

Short Answer Questions

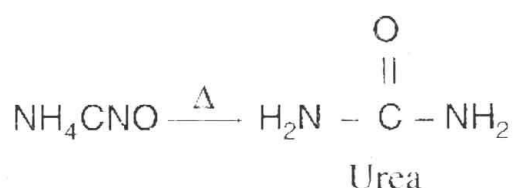
Q.1 What is vital force theory who proposed it?

Ans: According to vital force theory organic compounds could not be prepared in laboratories because they were supposed to be synthesized under the influence of a mysterious force called vital force inherent only in living things.

In early 19th century Swedish chemist Jacob Berzelius proposed this theory.

Q.2 Who rejected the vital force theory and how?

Ans: Vital force theory was rejected by Wohler in 1828 when he synthesized the first organic compound urea from inorganic substance by heating ammonium cyanate (NH_4CNO)



Q.3 Define organic chemistry.

Ans: The branch of chemistry which deals with the study of hydrocarbons and their derivatives is known as organic chemistry".

Q.4 What are different types of formula by which we can represent organic compounds?

Ans: Organic compounds can be represented by following four types of formula.

- a) Molecular formula.
- b) Structural formula
- c) Condensed formula
- d) dot and cross formula.

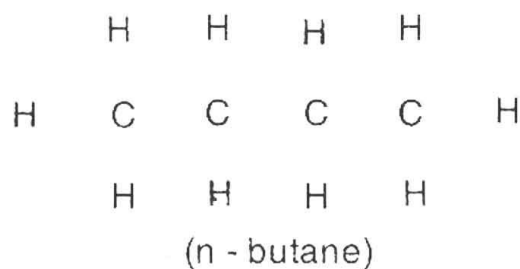
Q.5 Define molecular formula.

Ans: The formula which represents the actual number of atoms in one molecule of the organic compound is called molecular formula. For example molecular formula of butane is C_4H_{10} .

Q.6 Define structural formula.

Ans: Structural formula of a compound represents the exact arrangement of the different atoms of various elements present in molecule of a substance.

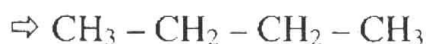
Structural formula of butane is



Q.7 Define condensed formula.

Ans: The short form of formula that indicates the group to each carbon atom in a straight chain or branched chain is called a condensed formula.

For example condensed formula for n – butane is

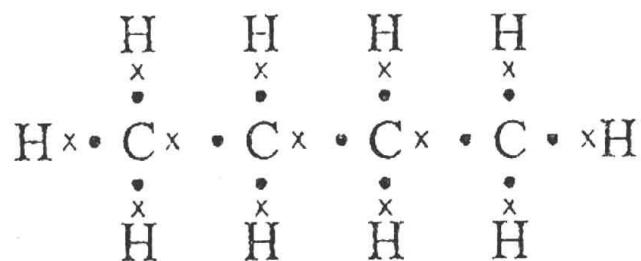


OR $\Rightarrow \text{CH}_3 - (\text{CH}_2)_2 - \text{CH}_3$

Q.8 What is dot and cross formula.

Ans: “The formula which shows the sharing of electrons between various atoms of one molecule of the organic compound is called dot cross formula or electronic formula”.

For example: cross and dot formula for butane is



Q.9 Write down the names of classes in which organic compounds are classified.

Ans: All organic compounds are broadly classified into two classes.

- Open chain or Acyclic compound:
- Closed chain or Cyclic compound:

Q.10 Define open chain compound. Explain their types.

Ans: Open chain compounds are those in which the end carbon atoms are not joined with each other in this way they form long chain of carbon atoms.

There are two types of open chain compound

- Straight chain compounds.
- Branched chain compounds:

a) Straight chain compounds.

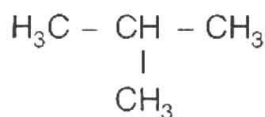
Compounds in which carbon atoms link with each other through a single, double or triple bonds forming a straight chain.

For example $\text{H}_3\text{C} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$
(Straight chain butane)

b) Branched chain compounds.

“compounds in which there is a branch along a straight chain”.

For example:



(Branched chain) (Iso-butane)

Q.11 What are aliphatic compounds?

Ans: Open chain compounds in which only single bond is present are also called aliphatic compounds.

Q.12 Define cyclic compounds explain their types.

Ans: Those compounds in which the carbon atoms at the ends are not free and they join to form rings.

They are further divided into two classes.

- a) Homocyclic compound b) Heterocyclic compound

Q.13 Define Homocyclic compounds. Explain their types.

Ans: Compounds contain rings which are made up of only one kind of atoms, i.e, carbon atoms are called Homocyclic compounds.

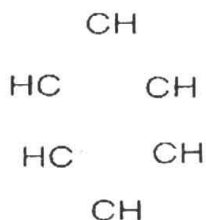
There are two types of Homocyclic compounds.

- a) Aromatic compounds b) Alicyclic compounds

Q.14 Define aromatic compound. Give example.

Ans: “Those homocyclic compounds in which at least one benzene ring having six carbon atoms with three alternate double and single bonds are called aromatic compound”.

Example benzene ring.



Q.15 What is the meaning of term aromatic?

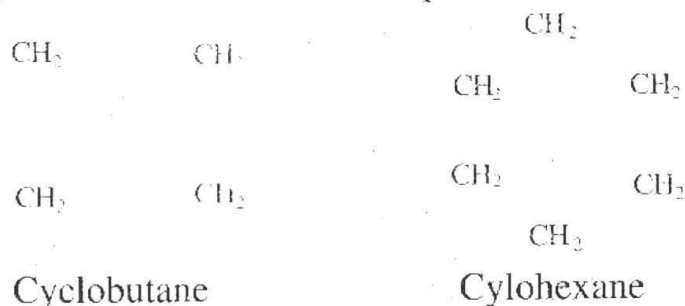
Ans: Term aromatic is derived from Greek word "Aroma" which means fragrant".

Q.16 What are benzenoid compounds?

Ans: Aromatic compounds are also called benzenoid compounds.

Q.17 Define alicyclic or non benzenoid Compounds.

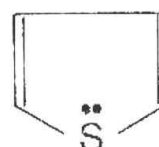
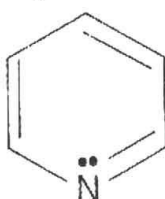
Ans: Carbocyclic or homocyclic compound which do not have benzene ring in their molecules are called alicyclic or non benzenoid compounds.



Q.18 Define Heterocyclic compound. Give example.

Ans: Cyclic compounds that contain one or more atoms other than carbon atoms in their rings are called heterocyclic compounds.

For examples:



Q.19 Define catenation.

Ans: The ability of carbon atoms to link with other carbon atoms to form long chains and large rings is called catenation.

Q.20 What are two basic conditions for elements to exhibit catenation?

Ans: Two basic conditions for catenation are:

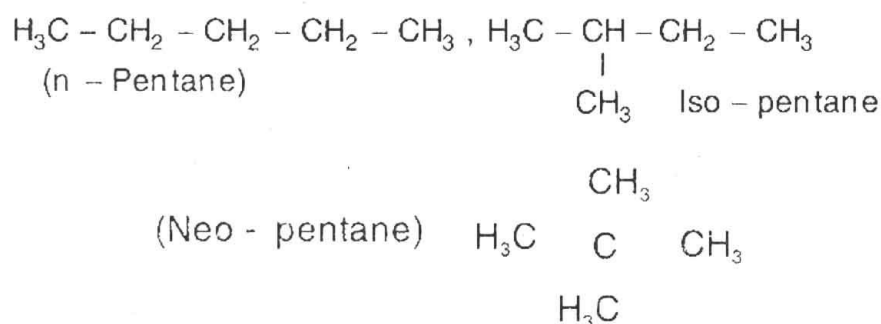
- Element should have valency two or more greater than two.
- Bond made by an element with its own atoms should be stronger than the bonds made by the element with other atoms especially oxygen.

Q.21 Define Isomerism. Give examples.

Ans: Isomerism

The compounds having same molecular formulae but different arrangement of atoms in their molecules or different structural formulae are called isomers and the phenomenon is

e.g. pentane (C_5H_{12}) has three isomers



Ans: To get stability, carbon completes its octet by making four covalent bond with other atoms.

Ans: Melting points and boiling point of organic compounds are low because carbon forms weak covalent bond with other carbon atoms which break up easily.

Ans: Due to presence of covalent bonds, organic compounds are poor conductor of electricity.

Ans: We get organic compounds by Destructive distillation of coal and by Fractional distillation of Petroleum.

Ans: Organic compounds have large diversity due to

- a) catenation b) isomerism c) weak covalent bond
d) Multiple bonds forming ability of carbon.

Ans: Coal is blackish, complex mixture of compounds of carbon, hydrogen and oxygen. It also consists of small amount of nitrogen and sulphur compounds.

Q.28 Define Carbonization.

Ans: Conversion of wood into coal is called carbonization. It is very slow bio-chemical process. It takes place in the absence of air under high pressure and high temperature over a long period of time.

Q.29 Write down the names of different types of coal.

Ans: Coal is of following four types.

a) Peat b) lignite c) Bituminous d) anthracite

Q.30 Define Destructive Distillation?

Ans: Breakdown of coal into smaller compounds by strong heating of coal in the absence of air is called destructive distillation.

Q.31 Write down the names of product obtained by destructive distillation of coal.

Ans: Products obtained by destructive distillation of coal are;

a) Coal Gas b) Ammonical Liquor c) Coal tar d) coke

Q.32 What is Pitch? What is its use?

Ans: Black residue of coal tar is called Pitch. In common words it is also known as "look". It is used for surfacing of roads and roofs.

Q.33 What is petroleum? What is its composition?

Ans: Petroleum is a dark brownish or greenish black coloured viscous liquid. It is a complex mixture of several solid, liquid or gaseous hydrocarbons in water mixed with salts and earth particles.

Q.34 What is composition of natural gas?

Ans: Natural gas is a mixture of low molecular mass hydrocarbons. The main component about 85% is methane, along with other gases i.e. ethane, butane, propane.

Q.35 What types of compounds are synthesized by plants?

Ans: Living plants synthesized macro-molecule e.g. carbohydrates, proteins, oils and vitamins plants also produce gums, rubber, medicines etc.

Q.36 What are alkanes? Give their general formula?

Ans: Alkanes are saturated hydrocarbons or paraffin's (Para - little , affines – affinity). Their general formula is C_nH_{2n+2} . Where n is the number of carbon atoms.

Q.37 Define alkyl radical. How they formed?

Ans: Alkyl Radicals are derivatives of alkanes they are formed by removal of one of the hydrogen atom of an alkane and are represented by "R.". Their general formula is C_nH_{2n+1}

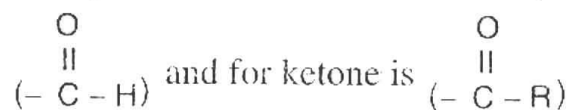
Q.38 What is Functional group? Give example.

Ans: "An atom or group of atom or presence of double or triple bond which determines the characteristics properties of an organic compound is known as the functional group".

For example - OH - hydroxyl group is the functional group of alcohol which give characteristic properties of alcohols.

Q.39 What is functional group for aldehyde and ketone?

Ans: Functional groups for aldehyde and ketone are



Q.40 What is functional group for ether and carboxylic compounds?

Ans: Functional group for ether is $(\text{R}-\text{O}-\text{R})$ and for carboxylic compound is $\begin{array}{c} \text{O} \\ \parallel \\ (\text{R}-\text{C}-\text{OH}) \end{array}$

Q.41 What is ester linkage?

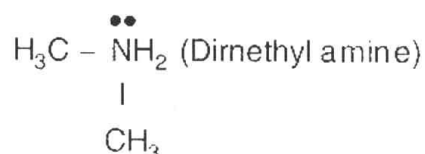
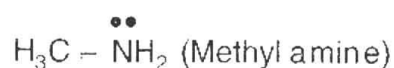
Ans: Organic compounds in which carbon has $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{OR}' \end{array}$ linkage is called ester linkage.

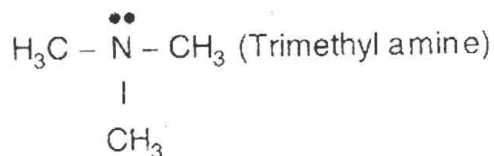
These compounds are called esters.

Q.42 What are amines give examples?

Ans: "The organic compounds containing carbon, hydrogen and nitrogen as a functional group $(-\text{NH}_2)$ are called amines. $(-\text{NH}_2)$ is functional group and their general formula is $\text{R}-\text{NH}_2$.

Examples:





Q.43 What is functional group for an alkyl Halide?

Ans: Functional group for alkyl halide is R – X where R is alkyl radical and X is halogen i.e. F, Cl, Br or I., etc.

Q.44 Give functional group for alkene and alkyne.

Ans: For alkene double bond (=) is functional group and triple bond (≡) is functional group for alkyne.

e.g. $\text{H}_2\text{C} = \text{CH}_2$ (ethene)

$\text{HC} \equiv \text{CH}$ (ethyne)

Q.45 Write down the name of tests for detection of double bond (unsaturation)?

Ans: i) Bromine water test **and**

ii) Baeyer's test is used to detect unsaturation.

Q.46 What are identification test for alcoholic group?

Ans: i) sodium metal test and

ii) Ester formation test is used to test alcoholic group.

Q.47 How carboxylic group is identified?

Ans: Carboxylic group is identified by

i) Litmus test

ii) Sodium bicarbonate test.

Q.48 Give identification test for aldehyde group?

Ans: Aldehydes are identified by

i) Sodium bisulphate test

ii) Fehling's solution Test

Q.49 What are identification test for ketonic group?

Ans: ketone group is identified by

i. Phenyl hydrazine Test

ii. Sodium Nitroprusside Test

iii. Fehling Solution Test

Q.50 Write down the name of identification test for primary Amines?

Ans: Carbyl amine test is used to identify primary amine group.

Q.51. Point out the properties of carbon which are responsible for formation of long chains of carbon atom compounds?

Ans: Catenation is the process which is responsible for formation of long chains of carbon atom compounds.

Q.52 Name the gases which are found in coal gas.

Ans: Carbon monoxide hydrogen and methane gases are present in coal gas.

Q.53 Is coal tar a compound? What is importance of coal tar?

Ans: No it is a mixture of more than 200 different organic compounds, mostly chromatic. The importance of coal tar is, the compounds obtained from coal tar are used to synthesize drugs, dyes. Paints, explosives, varnishes, plastics, synthetic fibre and pesticides.

Q.54 What is coke? For what purpose it is used?

Ans: When coal is subjected to destructive distillation it loses all its volatile components and leaves behind solid residue called coal. It is used as a reducing agent in the extraction of metal especially iron. It is also used as fuel.

Q.55 Which is the best quality of coal?

Ans: Anthracite is the best quality of coal. It contains 90% of carbon.

Q.56 What is destructive distillation?

Ans: The strong heating of coal in the absence of air is called destructive distillation

Q.57 Define petroleum.

Ans: Petroleum is a dark brownish or greenish black coloured viscous liquid. It is a complex mixture of several solid, liquid or gaseous hydrocarbons in water mixed with salts and earth particles.

Q.58 What types of compounds are synthesized by plants?

Ans: Living plants synthesized macro-molecules e.g. carbohydrates, proteins, oils and vitamins.

Q.59 What is the basic unit of carbohydrates and how it is synthesized?

Ans: The basic unit of all carbohydrates is glucose which is synthesized by plant through photosynthesis.

Q.60 CNG stands for.

Ans: CNG stands for compressed natural gas.

Q.61 What is the difference between aldehyde and ketones?

Ans:

Aldehydes	Ketenes
i. Aldehyde family consists of functional group $\begin{array}{c} \text{O} \\ \parallel \\ \text{---C-H} \end{array}$	i. Ketone family consist of functional group $\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---} \end{array}$
ii. Their general formula is RCHO eg $\begin{array}{c} \text{O} \\ \parallel \\ \text{H-C-H} \end{array}$ Formaldehyde	ii. Their general formula is $\begin{array}{c} \text{O} \\ \parallel \\ \text{R-C-OR'} \end{array}$ eg, $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_3\text{C-C-CH}_3 \end{array}$ acetaldehyde

Q62. What is the importance of natural gas?

Ans: The importance of natural gas are

- Natural gas is used as fuel in homes as well as in industries.
- It is used as fuel in automobiles as compressed natural gas (CNG).
- Natural gas is also used to make carbon black and fertilizer.

Q63. Justify that organic compounds are used as food.

Ans: The food we eat daily such as milk, eggs, meats, vegetables, etc, contain carbohydrates, proteins, fats, vitamins etc are all organic stuff.

Q64. What is the difference between n-propyl and isopropyl? explain with structure.

Ans:

n-propyl	Iso-propyl
When terminal hydrogen is removed from propane it is called n-propyl e.g. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 -$ n-propyl	When hydrogen is removed from central carbon is called iso-propyl e.g.