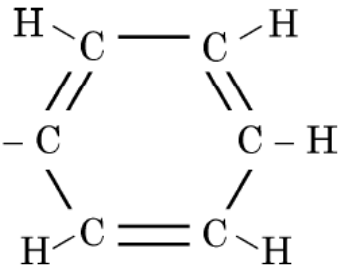
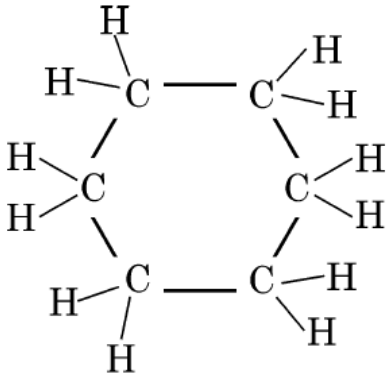
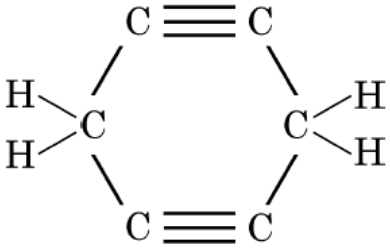
Year 2024

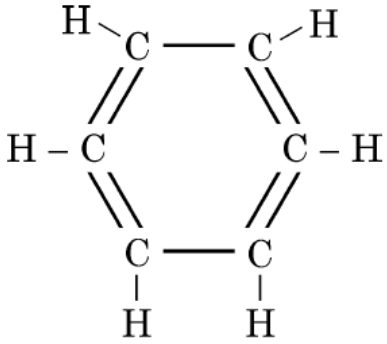
Multiple Choice Questions [2 Mark]

1) Carbon compounds : **[(31/1/1); (31/1/2)]**
   (i) are good conductors of electricity.
   (ii) are bad conductors of electricity.
   (iii) have strong forces of attraction between their molecules.
   (iv) have weak forces of attraction between their molecules.
   The correct statements are :
   (a) (i) and (ii)
   (b) (ii) and (iii)
   (c) (ii) and (iv)
   (d) (i) and (iii)
2) The name and formula of third member of homologous series of alkyne is: **[(31/1/1); (31/1/2); (31/3/3)]**
   (a) Propyne C_3H_6
   (b) Propyne C_3H_4
   (c) Butyne C_4H_8
   (d) Butyne C_4H_6
3) Consider the following statements about homologous series of carbon compounds : **[(31/2/1); (31/2/2); (31/2/3)]**
   (a) All succeeding members differ by — CH_2 unit.
   (b) Melting point and boiling point increases with increasing molecular mass.
   (c) The difference in molecular masses between two successive members is 16 u.
   (d) C_2H_2 and C_3H_4 are NOT the successive members of alkyne series.
   The correct statements are —
   (a) (a) and (b) (b) (b) and (c) (c) (a) and (c) (d) (c) and (d)
4) The structural formula of Cyclohexane is **[(31/3/1); (31/3/3)]**

(A) 

(B) 

(C) 

(D) 

5) Which one of the following hydrocarbons is different from the others ? **[(31/3/1); (31/3/2)]**
   (a) C_4H_{10} (b) C_7H_{14} (c) $C_5.H_{12}$ (d) C_2H_6
6) Select saponification reaction from the following : **[(31/3/2)]**

   (a) $C_4H_9OH \xrightarrow[KMnO_4]{Alkaline} C_3H_7COOH$
   (b) $2C_2H_5OH + 2Na \longrightarrow 2C_2H_5COONa + H_2$
   (c) $CH_3COOC_2H_5 + NaOH \longrightarrow CH_3COONa + C_2H_5OH$
   (d) $CH_3COONa + NaOH \longrightarrow CH_4 + Na_2CO_3$
7) Identify a group of the unsaturated hydrocarbons from the following : **[(31/3/3)]**
   (a) Propane, Ethene, Butyne
   (b) Ethene, Propane, Hexane
   (c) Cyclohexane, Methane, Ethane
   (d) Butyne, Ethene, Propyne
8) The number of single and double bonds present in a molecule of benzene (C_6H_6) respectively, are : **[(31/4/1); (31/4/2); (31/4/3)]**
   (a) 6 and 6 (b) 9 and 3 (c) 3 and 9 (d) 3 and 3

Assertion and Reasoning [1 Mark]

These consist of two statements —Assertion (A) and Reason(R). Answer these questions selecting the appropriate option given below:

(a) Both Assertion (A) and Reason(R) are true and Reason(R) is the correct explanation of the Assertion (A).

(b) Both Assertion (A) and Reason(R) are true, but Reason(R) is not the correct explanation of the Assertion (A).

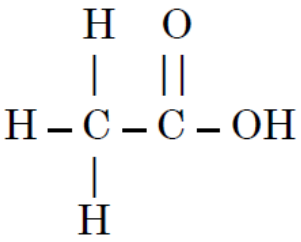
(c) Assertion (A) is true, but Reason(R) is false.

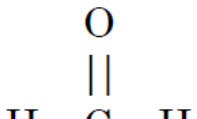
(d) Assertion (A) is false, but Reason(R) is true.

1) Assertion (A) : Some vegetable oils are healthy. **[(31/5/1); (31/5/2); (31/5/3)]**
Reason (R) : Vegetable oils generally have long unsaturated carbon chains.

Very Short Answer Type Questions [2 Mark]

1) Distinguish between a saturated and an unsaturated hydrocarbon by flame test. List the products of combustion reaction of a saturated hydrocarbon. **[(31/4/1)]**
2) A spatula full of sodium carbonate is taken in a test tube and 2 mL of dilute ethanoic acid is added to it.
(a) Write a chemical equation for the reaction.
(b) Suggest a method of testing the gas liberated in the reaction. **[(31/4/2)]**
3) When a soap is dissolved in water, the soap molecules form structures. What are these structures called ? Draw a labelled diagram of these structures. **[(31/4/3)]**
4) The melting and boiling points of carbon compounds are generally low and they are largely non-conductors of electricity. State two conclusions based on these two properties. **[(31/5/1)]**
5) Identify the functional group present in the following compounds and also name them : **[(31/5/2)]**

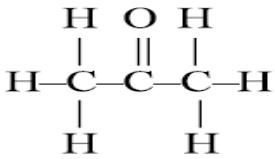
(a)


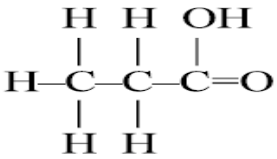
(b)


6) Write the formula and the molecular mass of the third homologue of alcohols. State how the boiling point of an alcohol changes as one moves from lower to higher homologues. **[(31/5/3)]**

Short Answer Type Questions [3 Mark]

1) (i) Define a homologous series of carbon compounds.
(ii) Why is the melting and boiling points of C_4H_8 higher than that of C_3H_6 or C_2H_4 ?
(iii) Why do we NOT see any gradation in chemical properties of a homologous series compounds ?
(iv) Write the name and structures of (i) aldehyde and (ii) ketonewith molecular form C_3H_6O.
[(31/1/1); (31/1/3)]
2) (i) Write the name and structure of an organic compound 'X' having two carbon atoms in its molecule and its name is suffixed with '-ol'.
(ii) What happens when 'X' is heated with excess concentrated sulphuric acid at 443 K? Write chemical equation for the reaction stating the conditions for the reaction. Also state the role played by concentrated sulphuric acid in the reaction.
(iii) Name and draw the electron dot structure of hydrocarbon produced in the above reaction.
[(31/1/1); (31/1/3)]
3) (i) Define the term functional group. Identify the functional groups present in the following carbon compounds :


(I)


(II)

(ii) What happens when ethanol reacts with acidified potassiumdichromate solution ? Write chemical equation for the reaction. Why is this reaction considered an oxidation reaction ?
(iii) Write chemical equation for the reaction of ethanoic acid with sodium hydroxide. **[(31/1/2)]**

4) (i) Describe method of preparation of soap giving chemical equation for the reaction involved.
(ii) Explain with diagram the mechanism of the cleansing action of soaps. **[(31/1/2)]**

5) (i) Give reason why carbon can neither form C^{4+} cations nor C^{4-}anions but form covalent compounds.
(ii) What is homologous series of carbon compound ? Write the molecular formula of any two consecutive members of homologous series of aldehydes.
(iii) Draw the structure of the molecule of cyclohexane (C_6H_{12}). **[(31/2/1); (31/2/2); (31/2/3)]**

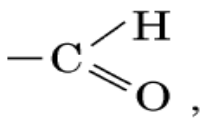
6) (i) Name a commercially important carbon compound having functional group — OH and write its molecular formula.
(ii) Write chemical equation to show its reaction with
(1) Sodium metal
(2) Excess conc. sulphuric acid
(3) Ethanoic acid in the presence of an acid catalyst
(4) Acidified potassium dichromate
Also write the name of the product formed in each case. **[(31/2/1); (31/2/2) ; (31/2/3)]**

7) Why is the conversion of ethanol to ethanoic acid an oxidation reaction ? Name the oxidising agent used in this conversion. Write chemical equation for this oxidation reaction. How is this reaction different from the reaction in which ethanol burns in the presence of oxygen? **[(31/4/1); (31/4/2)]**

8) Write chemical equations for the following reactions, giving the conditions for the reaction in each case :
(a) Reaction of ethanol with ethanoic acid
(b) Reaction of an ester with a base (NaOH)
(c) Formation of ethene from ethanol **[(31/4/3)]**

Case Study

1) More than three million carbon compounds have been discovered in the field of chemistry. The diversity of these compounds is due to the capacity of carbon atoms for bonding with one another as well as with other atoms. Most of the carbon compounds are poor conductors of electricity and have low melting and boiling points. 4
(a) Write the molecular formula of first two members of homologous series having functional group —Br. 1
(b) Given below are the formulae of some functional groups : 1



(i)

(ii)

Write the name of these functional groups.
(c) What would be observed on adding a 5% alkaline potassium permanganate drop by drop to some warm ethanol taken in a test tube ? State the role of $KMnO_4$ in the reaction and write the chemical equation for the reaction involved. 2
OR

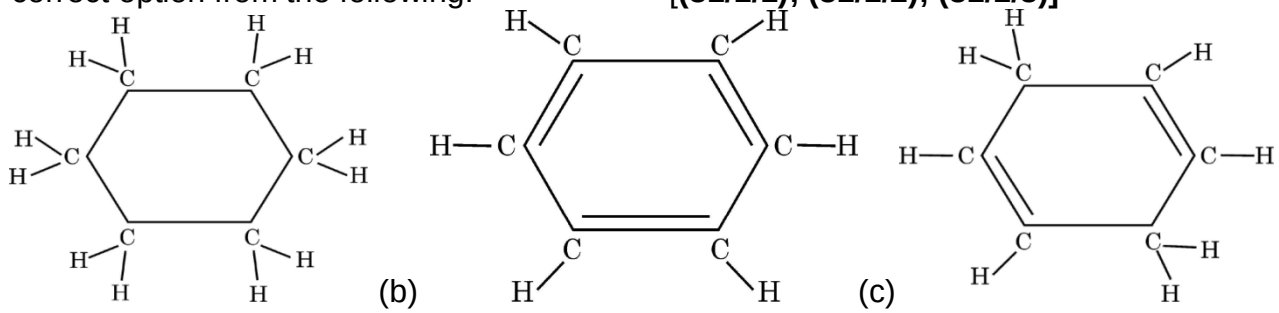
(c) Write the name of the compound formed when ethanol is heated at 443 K temperature with excess of conc. H_2SO_4. What is the role of conc. H_2SO_4 in the reaction ? Write the chemical equation for the reaction involved. **[(31/3/1); (31/3/2); (31/3/3)]**

2) Carbon is a versatile element that forms the basis of all living organisms and many of the things we use. A large variety of compounds is formed because of its tetravalency. Compounds of carbon are formed with oxygen, hydrogen, nitrogen, sulphur, chlorine and many other elements. Answer the following questions :
(a) What are hydrocarbons ?
(b) List two properties by virtue of which carbon can form a large number of compounds.
(c)(i) Write the formula of the functional group present in (1) aldehydes, and (2) ketones. Write chemical equation for the reaction that occurs between ethanoic acid and ethanol in the presence of a catalyst.
OR
(c) (ii) What are structural isomers ? Write the structures of two isomers of butane (C_4H_{10}).
[(31/5/1); (31/5/2); (31/5/3)]

Year 2023

Multiple Choice Questions [1 Mark]

1) Consider the structures of the three cyclic carbon compounds A, B and C given below and select the correct option from the following: **[(31/1/1); (31/1/2); (31/1/3)]**



(a) (b) (c)

(a)A and C are isomers of hexane and Bisbenzene.
(b)A is an isomer of hexane, Bisbenzene and C is an isomer of hexene.
(c)A is a saturated cyclic hydrocarbon and B and C are unsaturated cyclic hydrocarbons.
(d)A is cyclohexane and B and C are the isomers of benzene.

2) The total number of electrons shared in the formation of an ethyne molecule is:**[(31/2/1); (31/2/2)]**
(a) 6 (b) 3 (c) 10 (d) 4

3) When ethanol reacts with sodium two products are formed: These products are **[(31/2/2)]**
(a)Sodium ethanoate and oxygen
(b)Sodium ethanoate and hydrogen
(c)Sodium ethoxide and oxygen
(d)Sodium ethoxide and hydrogen

Long Answer Type Questions [5 Marks]

1) A saturated organic compound 'A' belongs to the homologous series of alcohols. On heating 'A' with concentrated sulphuric acid at 443K, it forms an unsaturated compound 'B 'with molecular mass 28u.

The compound 'B' on addition of one mole of hydrogen in the presence of Nickel, changes to a saturated hydrocarbon 'C'.

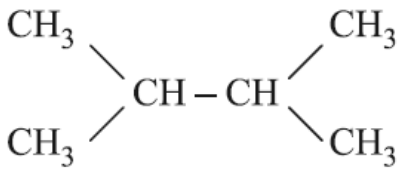
i. Identify A, B and C.
ii. Write the chemical equations showing the conversion of A into B.
iii. What happens when compound C under goes combustion?
iv. State one industrial application of hydrogen at ion reaction.
v. Name the products formed when compound A reacts with sodium. **[(31/1/1); (31/1/2); (31/1/3)]**

2) (i) With the help of diagram, show the formation of micelles, when soap is applied on oily dirt.
(ii) Take two test tubes X and Y with 10mL of hard water in each. In test tube 'X' ,add few drops of soap solution and in test tube 'Y' add a few drops of detergent solution. Shake both the test tubes for the same period.
(1)In which test tube the formation of foam will be more? Why?
(2) In which test tube is a curdy solid formed? Why? **[(31/1/1); (31/1/2); (31/1/3)]**

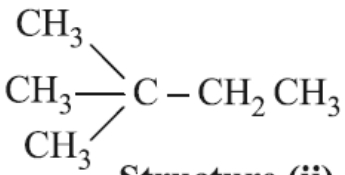
3) (i) Name the simplest saturated hydrocarbon. Draw its electron dot structure. Which type of bonds exist in this compound?
(ii) Name any two mixtures of the carbon compound used as a fuel in dailylife, of which the above mentioned compound is an important component.
(iii) In which homologous series of carbon compounds can this compound be placed? Write the general formula of the series.
(iv) Which type of flame is produced on burning it? **[(31/2/1); (31/2/2); (31/2/3)]**

4) An acid 'X' and an alcohol 'Y' react with each other in presence of an acid catalyst to form a sweet smelling substance 'Z'. Identify 'X', 'Y' and 'Z'. Write the chemical equation for the reaction involved and name it. The substance 'Z' on treatment with sodium hydroxide produces back the alcohol 'Y' and sodium ethanoate. Write the chemical equation for the reaction involved and name it, giving justification for the name. **[(31/2/1); (31/2/2); (31/2/3)]**

5) (i) Draw the structure of the following compounds :
(a) Butanoic acid (b) Chloropentane
(ii) How are structure (i) and structure (ii) given below related to one another ? Give reason to justify your answer.



Structure (i)



Structure (ii)

Draw one more possible structure for above case.
(iii) Differentiate between saturated and unsaturated carbon compounds on the basis of their general formula. **[(31/4/1)]**

6) (i) What happens when a small piece of sodium is dropped in ethanol ? Write the equation for this reaction.

(ii) Why is glacial acetic acid called so ?
(iii) What happens when ethanol is heated at 443 K in the presence of conc. H_2SO_4? Write the role of conc. H_2SO_4 in this case.
(iv) Write an equation showing saponification. **[(31/4/1)]**

7) (i) What are soaps ? Explain the mechanism of cleansing action ofsoap with the help of a labelled diagram.
(ii) Detergents are better than soaps. Justify. **[(31/4/2)]**

8) (i) It is observed that covalent compounds are bad conductors of electricity. Give reason.
(ii) Carbon can neither form C^{4+} cation nor C^{4-} anion. Why ?
(iii) Draw electron dot structure of Ethanol.
(iv) Identify hetero atom(s) in the following compounds :

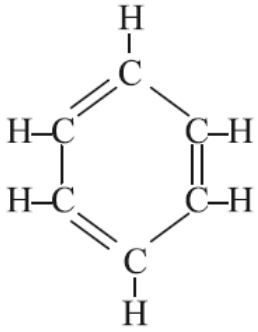
(a) $CH_3CH_2-\underset{\underset{O}{\|}}{C}-CH_3$

(b) CH_3CH_2Cl **[(31/4/2)]**

9) Write the chemical equation for the following :
(i) Combustion of methane
(ii) Oxidation of ethanol
(iii) Hydrogenation of ethene
(iv) Esterification Reaction
(v) Saponification Reaction **[(31/4/3)]**

10) (i) Draw two structural isomers of butane.
(ii) Draw the structures of propanol and propanone.
(iii) Name the third homologue of :(a) alcohols (b) aldehydes
(iv) Name the following :

(a)



(b) $CH_3-CH_2CH=CH_2$

(v) Show the covalent bond formation in nitrogen molecule. **[(31/4/3)]**

11) (a) A neutral organic compound 'X' (Molecular formula C_2H_6O) on reacting with acidified $K_2Cr_2O_7$gives an organic compound 'Y' which is acidic in nature. 'X' reacts with 'Y' on warming in presence of conc. H_2SO_4 to give a sweet smelling compound 'Z'.
(i) Identify 'X' , 'Y' and 'Z'
(ii) Write the chemical equations for the reactions in the conversion of (1) 'X' to 'Y' and (2) 'X' to 'Z' .

(iii) State the role of (1) acidified $K_2Cr_2O_7$ in the conversion of X to Y and (2) conc. H_2SO_4 in the reaction of 'X' and 'Y' .

(iv) Name the reaction which occurs when 'Z' reacts with an alkali. **[(31/5/1)]**

12) Carry out the following conversions, stating the condition(s) for each :

(i) Ethanol ⟶ Ethene

(ii) Ethene ⟶ Ethane

(iii) Ethane ⟶ Chloroethane

(iv) Ethanol ⟶ Ethanoic acid

(v) Ethanoic acid ⟶ Ethyl ethanoate **[(31/5/1)]**

13) (i) Butane had both Carbon - Carbon bonds as well as Carbon - Hydrogen bonds. Draw its structural formula and state the number of (1) C-H bonds and (2) C-C bonds in it.

(ii) You have two carbon compounds with the molecular formula C_3H_6O. Name two compounds with this formula and also draw their structural formula. **[(31/5/2)]**

14) (i) What is saponification? Differentiate between soaps and detergents on the basis of the following :

(1) Their chemical composition

(2) Their mechanism in hard water

(ii) Explain the formation of micelles between oily dirt and soap molecules. Also draw its diagram.**[(31/5/2)]**

15) Explain why carbon forms compounds mainly by covalent bonds. Explain in brief two main reasons for carbon forming a large number of compounds. Why does carbon form strong bonds with most other elements? **[(31/5/3)]**

16) (i) Write the name and general formula of a chain of hydrocarbons in which an addition reaction with hydrogen can take place. Stating the essential condition required for an addition reaction to occur, write the chemical equation giving the name of the reactant and product of such a reaction. How is an addition reaction different from a substitution reaction?

(ii) Write the structure of benzene. **[(31/5/3)]**

17) (i) A compound 'A' with a molecular formula of $C_2H_4O_2$ reacts with a base to give salt and water. Identify 'A', state its nature and the name of the functional group it possesses. Write chemical equation for the reaction involved.

(ii) When the above stated compound 'A' reacts with another compound 'B' having molecular formula C_2H_6O in the presence of an acid, a sweet smelling compound 'C' is formed.

(1) Identify 'B' and 'C'.

(2) State the role of acid in this reaction.

(3) Write chemical equation for the reaction involved. **[(31/6/1); (31/6/3)]**

18) (i) Name the compound formed when ethanol is heated at 443 K in the presence of conc.H_2SO_4 and draw its electron dot structure. State the role of conc.H_2SO_4 in this reaction.

(ii) What is hydrogenation ? Explain it with the help of a chemical equation. State the role of this reaction in industry. **[(31/6/1); (31/6/3)]**

19) (i) What are isomers? Write the structures of two compounds having molecular formula C_3H_6O and give their names.

(ii) What are soaps? How are they chemically different from detergents ? Why do soaps not work effectively in hard water ?

20) (i) What is a homologous series of carbon compounds ? Write general formula for alkynes. Name and draw the electron dot structure of first homologue of this series.

(ii) State the meaning of the functional group in an organic compound. Write the formula of the functional group present in alcohols and carboxylic acids.

Year 2022

Very Short Answer Type Questions [2 Mark]

4) (a) Write the molecular formula of the following carbon compounds:
(i) Methane (ii) Propane
(b) Carbon compounds have low melting and boiling points. Why? **[(31/1/1)]**

5) The molecular formulae of two alkynes, A and B are C_xH_2 and C_3H_yrespectively.
(a) Find the values of x and y.
(b) Write the names of A and B. **[(31/1/2)]**

6) "Carbon prefers to share its balance electron with other atoms of carbon or with atoms of other element rather than gaining or losing the valence electrons in order to attain noble gas configuration."Give reason to justify this statement **[(31/2/1)]**

7) Write the chemical formula of two consecutive homologous of organic compounds having functional group -OH. What happens to the (i) boiling point and (ii) solubility of organic compounds of a homologous series as the molecular mass increases?**[(31/2/2)]**

8) (i) Write the name and draw the structure of saturated hydrocarbon with four carbon atoms.
(ii) Write the number of single covalent bonds present in this compound. **[(31/2/3)]**

9) Draw the electron dot structure of the following:
(a) Cyclohexane
(b) Butane **[(31/3/1)]**

10) Draw the electron dot structure of the following:
(a) Benzene
(b) Ethane **[(31/3/2)]**

11) Draw two structural isomers of butane. **[(31/3/3)]**

12) Consider the carbon compounds having falling molecular formula.
(i)C_3H_6 (ii) C_3H_8 (iii) C_4H_6 (iv) C_6H_6 (v) C_6H_{12}
(a) State the number of double covalent bonds present in C_3H_6.
(b) Write the formula of first member of homologous series in which carbon compound C_4H_6 belongs.
(c) Which of the above compound forms ring structure of carbon atoms?
(d) Identify, which of the above compounds, is member of alkane series? **[(31/4/1); (31/4/3)]**

13) Consider the carbon compounds having falling molecular formula.
(i) CH_3COOH (ii) CH_3OH (iii) C_2H_6 (iv) C_3H_4 (v) C_4H_8
(a) Which of the following compounds belongs to homologous series of alcohol.
(b) Identify the compound having triple bond between carbon-carbon atoms.
(c) Write the molecular formula of the first member of homologous series in which CH_3COOH belongs.
(d) Write the general formula of the series in which the compound C_4H_8 belongs. **[(31/4/2)]**

14) What are Covalent Compounds ? List two properties of covalent compounds. **[31/B/5]**

15) Consider the carbon compounds having falling molecular formula.
(i) C_2H_2 (ii) C_2H_6 (iii) C_3H_7OH (iv) C_2H_5COOH (v) CH_3CHO
(a) Identify which of the above compounds, is a member of aldehyde series.
(b) Write the general formula of the series in which the compound C_2H_2 belongs.
(c) Which of the above compounds has triple bonds between carbon-carbon atoms.
(d) Write the molecular formula of the first member of homologous series in which C_3H_7OH belongs. **[(31/4/3)]**

16) "Carbon cannot form ionic bonds." Justify this statement. **[31/B/5]**

Very Short Answer Type Questions [3 Marks]

1) (a) Draw two different possible structures of a saturated hydrocarbon having four carbon atoms in its molecule. What are these two structures of the hydrocarbon having same molecular formula called? Write the molecular formula and the common name of this compound. Also write the molecular formula of its alkyne. **[(31/1/1); (31/1/2); (31/1/3)]**

2) (i) Write the molecular formula of benzene and draw its structure.
(ii) Write the number of single and double covalent bonds present in a molecule of benzene.
(iii) Which compounds are called alkynes? **[(31/1/1); (31/1/2); (31/1/3)]**

3) Consider the following organic compounds.

(a) Name the functional group present in their compounds.
(b) Write the general formula for the compounds of this functional group.
(c)State the relationship between these compounds and draw the structure of any other compound having similar functional group. **[(31/2/1); (31/2/2); (31/2/3)]**

4) (a) Draw the electron dot structure for ethyne.
(b) List two differences between the properties exhibited by covalent compounds and ionic compounds. **[(31/2/1); (31/2/2); (31/2/3)]**

5) State the reason why
(i) carbon compounds have low melting and boiling points.
(ii) carbon compounds do not conduct electricity.
(iii) carbon can form only covalent compounds. **[(31/3/1); (31/3/2); (31/3/3)]**

6) What is a homologous series? Find the difference in molecular mass between the two consecutive members of a homologous series. State how in a homologous series of carbon compounds the following properties vary with increase in molecular mass:
(i) Melting and boiling points
(ii) Chemical properties **[(31/3/1); (31/3/2); (31/3/3)]**

7) "Two different forms of carbon- diamond and graphite have different structures and very different physical properties even though their chemical properties are same." Explain why.**[(31/4/1); (31/4/2); (31/4/3)]**

8) Stated the reason, why carbon cannot.
(i)Lose four electrons to form C^{4+} cation.
(ii) Gain four electrons to form C^{4-}anion.
How does carbon overcome this problem to form compounds? **[(31/4/1); (31/4/2); (31/4/3)]**

9) (i) What is a Homologous Series? Write the general formula of the homologous series for the compounds having functional group - OH and give the molecular formula for the third member of this series.
(ii) Draw the structure of ethane and write the number of single bonds present in its molecule.**[(31/B/5)]**

10) (i) What are Structural Isomers? Draw the structures of two isomers of butane (C_4H_{10}).
(ii) Write the molecular formula of (i) cyclohexane, and (ii) benzene. **[(31/B/5)]**

Year 2020

Very Short Answer Type Questions [1 Mark]

1) Name a cyclic unsaturated carbon compound. **[(31/1/1); (31/1/3)]**
2) Name the functional group present in propanone. **[(31/1/2)]**
3) Covalent compounds have low melting and boiling point. Why? **[(31/2/1); (31/2/2); (31/2/3)]**
4) How are covalent bonds formed? **[(31/3/1); (31/3/2); (31/3/3)]**
5) Which oils should be chosen for cooking to remain healthy? **[(31/4/2)]**
6) Draw the structure of a carboxylic acid containing three carbon atoms. **[(31/4/3)]**
7) Covalent compounds are generally poor conductors of electricity. Why? **[(31/5/1); (31/5/2); (31/5/3)]**

Assertion and Reasons [1 Mark]

Two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :
(a) Both A and R are true and R is correct explanation of the Assertion.
(b) Both A and R are true but R is not the correct explanation of the Assertion.
(c) A is true but R is false.
(d) A is false but R is true.

1) 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. **[(31/1/1); [(31/1/3)]**
2) Assertion (A) : In a homologous series of alcohols, the formula for thesecond member is C_2H_5OH and the third member is C_3H_7OH.
Reason (R) : The difference between the molecular masses of the twoconsecutive members of a homologous series is 144. **[(31/1/2)]**
3) 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. **[(31/2/1); (31/2/2); (31/2/3)]**
4) 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 a homologous series. **[(31/3/1); (31/3/2); (31/3/3)]**
5) Assertion (A) : Carbon has a strong tendency to either lose or gain electrons to attain noble gas configuration.
Reason (R) : Carbon has four electrons in its outermost shell and has the tendency to share electrons with carbon or other elements **[(31/5/1); (31/5/2); (31/5/3)]**

Short Answer Type Questions [3 Marks]

1) 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. Whathappens on adding it in excess?
(iii) Write chemical equation of this reaction. **[(31/1/1); (31/1/2)]**
2) (a) Draw the structures for (i) ethanol, (ii) ethanoic acid.

(b) Why is the conversion of ethanol to ethanoic acid considered anoxidation reaction? Write the oxidising agent used in the reactioninvolved. **[(31/1/3)]**

3) 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. **[(31/4/1); (31/4/2)]**

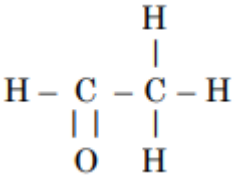
4) (a) How is a soap different from a detergent in composition?
(b) Design an activity to show that a detergent works well with all types of water while a soap does not. **[(31/4/3)]**

Long Answer Type Questions [5 Marks]

1) Carbon cannot reduce the oxides of sodium, magnesium and aluminium to their respective metals. Why? Where are these metals placed in the reactivity series? How are these metals obtained from their ores? Take an example to explain the process of extraction along with chemical equations. **[(31/1/1)]**

2) (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 **[(31/2/1); (31/2/3)]**

3) (a) Compare soaps and detergents on the basis of their composition and cleansing action in hard water.
(b) What happens when ethanol is treated with sodium metal? State the behaviour of ethanol in this reaction.
(c) Draw the structure of cyclohexane.
(d) Name the following compound.



[(31/3/1); (31/3/3)]

4) (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. **[(31/3/2)]**

5) (a) Define isomerism. Draw all possible isomers of butane.
(b) ‘‘A compound ‘X’ on combustion gives a yellow flame with lots of smoke.’’ What inference would you draw from this statement ?
(c) State the role of alkaline $KMnO_4$ in the reaction involving conversion of an alcohol to corresponding carboxylic acid. **[(31/5/3)]**

6) Consider the molecular formula of the carbon compounds (a) and (b) given below :
(a) C_3H_8O
(b) $C_3H_6O_2$
(i) Identify the functional groups in (a) and (b) and write their structures.
(ii) Are (a) and (b) isomers ? Give reason.
(iii) What happens when alkaline $KMnO_4$ is added, drop by drop, into a test tube containing warm propanol? Write the chemical equation for the reaction and state the role of alkaline $KMnO_4$ in this reaction. **[(31/5/2)]**

Year 2019

Very Short Answer Type Questions [2 Marks]

1) Write the molecular formula of ethene and draw its electron dot structure. **[(31/2/1)]**
2) Draw electron dot structure of carbon dioxide and write the nature of bonding between carbon and oxygen in its molecule. **[(31/2/2)]**
3) List two properties of carbon which lead to the huge number of carbon compounds we see around us, giving reason for each. **[(31/2/2)]**
4) List two chemical properties on the basis of which ethanol and ethanoic acid may be differentiated and explain how. **[(31/2/3)]**
5) Unsaturated hydrocarbons contain multiple bonds between two carbon atoms and these compounds show addition reactions. Out of saturated and unsaturated carbon compounds, which compounds are more reactive? Write a test to distinguish ethane from ethene. **[(31/2/3)]**
6) What happens when 5% alkaline potassium permanganate solution is added drop by drop to warm propyl alcohol (propanol) taken in a test tube? Explain with the help of a chemical equation. **[(31/4/1)]**
7) Write the name and molecular formula of a carbon compound having its name suffixed with ‘‘-ol’’ and having two carbon atoms in its molecule. With the help of a chemical equation indicate what happens when this compound is heated with excess conc. H_2SO_4. **[(31/4/2)]**
8) ‘‘Conversion of ethanol to ethanoic acid is an oxidation reaction.’’ Justify this statement giving the relevant equation for the chemical reaction involved.**[(31/4/3)]**

Short Answer Type Questions [3 Marks]

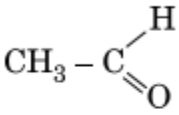
1) What is a homologous series of carbon compounds? Give an example and list its three characteristics.**[(31/2/1); (31/2/3)]**
2) Which compounds are called (i) alkanes, (ii) alkenes and (iii) alkynes? C_4H_{10} belongs to which of these? Draw two structural isomers of this compound.**[(31/2/2)]**

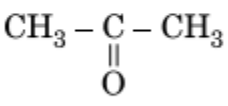
Long Answer Type Questions [5 Mark]

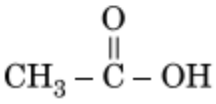
1) Write the chemical formula and name of the compound which isthe active ingredient of all alcoholic drinks. List its two uses. Writechemical equation and name of the product formed when this compound reacts with —
   (i) sodium metal
   (ii) hot concentrated sulphuric acid**[(31/1/1); (31/1/2); (31/1/3)]**
2) What is methane? Draw its electron dot structure. Name the type of bonds formed in this compound. Why are such compounds:
   (a) Poor conductors of electricity and
   (b) Have low melting and boiling points? What happens when this compound bums in oxygen?
   [(31/1/1); (31/1/2); (31/1/3)]
3) (a) Distinguish between esterification and saponification reactions with the help of chemical equation for each.
   (b) Write an activity to show the formation of an ester in a school laboratory. **[(31/3/1)]**
4) What are structural isomers? List any four characteristics of isomers. Draw the possible structures of butane. **[(31/3/2)]**
5) (a) What is a hydrocarbon ? Give its one example.
   (b) Give the structural difference between saturated and unsaturated hydrocarbons with two examples each.

(c) Name the following compounds :

(i) $CH_3 - OH$

(ii) 

(iii) 

(iv) 

[(31/3/3)]

6) (a) Distinguish between esterification and saponification reactions with the help of chemical equations for each.
(b) With a labelled diagram describe in brief an activity to show the formation of an ester. **[(31/4/1); (31/4/2)]**
7) What is the difference between soaps and detergents? State in brief the cleansing action of soaps in removing an oily spot from a fabric. Why are soaps not very effective when a fabric is washed in hard water? How is this problem resolved? **[(31/4/1); (31/4/2)]**
8) (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 low melting and boiling points.
(b) Write the structural formula of benzene, C_6H_6. **[(31/5/1); (31/5/2); (31/5/3)]**
9) (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 **[(31/5/1); (31/5/2); (31/5/3)]**

Year 2018

Very Short Answer Type Questions [2 Marks]

1) A compound 'X' on heating with excess conc. 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. **[All India]**
2) Which compounds are called (i) alkanes, (ii) alkenes and (iii) alkynes ? Which of them is C_4H_{10} ? **[For Blind Student]**
3) What happens when you add few drops of acetic acid to a test tube containing powder of sodium hydrogen carbonate? List two observations. Write the name of the gas evolved and the method of its testing. **[For Blind Student]**

Short Answer Type Questions [3 Marks]

1) (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. **[All India]**

2) What is a homologous series of carbon compounds? Write its two characteristics. Giving reason select two compounds from the following which belong to the same homologous series : C_2H_2 , C_2H_4 , C_2H_6 , C_3H_4 , C_4H_5 , C_6H_6 **[For Blind Student]**

Year 2017

Very Short Answer Type Questions [1 Marks]

1) Write the molecular formula of the 2nd and the 3rd member of the homologous series whose first member is methane. **[All India]**
2) Write the molecular formula of the 2nd and the 3rd member of the homologous series whose first member is ethene. **[All India]**
3) Write the molecular formula of the 2nd and the 3rd member of the homologous series where the first member is ethyne. **[All India]**
4) Write the molecular formula of first two members of homologous series having functional group – Cl. **[Delhi]**
5) Write the molecular formula of the first two members of the homologous series having functional group – COOH. **[Foreign]**
6) Write the molecular formula of the first two members of the homologous series whose functional group is – CHO. **[Foreign]**
7) Write the molecular formula of the first two members of the homologous series having functional group $>C=O$. **[Foreign]**

Short Answer Type Questions [3 Marks]

1) Write the structural formula of ethanol. What happens when it is heated with excess of conc. H_2SO_4 at 443 K? Write the chemical equation for the reaction stating the role of conc. H_2SO_4 in this reaction. **[All India]**
2) Distinguish between esterification and saponification reactions with the help of the chemical equations for each. State one use of each (i) esters, and (ii) saponification process. **[All India]**
3) What happens when (write chemical equation in each case)
   (a) ethanol is burnt in air ?
   (b) ethanol is heated with excess conc. H_2SO_4 at 443 K?
   (c) a piece of sodium is dropped into ethanol? **[All India]**
4) Explain esterification reaction with the help of a chemical equation. Describe an activity to show esterification. **[All India]**
5) 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]**
6) Complete the following chemical equations :
   (i) $CH_3COOC_2H_5 + NaOH \longrightarrow$
   (ii) $CH_3COOH + NaOH \longrightarrow$
   (iii) $C_2H_5OH + CH_3COOH \xrightarrow{\text{Conc. } H_2SO_4}$ **[Delhi]**

7) Name two oxidising agents that are used for the conversion of alcohols to acids. Distinguish between ethanol and ethanoic acid on the basis of (i) litmus test, and (ii) reaction with sodium hydrogen carbonate. **[Foreign]**
8) Explain, giving reason, why carbon neither forms C^{4+} cations nor C^{4-} anions, but forms covalent compounds which are bad conductors of electricity and have low melting point and low boiling point. **[Foreign]**
9) Write the molecular formula of benzene and draw its structure. List in tabular form the two properties in which covalent compounds differ from ionic compounds. **[Foreign]**
10) What are hydrocarbons ? Write the general formula of (i) saturated hydrocarbons, and (ii) unsaturated hydrocarbons and draw the structure of one hydrocarbon of each type. **[Foreign]**

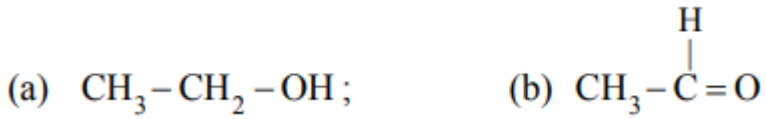
Long Answer Type Questions [5 Marks]

1) 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. **[All India]**
2) 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]**
3) What are esters ? How are esters prepared ? Write the chemical equation for the reaction involved. What happens when an ester reacts with sodium hydroxide ? Write the chemical equation for the reaction and also state the name and use of this reaction. **[Foreign]**

Year 2016

Very Short Answer Type Question [1 Mark]

1) Write the name and structure of an alcohol with three carbon atoms in its molecule. **[All India]**
2) Write the name and structure of an alcohol with four carbon atoms in its molecule. **[All India]**
3) Write the name and structure of an aldehyde with four carbon atoms in its molecule. **[All India]**
4) Select saturated hydrocarbons from the following:
   C_2H_4 ; C_4H_6 **[Delhi]**
5) Name the following compounds :



(a) CH_3-CH_2-OH ; (b) $CH_3-\overset{\overset{H}{|}}{C}=O$ **[Delhi]**

6) Select saturated hydrocarbons from the following:
   C_3H_6 ; C_5H_{10} ; C_4H_{10} ; C_6H_{14} ; C_2H_4 **[Delhi]**
7) Write the next homologue of each of the following : (i) C_2H_4 (ii) C_4H_6
8) Name the chemical reaction used to change unsaturated fats to saturated fats. **[Blind Candidate]**
9) Which element exhibits the property of catenation to maximum extent and why? **[Foreign]**
10) Write the name and molecular formula of the fourth member of alkane series.**[Foreign]**
11) What is a homologous series of carbon compounds? **[Foreign]**

Very Short Answer Type Question [2 Mark]

1) What do you observe when you drop a few drops of acetic acid to a test tube containing :
(i) phenolphthalein
(ii) distilled water
(iii) universal indicator
(iv) sodium hydrogen carbonate powder **[Delhi]**
2) A student adds a spoon full of powdered sodium hydrogen carbonate to a flask containing ethanoic acid. List two main observations, he must note in his note book, about the reaction that takes place. Also write chemical equation for the reaction.**[All India]**
3) Consider the following observations as recorded by a student while studying the property of acetic acid :

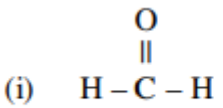
Sl. No.	Property	Observation
1	Colour of acetic acid	Colourless
2	Adour of acetic acid	No odour
3	Solubility in water	Soluble
4	Gas evolved when acetic acid is added to sodium hydrogen carbonate	Hydrogen

Out of the above four observations :
(i) identify two correct observations, and
(ii) correct the two incorrect observations. **[For Blind Candidate]**
4) A student is studying the properties of acetic acid in his school laboratory. List two physical and two chemical properties which he must observe and note in his record book. **[Foreign]**

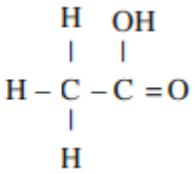
Short Answer Type Question [3 Marks]

1) 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. **[All India]**
2) 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. **[All India]**
3) 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 conc. sulphuric acid. **[All India]**
4) An aldehyde as well as a ketone can be represented by the same molecular formula, sayC_3H_6O. Write their structures and name them. State the relation between the two in the language of science. **[All India]**
5) 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. **[All India]**
6) What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties. **[Delhi]**

7) When ethanol reacts with ethanoic acid in the presence of conc. 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 conc. H_2SO_4 in this reaction. **[Delhi]**
8) What is an oxidising agent? What happens when an oxidising agent is added to propanol? Explain with the help of a chemical equation. **[Delhi]**
9) Name the compound formed when ethanol is heated in excess of conc. sulphuric acid at 443 K. Also write the chemical equation of the reaction stating the role of conc. sulphuric acid in it. What would happen if hydrogen is added to the product of this reaction in the presence of catalysts such as palladium or nickel? **[Delhi]**
10) What is meant by "structural isomers"? Give reason why propane (C_3H_8) cannot exhibit this characteristic. Draw the structures of possible isomers of butane (C_4H_{10}). **[For Blind Candidate]**
11) Write chemical equations to show how the following may be obtained from ethanol:
(i) Ethene
(ii) Ethyl ethanoate
(iii) Sodium ethoxide **[For Blind Candidate]**
12) Write the name 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 conc. H_2SO_4 and the name of main product formed. Also state the role of conc. H_2SO_4 in the reaction. **[Foreign]**
13) 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]**
14) (a) Define the term functional group. Identify the functional group present in



(ii)



(b) 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. **[Foreign]**

Long Answer Type Questions [5 Marks]

1) A carbon compound 'P' on heating with excess conc. 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.**[All India]**
2) (a) Give a chemical test to distinguish between saturated and unsaturated hydrocarbon.
(b) Name the products formed when ethane burns in air. Write the balanced chemical equation for the reaction showing the types of energies liberated.
(c) Why is reaction between methane and chlorine in the presence of sunlight considered a substitution reaction? **[Delhi]**
3) (a) What are hydrocarbons? List two categories in which these compounds may be classified.

(b) What are alkanes, alkenes and alkynes? Write one distinguishing feature of each.**[For Blind Candidate]**

4) (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]**
5) 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]**

Year 2015

Very Short Answer Type Question [1 Mark]

1) Write the number of covalent bonds in the molecule of ethane. **[All India]**
2) Write the number of covalent bonds in the molecule of butane, C_4H_{10}. **[All India]**
3) Write the name and molecular formula of the first member of the homologous series of alkynes.**[Foreign]**
4) Name the process by which unsaturated fats are changed to saturated fats.**[Foreign]**
5) Write the name of each of the following functional groups :

(a) $-OH$

(b) $-\overset{\overset{O}{\|}}{C}-$

[Foreign]

6) Write the name and formula of the 2nd member of homologous series having general formula C_nH_{2n}.**[Delhi]**
7) Write the name and formula of the 2nd member of homologous series having general formula C_nH_{2n+2}. **[Delhi]**
8) Write the name and formula of the 2nd member of homologous series having general formula C_nH_{2n-2}.**[Delhi]**

Very Short Answer Type Question [2 Mark]

1) When you add sodium hydrogen carbonate to acetic acid in a test tube, a gas liberates immediately with a brisk effervescence. Name this gas. Describe the method of testing this gas. **[All India]**
2) A student is studying the properties of acetic acid. List two physical properties of acetic acid he observes. What happens when he adds a pinch of sodium hydrogen carbonate to this acid ? Write any two observations. **[Foreign]**
3) List two observations which you make when you add a pinch of sodium hydrogen carbonate to acetic acid in a test tube. Write chemical equation for the reaction that occurs. **[Delhi]**

Short Answer Type Question [3 Mark]

1) List two tests for experimentally distinguishing between an alcohol and a carboxylic acid and describe how these tests are performed. **[All India]**
2) 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 ? **[All India]**

3) 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.**[All India]**
4) Write the name and structural formula of the compound formed when ethanol is heated at 443 K temperature with excess of conc. H_2SO_4. What is the role of conc. H_2SO_4 in this reaction ? Also give the chemical equation for the reaction. **[Foreign]**
5) 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]**
6) Write the molecular formula of the following compounds and draw their electron-dot structures :
   (i) Ethane
   (ii) Ethene
   (iii) Ethyne **[Foreign]**
7) 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]**
8) With the help of an example, explain the process of hydrogenation. Mention the essential conditions for the reaction and state the change in physical property with the formation of the product. **[Delhi]**
9) What is the difference between the molecules of soaps and detergents, chemically ? Explain the cleansing action of soaps. **[Delhi]**
10) Write the name and structural formula of the compound obtained when ethanol is heated at 443 K with excess of conc. H_2SO_4. Also write chemical equation for the reaction stating the role of conc. H_2SO_4 in it. **[Delhi]**
11) With the help of an example, explain the process of hydrogenation. Mention the essential conditions for the reaction and state the change in physical property with the formation of the product. **[Delhi]**
12) 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]**
13) What is difference between the molecules of soaps and detergents, chemically ? Explain the cleansing action of soaps. **[Delhi]**

Long Answer Type Question [5 Mark]

1) Both soap and detergent are some type of salts. What is the difference between them ? Describe in brief the cleansing action of soap. Why do soaps not form lather in hard water ? List two problems that arise due to the use of detergents instead of soaps. **[All India]**
2) 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]**
3) 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 bonds with most other elements? **[Delhi]**

Year 2014

Short Answer Type Questions [3 Marks]

1) What are homologous series of carbon compounds ? Write the molecular formula of two consecutive members of homologous series of aldehydes. State which part of these compounds determines their (i) physical and (ii) chemical properties. **[All India]**
2) 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'. **[All India]**
3) 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. **[All India]**
4) Define the term 'structural isomerism'. Explain why propane cannot exhibit this property. Draw the structures of possible isomers of butane, C_4H_{10}. **[All India]**
5) What are isomers ? Why can't we have isomers of first three members of alkane series ? Draw the possible structures of isomers of butane, C_4H_{10}. **[Foreign]**
6) Write the chemical equations to show what happens when
   (i) an ester reacts with a base ?
   (ii) methane is treated with chlorine in the presence of sunlight ?
   (iii) ethanol reacts with ethanoic acid in the presence of sulphuric acid ? **[Foreign]**
7) Write the respective chemical equations to show what happens when
   (i) methane is burned in presence of oxygen ?
   (ii) ethanol is heated with concentrated sulphuric acid at 443 K ?
   (iii) ethanol reacts with ethanoic acid in the presence of an acid acting as a catalyst ? **[Foreign]**
8) 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]**
9) Write chemical equations to describe two examples of different oxidations of ethanol. List two uses of ethanol. **[Foreign]**
10) 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]**
11) 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]**
12) Write the name and general formula of a chain of hydrocarbons in which an addition reaction with hydrogen can take place. Stating the essential conditions required for an addition reaction to occur write the chemical equation giving the name of the reactant and the product of such a reaction. **[Delhi]**
13) 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]**
14) What are esters ? How are they prepared ? List two uses of esters. **[Delhi]**

Long Answer Type Questions [5 Marks]

1) Elements forming ionic compounds attain noble gas configuration by either gaining or losing electrons from their outermost shells. Give reason to explain why carbon cannot attain noble gas

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 give reason why carbon compounds are generally poor conductors of electricity **[All India]**

2) List two reasons for carbon forming a large number of compounds. Name the type of bonding found in most of its compounds. Why does carbon form compounds mainly by this kind of bonding ? Give reason why the carbon compounds –
(i) generally have low melting and boiling points.
(ii) do not conduct electricity in molten state. **[All India]**

3) 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]**

4) 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]**

Year 2013

Short Answer Type Questions [3 Marks]

1) Write the name and the structural formula of the compound formed when ethanol is heated at 443 K with excess of conc. H_2SO_4. State the role of conc.H_2SO_4 in this reaction. Write chemical equation for the reaction. **[Delhi]**

2) Why homologous series of carbon compounds are so called? Write chemical formula of two consecutive members of a homologous series and state the part of these compounds that determines their (i) physical properties, and (ii) chemical properties. **[Delhi]**

Long Answer Type Questions [5 Marks]

1) (a) Define the term 'isomers'.
(b) Draw two possible isomers of the compound with molecular formulaC_3H_6O and write their names.
(c) Give the electron dot structures of the above two compounds. **[Delhi]**

Year 2012

Very Short Answer Type Questions [1 Mark]

1) Write the name and formula of the second member of the carbon compounds having functional group — OH. **[All India]**

2) Name the functional group present in each of the following organic compounds:
(i) C_2H_5Cl (ii) C_2H_5OH **[Delhi]**

3) Write the name and formula of the first member of the seriesof carbon compounds having

functional group $-\overset{\overset{O}{\|}}{C}-OH$ **[Foreign]**

Short Answer Type Questions [3 Marks]

1) What is meant by homologous series of organic compounds ? Write the chemical formulae of two members of a homologous series and state which part determines the (i) physical properties, (ii) chemical properties, of these compounds. **[All India]**
2) What are isomers? Draw the structures of two isomers of butane, C_4H_{10}. Why can't we have isomers of first three members of alkane series?**[Delhi]**
3) Distinguish between esterification and saponification reactions of organic compounds with the help of the chemical equation for each. What is the use of (i) esters and (ii) saponification process ? **[Foreign]**

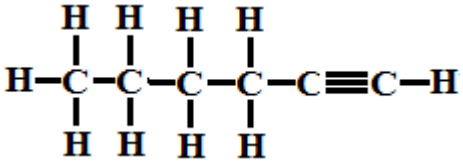
Long Answer Type Questions [5 Marks]

1) 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 ? **[All India]**
2) 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.**[All India]**
3) 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]**
4) List in tabular form three physical and two chemical properties on the basis of which ethanol and ethanoic acid can be differentiated. **[Delhi]**
5) (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.
   (b) How does a saturated hydrocarbon react with chlorine ? Write chemical equation for it. What type of reaction is it called and why ? **[Foreign]**
6) 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]**

Year 2011

Very Short Answer Type Questions [1 Marks]

1) Draw the structure for ethanoic acid molecule, CH_3COOH. **[All India]**
2) How many covalent bonds are there in a molecule of ethane, C_2H_6 **[Delhi]**
3) Butanone is a four-carbon per molecule compound. Name the functionalgroup present in it. **[Foreign]**
4) How many covalent bonds are there in a molecule of ethane (C_2H_6)?
5) Write the electron dot structure of ethene molecule (C_2H_4).
6) Write the electron dot structure of ethane molecule (C_2H_6).
7) Draw the structure of butanone molecule, $CH_3COC_2H_5$.
8) Draw the structure of the hexanal molecule, $C_5H_{11}CHO$.
9) Butanone is a four carbon per molecule compound. Name the functional group present in it.
10) Name the following compound:



Short Answer Type Questions [3 Marks]

1) 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. **[All India]**
2) Write one chemical equation to represent each of the following types of reactions of organic substances :
   (i) Esterification
   (ii) Saponification
   (iii) Substitution **[Delhi]**
3) (a) What is a homologous series of compounds ? List any two of its characteristics.
4) b) What is the next higher homologue of C_3H_7OH ? What is its formula and what is it called ? **[Foreign]**
5) What is an 'esterification' reaction? Describe an activity to show esterification.
6) Out of HCl and CH_3COOH, which one is a weak acid and why? Describe an activity to support your answer.
7) 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.
   Describe two examples of different oxidations of ethanol. Name the products obtained in each case.
8) Write a chemical equation in each case to represent the following types of chemical reactions of organic compounds:
   (i) Oxidation reactions
   (ii) Addition reactions
   (iii) Substitution reactions

Long Answer Type Questions [5 Marks]

1) (a) State two properties of carbon which lead to a very large number of carbon compounds.
   (b) Why does micelle formation take place when soap is added to water? Why are micelles not formed when soap is added to ethanol? **[All India]**
2) Explain isomerism. State any four characteristics of isomers. Draw the structures of possible isomers of butane, C_4H_{10}. **[All India]**
3) (a) In a tabular form, differentiate between ethanol and ethanoic acidunder 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]**
4) (a) What is a soap ? Why are soaps not suitable for washing clotheswhen the water is hard?

(b) Explain the action of soap in removing an oily spot from a piece ofcloth. **[Delhi]**

5) Give reasons for the following :
(i) Element carbon forms compounds mainly by covalent bonding.
(ii) Diamond has a high melting point.
(iii) Graphite is a good conductor of electricity.
(iv) Acetylene burns with a sooty flame.
(v) Kerosene does not decolourise Bromine water while cooking oils do. **[Foreign]**

6) (a) What is a detergent ? Name one detergent.
(b) Write two advantages and two disadvantages of using detergents over soaps.
(c) Why, by using a detergent, can we wash clothes even in hard water? **[Foreign]**

Year 2010

Very Short Answer Type Questions [1 Mark]

1) State two characteristic features of carbon which when put together give rise to large number of carbon compounds.
2) Write the structural formula of chloroethane.
State two characteristic features of carbon which when put together giverise to a large number of carbon compounds. **[Delhi]**
3) Write the structural formula of chloroethane. **[Foreign]**

Short Answer Type Questions [2 Marks]

1) Write the name and molecular formula of an organic compound having its name suffixed with '-ol and having two carbon atoms in the molecule. With the help of a balanced chemical equation indicate what happens when it is heated with excess of cone.H_2SO_4.
2) Write the names and molecular formula of two organic compounds having functional group suffixed as '-oic acid'. With the help of a balanced chemical equation and explain what happens when any one of them reacts with sodium hydroxide.
3) What is a homologous series? Which two of the following organic compounds belong to the same homologous?
CH_3 ,C_2H_6, C_2H_6O, $C_2H_6O_2$,CH_4O

Short Answer Type Questions [3 Marks]

1) Name the functional group of organic compounds that can be hydrogenated. With the help of 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. Name anyone natural source of organic compounds that are hydrogenated. **[Delhi]**
2) With the help of balanced chemical equations explain what happens when ethanol is heated with (i) alkaline solution of potassiumpermanganate, (ii) excess concentrated sulphuric acid at 443K. Mention any two uses of ethanol. **[Foreign]**
3) An ester has the molecular formula $C_4H_8O_2$. Write its structural formula. What happens when this ester is heated in the presence of sodium hydroxide solution? Write the balanced chemical equation for the reaction and name the products. What is a saponification reaction?
4) An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields an organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formula. What happens when 'A' and 'B' react in the presence of an acid catalyst? Write the chemical equation for the reaction.

Year 2009

Very Short Answer Type Questions [1 Mark]

1) Name the carbon compound which on heating with excess of concentrated sulphuric acid at 443 K gives ethene.
2) What is meant by a saturated hydrocarbon?
3) Name the compound formed when ethanol is warmed with ethanoic acid in the presence of a few drops of cone.H_2SO_4
4) Draw the structure of CH_3COOH molecule.
5) Draw the structure of ethanol molecule.
6) What happens when a small piece of sodium is dropped into ethanol ? **[All India]**

Very Short Answer Type Questions [2 Marks]

1) Name the functional group present in each of the following organic compounds:
   (i) C_2H_5Cl
   (ii) C_2H_5OH
2) Name the functional group present in each of the following compounds:
   (i) HCOOH
   (ii) C_2H_5CHO
3) Name the functional group present in each of the following organic compounds:
   (i)CH_3COCH_3
   (ii) C_2H_5COOH
4) Write the name and formula of the second member of the carbon compounds having functional group —OH.
5) Write the name and formula of the first member of the carbon compounds having functional group —CHO.
6) Write the name and formula of the first member of the carbon compounds having functional group —COOH.
7) Write the name and formula of the 2nd member of the series of carbon compounds whose general formula is $C_nH_{2n+1}OH$
8) Write the name and formula of the 2nd member of the series of carbon compounds whose general formula is C_nH_{2n}.

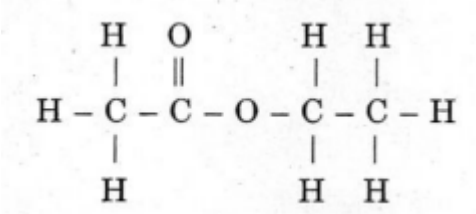
Short Answer Type Questions [3 Marks]

1) What are isomers? Draw the structures of two isomers of butane, C_4H_{10}. Why can't we have isomers of first three members of alkane series?
2) Define homologous series of organic compounds. List its two characteristics. Write the name and formula of the first member of the series of alkenes.
3) Complete the following equations:
   (i) $CH_4 + O_2 \longrightarrow$
   (ii) $C_2H_5OH \xrightarrow{\text{conc } H_2SO_4}$
   (iii) $CH_3COOH + NaOH \longrightarrow$
4) Why homologous series of carbon compounds are so called? Write chemical formula of two consecutive members of a homologous series and state the part of these compounds that determines their
   (i) physical properties, and (ii) chemical properties.

5) Name the oxidising agent used for the conversion of ethanol to ethanoic acid. Distinguish between ethanol and ethanoic acid on the basis of (i) litmus test, (ii) reaction with sodium hydrogencarbonate.
6) Distinguish between esterification and saponification reactions of organic compounds with the help of the chemical equation for each. What is the use of (i) esters and (ii) saponification process?
7) What is meant by a functional group in an organic compound? Name the functional group present in
   (i) CH_3CH_2OH
   (ii) CH_3COOH
   (b) State one point of difference between soap and synthetic detergent.
8) Give reasons for the following observations:
   (a) The element carbon forms a very large number of compounds.
   (b) Air holes of a gas burner have to be adjusted when the heated vessels get blackened by the flame.
   (c) Use of synthetic detergents causes pollution of water..
9) What is ethanoic acid? Write the formula of the functional group present in this acid. What special name is given to its 5 – 8% solution in water? How does ethanoic acid react with sodium carbonate? Write a chemical equation of the reaction and common name of the salt produced.
10) (a) Distinguish between esterification and saponification reactions of organic compounds.
   (b) With a labelled diagram describe an activity to show the formation of an ester. **[All India]**
11) Give reasons for the following observations :
   (a) The element carbon forms a very large number of compounds.
   (b) Air holes of a gas burner have to be adjusted when the heated vessels get blackened by the flame.
   (c) Use of synthetic detergents causes pollution of water. **[Delhi]**

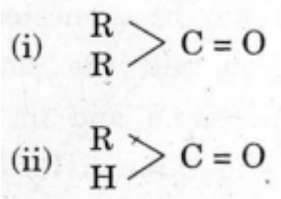
Long Answer Type Questions [5 Marks]

1) (a) The structural formula of an ester is



Write the structural formulae of the corresponding alcohol and the acid.
(b) (i) Mention the experimental conditions involved in obtaining ethene from ethanol.
(ii) Write the chemical equation for the above reaction.
(c) Explain the cleansing action of soap. **[Foreign]**

2) (a) Write the names of the functional groups in :



(b) Describe a chemical test to distinguish between ethanol andethanoic acid.

(c) Write a chemical equation to represent what happens when hydrogen gas is passed through an unsaturated hydrocarbon in the presence of nickel acting as a catalyst. **[Foreign]**

3) 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?
4) List in tabular form three physical and two chemical properties on the basis of which ethanol and ethanoic acid can be differentiated
5) What are the 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?

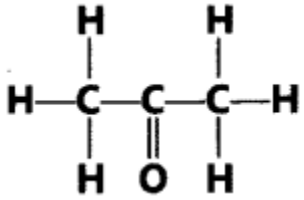
Year 2008

Very Short Answer Type Question [1 Mark]

1) What is the difference in the molecular formula of any two consecutive members of a homologous series of organic compounds?

Short Answer Type Questions [2 Marks]

1) (a) Give a chemical test to distinguish between saturated and unsaturated hydrocarbons.
   (b) (i) Name the products formed when ethanol burns in air. ‘
   (ii) What two forms of energy are liberated on burning alcohol?
   (c) Why is the reaction between methane and chlorine considered a substitution reaction?
2) (a) Why are covalent compounds generally poor conductors of electricity?
   (b) Name the following compound:



   (c) Name the gas evolved when ethanoic acid is added to sodium carbonate. How would you prove the presence of this gas?

Year 2007

Very Short Answer Type Question [1 Mark]

1) Give the names of the following functional groups:
   (i) —OH (ii) —COOH