

Solution 9:

(a) A homologous series is a group of organic compounds having similar structures and similar chemical properties .

(b) The difference in molecular formula of any two adjacent homologues in terms of types of atoms is that that they differ by CH_2 group i.e. by one carbon atom and two hydrogen atom.

The difference in the molecular masses of any two adjacent homologues is 14.

Solution 10:

Carbon has the unique property of combining any number of carbon atoms to form straight chains, branched chains and rings of different sizes.

Carbon show maximum tendency of catenation due to:

(i) Tetra covalency of carbon and
(ii) Great strength of carbon- carbon bonds.

Solution 11:

The name and Formulae of one member of each of following are:

(a) Saturated Hydrocarbons:

Formulae: CH_4
Name: Methane

(b) Unsaturated Hydrocarbons:

Formulae: C_2H_4
Name: Ethene

Solution 12:

(a) The group formed by the removal of one hydrogen atom from an alkane molecule is called an alkyl group.

(b) The three alkyl groups are:

- Methyl
- Ethyl
- Propyl

Formation of alkyl group:

- Methyl:

$$CH_4 \xrightarrow{-H} CH_3 -$$

- Ethyl:

$$C_2H_6 \xrightarrow{-H} C_2H_5 -$$

- Propyl:

$$C_3H_8 \xrightarrow{-H} C_3H_7 -$$

Solution 13:

(i) Pentane
(ii) 2,2-dimethylpropane
(iii) Pent-2-ene
(iv) Propyne

Solution 14:

A functional group may be defined as an atom or group of atoms present in a molecule which largely determines its chemical properties.

For Example: -OH- Alcohol, -CHO- Aldehyde

Functional group of:

(i) Alcohol: -OH
(ii) Ketone: >C=O
(iii) Carboxylic acid: -COOH

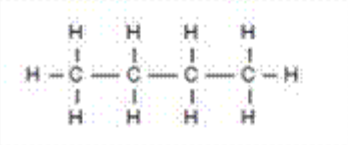
Solution 15:

(i) Molecular formula: The formula of an organic compound which represents kind of atoms and the number of each kind of atoms present in one molecule is called molecular formula.

Molecular formula of butane: C_4H_{10}

(ii) Structural formula: The formula of an organic compound which represents the arrangement of various atoms in one molecule in space is called structural formula.

Structural formula of butane:



(iii) Condensed formula: A kind of structural formula which indicates the group of atoms joined together to each of the carbon atom in straight or branched carbon chain is called condensed formula.

Condensed formula of butane: $CH_3CH_2CH_2CH_3$

Solution 16:

The names of the functional groups are:

-OH : alcohol

$\rightarrow C = O$: Ketone

-CHO : Aldehyde

-COOH : Carboxylic acid

Solution 17:

S.No.	compound	Trivial Name	IUPAC
(a)	C_3H_6	Propylene	Propene
(b)	C_2H_4	Ethylene	Ethene
(c)	C_2H_2	Acetylene	Ethyne
(d)	CH_3OH	methylalcohol	methanol
(e)	CH_3COOH	Acetic Acid	Ethanoic acid