

SCIENCE

CLASS 10 SCIENCE CHAPTER 4 - CARBON and Its Compounds 1 Marks Questions WITH ANSWERS

CLASS 10

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1. Soaps are formed by the saponification of

Ans: glycerides.

2. The functional group of butanone is

Ans: ketonic .

3. Enzyme which converts starch into glucose is

Ans: Zymase.

4. The first compound to be prepared in the laboratory was

Ans: Urea.

5. The IUPAC name of CH_3CHO .

Ans: Ethanal.

6. Rectified spirit is

Ans: 95% ethanol.

7. Dilute alkaline KMnO_4 solution is

Ans: an oxidising agent.

8. The by product in soap industry is

Ans: glycerol.

9. An example of soap is

Ans : $\text{C}_{17}\text{H}_{35}\text{COONa}$

10. The number of C-H bonds in ethane C_2H_6 molecule are

Ans: 6.

11. The odour of acetic acid resembles that of

Ans: Vinegar.

12. Diamond is not a good conductor of electricity because

Ans: It has no free electrons to conduct electric current.

13. Alcohols can be produced by the hydration of

Ans: Alkenes.

14. IUPAC name of first member of homologous series of ketones is

Ans: Propanone.

15. An unknown compound has the smell of vinegar. Identify it.

Ans. Acetic acid.

16. Out of butter and groundnut oil which is unsaturated in nature?

Ans. Groundnut oil.

17. Which has triple bond, C_2H_4 , C_3H_4 , C_3H_6

Ans: C_3H_4

18. Which substance is added for the denaturation of ethyl alcohol

Ans. Methyl Alcohol.

19. Which ions are responsible for making water hard?

Ans: Ca^{2+} and Mg^{2+} .

20. Ethane, with the molecular formula C_2H_6 has

Ans: 7 covalent bonds.

21. Butanone is a four carbon compound with the functional group

Ans: ketone.

22. While cooking, if the bottom of the vessels is getting blackened on the outside, it means that

Ans: the fuel is not burning completely.

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

Answer:

Covalent compounds have low melting and boiling points because the forces of attraction between molecules of covalent compounds are very weak. On applying a small amount of heat these molecular forces break.

24 What is Methane ?

Ans: Methane is the first member of alkane series having formula CH_4 .

25. 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.

Answer:(i) As carbon has four valence electrons and it can neither lose nor gain four electrons thus, it attains noble gas configuration only by sharing of electrons. In fact, it forms covalent compounds. (ii) In diamond, each carbon atom is bonded to four other carbon atoms forming a rigid three-dimensional structure. This makes diamond the hardest known substance. Thus, it has high melting point.

(iii) In graphite, each carbon atom is bonded to three other carbon atoms by covalent bonds in the same plane giving a hexagonal array. Thus, only three valence electrons are used for bond formation and hence, the fourth valence electron is free to move. As a result, graphite is a good conductor of electricity.

26. Write the molecular formula of first two members of homologous series having functional group -OH.

Answer:

The molecular formula of first two members of homologous series having -OH functional group are CH_3OH and $\text{CH}_3\text{CH}_2\text{OH}$.

27. Write the molecular formula of the 2nd and 3rd member of the homologous series whose first member is ethene.

Answer: Homologous series of alkenes have general formula, C_nH_{2n} whose first member is ethene. 2nd member of homologous series of alkenes is C_3H_6 i.e., propene. 3rd member of homologous series of alkenes is C_4H_8 i.e., butene.

28. Write the molecular formula of the 2nd and 3rd member of the homologous series whose first member is methane.

Answer:

Methane, CH_4 is an alkane. Alkanes have general formula, C_nH_{2n+2} .

2nd member of homologous series of alkanes is C_2H_6 i.e., ethane.

3rd member of homologous series of alkanes is C_3H_8 i.e., propane.

29. Write the next homologue of each of the following:

(i) C_2H_4 (ii) C_4H_6

Answer:

(i) C_2H_4 belongs to alkene series having general formula, C_nH_{2n} .

Thus, next homologue will be $C_3H_{2 \times 3} = C_3H_6$

(ii) C_4H_6 belongs to alkyne series having general formula, C_nH_{2n-2} .

Thus, next homologue will be $C_5H_{2 \times 5 - 2} = C_5H_8$

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

Answer:

Saturated hydrocarbons have general formula, C_nH_{2n+2} .

Among the given compounds only C_4H_{10} and C_6H_{14} satisfy the above formula. Thus, these are saturated hydrocarbons.

31. Write the name and structure of an alcohol with three carbon atoms in its molecule.

Answer:

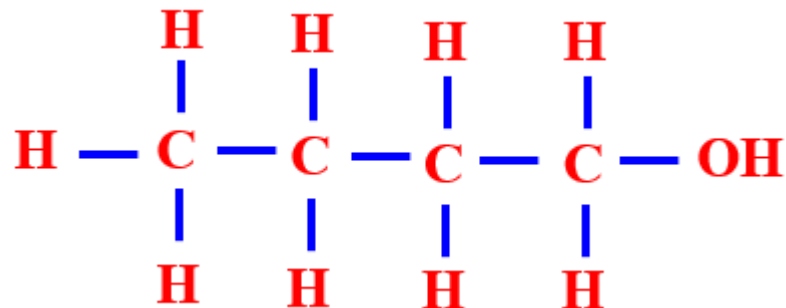
An alcohol with three carbon atoms in its molecule is propanol.

The structure of propanol is.

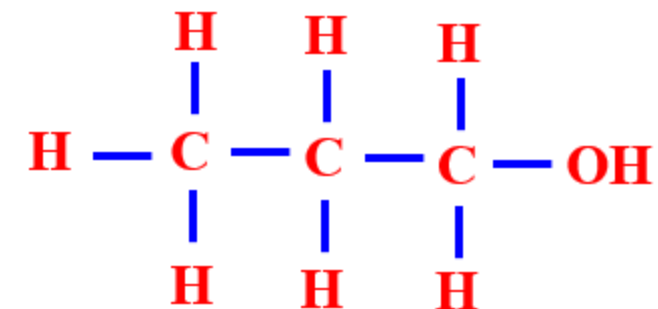
32. Write the name and structure of an alcohol with four carbon atoms in its molecule.

Answer:

An alcohol with four carbon atoms is butanol and its structure is :



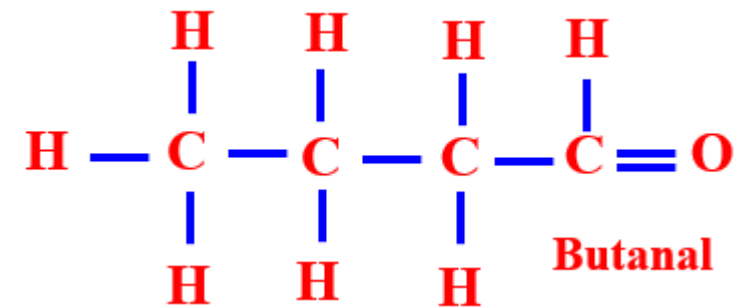
Alcohol \longrightarrow Propanol



33. Write the name and structure of an aldehyde with four carbon atoms in its molecule.

Answer:

An aldehyde with four carbon atoms is butanal and its structure is.



34. Which element exhibits the property of catenation to maximum extent and why?

Answer:

Carbon has the unique ability to form bonds with other atoms of carbon, giving rise to large molecules. This property is called catenation. Carbon shows catenation due to its small size and Stronger carbon-carbon bond strength.

35. Write the name and molecular formula of the fourth member of alkane series.

Answer: The general formula of the alkane series is C_nH_{2n+2} . For fourth member of alkane series, $n = 4 \therefore C_4H_{2 \times 4 + 2} = C_4H_{10}$ i.e., butane.

36. What is homologous series of carbon compounds?

Answer:

A homologous series is the family of organic compounds having the same functional group, similar chemical properties but the successive (adjacent) members of the series differ by a $-CH_2$ unit or 14 mass units.

37. Write the name and formula of the 2nd member of homologous series having general formula C_nH_{2n-2} .

Answer: General formula, C_nH_{2n-2} belongs to alkyne series. The second member of this series is propyne i.e., (C_3H_4) or $CH_3 - C \equiv CH$.

38. Name the functional group present in each of the following organic compounds:

(i) C_2H_5Cl (ii) C_2H_5OH

Answer:(i) C_2H_5Cl contains $-Cl$ (chloro) group which belongs to halo functional group.

(ii) C_2H_5OH contains $-OH$ group which belongs to alcoholic functional group.

39. Write the name and formula of the second member of the carbon compounds having functional group $-OH$.

Answer: Those having $-OH$ as functional group belong to alcohol family. Second member of this family is ethanol, C_2H_5OH .

40. State two properties of carbon which lead to a very large number of carbon compounds.

Answer: Carbon forms a large number of carbon compounds like long chains which may be straight or branched chains or ring of different sizes due to its tetravalency and unique property of catenation. Carbon due to its small size forms exceptionally stable compounds by forming strong bonds.

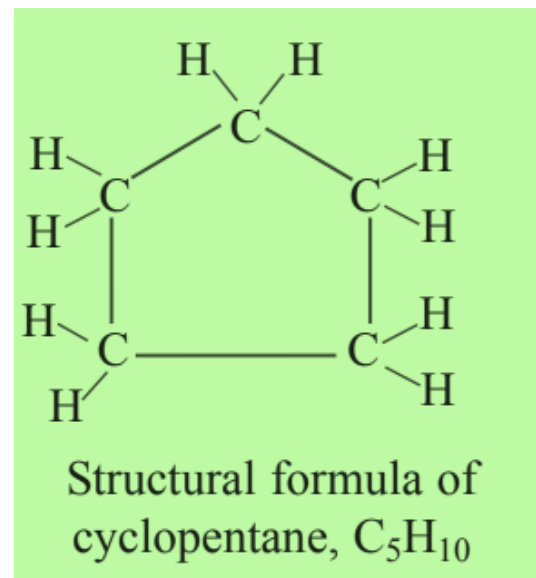
41. a) Why are most carbon compounds poor conductors of electricity?

(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.

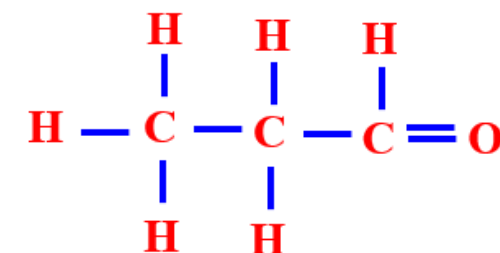
Answer: (a) Due to catenation, carbon forms covalent bonds with the constituent elements in the carbon compounds, hence it does not have mobile electrons and carbon compounds do not dissociate themselves into ions and hence, they are poor conductor of electricity.

[b] Name: Cyclopentane Number of single bonds : 15.

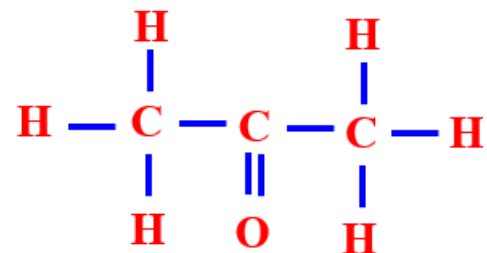
42. An aldehyde as well as a ketone can be represented by the same molecular formula, say C_3H_6O . Write their structures and name them. State the relation between the two in the language of science. Answer: The aldehyde and ketone represented by the molecular formula, C_3H_6O . In the language of science, they are called as isomers because both have same molecular formula but different structural formulae (having different functional groups.)



Aldehyde \longrightarrow Propanal



Ketone \longrightarrow Propanone

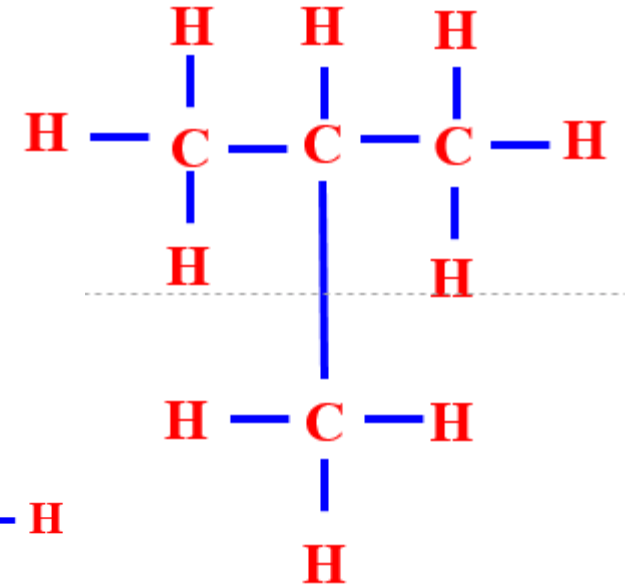
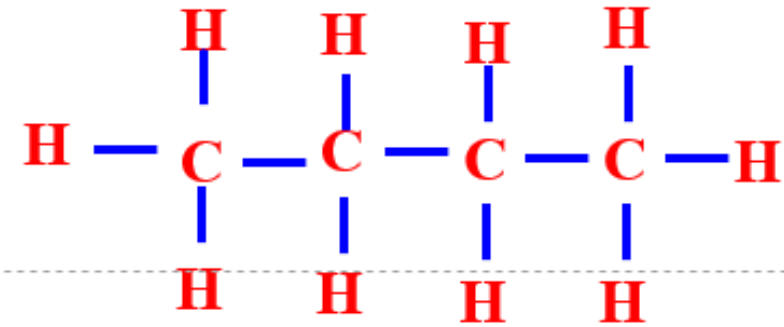


43. What is meant by isomers? Draw the structures of two isomers of butane, C_4H_{10} . Explain why we cannot have isomers of first three members of alkane series.

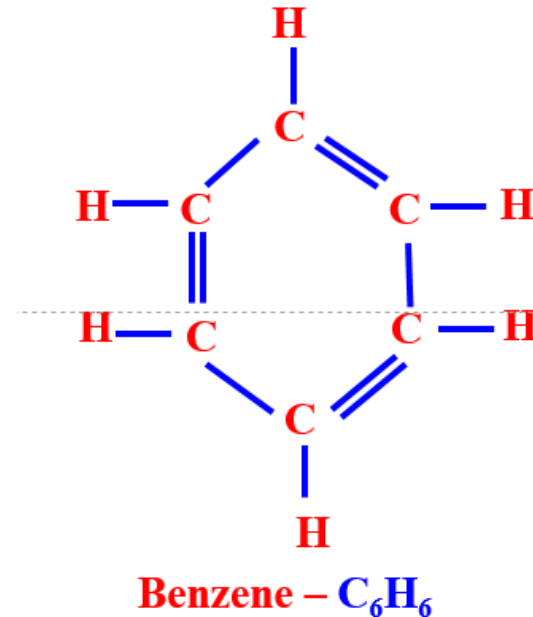
Answer:

Isomers are those molecules which have the same molecular formula but different structural formula i.e., show different properties.

The structures of possible isomers of butane (C_4H_{10}) are:



44. Write the structural formula of benzene, C_6H_6 .



45. What are hydrocarbons? Distinguish alkanes from alkenes and each of them from alkynes, giving one example of each.

Hydrocarbons are the compounds of carbon and hydrogen atoms. Those hydrocarbons which contain only single carbon-carbon bonds are called alkanes (saturated hydrocarbons) while those having double and triple bonds are called alkenes and alkynes respectively (unsaturated hydrocarbon).

Alkanes	Alkenes	Alkynes
1. General formula = C_nH_{2n+2}	General formula = C_nH_{2n}	General formula = C_nH_{2n-2}
2. Contain C – C single bonds	Contain C = C double bonds	Contain C \equiv C triple bonds
3. e.g., methane (CH₄)	e.g., ethene (C₂H₄)	e.g., ethyne (C₂H₂)

46. State any four characteristics of isomers.

Four characteristics of isomers are :

(i) They have same molecular formula but different structures.

(ii) For hydrocarbons, isomers is possible only with hydrocarbons having four or more carbon atoms.(iii) Due to isomerism, a given molecular formula can represent two or more different compounds.(iv) Due to isomerism, the different compounds have different properties.

47. Name the process by which unsaturated fats are changed to saturated fats.

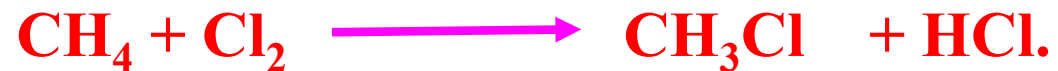
Answer:

Hydrogenation is the process in which unsaturated fats are changed to saturated fats.

48. Write the chemical equation to show what happens when methane is treated with chlorine in the presence of sunlight ?

Answer:

When methane is treated with chlorine in the presence of sunlight then substitution reaction takes place. In this, chlorine replaces the hydrogen atom of methane.



49. Write the respective chemical reaction to show what happens when methane is burnt in presence of oxygen?

Answer: When methane is burnt in presence of oxygen then carbon dioxide will be produced.



50. Give reason for the following : Acetylene burns with a sooty flame.

Answer: The formula of acetylene is $\text{HC} \equiv \text{CH}$. It is an unsaturated hydrocarbon where carbon content is more than the hydrogen content. Hence, carbon is not completely burnt and the unburnt carbon deposits as a soot.

51. Give reason for the following : Kerosene does not decolourise bromine water while cooking oils do.

Answer:

Cooking oils (unsaturated compounds) decolourise bromine water due to formation of addition products whereas kerosene (saturated compound) does not decolourise bromine water.

52. 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.

Answer: (i) 5% solution of KMnO_4 is prepared by adding 5 g of KMnO_4 in 95 g of water.

(ii) Here alkaline KMnO_4 acts as an oxidising agent. It oxidises ethanol to ethanoic acid by donating nascent oxygen. If excess of KMnO_4 is added the purple colour will persist indicating no more alcohol is left and there is no reaction.



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THANKS FOR WATCHING



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