CLASS 10 CHEMISTRY PREVIOUS YEAR QUESTIONS
CARBON & IT'S COMPOUNDS

Question 1. Covalent compounds have low melting and boiling point. Why? (2020)

Question 2. What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties. (Delhi 2016)

Question 3. What are covalent bonds? Show their formation with the help of electron dot structure of methane. Why are covalent compounds generally poor conductors of electricity? (Delhi 2013C)

Question 4. Give reasons for the following:
(i) Element carbon forms compounds mainly by covalent bonding.
(ii) Diamond has high melting point.
(iii) Graphite is a good conductor of electricity. (3/5, Foreign 2011)

Question 5. What is methane? Draw its electron dot structure. Name the type of bonds formed in this compound. Why are such compounds
(i) poor conductors of electricity and
(ii) have low melting and boiling points?
What happens when this compound burns in oxygen? (Delhi 2019)

Question 6. Elements forming ionic compounds attain noble gas electronic configuration by either gaining or losing electrons from their valence shells. Explain giving reason why carbon cannot attain such a configuration in this manner to form its compounds. Name the type of bonds formed in ionic compounds and in the compounds formed by carbon. Also explain with reason why carbon compounds are generally poor conductors of electricity. (Foreign 2015, AI 2014)

Question 7. State the reason why carbon can neither form C^{4+} cations nor C^{4-} anions, but forms covalent compounds. Also state reasons to explain why covalent compounds :
(i) are bad conductors of electricity?
(ii) have low melting and boiling points? (Delhi 2014)

Question 8. Name a cyclic unsaturated carbon compound. (2020)

Question 9. Assertion (A) : Following are the members of a homologous series :
CH_3OH, CH_3CH_2OH, $CH_3CH_2CH_2OH$
Reason (R) : A series of compounds with same functional group but differing by $-CH_2$ unit is called homologous series.
(a) Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true. (2020)

Question 10. Write the molecular formula of first two members of homologous series having functional group -Cl. (Delhi 2017)

Question 11. Write the molecular formula of first two members of homologous series having

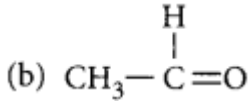
functional group -OH. (Delhi 2017)

Question 12. Write the molecular formula of the 2nd and 3rd member of the homologous series whose first member is ethene. (AI 2017)

Question 13. Write the molecular formula of the 2nd and 3rd member of the homologous series whose first member is methane. (AI 2017)

Question 14. Write the next homologue of each of the following:
(i) C_2H_4
(ii) C_4H_6 (Delhi 2016)

Question 15. Name the following compounds :
(a) $CH_3 – CH_2 – OH$

(b) 

Question 16. Select saturated hydrocarbons from the following : C_3H_6; C_5H_{10}; C_4H_{10}; C_6H_{14}; C_2H_4

Question 17. Write the name and structure of an alcohol with three carbon atoms in its molecule. (AI 2016)

Question 18. Write the name and structure of an alcohol with four carbon atoms in its molecule. (AI 2016)

Question 19. Write the name and structure of an aldehyde with four carbon atoms in its molecule. (AI 2016)

Question 20. Which element exhibits the property of catenation to maximum extent and why? (Foreign 2016)

Question 21. Write the name and molecular formula of the fourth member of alkane series. (Foreign 2016)

Question 22. What is homologous series of carbon compounds? (Foreign 2016)

Question 23. Write the name and formula of the 2nd member of homologous series having general formula C_nH_{2n}. (Delhi 2015)

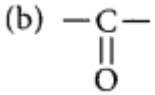
Question 24. Write the name and formula of the 2nd member of homologous series having general formula C_nH_{2n+2}. (Delhi 2015)

Question 25. Write the name and formula of the 2nd member of homologous series having general formula C_nH_{2n-2}. (Delhi 2015)

Question 26. Write the number of covalent bonds in the molecule of ethane. (AI2015, Delhi 2014)

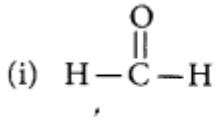
Question 27. Write the number of covalent bonds in the molecule of butane, C_4H_{10}. (AI 2015)

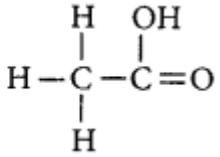
Question 28. Write the name of each of the following functional groups: (Foreign 2015, Delhi 2013)
(a) -OH

(b) 

Question 29. Write the name and molecular formula of the first member of the homologous series of alkynes. (Foreign 2015)

Question 30. Define the term functional group. Identify the functional group present in

(i) 

(ii) 

Question 31. Name the functional group present in each of the following organic compounds:
(i) C_2H_5Cl
(ii) C_2H_5OH (Delhi 2012)

Question 32. Write the name and formula of the second member of the carbon compounds having functional group -OH. (AI 2012)

Question 33. Write the name and formula of the first member of the series of carbon compounds having functional group (Foreign 2012)

Question 34. Butanone is a four-carbon per molecule compound. Name the functional group present in it. (Foreign 2011)

Question 35. State two properties of carbon which lead to a very large number of carbon compounds. (2/5, AI 2011)

Question 36. Carbon, a member of group 14, forms a large number of carbon compounds estimated to be about three million. Why is this property not exhibited by other elements of this group? Explain. (2020)

Question 37. (a) Why are most carbon compounds poor conductors of electricity?
(b) Write the name and structure of a saturated compound in which the carbon atoms are arranged in a ring. Give the number of single bonds present in this compound. (2018)

Question 38. An aldehyde as well as a ketone can be represented by the same molecular formula, say C_3H_6O. Write their structures and name them. State the relation between the two in the language of science. (AI 2016)

Question 39. What is meant by isomers? Draw the structures of two isomers of butane, C_4H_{10}. Explain why we cannot have isomers of first three members of alkane series. (Delhi 2015, Foreign 2014)

Question 40. Write the molecular formula of the following compounds and draw their electron-dot structures:
(i) Ethane
(ii) Ethene
(iii) Ethyne (Foreign 2015)

Question 41. What is meant by functional group in carbon compounds? Write in tabular form the structural formula and the functional group present in the following compounds :
(i) Ethanol
(ii) Ethanoic acid (Foreign 2015)

Question 42. Why is homologous series of carbon compounds so called? Write the chemical formula of two consecutive members of any homologous series and state the part of these compounds that determines their (i) physical and (ii) chemical properties. (Foreign 2015, AI2014, Delhi 2013)

Question 43. State the meaning of functional group in a carbon compound. Write the functional group present in (i) ethanol and (ii) ethanoic acid and also draw their structures. (Delhi 2014)

Question 44. State the meaning of the functional group in an organic compound. Write the formula of the functional group present in alcohols, aldehydes, ketones and carboxylic acids. (Delhi 2014)

Question 45. What is meant by homologous series of carbon compounds? Write the general formula of (i) alkenes, and (ii) alkynes. Draw the structures of the first member of each series to show the bonding between the two carbon atoms. (AI 2014)

Question 46. Define the term structural isomerism'. Explain why propane cannot exhibit this property. Draw the structures of possible isomers of butane, C_4H_{10}. (AI 2014)

Question 47. (a) What is a homologous series of compounds? List any two of its characteristics. (Foreign 2011)
(b) What is the next higher homologue of C_3H_7OH? What is its formula and what is it called? (Foreign 2011)

Question 48. (a) State the reason why carbon can neither form C^{4+} cations nor C^{4-} anions, but forms covalent bonds. Also state reasons to explain why covalent compounds
(i) are bad conductors of electricity
(ii) have (ow melting and boiling points.
(b) Write the structural formula of benzene, C_6H_6. (AI2019)

Question 49. Explain why carbon forms compounds mainly by covalent bond. Explain in brief two main reasons for carbon forming a large number of compounds. Why does carbon form strong bond with most other elements? (Delhi 2015)

Question 50. What are hydrocarbons? Distinguish alkanes from alkenes and each of them from alkynes, giving one example of each. Draw the structure of each compound cited as example to justify your answer. (Foreign 2014)

Question 51. (a) Define the term'isomers'.
(b) Draw two possible isomers of the compound with molecular formula C_3H_6O and write their names.
(c) Give the electron dot structures of the above two compounds. (Delhi 2013)

Question 52. Explain isomerism. State any four characteristics of isomers. Draw the structures of possible isomers of butane, C_4H_{10}. (AI 2011)

Question 53. Name the process by which unsaturated fats are changed to saturated fats. (Foreign 2015)

Question 54. Write the chemical equation to show what happen when methane is treated with chlorine in the presence of sunlight ? (1/3, Foreign 2014)

Question 55. Write the respective chemical reaction to show what happens when methane is burnt in presence of oxygen? (1/3, Foreign 2014)

Question 56. Write one chemical equation to represent the following type of reaction of organic substances: substitution. (1/3, Foreign 2014)

Question 57. Give reason for the following : Acetylene burns with a sooty flame. (1/5, Foreign 2011)

Question 58. Give reason for the following : Kerosene does not decolourise bromine water while cooking oils do. (1/5, Foreign 2011)

Question 59. What happens when 5% alkaline $KMnO_4$ solution is added drop by drop to warm ethanol taken in a test tube? State the role of alkaline $KMnO_4$ solution in this reaction. (2/3, Foreign 2016)

Question 60. 3 mL of ethanol is taken in a test tube and warmed gently in a water bath. A 5% solution of alkaline potassium permanganate is added first drop by drop to this solution, then in excess.
(i) How is 5% solution of $KMnO_4$ prepared?
(ii) State the role of alkaline potassium permanganate in this reaction. What happens on adding it in excess?
(iii) Write chemical equation of this reaction. (2020)

Question 61. Two carbon compounds X and Y have the molecular formula C_4H_8 and C_5H_{12} respectively. Which one of these is most likely to show addition reaction? Justify your answer. Also give the chemical equation to explain the process of addition reaction in this case. (Delhi 2017)

Question 62. The molecular formula of two carbon compounds are C_4H_8 and C_3H_8. Which one of the two is most likely to show addition reaction? Justify your answer. Also give the chemical equation to explain the process of addition reaction in this case. (Delhi 2017)

Question 63. What is an oxidising agent? What happens when an oxidising agent is added to propanol? Explain with the help of a chemical equation. (Delhi 2016)

Question 64. Draw the electron-dot structure for ethyne. A mixture of ethyne and oxygen is burnt for welding. In your opinion, why cannot we use a mixture of ethyne and air for this purpose? (AI 2015)

Question 65. Write the name and general formula of a chain of hydrocarbons in which an addition reaction with hydrogen is possible. State the essential condition for an addition reaction. Stating this condition, write a chemical equation giving the name of the reactant and the product of the reaction. (AI 2015, Delhi 2014)

Question 66. Why are certain compounds called hydrocarbons? Write the general formula for homologous series of alkanes, alkenes and alkynes and also draw the structure of the first member of each series. Write the name of the reaction that converts alkenes into alkanes and also write a chemical equation to show the necessary conditions for the reaction to occur. (AI 2017)

Question 67. What are hydrocarbons? Write the name and general formula of
(i) saturated hydrocarbons
(ii) unsaturated hydrocarbons, and draw the structure of one hydrocarbon of each type. How can an unsaturated hydrocarbon be made saturated? (AI 2012)

Question 68. (a) With the help of a suitable example, explain the process of hydrogenation mentioning the conditions of the reaction and any one change in physical property with the formation of the product. (Delhi 2015, 2013, Foreign 2012)
(b) How does a saturated hydrocarbon react with chlorine? Write chemical equation for it. What type of reaction is it called and why? (Foreign 2012)

Question 69. Assertion (A) : Esterification is a process in which a sweet smelling substance is produced.
Reason (R): When esters react with sodium hydroxide, an alcohol and sodium salt of carboxylic acid are obtained.
(a) Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true. (2020)

Question 70. Assertion (A) : Ethanoic acid is also known as glacial acetic acid.

Reason (R) : The melting point of pure ethanoic acid is 290 K and hence it often freezes during winters in cold climates.
(a) Both (A) and (R) are true and (R) is the correct explanation of the assertion (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true. (2020)

Question 71. Draw the structure for ethanoic acid molecule, CH_3COOH. (AI 2011)

Question 72. A compound 'X' on heating with excess cone, sulphuric acid at 443 K gives an unsaturated compound 'Y'. 'X' also reacts with sodium metal to evolve a colourless gas 'Z'. Identify 'X', 'Y' and 'Z'. Write the equation of the chemical reaction of formation of 'Y' and also write the role of sulphuric acid in the reaction. (2018)

Question 73. Write the chemical equations to show what happens when
(i) an ester reacts with a base?
(ii) ethanol reacts with ethanoic acid in the presence of sulphuric acid? (2/3, Foreign 2014)

Question 74. Write the respective chemical equations to show what happens when
(i) ethanol is heated with concentrated sulphuric acid at 443 K ?
(ii) ethanol reacts with ethanoic acid in the presence of an acid acting as a catalyst? (2/3, Foreign 2014)

Question 75. Write one chemical equation to represent each of the following types of reactions of organic substances:
(i) Esterification
(ii) Saponification (2/3, Delhi 2011)

Question 76. Complete the following chemical equations : (Delhi 2017)
(i) $CH_3COOC_2H_5 + NaOH \rightarrow$
(ii) $CH_3COOH + NaOH \rightarrow$
(iii) $C_2H_5OH + CH_3COOH \xrightarrow{Conc.H_2SO_4}$

Question 77. Complete the following chemical equations: (Delhi 2017)
(i) $C_2H_5OH + O_2 \rightarrow$
(ii) $C_2H_5OH \xrightarrow[443\ K]{Conc.H_2SO_4}$
(iii) $CH_3COOH + NaHCO_3 \rightarrow$

Question 78. Write the structural formula of ethanol. What happens when it is heated with excess of cone. H_2SO_4 at 443 K? Write the chemical equation for the reaction stating the role of cone. H_2SO_4 in this reaction. (AI 2017, Delhi 2015, 2013)

Question 79. What happens when (write chemical equation in each case)
(a) ethanol is burnt in air?
(b) ethanol is heated with excess cone. H_2SO_4 at 443 K?
(c) a piece of sodium is dropped into ethanol? (AI 2017)

Question 80. Distinguish between esterification and saponification reaction with the help of the chemical equations for each. State one use of each (i) esters, and (ii) saponification process. (AI 2017, Foreign 2012)

Question 81. Explain esterification reaction with the help of a chemical equation. Describe an activity to show esterification. (AI 2017)

Question 82. When ethanol reacts with ethanoic acid in the presence of cone. H_2SO_4, a substance with fruity smell is produced. Answer the following:
(i) State the class of compounds to which the fruity smelling compounds belong. Write the chemical equation for the reaction and write the chemical name of the product formed.
(ii) State the role of cone. H_2SO_4 in this reaction. (Delhi 2016)

Question 83. Name the compound formed when ethanol is heated in excess of cone, sulphuric acid at 443 K. Also write the chemical equation of the reaction stating the role of cone, sulphuric acid in it. What would happen if hydrogen is added to the product of this reaction in the presence of catalyst such as palladium or nickel? (Delhi 2016, Foreign 2015)

Question 84. Write chemical equation of the reaction of ethanoic acid with the following :
(a) Sodium;
(b) Sodium hydroxide;
(c) Ethanol
Write the name of one main product of each reaction. (AI 2016)

Question 85. On dropping a small piece of sodium in a test tube containing carbon compound 'X' with molecular formula C_2H_6O, a brisk effervescence is observed and a gas 'Y' is produced. On bringing a burning splinter at the mouth of the test tube the gas evolved burns with a pop sound. Identify 'X' and 'Y'. Also write the chemical equation for the reaction. Write the name and structure of the product formed, when you heat 'X' with excess cone, sulphuric acid. (AI 2016)

Question 86. Write three different chemical reactions showing the conversion of ethanoic acid to sodium ethanoate. Write balanced chemical equation in each case. Write the name of the reactants and the products other than ethanoic acid and sodium ethanoate in each case. (AI 2016)

Question 87. Write the nam e and molecular formula of an organic compound having its name suffixed with 'ol' and having two carbon atoms in its molecule. Write balanced chemical equation to indicate what happens when this compound is heated with excess cone. H_2SO_4 and the narpe of main product formed. Also state the role of cone. H_2SO_4 in the reaction. (Foreign 2016)

Question 88. An organic compound 'P' is a constituent of wine. 'P' on reacting with acidified $K_2Cr_2O_7$ forms another compound 'Q'. When a piece of sodium is added to 'Q', a gas 'R' evolves which burns with a pop sound. Identify P, Q and R and write the chemical equations of the reactions involved. (Foreign 2016)

Question 89. List two tests for experimentally distinguishing between an alcohol and a carboxylic acid and describe how these tests are performed. (AI 2015)

Question 90. What are esters? How are they prepared? List two uses of esters. (Delhi 2014)

Question 91. A carboxylic acid (molecular formula, $C_2H_4O_2$) reacts with an alcohol in the presence of an acid catalyst to form a compound 'X'. The alcohol on oxidation with alkaline $KMnO_4$ followed by acidification gives the same carboxylic acid $C_2H_4O_2$. Write the name and structure of (i) carboxylic acid, (ii) alcohol and (iii) the compound 'X' (AI 2014)

Question 92. Write the chemical equation to explain what happens when ethanol is heated with alkaline solution, of potassium permanganate. Mention two physical properties and two uses of ethanol. (Foreign 2014)

Question 93. Write chemical equations to describe two examples of different oxidations of ethanol. List two uses of ethanol. (Foreign 2014)

Question 94. Write the chemical equations to show what happens when

(i) sodium hydroxide is added to ethanoic acid?
(ii) solid sodium hydrogen carbonate is added to ethanoic acid?
(iii) ethanol reacts with sodium? (Foreign 2014)

Question 95. Write chemical equations for what happens when
(i) sodium metal is added to ethanoic acid?
(ii) solid sodium carbonate is added to ethanoic acid?
(iii) ethanoic acid reacts with a dilute solution of sodium hydroxide? (AI 2011)

Question 96. (a) What is a homologous series? Explain with an example.
(b) Define the following terms giving one example of each.
(i) Esterification (ii) Addition reaction (2020)

Question 97. (a) Carry out following conversions :
(i) Ethanol to ethene
(ii) Ethanol to ethanoic acid
(b) Differentiate between addition reaction and substitution reaction. Give one example of each. (2020)

Question 98. Write the chemical formula and name of the compound which is the active ingredient of all alcoholic drinks. List its two uses. Write chemical equation and name of the product formed when this compound reacts with
(i) sodium metal
(ii) hot concentrated sulphuric acid. (Delhi 2019)

Question 99. (a) Define the term isomer.
(b) Two compounds have same molecular formula C_3H_6O. Write the name of these compounds and their structural formula.
(c) How would you bring the following conversions:
(i) Ethanol to ethene
(ii) Propanol to propanoic acid? (AI 2019)

Question 100. A carbon compound 'P' on heating with excess cone. H_2SO_4 forms another carbon compound 'Q' which on addition of hydrogen in the presence of nickel catalyst forms a saturated carbon compound 'R' One molecule of 'R' on combustion forms two molecules of carbon dioxide and three molecules of water. Identify P, Q and R and write chemical equations for the reactions involved. (AI 2016)

Question 101. List in tabular form three physical and two chemical properties on the basis of which ethanol and ethanoic acid can be differentiated. (Delhi 2012)

Question 102.(a) In a tabular form, differentiate between ethanol and ethanoic acid under the following heads:(i) Physical state (ii) Taste (iii) $NaHCO_3$ test (iv) Ester test
(b) Write a chemical reaction to show the dehydration of ethanol. (Delhi 2011)

Question 103. Several factories were pouring their wastes in rivers A and B. Water samples were collected from these two rivers. It was observed that sample collected from river A was acidic while that of river B was basic. The factories located near A and B are
(a) Soaps and detergents factories near A and alcohol distillery near B.
(b) Soaps and detergents factories near B and alcohol distillery near A.
(c) Lead storage battery manufacturing factories near A and soaps and detergents factories near B.
(d) Lead storage battery manufacturing factories near B and soaps and detergents factories near A.
(2020)

Question 104. Why does micelle formation take place when soap is added to water? Why are micelles not formed when soap is added to ethanol? (3/5, AI 2011)

Question 105. Soaps and detergents are both, types of salts. State the difference between the two. Write the mechanism of the cleansing action of soaps. Why do soaps not form lather (foam) with hard water? Mention any two problems that arise due to the use of detergents instead of soaps. (Delhi 2017, AI 2015)

Question 106. What are micelles? Why does it form when soap is added to water? Will a micelle be formed in other solvents such as ethanol also? State briefly how the formation of micelles help to clean the clothes having oily spots. (Foreign 2016)

Question 107. (a) You have three unlabelled test tubes containing ethanol, ethanoic acid and soap solution. Explain the method you would use to identify the compounds in different test tubes by chemical tests using litmus paper and sodium metal.
(b) Give the reason of formation of scum when soaps are used with hard water. (Foreign 2016)

Question 108. What is the difference between the molecules of soaps and detergents, chemically? Explain the cleansing action of soaps. (Delhi 2015)

Question 109. What is the difference between the chemical composition of soaps and detergents? State in brief the action of soaps in removing an oily spot from a shirt. Why are soaps not considered suitable for washing where water is hard? (Delhi 2012)

Question 110. What are detergents chemically? List two merits and two demerits of using detergents for cleansing. State the reason for the suitability of detergents for washing, even in the case of water having calcium and magnesium ions. (AI 2012)

Question 111. What are soaps and detergents chemically? Explain the action of cleaning by soaps. State the reason why we can wash our clothes even in hard water using detergents. (Foreign 2012)

Question 112. (a) What is a soap? Why are soaps not suitable for washing clothes when the water is hard?
(b) Explain the action of soap in removing an oily spot from a piece of cloth. (Delhi 2011)

Question 113. (a) What is a detergent? Name one detergent.
(b) Write two advantages and two dis-advantages of using detergents over soaps.
(c) Why, by using a detergent, can we wash clothes even in hard water?