Carbon and Its Compounds MCQS TEST - 1

10th Standard

Science

Carbon and Its Compounds

Total Mark : 30

Multiple Choice Question

14 × 1 = 14

1) Ethane, with the molecular formula C_2H_6 has
(a) 6 covalent bonds (b) 7 covalent bonds (c) 8 covalent bonds (d) 9 covalent bonds

2) Butanone is a four-carbon compound with the functional group
(a) carboxylic acid (b) aldehyde (c) ketone (d) alcohol

3) While cooking, if the bottom of the vessel is getting blackened on the outside, it means that
(a) the food is not cooked completely. (b) the fuel is not burning completely. (c) the fuel is wet. (d) the fuel is burning completely.

4) Carbon exists in the atmosphere in the form of
(a) carbon monoxide only (b) carbon monoxide in traces and carbon dioxide (c) carbon dioxide only (d) coal

5) Which of the following statements are usually correct for carbon compounds? These
i) are good conductors of electricity
ii) are poor conductors of electricity
iii) have strong forces of attraction between their molecules
iv) do not have strong forces of attraction between their molecules
(a) (i) and (iii) (b) (ii) and (iii) (c) (i) and (iv) (d) (ii) and (iv)

6) A molecule of ammonia (NH_3) has
(a) only single bonds (b) only double bonds (c) only triple bonds (d) two double bonds and one single bond

7) Buckminsterfullerene is an allotropic form of
(a) Phosphorous (b) Sulphur (c) Carbon (d) Tin

8) $CH_3 - CH_2 - OH \xrightarrow{Alkaline\ KMnO_4 + Heat} CH_3 - COOH$

In the above given reaction, alkaline $KMnO_4$ acts as
(a) reducing agent (b) oxidising agent (c) catalyst (d) dehydrating agent

9) Oils on treating with hydrogen in the presence of palladium or nickel catalyst form fats. This is an example of
(a) Addition reaction (b) Substitution reaction (c) Displacement reaction (d) Oxidation reaction

10) In which of the following compounds, -OH is the functional group?
(a) Butanone (b) Butanol (c) Butanoic acid (d) Butanal

11) The soap molecule has a
(a) hydrophilic head and a hydrophobic tail (b) hydrophobic head and a hydrophilic tail (c) hydrophobic head and a hydrophobic tail
(d) hydrophilic head and a hydrophilic tail

12) Identify the unstructured compounds from the following
(i) Propane
(ii) Propene
(iii) Propyne
(iv) Chloropropane
(a) (i) and (ii) (b) (ii) and (iv) (c) (iii) and (iv) (d) (ii) and (iii)

13) Chlorine reacts with saturated hydrocarbons at room temperature in the
(a) absence of sunlight (b) presence of sunlight (c) presence of water (d) presence of hydrochloric acid

14) In the soap micelles
(a) the ionic end of soap is on the surface of the cluster while the carbon chain is in the interior of the cluster.
(b) ionic end of soap is in the interior of the cluster and the carbon chain is out of the cluster.
(c) both ionic end and carbon chain are in the interior of the cluster (d) both ionic end and carbon chain are on the exterior of the cluster

Assertion and reason

4 × 1 = 4

15) **Assertion**: The earth's crust has only 0.02% carbon in the form of minerals.
Reason: The atmosphere has 0.03% of carbon dioxide.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false

16) **Assertion**: It is not that easy to break the bond of nitrogen molecule.
Reason. Each nitrogen atom has three bonds due to three shared pairs of electrons.
Codes
(a) If both assertion and reason are true and the reason is correct explanation of assertion.

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false

17) **Assertion**: Methane is widely used as a fuel

Reason: It is a major component of bio-gas and Compressed Natural Gas (CNG).

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false

18) **Assertion:** Diamond and graphite are two isotopes of carbon.

Reason: Diamond is the hardest substance known while graphite is non conductor of electricity.

Codes

(a) If both assertion and reason are true and the reason is correct explanation of assertion.
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.
(c) If assertion is true and reason is false.
(d) If both assertion and reason are false

4 Mark Questions

3 × 4 = 12

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19) A series of organic compounds having same functional group, with similar or almost identical chemical characteristics in which all the members can be represented by the same general formula and the two consecutive members of the series differ by -CH_2 group or 14 mass unit in their molecular formulae is called a homologous series. For example, all the members of alcohol family can be represented by the general formula, C_nH_{2n+1} OH where, n may have the values 1, 2, 3, ... etc. The various members of a particular homologous series are called homologues. The physical properties such as density, melting point, boiling point, solubility, etc. of the members of a homologous series show almost regular variation in ascending or descending the series.

(i) Which of the following is not a characteristic of members of a homologous series?

(a) They possess varying chemical properties.
(b) Their physical properties vary in regular and predictable manner.
(c) Their formulae fit the general molecular formula.
(d) Adjacent members differ by one carbon and two hydrogen atoms.

(ii) All the members of homologous series of alkynes have the general formula

(a) C_nH_{2n} **(b) C_nH_{2n+2}**
(c) C_nH_{2n-2} **(d) C_nH_{2n-4}**

(iii) Which of the following statements is not correct?

(a) A common functional group is present in different members of a homologous series..
(b) Two consecutive members of a homologous series differ by a -CH_3 group
(c) The molecular mass of a compound in the series differs by 14 a.m.u. from that of its neighbour.
(d) All the members of a homologous series have common general methods of preparation.

(iv) Identify the correct statements.

(I) As the molecular mass increases in any homologous series, a gradation in physical properties is seen.
(II) The melting and boiling points decrease with increasing molecular mass.
(III) Other physical properties such as solubility in a particular solvent decreases with increasing molecular mass.
(IV)The chemical properties, which are determined solely by the functional group, remain similar in a homologous series

(a) (II) and (III) **(b) (II) and (IV)**
(c) (I), (III) and (IV) **(d) (I), (II), (III) and (IV)**

(v) The table shows the formulae of three organic compounds that belong to the same homologous series.

First member of the homologous series	CH_3 -O-CH_3
Second member of the homologous series	CH_3CH_2 -O-CH_3
Third member of the homologous series	$CH_3CH_2CH_2$-O-CH_3

What is the general formula of this series?

(a) $C_nH_{2n}O$ **(b) $C_nH_{2n+2}O$**
(c) $C_nH_{2n}OH$ **(d) $C_nH_{2n+2}OH$**

20) When an element exists in two or more different forms in the same physical state, these different forms are called allotropes and the phenomenon is known as allotropy. Allotropes have similar chemical properties but they differ in their physical properties. Carbon exists in crystalline and amorphous forms. In crystalline form, it occurs as diamond, graphite and fullerenes. Diamond is a colourless, transparent substance having extraordinary brilliance. It is the hardest natural substance known. It is used for cutting marble, granite and glass. Graphite is a greyish-black, opaque substance. It is lighter than diamond i.e., it has lower density. It has sheet like structure having hexagonal layers. One layer slides over the other layer which makes it soft to touch. It is the reason that graphite is used as a lubricant.

(i) Substance *X* is a moderate conductor of electricity. Substance *X* has the structure shown below:

Which statements about substance X are correct?

(I) It is a covalent compound.
(II) It has a giant molecular structure.
(III) It has the same structure as graphite
(IV) It has the same structure as diamond

(a) (I) and (III) **(b) (II) and (III)**
(c) (II) and (IV) **(d) (I), (II) and (IV)**

(ii) Which of the following is correct about the structure of diamond?

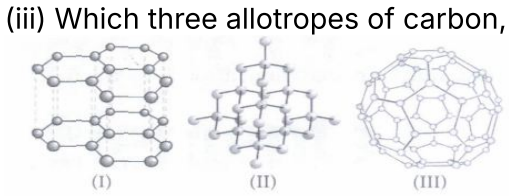
(a) Carbon atoms are held together by single covalent bonds.

(b) Electrons move freely through the structure.

(c) Layers of atoms slide easily over each other.

(d) Carbon atoms conduct electricity in the molten state.

(iii) Which three allotropes of carbon, do the given figure represents.



	(I)	**(II)**	**(III)**
(a)	Diamond	Graphite	Buckminster fullerene
(b)	Graphite	Buckminster fullerene	Diamond
(c)	Diamond	Buckminster fullerene	Graphite
(d)	Graphite	Diamond	Buckminster fullerene

(iv) Identify the incorrect statement(s).

(I) Diamond is the hardest substance known while graphite is smooth and slippery.

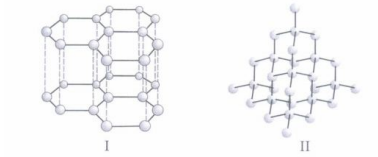
(II) Diamond is made up of billions of carbon atoms. Each carbon atom is bonded to four other carbon atoms in a tetrahedral manner to form a giant lattice. All carbon atoms are bonded by strong covalent bonds.

(III) Graphite is a poor conductor of electricity unlike other non-metals.

(IV) Graphite has a giant covalent structure that is made up of layers of carbon atoms. In each layer, each carbon atom is bonded to three other carbon atoms to form hexagonal rings of carbon atoms.

(a) (1) and (III) (b) Only (III) (c) (II) and (IV) (d) (1), (II) and (IV)

(v) Structures Qf two different forms of carbon are given below:



Identify the two forms (I and II respectively) and how are they related to each other?

(a) Diamond, Graphite, Isotopes of carbon

(b) Graphite, Diamond, Allotropes of carbon

(c) C_{12} , C_{14} , Allotropes of carbon

(d) C_{14}, C_{12} , Isotopes of carbon

21) As neutral atom carbon has electronic configuration K L. To gain inert gas configuration carbon can either 2, 4 donate 4 valence electrons (helium gas configuration) or gain 4 electrons (neon gas configuration), but it cannot do so. To acquire inert gas configuration carbon can only share its 4 valence electrons with other atoms forming covalent bonds. A covalent bond can be defined as a chemical bond formed between two atoms by mutual sharing of valence electrons so that each atom acquires the stable electronic configuration of the nearest noble gas. The concept of covalent bonds was given by Langmuir and Lewis to explain bonding in non-ionic compounds. The covalent bonds are of three types. If each atom contributes one electron, the covalent bond formed is called a single covalent bond and is represented by a single line (-) and if each atom contributes two electrons, the covalent bond formed is called a double bond and is represented by a double line (=) and if each atom contributes three electrons, the covalent bond formed is called a triple bond and is represented by a triple line (=).

(i) Which of the following do not contain a double bond?

I. S02

II. NH3

III. HCl

IV. 02

(a) I and II only (b) II and III only (c) III and IV only (d) I and IV only

(ii) Which of the following contains a triple bond?

(a) N_2 (b) O_2 (c) CO_2 (d) H_2

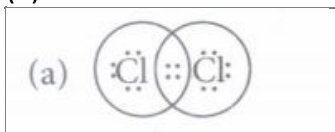
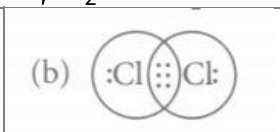
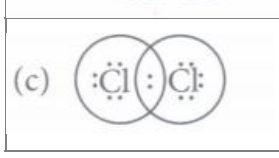
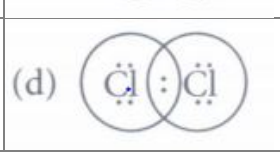
(iii) The shared pair of electrons is said to constitute a _____ bond between two hydrogen atoms.

(a) single (b) double (c) triple (d) ionic

(iv) Which of the following molecules has all its atoms joined together by double covalent bonds?

(a) Methane (b) Water (c) Carbon dioxide (d) Nitrogen trichloride

(v) Chlorine forms a diatomic molecule, Cl_2 . The electron dot structure for this molecule is

(a) 	(b) 
(c) 	(d) 

Multiple Choice Question

14 × 1 = 14

1)

(b) 7 covalent bonds

2)

(c) ketone

3)

(b) the fuel is not burning completely.

4)

(c) carbon dioxide only

5)

(d) (ii) and (iv)

6)

(a) only single bonds

7)

(c) Carbon

8)

(b) oxidising agent

9)

(a) Addition reaction

10)

(b) Butanol

11)

(a) hydrophilic head and a hydrophobic tail

12)

(d) (ii) and (iii)

13)

(b) presence of sunlight

14)

(a) the ionic end of soap is on the surface of the cluster while the carbon chain is in the interior of the cluster.

Assertion and reason

4 × 1 = 4

15)

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

16)

(a) If both assertion and reason are true and the reason is correct explanation of assertion.

17)

(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

18)

(d) If both assertion and reason are false

4 Mark Questions

3 × 4 = 12

19)

(i) **(a)**: All the members of homologous series show similar chemical properties.

(ii) **(c):** Alkynes have the general formula $C_n H_{2n-2}$ e.g., Ethyne (C_2H_2), Propyne (C_3H_4), Butyne ($C_4 H_6$).

(iii) **(b):** Two consecutive members of a homologous series differ by a - CH_2 group.

(iv) **(c):** The melting and boiling points increase with increasing molecular mass.

(v) **(b):** Molecular formula of first member: $C_2 H_6O$ Molecular formula of second member: $C_3 H_5 O$ Molecular formula of third member: $C_4 H_{10}O$ Thus, the general formula of the homologous series is $C_nH_{2n+2}O$.

20)

(i) **(c):** Each atom is covalently bonded to four other atoms, which in turn, are bonded to four more atoms. Thus, *X* is a giant molecule and has a structure similar to that of diamond. Substance *X* is not a compound as it consists of only one type of atoms. Thus, *X* is an element. Graphite has layers of carbon atoms.

(ii) **(a)**

(iii) **(d)**

(iv) **(b):** In graphite only three valence electrons are used for bond formation and hence fourth electron is free to move which makes it a good conductor of electricity.

(v) **(b):** Given structures are of graphite and diamond and these are allotropes of carbon.

21)

(i) **(b):** Both NH3 and HCl have single bonds.

(ii) **(a):** N=N

(iii) (a)

(iv) **(c):** O=C=O

(v) **(c):** In chlorine molecule, both chlorine atoms contribute one electron and thus share single electron pair to form single covalent bond. As shared pair is shared by both atoms, they acquire inert gas configuration of argon atom in valence shell.