RAVI MATHS TUITION CENTER , WHATSAPP - 8056206308

Carbon And Its Compounds MCQ TEST

10th Standard

Science

60 x 1 = 60

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) Ethanol reacts with sodium and forms two products. These are

(a) sodium ethanoate and hydrogen (b) sodium ethanoate and oxygen (c) sodium ethoxide and hydrogen (d) UnAvailable Option

5) 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

6) 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)

7) 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

8) Buckminsterfullerene is an allotropic form of

(a) Phosphorous (b) Sulphur (c) Carbon (d) Tin

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

In the above given reaction, alkaline $KMnO_4$ acts as

(a) reducing agent (b) oxidising agent (c) catalyst (d) dehydrating agent

11) In which of the following compounds, -OH is the functional group?

(a) Butanone (b) Butanol (c) Butanoic acid (d) Butanal

12) 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

13) 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)

14) 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

15) 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

16) Pentane has the molecular formula C_5H_{12} . It has

(a) 5 covalent bonds (b) 12 covalent bonds (c) 16 covalent bonds (d) 17 covalent bonds

17) Vinegar is a solution of

(a) 50% - 60% acetic acid in alcohol (b) 5% - 8% acetic acid in alcohol (c) 5% - 8% acetic acid in water (d) 50% - 60% acetic acid in water

18) Mineral acids are stronger acids than carboxylic acids because

i) mineral acids are completely ionized

ii) carboxylic acids are completely ionized

iii) mineral acids are partially ionized

iv) carboxylic acids are partially ionised

(a) (i) and (iv) (b) (ii) and (iii) (c) (i) and (ii) (d) (iii) and (iv)

19) Carbon forms four covalent bonds by sharing its four valence electrons with four univalent atoms, e.g. hydrogen. After the formation of four bonds, carbon attains the electronic configuration of

(a) Helium (b) Neon (c) Argon (d) Krypton

20) Which of the following does not belong to the same homologous series?

(a) CH_4 (b) C_2H_6 (c) C_3H_8 (d) C_4H_8

21) The name of the compound $CH_3 - CH_2 - CHO$ is

(a) Propanal (b) Propanone (c) Ethanol (d) Ethanal

22) The heteroatoms present in $CH_3 - CH_2 - O - CH_2 - CH_2Cl$ are

i) oxygen

ii) carbon

iii) hydrogen

iv) chlorine

(a) (i) and (ii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i) and (iv)

23) Which of the following represents saponification reaction?

(a) $CH_3COONa + NaOH \xrightarrow{CaO} CH_4 + Na_2CO_3$ (b) $CH_3COOH + C_2H_5OH \xrightarrow{H_2SO_4} CH_3COOC_2H_5 + H_2O$ (c) $2CH_3COOH + 2Na \rightarrow 2CH_3COONa + H_2$

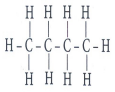
(d) $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$

24) The first member of alkyne homologous series is

(a) Ethyne (b) Ethane (c) Propyne (d) Methane

25) Which of the following are correct structural isomers of butane?

(i)



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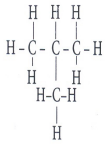
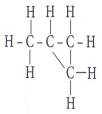


(iii)



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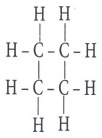
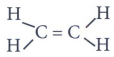


(a) (i) and (iii) (b) (ii) and (iv) (c) (i) and (ii) (d) (iii) and (iv)

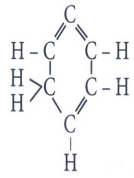
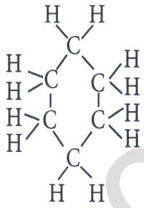
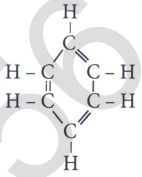
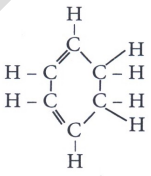
26) Which of the following is the correct representation of electron dot structure of nitrogen?

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

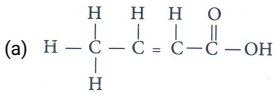
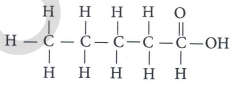
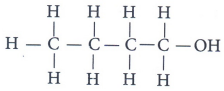
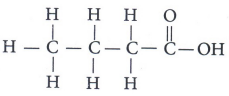
27) Structural formula of ethyne is

(a) $H-C\equiv C-H$ (b) $H_3-C\equiv C-H$ (c)  (d) 

28) Structural formula of benzene is

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

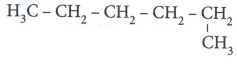
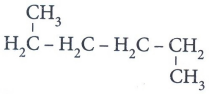
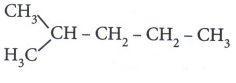
29) The correct structural formula of butanoic acid is

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

30) The correct electron dot structure of a water molecule is

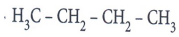
(a)  (b)  (c)  (d) 

31) Which of the following is not a straight chain hydrocarbon?

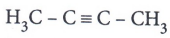
(a)  (b) $H_3C-CH_2-CH_2-CH_2-CH_2-CH_3$ (c)  (d) 

32) Which among the following are unsaturated hydrocarbons?

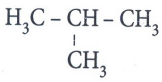
(i)



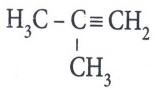
(ii)



(iii)



(iv)



(a) (i) and (iii) (b) (ii) and (iii) (c) (ii) and (iv) (d) (iii) and (iv)

33) The isomeric pair is

(a) ethane and propane (b) propane and butane (c) ethane and ethane (d) butane and 2-methyl propane

34) Which of the following is used to oxidise ethanol to ethanoic acid

(a) Alkalme $KMnO_4$ (b) Cone. H_2SO_4 (c) Acidified $K_2Cr_2O_7$ (d) All of above

35) The compound which gives a brisk effervescence with sodium metal and not with sodium hydrogen carbonate is

(a) ethanol (b) ethanoic acid (c) both ethanoic acid and ethanol (d) none of these

36) Identify the product formed when methane reacts with chlorine in the presence of sunlight is

(a) C_2Cl_6 (b) CH_3Cl (c) $CHCl_4$ (d) None of these

37) Which is denatured spirit?

(a) ethanol only (b) ethanol and methanol (50%) (c) ethanol and methanol (5%) (d) methanol only

38) Drinking alcohol and driving may cause serious accidents. To discourage this, police randomly test drivers for alcohol using a breath analyser. The breath analyser works because

(a) Alcohol makes the breath dry and the machine registers moisture (b) Alcohol makes the breath hotter which changes the machine reading

(c) Alcohol causes more saliva which the machine checks. (d) Alcohol in the breath cause a chemical change registered by the machine

39) Tertiary butane gets oxidised with oxidising agents like alkaline $KMnO_4$ to

(a) Isobutane (b) Tert-butyl alcohol (c) Secondary-propyl alcohol (d) All of above

40) The substance not responsible for the hardness of water is

(a) sodium nitrate (b) calcium hydrogen carbonate (c) calcium carbonate (d) magnesium carbonate

41) The by product of soap is

(a) isoprene (b) glycerol (c) butene (d) ethylene glycol

42) Covalent compounds

(a) have high melting and boiling points (b) are mostly soluble in water (c) are formed between atoms of metals and non-metals

(d) are formed by the sharing of electrons in the bonding atoms

43) The heteroatoms present is CH_3 - O -CH_2 - CH_2 (Br)

(a) oxygen (b) carbon (c) hydrogen (d) bromine

44) Which of the following can be used for the denaturation of ethyl alcohol?

(a) Methyl alcohol (b) Pyridines (c) Copper sulphate (d) All of above

45) Soaps are formed by saponification of

(a) alcohols (b) glycosides (c) simple esters (d) carboxylic acids

46) Acetic acid was added to a liquid X kept in a test tube. A colourless and odourless gas Y was evolved. The gas was passed through lime water which turned milky. It was concluded that:

(a) Liquid X is sodium hydroxide and the gas Y is CO (b) Liquid X is sodium carbonate and the gas Y is CO_2

(c) Liquid X is sodium acetates and the gas Y is CO_2 (d) Liquid X is sodium chloride and the gas Y is SO_2

47) For gas welding used for welding broken pieces of iron, we normally use a mixture of

(a) Ethane and oxygen (b) Ethene and oxygen (c) Ethyne and oxygen (d) Ethene and air

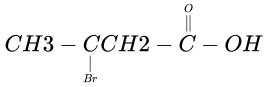
48) Bromine reacts with saturated hydrocarbon at room temperature in the

(a) absence of sunlight (b) presence of wate (c) presence of sunligh (d) presence of hydrochloric acid

49) The number of single and double bonds present in benzene are

(a) 9 and 6 (b) 9 and 3 (c) 12 and 3 (d) 12 and 6

50) Identify the functional group present in the following compound



(a) aldehyde (b) bromine (c) carboxylic (d) both bromine and carboxylic group

51) The upper and lower homologue of C_2H_5OH are respectively

(a) methyl alcohol and butyl alcohol (b) ethyl alcohol and propyl alcohol (c) butyl alcohol and propyl alcohol

(d) propyl alcohol and methyl alcohol

52) Which is not true about homologous series?

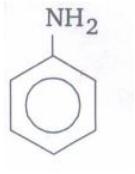
(a) They have same general formula. (b) They differ from other by CH_3 group (c) They have same functional group.

(d) They have same chemical properties

53) Name the following aromatic compound

(a) toluene (b) aniline (c) phenol (d) furan

54) Ethanoic acid was added to sodium carbonate solution and the gas evolved was tested with a burning splinter. The following four observations were reported. Identify the correct observation.



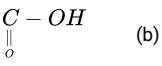
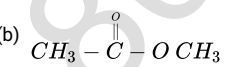
(a) The gas burns with pop sound and the flame gets extinguished (b) The gas does not burn but the splinter burns with pop sound

(c) The flame extinguishes and the gas does not burn (d) The gas burns with a blue flame and the splinter burns brightly

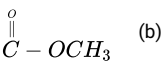
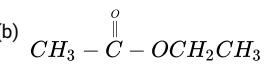
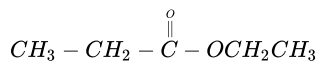
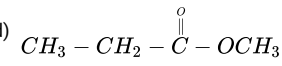
55) The general formula for aldehydes is CnH_{2n+1} -CHO.The value of 'n' for the first member.

(a) 1 (b) 0 (c) 0.5 (d) 1.1

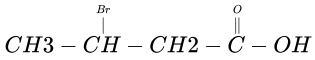
56) An organic compound 'X' has the molecular formula $C_3H_6O_2$. It has a pleasant smell but does not turn blue limus red. It has structural formula

(a)  (b)  (c) both (a) and (b) (d) None of the above

57) The structural formula of ethyl ethanoate

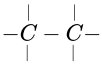
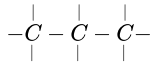
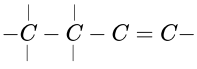
(a)  (b)  (c)  (d) 

58) According to IUPAC system, the correct name of the organic compound is

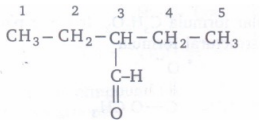


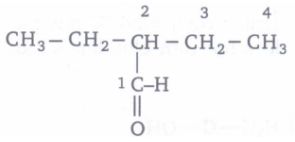
(a) 2-bromobutanoic acid (b) 2-bromobutysis acid (c) 3-bromobutanoic acid (d) 3-bromo-2-hydroxybutan-2-one

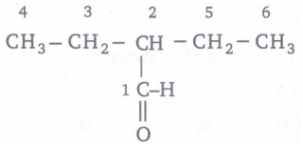
59) Identify the compound that undergoes bromination reaction:

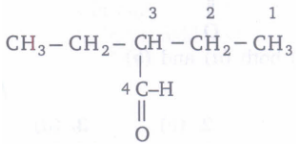
(a)  (b)  (c)  (d) All of above

60) Identify the correct way of numbering an organic compound (according to IUPAC

(a) 

(b) 

(c) 

(d) 

26 x 1 = 26

61) **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

62) **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

63) **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

64) **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

65) **Assertion:** The bonds formed by elements having larger atoms are much weaker.

Reason: This enables the nucleus to hold on to the shared pairs of electrons strongly.

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.

66) **Assertion**: As the molecular mass increases in any homologous series, a gradation in physical properties is seen.

Reason: This is because the melting points and boiling points increase with increasing molecular mass.

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.

67) **Assertion**: Unsaturated carbon compounds will give a yellow flame with lots of black smoke

Reason: Limiting the supply of air results in incomplete combustion.

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.

68) **Assertion:** Acidified potassium dichromate is oxidising alcohols to acids.

Reason: It adds oxygen to alcohol and is known as oxidising agent.

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.

69) **Assertion**: Ethanoic acid often freezes during winter in cold climates

Reason: The melting point of pure ethanoic acid is 290 K

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.

70) **Assertion**: $CH_3COOC_2H_5$+ NaOH $\rightarrow$ CH_3COONa + C_2H_5OH is saponification reaction.

Reason: $CH_3COOH + C_2H_5OH \xrightarrow{Conc.H_2SO_4} CH_3COOC_2H_5 + H_2O$ is esterification.

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.

71) **Assertion:** Following are the structural isomers of butane.

Reason: Structural isomers have the same molecular formula but they differ in their structures.

(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.

72) **Assertion:** Saturated hydrocarbons are chemically less reactive.

Reason: All the valencies of carbon atom are satisfied by single covalent bonds.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

73) **Assertion:** Both aldehydes and ketones contain carbonyl group.

Reason: In aldehydes, the functional group is attached to atleast one hydrogen atom.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

74) **Assertion:** In alkanes, alkenes and alkynes the valency of carbon is always four.

Reason: All hydrocarbons except alkanes contain double bonds.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

75) **Assertion:** Graphite is a good conductor of electricity.

Reason: It has one free valence electron.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

76) **Assertion:** The functional group present in alcohols is -OH.

Reason: It is the same group as present in water, hence water and alcohol have similar properties.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

77) **Assertion:** Ethanol is first member of the alcohol homologous series.

Reason: A homologous series can be represented by a general formula.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

78) **Assertion:** Carbon and its compounds can be used as fuels.

Reason : They are highly inflammable and have high calorific value.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

79) **Assertion:** Diamond is not good conductor of electricity.

Reason: It has no free electrons.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

80) **Assertion:** Covalent compounds are generally poor conductor of electricity.

Reason: They consist of molecules and not ions which can transfer charge.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

81) **Assertion:** Carbon possesses property of catenation.

Reason: Carbon atoms form double as well as triple bonds during catenation.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

82) **Assertion:** Two members of a homologous series have similar chemical properties.

Reason: Propane and butane are members of same homologous series.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

83) **Assertion:** Olefins have the general formula C_nH_{2n+1}.

Reason: There is atleast one double bond between two carbon atoms in their molecules.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

84) **Assertion:** Diamond is the hardest natural known substance.

Reason: Diamond is used for cutting marble, granite and glass.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

85) **Assertion:** Diamond and graphite do not have the same crystal structure.

Reason: Diamond is crystalline while graphite is amorphous.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

86) **Assertion:** Graphite is soft and slippery to touch.

Reason: Graphite has sheet like layered structure.

Codes

(a) Both A and R are true, and R is correct explanation ofthe 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.

11 x 4 = 44

87) 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) $C_nH_{2n+2}OH$**

88) 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 theydiffer 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?

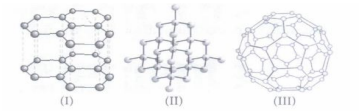
(a) Carbon atoms are held together by single covalent bonds.

(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 reopresents.



	(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.

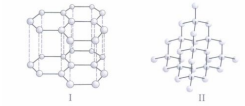
(II) Diamond is made up of billions of carbon atoms. Each carbon atom is bonded to four other carbon atoms in a tetrahedral manner to form a giant lattice. All carbon atoms are bonded by strong covalent bonds.

(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**

89) 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

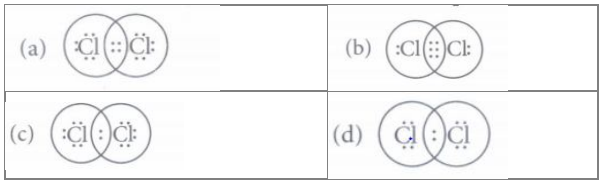
(iii) The shared pair of electrons is said to constitute a _____ bond between two hydrogen atoms.

(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



90) Two allotropic forms of carbon which are crystalline in nature, are diamond and graphite. They differ physically but chemically they are similar. Diamond is the hardest crystalline form of carbon. In diamond, each carbon atom is linked to four other carbon atoms by covalent bonds. In graphite, each carbon atom is linked to three other carbon atoms by covalent bond. Graphite is relatively soft and greasy. It is also a good conductor of electricity. The C-C bond length in graphite is 141.5 pm while in diamond it is 154 pm.

(i) Which of the following is a good conductor of heat and electricity?

(a) Coal (b) Diamond (c) Charcoal (d) Graphite

(ii) Graphite is a good conductor of electricity because

(a) it has free electrons (b) it has free atoms (c) it is crystalline (d) it is soft and greasy.

(iii) Which of the following types of binding forces is present in the structure of diamond?

(a) Ionic (b) van der Waals' (c) Covalent (d) None of these

(iv) Diamond is not a good conductor of electricity because

(a) it is very hard (b) its structure is very compact

(c) it is not water soluble (d) it has no free electron.

(v) Which of the following is the structure of diamond?