



FOR GOD AND COUNTRY

ST. LAWRENCE HIGH SCHOOL

A Jesuit Christian Minority Institution



Study Material

Subject: Physical Science

CLASS – 10

Topic: Organic Chemistry

Date: 20/06/2020

(i) Very Short Answer Type Questions

Q.1. What is the common element of organic compounds ?

Ans. Carbon is the common element of organic compounds.

Q.2. What is Catenation ?

Ans. Catenation is the property of organic compounds where a large number of carbon atom link together.

Q.3. What is monomer ?

Ans. Monomer is a small organic molecule that joins with other similar molecules to form a polymer.

Q.4. What is mustard gas ?

Ans. It is a gas produced from ethylene.

Q.5. What is a primary alcohol ?

Ans. It is a type of alcohol in which the carbon atom bearing the OH group contains at least 2 hydrogen atoms.

Q.6. What is an unsaturated hydrocarbon ?

Ans. It is an organic compound in which at least two carbon atoms join by covalent double or triple bond.

Q.7. What is a saturated hydrocarbon ?

Ans. It is hydrocarbon in which carbon atoms are linked with single covalent bond.

Q.8. What is a functional group ?

Ans. Functional group is a group of atoms present in organic compounds of a class determining almost the common properties of the compounds.

Q.9. What type of bonding exists in organic compounds ?

Ans. Covalent type of bonding exists in organic compounds.

Q.10. What is DNA ?

Ans. DNA stands for deoxyribonucleic acid.

Q.11. What are biomolecules ?

Ans. These are some organic molecules involved in metabolic process.

Q.12. What is isomerism ?

Ans. Isomerism is the property due to which a group of organic compounds of same molecular formula but differ from each other in their structural formulae and properties.

Q.13. State one use of methane.

Ans. Use of methane : As a domestic and industrial fuel.

Q.14. State one use of ethylene.

Ans. Use of ethylene : To prepare polythene.

Q.15. State one use of acetylene ?

Ans. Use of acetylene : To produce benzene, artificial rubber.

Q.16. What are the essential two components of amino acids ?

Ans. The essential two components of amino acids are carboxyl ($-\text{COOH}$) and an amino ($-\text{NH}_2$) group attached to the same carbon atom.

Q.17. Name and write down the formula of a ketone.

Ans. The name of a ketone is acetone (CH_3COCH_3).

Q.18. Which gas burns in a carbide gas lamp ?

Ans. Acetylene gas burns in a carbide gas lamp.

Q.19. What change of litmus will occur in alcohol ?

Ans. Alcohol is a neutral compound, so no change of colour of a litmus paper dipped in it occurs.

Q.20. What is the functional group of alcohol ?

Ans. Hydroxyl group ($-\text{OH}$) is the functional group of alcohol.

Q.21. Which gas is known as marsh gas ? Why is it called so ?

Ans. Methane gas is known as marsh gas. It is present in marshy (i.e. always watery) lands, so it is called marsh gas.

Q.22. Name three hydrocarbons available from coal gas.

Ans. Methane, ethylene, acetylene are three hydrocarbons available from coal gas.

Q.23. Give two examples of alkyne with corresponding formulae.

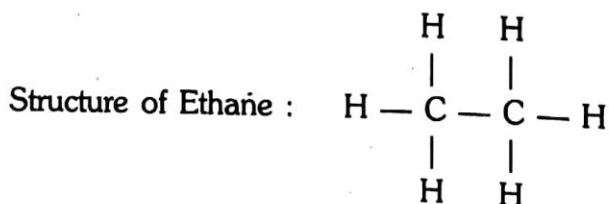
Ans. Two alkyne : (a) Acetylene ($\text{HC} \equiv \text{CH}$)
(b) Propyne ($\text{CH}_3 - \text{C} \equiv \text{C} - \text{H}$)

Q.24. What is alkane ? Write down its general formula.

Ans. An alkane is an open-chained saturated hydrocarbon. The general formula of alkane : $\text{C}_n\text{H}_{2n+2}$ (n - integer)

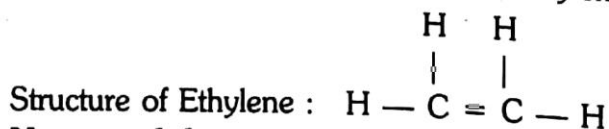
Q.25. Name and draw structural formula of a saturated organic compound.

Ans. Saturated organic compound : Ethane



Q.26. Name and draw structural formula of an unsaturated organic compound.

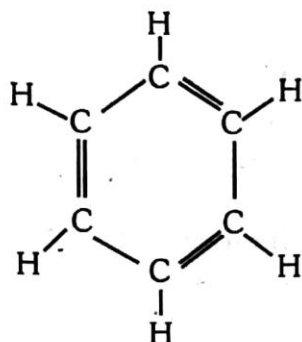
Ans. Unsaturated organic compound : Ethylene



Q.27. Name and draw structural formula of an aromatic compound.

Ans. Aromatic compound : Benzene

Structure of Benzene :



Q.28. Name three organic compounds used in daily life.

Ans. Three organic compounds used in daily life : Carbohydrates, proteins, glucose.

Q.29. Name two polymers.

Ans. Two polymers are : (a) Polythene
(b) Teflon

Q.30. What is hydrocarbon ? Name the simplest hydrocarbon.

Ans. Hydrocarbon : A binary compound formed of carbon and hydrogen by covalency is called hydrocarbon.

Simplest hydrocarbon : Methane (CH₄).

Q.31. What is PVC ? State its use.

Ans. PVC : It is polyvinyl chloride, its monomer is vinyl chloride.

Uses of PVC : To prepare water and rain pipes, toys etc.

Q.32. Why butane is used in LPG ?

Ans. Butane is the most convenient fuel for domestic use because both isomers of butane (*n*-butane and isobutane) are easily liquefied and can be transported in steel cylinders easily.

Q.33. How does the boiling point of alkane changes ?

Ans. The boiling point generally increase with increase in the number of carbon atoms.

Q.34. What is mineral oil ?

Ans. Oil obtained from petroleum is called mineral oil.

Q.35. What is fire damp ?

Ans. The gas responsible for explosions in coal mines is methane and is also known as fire damp.

Q.36. Why are the alkenes more reactive than alkanes ?

Ans. The chemical reactivity of alkenes are more than alkanes due to presence of π -electron in alkenes.

Q.37. How many σ and π bonds are present in ethylene ?

Ans. Ethylene has one π -bond and five σ -bonds.

Q.38. Why the hydrogens of alkynes are acidic in nature ?

Ans. Hydrogen has appreciable acidic character when bond to a carbon atom of a (C = C) triple bond (in case of alkyne).

Q.39. What are the end products of combustion of hydrocarbons ?

Ans. End products of combustion of all hydrocarbons are carbon dioxide and water.

Q.40. What is the most oxidised form of hydrocarbon ?

Ans. RCOOH (R = alkyl group) represents the most oxidised form of hydrocarbons.

Q.41. What is sabatier and senderens reaction ?

Ans. Hydrogenation of unsaturated aliphatic hydrocarbons in presence of nickel catalyst is called sabatier and senderens reaction.

Q.42. What is the condition for halogenation of alkanes ?

Ans. Halogenation of alkanes does not occur in absence of light or heat.

Q.43. What is aldose ?

Ans. Carbohydrate containing aldehyde ($-C = O$) group is called aldose.



Q.44. What is ketose ?

Ans. Carbohydrate containing keto ($>C = O$) group is called ketose.

Q.45. Give an example of a monosaccharide.

Ans. Glucose ($C_6H_{12}O_6$)

Q.46. Give an example of polysaccharide.

Ans. Starch.

Q.47. What is pyrofax ?

Ans. Propane is used as a fuel under the name pyrofax.

Q.48. What is an artificial camphor ?

Ans. Hexachloroethane is called artificial camphor.

Q.49. What is TEL ?

Ans. TEL is commonly used antiknock compound tetraethyl lead, $[(C_2H_5)_4 Pb]$.

Q.50. What is AK - 33X ?

Ans. To avoid lead pollution, a new compound called AK - 33X (cyclopentadienyl manganese carbonyl) is used as an antiknock these days.

Q.51. What is dextrose ?

Ans. Glucose is called grape sugar or dextrose.

Q.52. What is fruit sugar ?

Ans. Fructose is called laevolase or fruit sugar and is the sweetest sugar.

Q.53. What is milk sugar ?

Ans. Lactose is known as milk sugar.

Q.54. What is amyllum ?

Ans. Starch is called amyllum.

Q.55. State an example of globular protein.

Ans. Insulin is an example of globular protein.

Q.56. What is nucleotide ?

Ans. Both DNA and RNA are polymers of a basic repeating unit, called a nucleotide.

Q.57. What is the sugar present in RNA ?

Ans. Sugar present in RNA is ribose.

Q.58. What is the sugar present in DNA ?

Ans. Sugar present in DNA is 2-deoxyribose.

Q.59. What are the main functions of nucleic acids ?

Ans. Main functions of nucleic acids are the direct synthesis of protein in living cells and transference of genetic information.

Q.60. Who discovered the double helix structure of DNA ?

Ans. The double helix structure of DNA was proposed by Watson and Crick (1953).

Q.61. What is called gene ?

Ans. DNA sequence that acts as a code for a specific protein or a polypeptide is called gene.

Q.62. What is called an anabolism ?

Ans. Anabolism is the process in which macro molecules are synthesised by the cell.

Q.63. What is called catabolism ?

Ans. Catabolism is the process in which macro molecules break into smaller ones.

Q.64. What is metabolism ?

Ans. Metabolism is the combination of anabolism and catabolism.

Q.65. What is proteases ?

Ans. Proteases is the breakdown of large protein molecules into peptides.

Q.66. Who converts peptides into amino acids ?

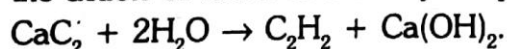
Ans. Peptidases convert peptides into amino acids.

Q.67. What is soda lime ?

Ans. Soda lime is a mixture of sodium hydroxide and calcium oxide ($\text{NaOH} + \text{CaO}$).

Q.68. What is the source of acetylene ?

Ans. The source of acetylene is calcium carbide (CaC_2) from which it is obtained by the action of water at ordinary temperature.



(ii) Fill in the blanks

Q.1. — is the abbreviation of polyvinyl chloride.

Ans. PVC.

Q.2. The monomer of — is tetrafluoroethene.

Ans. teflon.

Q.3. — is a large molecule made up of many similar units of small molecules.

Ans. Polymer.

Q.4. The compound bearing the monovalent functional group — CHO are _____.

Ans. aldehydes.

Q.5. Alkynes are hydrocarbons where at least two carbon atoms combine with a — bond.

Ans. triple.

Q.6. The function group of organic acid is — .

Ans. —COOH.

Q.7. The functional group of — is —NH₂.

Ans. amines.

Q.8. Hydrocarbons in which at least two carbon atoms join with a double bond are called — .

Ans. alkenes.

Q.9. Catenation is the property where a large number of — atoms link together to form large organic molecules.

Ans. carbon.

Q.10. Proteins contain various kinds of — acids.

Ans. amino

Q.11. RNA is the abbreviation for — acid.

Ans. ribonucleic.

Q.12. — is a complex organic compound responsible for reproduction and maintaining heredity.

Ans. Gene.

Q.13. — and proteins are the polymerisation products of amino acids.

Ans. Polypeptides.

Q.14. Amino acids are the end products of the digestion of —.

Ans. proteins.

Q.15. Polypeptide chains are the chains of —.

Ans. polymers of amino acids.

Q.16. Sucrose on hydrolysis give one — and one fructose molecule.

Ans. glucose.

Q.17. Starch is — saccharide.

Ans. poly.

Q.18. Carbohydrates containing a keto group are called —.

Ans. ketoses.

Q.19. Vitamin C is soluble in —.

Ans. water.

Q.20. Globular proteins are — in water.

Ans. soluble.

Q.21. The carbon chains in alkenes are —.

Ans. zig-zag.

Q.22. Hydrocarbons are more soluble in — solvents.

Ans. non-polar.

Q.23. Ethane on combustion produces —.

Ans. Carbon dioxide and water.

Q.24. Al_4C_3 evolves — when treated with water.

Ans. methane.

Q.25. Halogenation of alkanes does not occur in —.

Ans. dark.

Q.26. Wurtz reaction is used for the preparation of —. I

Ans. alkanes.

Q.27. Melting point of organic compounds are _____ than of inorganic compounds.

Ans. lower.

Q.28. Organic compounds are _____ and inorganic compounds are.

Ans. covalent, electrovalent

Q.29. Kekule proposed C is _____ and Vant Hoff proves C is _____.

Ans. tetravalent, covalent

(iii) Multiple Choice Questions

Q.1. C_nH_{2n+2} is general formula of

- (A) Alkenes (B) Alkynes (C) Alkanes (D) Ring

Ans. (C) Alkanes

Q.2. Aliphatic hydrocarbons with double bond :

- (A) are saturated (B) generally add bromine
(C) belong to the acetylene family group (D) belong to the paraffin

Ans. (B) generally add bromine

Q.3. When sodium acetate is heated with soda lime, the reaction is called :

- (A) Dehydration (B) Decarboxylation
(C) Dehydrogenation (D) Dehydrohalogenation

Ans. (B) Decarboxylation

Q.4. Ethylene can be prepared by reacting ethyl bromide with :

- (A) Alcoholic KOH (B) Amoniacal $AgNO_3$
(C) Acidified $KMnO_4$ (D) C and H_2SO_4

Ans. (A) Alcoholic KOH.

Q.5. The product obtained when chloroform is treated with silver powder is :

- (A) Ethylene (B) ethane (C) Acetylene (D) Methane

Ans. (C) Acetylene

Q.6. A metallic carbide on treatment with water gives a colourless gas which burns readily in air and gives a precipitate with ammoniacal silver nitrate. The gas is :

- (A) Methane (B) Ethane (C) Ethylene (D) Acetylene

Ans. (D) Acetylene

Q.7. A gas decolourises bromine in CCl_4 and forms a precipitate with ammoniacal silver nitrate. The gas is :

- (A) Acetylene (B) Ethylene (C) Methane (D) Ethane

Ans. (B) Ethylene

Q.8. The LHCC bond angle in ethylene is :

- (A) 90° (B) 120° (C) $109^\circ 28'$ (D) 180°

Ans. (B) 120°

Q.9. Saturated hydrocarbons mainly undergo :

- (A) Addition reactions (B) Substitution reactions
(C) Elimination reaction (D) Polymerisation

Ans. (B) Substitution reactions

Q.10 Which of the following bonds is strongest ?

- (A) $\text{>C}-\text{C}<$ (B) $\text{>C}=\text{C}<$ (C) $-\text{C}\equiv\text{C}-$ (D) none of these

Ans. (C) $-\text{C}\equiv\text{C}-$

Q.11. The reaction $\text{C}_n\text{H}_{2n} + \text{H}_2 \xrightarrow[573\text{K}]{\text{Ni}} \text{C}_n\text{H}_{2n+2}$ is called :

- (A) Kolbe's reaction (B) Annizzaro's reaction
(C) Sabatier and Senderen's reaction (D) Clemmensen reaction

Ans. (C) Sabatier and senderen's reaction

Q.12. Both methane and ethane may be obtained in one step reaction from

- (A) C_2H_4 (B) CH_3I (C) CH_3OH (D) $\text{C}_2\text{H}_5\text{OH}$

Ans. (B) CH_3I

Q.13. Which of the following liberates methane on treatment with water ?

- (A) Silicon carbide (B) Calcium carbide
(C) Aluminium carbide (D) Iron carbide

Ans. (C) Aluminium carbide

Q.14. On heating sodium acetate with sodium hydroxide, the gas evolved will be :

- (A) Acetylene (B) Ethane (C) Methane (D) Ethylene

Ans. (C) Methane.

Q.15. A compound having a triple bond is more reactive because :

- (A) there is a strain in the molecule (B) valency of hydrogen is different
(C) electron density is higher (D) none

Ans. (C) electron density is higher.

Q.16. Acidic hydrogen is present in :

- (A) Ethyne (B) Ethene (C) Benzene (D) Ethane

Ans. (A) Ethyne

Q.17. Final product of the oxidation of hydrocarbon is :

- (A) CO_2 and H_2O (B) Alcohol (C) Acid (D) Aldehyde

Ans. (A) CO_2 and H_2O .

Q.18. General formula for alkenes is :

- (A) C_nH_{2n} (B) $\text{C}_n\text{H}_{2n+2}$ (C) $\text{C}_n\text{H}_{2n-2}$ (D) $\text{C}_{2n}\text{H}_{2n}$

Ans. (A) C_nH_{2n}

Q.19. Marsh gas mainly contains :

- (A) H_2S (B) CO (C) CH_4 (D) C_2H_2

Ans. (C) CH_4

Q.20. Which of the following gases is used in welding ?

- (A) C_2H_4 (B) C_2H_2 (C) CH_4 (D) C_2H_6

Ans. (B) C_2H_2

Q.21. Which hydrocarbon is used in making printer's ink and paints ?

- (A) CH_4 (B) C_2H_6 (C) C_2H_4 (D) C_2H_2

Ans. (A) CH_4

Q.22. The sugar which is stored in the liver to act as reserve food is :

- (A) Glycogen (B) Glucose (C) Sucrose (D) Fructose

Ans. (A) Glycogen.

Q.23. Sweetest among all the sugar is :

- (A) Fructose (B) Glucose (C) Sucrose (D) Lactose

Ans. (A) Fructose

Q.24. The main structural feature of protein is :

- (A) Ether linkage (B) Peptide linkage (C) Ester linkage (D) All the above

Ans. (B) Peptide linkage

Q.25. Which of the following is protein ?

- (A) Terry cotton (B) Natural silk (C) Nylon (D) Rayon

Ans. (B) Natural silk.

Q.26. Which of the following contains nitrogen ?

- (A) Fats (B) Proteins (C) Carbohydrate (D) None

Ans. (B) Proteins

Q.27. Which of the following is an organic compound ?

- (A) urea (B) NaHCO_3
(C) CO_2 (D) NH_4CNS

Ans. (A) urea

Q.28. Organic compounds are :

- (A) high melting (B) low melting
(C) soluble in water (D) conducts electricity in molten state

Ans. (B) low melting

Q.29. Tetravalence of carbon is proposed by :

- (A) Wohler (B) Lavoisier
(C) Kekule (D) Vant Hoff

Ans. (C) Kekule

Q.30. Tetrahedral model of carbon compounds proposed by :

- (A) Kekule (B) Rutherford
(C) Wohler (D) Vant Hoff

Ans. (D) Vant Hoff

Q.31. The number of covalent bonds present in ethane is :

- (A) 4 (B) 6
(C) 7 (D) 9

Ans. (C) 7

Q.32. Which molecule has tetrahedral geometry ?

- (A) methane (B) ethylene
(C) acetylene (D) carbon dioxide

Ans. (A) methane

Q.33. Which does not react with metallic sodium ?

- (A) methyl alcohol (B) ethyl alcohol
(C) acetic acid (D) dimethyl ether

Ans. (D) Dimethyl ether.

Q.34. How many positional isomers are possible with the molecular formula C_4H_8O ?

- (A) 1 (B) 2
(C) 3 (D) 4

Ans. (B) 2

Q.35. How many functional isomers are possible with molecular formula C_4H_8O ?

- (A) 1 (B) 3
(C) 2 (D) 4

Ans. (C) 2

Q.36. IUPAC name of $CH_3CH_2CH_2OH$ is :

- (A) propan-1-ol (B) n-propanol
(C) isopropanol (D) propyl alcohol

Ans. (A) Propan-1-ol