Ravi Maths Tuition

Carbon and Its Compounds

10th Standard

Science

Multiple Choice Question 76 x 1 = 76

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

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

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

10) 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

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) $CH_3COOH + C_2H_5OH \xrightarrow{H_2SO_4} CH_3COOC_2H_5 + H_2O$

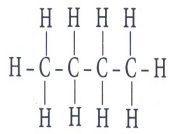
(c) $2CH_3COOH + 2Na \rightarrow 2CH_3COONa + H_2$ (d) $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$

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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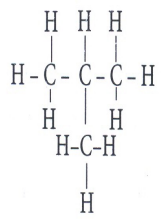

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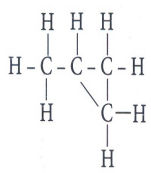

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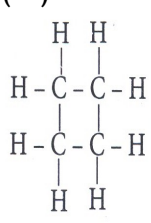
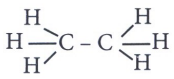


(a) (i) and (iii) (b) (ii) and (iv) (c) (i) and (ii) (d) (iii) and (iv)

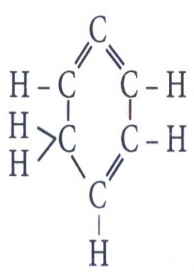
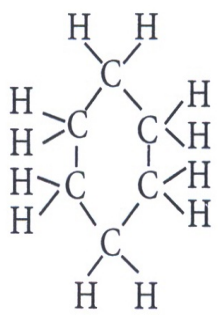
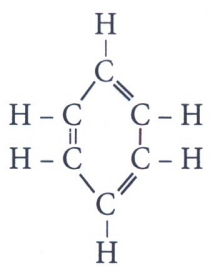
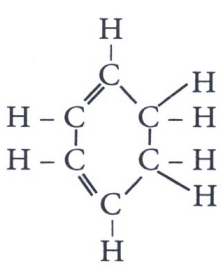
26) Which of the following is the correct representation of electron dot structure of nitrogen?

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

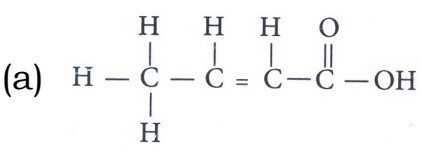
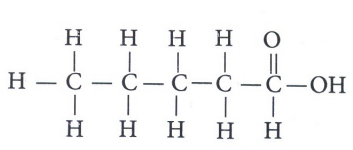
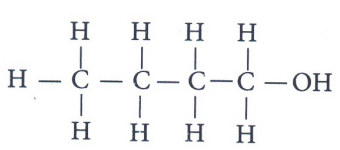
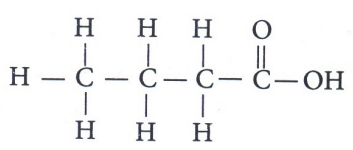
27) Structural formula of ethyne is

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

28) Structural formula of benzene is

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

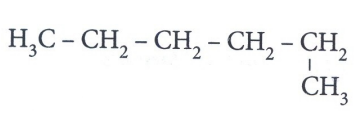
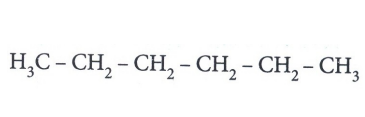
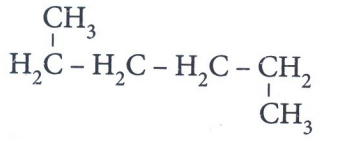
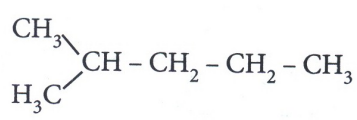
29) The correct structural formula of butanoic acid is

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

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

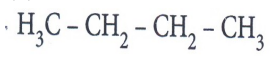
(a)  (b)  (c)  (d) 

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

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

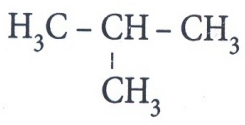
32) Which among the following are unsaturated hydrocarbons?

(i)

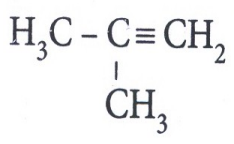


(ii)

(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 water (c) presence of sunlight

(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

$$CH3 - \underset{\underset{Br}{|}}{C}CH2 - \overset{\overset{O}{\|}}{C} - OH$$

(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?

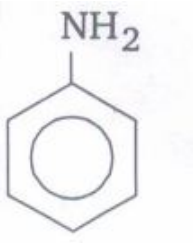
(a) They have same general formula. (b) They differ from other by CH_3 group

(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 C_nH_{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 litmus red. It has structural formula

(a) $H_3C-\overset{\overset{O}{\|}}{C}-OH$ (b) $CH_3-\overset{\overset{O}{\|}}{C}-O\,CH_3$ (c) both (a) and (b) (d) None of the above

57) The structural formula of ethyl ethanoate

(a) $CH_3-\overset{\overset{O}{\|}}{C}-OCH_3$ (b) $CH_3-\overset{\overset{O}{\|}}{C}-OCH_2CH_3$ (c) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-OCH_2CH_3$

(d) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-OCH_3$

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

$CH3-\overset{\overset{Br}{|}}{C}H-CH2-\overset{\overset{O}{\|}}{C}-OH$

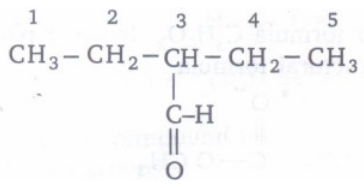
(a) 2-bromobutanoic acid (b) 2-bromobutysis acid (c) 3-bromobutanoic acid

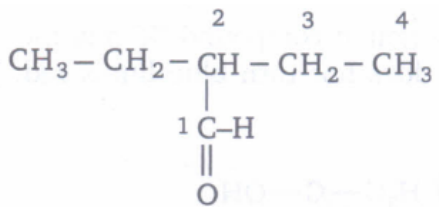
(d) 3-bromo-2-hydroxybutan-2-one

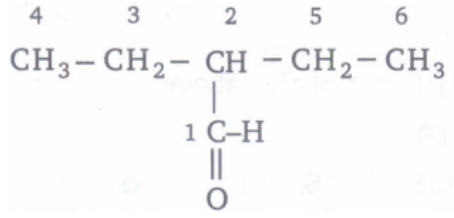
59) Identify the compound that undergoes bromination reaction:

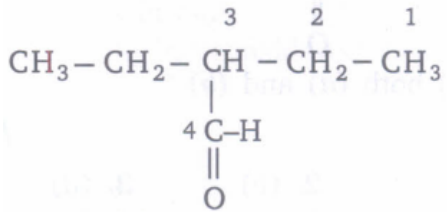
(a) $-\overset{|}{\underset{|}{C}}-\overset{|}{\underset{|}{C}}-$ (b) $-\overset{|}{\underset{|}{C}}-\overset{|}{\underset{|}{C}}-\overset{|}{\underset{|}{C}}-$ (c) $-\overset{|}{\underset{|}{C}}-\overset{|}{\underset{|}{C}}-C=C-$ (d) All of above

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

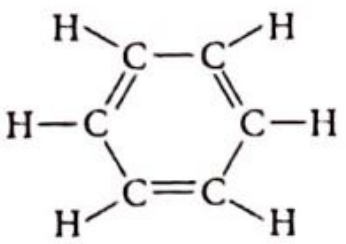
(a) 

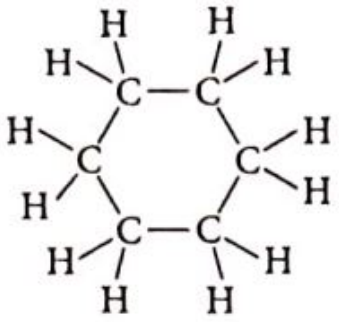
(b) 

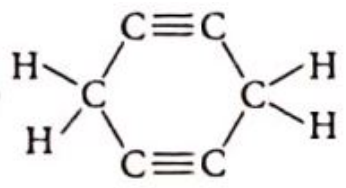
(c) 

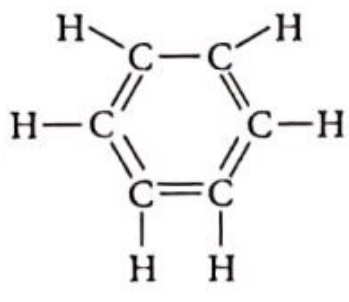
(d) 

61) The structural formula of cyclohexane is

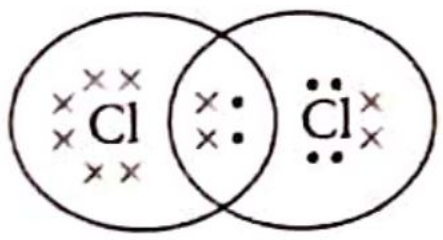
(a) 

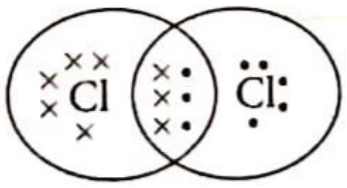
(b) 

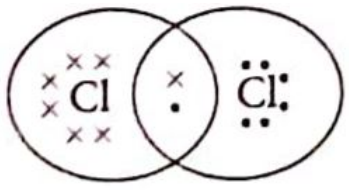
(c) 

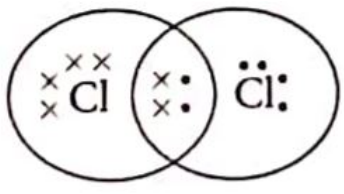
(d) 

62) The electron dot structure of chlorine molecule is

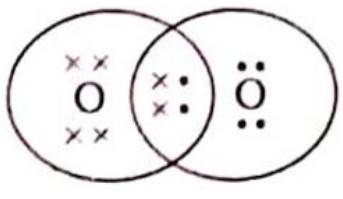
(a) 

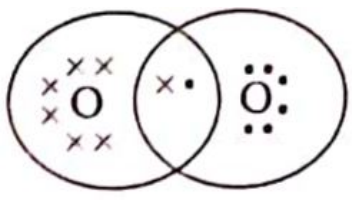
(b) 

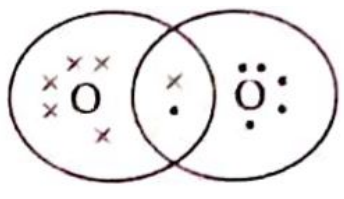
(c) 

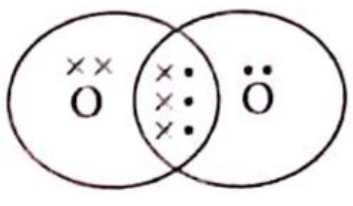
(d) 

63) The correct representation of covalent bonding in an Oxygen molecule is

(a) 

(b) 

(c) 

(d) 

64) Which of the following hydrocarbons is different from the others?

(a) C_4H_{10} (b) C_7H_{14} (c) C_5H_{12} (d) C_2H_6

65) Which of the following is not a property of carbon?

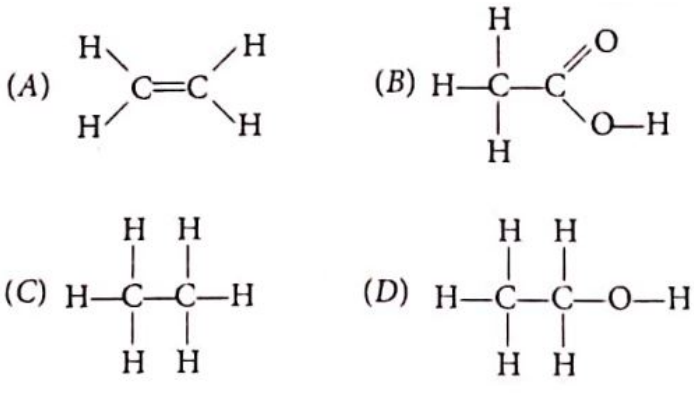
(a) Carbon compounds are good conductor of heat and electricity.

(b) Carbon has ability to make long chain.

(c) Most of the carbon compounds are covalent compounds.

(d) Boiling and melting point of carbon compounds are relatively lower than those of ionic compounds.

66) The formulae of four organic compounds are shown below. Choose the correct option.



(a) A and B are unsaturated hydrocarbons. (b) C and D are saturated hydrocarbons.

(c) Addition of hydrogen in presence of catalyst changes A to C.

(d) Addition of potassium permanganate changes B to D.

67) ldentify a group of the unsaturated hydrocarbons from the following

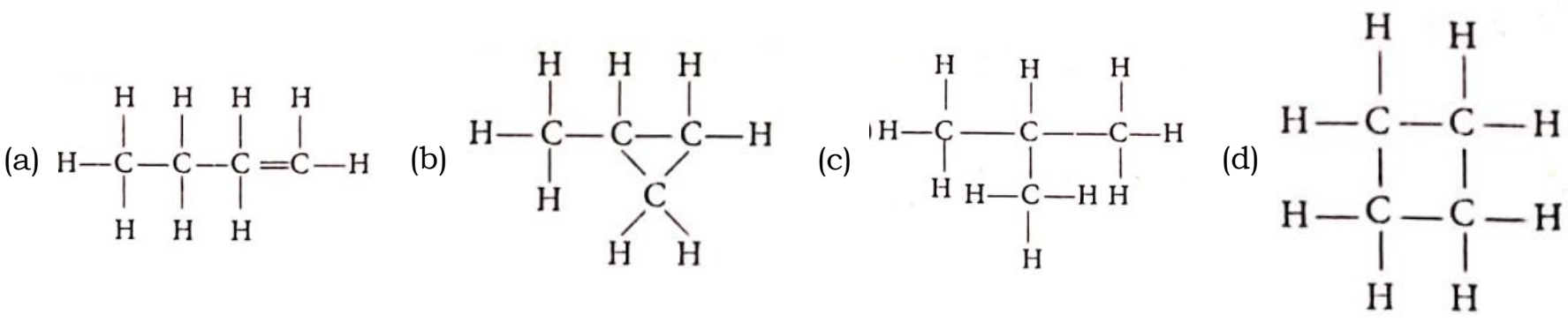
(a) Propane, ethene, butyne (b) Ethene, propane, hexane (c) Cyclohexane, methane, ethane

(d) Butyne, ethene, propyne

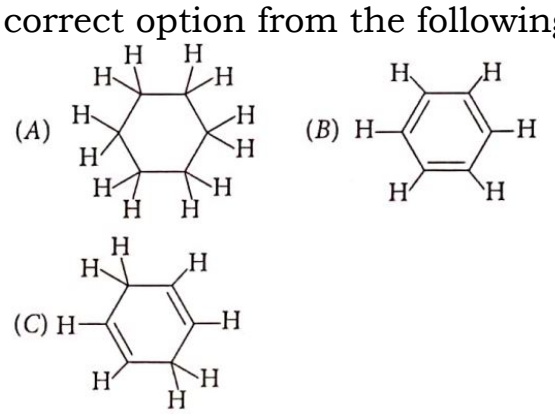
68) The total number of electrons shared in the formation of an ethyne molecule is

(a) 6 (b) 3 (c) 10 (d) 4

69) Which of the following is correct structural isomer of butane?



70) Consider the structures of the three cyclic carbon compounds A, B and C given below and select the correct option from the following.



(a) A and C are isomers of hexane and B is benzene.

(b) A is an isomer of hexane, B is benzene and C is an isomer of hexene.

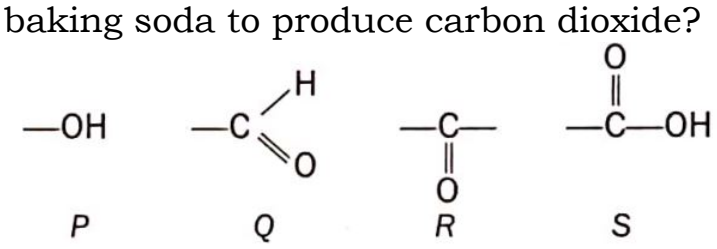
(c) A is a saturated cyclic hydrocarbon and B and C are unsaturated cyclic hydrocarbons.

(d) A is cyclohexane and B and C are the isomers of benzene.

71) On undergoing complete combustion in an adequate supply of oxygen, an organic compound produces only carbon dioxide and water vapour as the products. Based on this information, which of the following homologous series could the compound belong to?

(a) alkanes (b) alcohols (c) aldehydes (d) carboxylic acid

72) A compound with which of the following functional groups is most likely to cause the decomposition of baking soda to produce carbon dioxide?



(a) P (b) Q (c) R (d) S

73) Mineral acids are stronger acids than carboxylic acids because

(a) both mineral acids and carboxylic acids are completely ionised

(b) both mineral acids and carboxylic acids are partially ionised

(c) mineral acids are completely ionised while carboxylic acids are partially ionised

(d) mineral acids are partially ionised while carboxylic acids are completely ionised

74) Which heteroatoms are present in the following compound?
CH_3 - CH_2 - O - CH_2 - CH_2Cl are

(a) oxygen and carbon (b) carbon and chlorine (c) hydrogen and carbon (d) chlorine and oxygen

75) Vinegar is a diluted form of ethanoic acid, freezes during winter. What does this suggest about physical properties of pure ethanoic acid?

(a) It has a low boiling point. (b) It has a low melting point. (c) It is a high boiling point.

(d) It has a high melting point.

76) Select saponification reaction from the following

(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 $\rightarrow$ CH_3COONa + C_2H_5OH (d) CH_3COONa + NaOH $\rightarrow$ CH_4 + Na_2CO_3

Assertion and reason 28 x 1 = 28

77) **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

78) **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

79) **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

80) **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

81) **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.

82) **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.

83) **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.

84) **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.

85) **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.

86) **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.

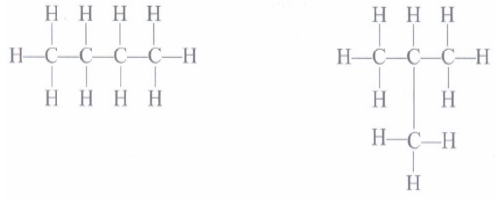
(b) If both assertion and reason are true but reason is not a correct explanation of assertion.

(c) If assertion is true and reason is false.

(d) If both assertion and reason are false.

87) **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.

88) **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 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.

89) **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 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.

90) **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 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.

91) **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 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.

92) **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 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.

93) **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 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.

94) **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 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.

95) **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 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.

96) **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 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.

97) **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 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.

98) **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 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.

99) **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 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.

100) **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 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.

101) **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 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.

102) **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 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.

103) **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.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false.
(d) Assertion is false but Reason is true.

104) **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.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false.
(d) Assertion is false but Reason is true.

Passage Based Questions 3 x 1 = 3

105) Water is a simple molecule consisting of one oxygen atom bonded to two different hydrogen atoms. Because of the higher electronegativity of the oxygen atom, the bonds are polar covalent (polar bonds). The oxygen atom attracts the shared electrons of the covalent bonds to a significantly greater extent than the hydrogen atoms. The molecule has a bent structure, the $H-\ddot{\underset{\ddot{}}{O}}-H$ bond angle is about 105°.

Answer the following questions based on the above information
(a) Why is oxygen forming two bonds with hydrogen atoms?
(b) What is the shape of water molecule?
(c) Name the type of bonding seen in water molecule.
(d) Draw the electron-dot structure of H_2O.

106) The United States Department of Agriculture (USDA) dietary guidelines recommend limiting our intake of saturated fats. Too much can increase your risk of heart disease and high blood cholesterol. For a healthy diet, no more than 35 percent of total daily calories should come from fat, with saturated fats consisting of less than 10 percent of total daily calories.

The body breaks down fat and uses it for energy and other processes. Unsaturated fats can lower triglycerides and cholesterol, which is why these are healthier than saturated fats. Too much saturated fat in the blood increases cholesterol and causes plaque to form in blood vessels. As a result, it becomes harder for blood and oxygen to travel through the body. This raises the risk for stroke and heart disease.

Even though unsaturated fats are healthier, they should be consumed in moderation. Too much total fat - whether good or bad - can increase cholesterol and the risk of heart disease and stroke.

Answer the following questions based on the above information

(a) Name anyone food with saturated fat

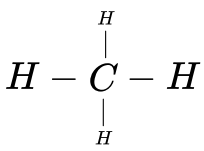
(b) Give one chemical difference between saturated and unsaturated fats.

(c) What is the general formula of saturated hydrocarbon?

(d) What type of fat olive oil is?

107) The compounds entirely consisting of carbons and hydrogens are known as hydrocarbons. There are different categories in which hydrocarbons are divided out of which the two are:

Saturated Hydrocarbons: The hydrocarbons having only single bonds between the carbon atoms are called saturated hydrocarbons. This includes alkanes having a general formula C_nH_{2n+2}. The first member of homologous series of alkanes is methane (CH_4). Structure of methane is as follows:



Unsaturated Hydrocarbons: The hydrocarbons having double and triple bonds between the carbons atoms are called unsaturated hydrocarbons. This includes alkenes and alkynes having general formula C_nH_{2n} and $C_nH_{2n\_2}$,respectively. The first member of homologous series of alkynes is ethene ($C_2H_{4)}$. The structure of ethene is as follows: $H_2C = CH_2$.

The first member of homologous series of alkynes is ethyne (C_2H_2) having structural formula HC = CH.

Answer the following questions based on the above information

(a) Select alkenes and alkynes from the following:

C_2H_4 C_3H_4, C_2H_2, C_4H_8

(b) Name the reaction used to convert unsaturated hydrocarbons to saturated hydrocarbons.

(c) Name the catalyst used in the above conversion reaction.

(d) Draw the structure of hydrocarbon with general formula C_nH_{2n-2} where n = 3.

Data Based Questions 1 x 1 = 1

108) The data for four elements is given below:

Element	Carbon	Nitrogen	Fluorine	Neon
Symbol	C	N	F	Ne
Structure	Macromolecular	Simple molecules N_2	Simple molecules F_2	Single atoms Ne
Boiling point/˚C	4200	-196	-188	-246

Answer the following questions based on the above information

(a) Name the element that is solid at room temperature.

(b) Why is the boiling point of carbon the highest?

(c) Which of the following element is inert?

(i) Carbon (ii) Nitrogen (iii) Fluorine (iv) Neon

(d) Carbon has many allotropes with macromolecular structure. Which of the following is not such kind of allotrope of carbon?

(i) Diamond (ii) Fullerene (iii) Graphite (iv) Coke

2 Marks 207 x 2 = 414

109) What are the two properties of carbon which lead to the huge number of carbon compounds we see around us?

110) A mixture of oxygen and ethyne is burnt for welding. Can you tell why a mixture of ethyne and air is not used?

111) How would you distinguish experimentally between an alcohol and a carboxylic acid?

112) Would you be able to check if water is hard by using a detergent?

113) People use a variety of methods to wash clothes. Usually after adding the soap, they 'beat' the clothes on a stone, or beat it with a paddle, scrub with a brush or the mixture is agitated in a washing machine. Why is agitation necessary to get clean clothes?

114) What would be the electron dot structure of carbon dioxide which has the formula CO_2 ?

115) What would be the electron dot structure of a molecule of sulphur which is made up of eight atoms sulphur? (Hint - the eight atoms of sulphur are joined together in the form of a ring.)

116) What will be the formula and electron dot structure of cyclopentane?

117) Why are carbon and its compounds used as fuel for most applications?

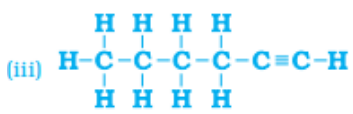
118) Explain the formation of scum when hard water is treated with soap.

119) What change will you observe if you test soap with litmus paper (red and blue)?

120) Which of the following hydrocarbons undergo addition reactions:
C_2H_6, C_3H_8, C_3H_6, C_2H_2 and CH_4.

121) How would you name the following compounds?
(i) $CH_3 - CH_2 - Br$

(ii) H - C = O

(iii) 

122) Give a test that can be used to differentiate between butter and cooking oil.

123) Which of the following compounds contain a carboxyl group?
CH_3OH, CH_3COOH, CH_3CHO, CH_3COCH_3

124) An organic compound 'A' which is used as antifreeze has the molecular formula C_2H_6O. On addition, it gives a compound 'B' which baking soda solution. Identify the compound A and B.

125) An organic compound 'X' is a constituent of wine and beer. The compound X on heating with potassium dichromate forms another organic compound 'Y'. Identify the compound X and Y.

126) How will you convert ethanol to ethene?

127) Draw the electron dot structure of ethyne and also draw its structural formula.

128) A compound X is formed by the reaction of a carboxylic acid $C_2H_4O_2$ and an alcohol in presence of a few drops of H_2SO_4. The alcohol on oxidation with alkaline $kMnO_4$ followed by acidification gives the same carboxylic acid as used in this reaction. Give the names and structures of (a) carboxylic acid, (b) alcohol and (c) the compound X. Also write the reaction.

129) Why detergents are better cleansing agents than soaps? Explain.

130) Name the functional groups present in the following compounds.
(a) $CH_3COCH_2CH_2CH_3$
(b) $CH_3CH_2CH_2COOH$
(c) $CH_3CH_2CH_2CH_2CHO$
(d) CH_3CH_2OH

131) How is ethene prepared from ethanol? Give the reaction involved in it.

132) Intake of small quantity of methanol can be lethal. Comment.

133) A gas is evolved when ethanol reacts with sodium. Name the gas evolved and also write the balanced chemical equation of the reaction involved.

134) Ethene is formed when ethanol at 443 K is heated with excess of concentrated sulphuric acid. What is the role of sulphuric acid in this reaction? Write the balanced chemical equation of this reaction.

135) Carbon, Group (14) element in the Periodic Table, is known to form compounds with many elements. Write an example of a compound formed with
a) Chlorine (Group 17 of periodic table)
b) Oxygen (Group 16 of periodic table)

136) In electron dot structure, the valence shell electrons are represented by crosses or dots.
a) The atomic number of chlorine is 17. Write its electronic configuration
b) Draw the electron dot structure of chlorine molecule

137) Catenation is the ability of an atom to form bonds with other atoms of the same element. it is exhibited by both carbon and silicon. Compare the ability of catenation of the two elements. Give reasons.

138) Unsaturated hydrocarbons contain multiple bonds between the two C-atoms and show addition reactions. Give the test to distinguish ethane from ethene.

139) Match the reaction given in Column (A) with the names given in Column(B)

Column (A)	**Column (B)**
a) $CH_3OH + CH_3COOH \xrightarrow{H^+} CH_3COOCH_3 + H_2O$	i) Addition Reaction
b) $CH_2 = CH_2 + H_2 \xrightarrow{Ni} CH_3 - CH_3$	ii) Substitution Reaction
c) $CH_4 + Cl_2 \xrightarrow{Sunlight} CH_3Cl + HCl$	iii) Neutralisation Reaction
d) $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$	iv) Esterification Reaction

140) Write the structural formulae of all the isomers of hexane.

141) Give the names of the following functional groups:
(i) -OH
(ii) -COOH

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

143) Name the carbon compound which on heating with excess of concentrated sulphuric acid at 443 K gives ethene.

144) What is meant by a saturated hydrocarbon?

145) Name the compound formed when ethanol is warmed with ethanoic acid in the presence of a few drops of conc. H_2SO_4

146) Draw the structure of CH_3COOH molecule.

147) Draw the structure of ethanol molecule.

148) What happens when a small piece of sodium is dropped into ethanol?

149) State two characteristic features of carbon which when put together give rise to large number of carbon compounds.

150) Write the structural formula of chloroethane.

151) How many covalent bonds are there in a molecule of ethane (C_2H_6)?

152) Write the electron dot structure of ethene molecule (C_2H_4).

153) Write the electron dot structure of ethene molecule (C_2H_6).

154) Draw the structure of butanone molecule, $CH_3COC_2H_5$.

155) Draw the structure of the hexanal molecule, $C_5 H_{11}CHO$.

156) Butanone is a four carbon per molecule compound. Name the functional group present in it.

157) Name the functional group present in each of the following organic compounds:
(i) C_2H_5Cl
(ii) C_2H_5OH

158) Name the functional group present in each of the following compounds:
(i) HCOOH
(ii) C_2H_5CHO

159) Name the functional group present in each of the following organic compounds:
(i) CH_3COCH_3
(ii) C_2H_5COOH

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

161) Write the name and formula of the first member of the carbon compounds having group -CHO.

162) Write the name and formula of the first member of the carbon compounds having functional group -COOH.

163) Write the name and formula of the 2nd member of the series of carbon compounds whose general formula is $C_nH_{2n+1}OH$.

164) Write the name and formula of the 2nd member of the series of carbon compounds whose general formula is C_nH_{2n}.

165) Write the next homologue of each of the following:
(i) C_2H_4
(ii) C_4H_6

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

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

168) (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?

169) (a) 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.

170) 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.

171) 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.

172) Write the name and molecular formula of an organic compound having its name suffixed with '-ol and having two carbon atoms in the molecule. Write the help of a balanced chemical equation indicate what happens when it is heated with excess of conc. H_2SO_4

173) 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.

174) What is a homologous series? Which two of the following organic compounds belong to the same homologous?

175) 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 any one natural source of organic compounds that are hydrogenated.

176) 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?

177) 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.

178) What is ethanol? State its two properties. What happens when it is heated with excess of conc. H_2SO_4 at 443 K? What role does conc. H_2SO_4 play in this reaction? Write chemical equation of the reaction involved and the structural formula of the main product formed.

179) With the help of balance chemical equations explain what happens when ethanol is heated with (i) alkaline solution of potassium permanganate, (ii) excess concentrated sulphuric acid at 443 K. Mention any two uses of ethanol.

180) 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.

181) Describe two examples of different oxidation of ethanol. Name the products obtained each case.

182) Write a chemical equation in each case to represent the following types of chemical reactions of organic compounds:
(i) Organic reactions
(ii) Addition reactions
(iii) Substitution reactions

183) 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?

184) Define homologous series of organic compounds. List its two characteristics. Write the name and formula of the first member of the series of alkanes.

185) Complete the following equations:
(i) $CH_4 + O_2 \rightarrow$
(ii) $C_2H_5OH \xrightarrow{Hot\ \ Conc.H_2SO_4}$
(iii) $CH_3COOH + NaOH \rightarrow$

186) Why homologous series of carbon compounds are so called? Write chemical formula of two consecutive members of a homolous series and state the part of these compounds that determines their
(i) Physical properties and
(ii) Chemical properties

187) Name the oxidizing agent used for the conversion of ethanol to ethanoic acid. Distinguish between ethanol and ethanoic on the basis of
(i) litmus test.
(ii) reaction with sodium hydrogen carbonate.

188) 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?

189) What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties.

190) 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 belong. Write the chemical equation for the reaction and write the chemical name of the product formed.
(ii) State the role of cone. H_2SO_4 in this reaction.

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

192) 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 this reaction.

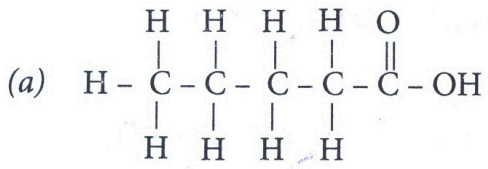
193) Why homologous series of carbon compound are so called? Write chemical formula of two consecutive members of a homologous series and state the part of these compounds that determines their (i) physical properties and (ii) chemical properties.

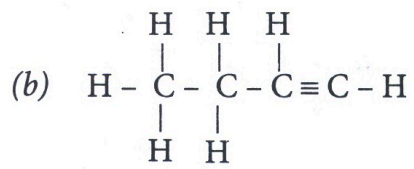
194) State the meaning of functional group in a carbon compound. Write the functional group present in (i) ethanol and (ii) ethanoic acid and also draw their structures.

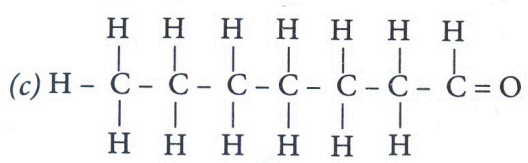
195) Write the name and general formula of a chain of hydrocarbons in which an addition reaction with hydrogen can take place. Stating the essential conditions required for an addition to occur write the chemical equation giving the name of the reactant and the product of such a reaction.

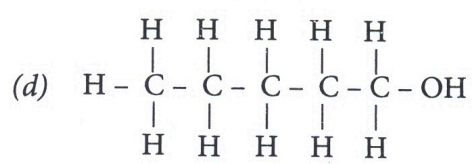
196) With the help of an example, explain the process of hydrogenation. Mention the essential conditions for the reaction and state the change in physical property with the formation of the product.

197) Write the names of the following compounds

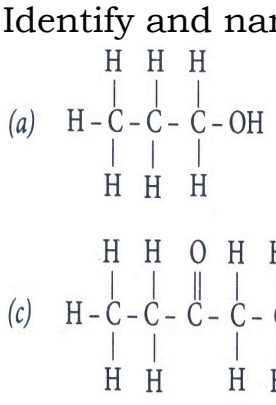


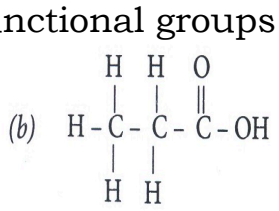


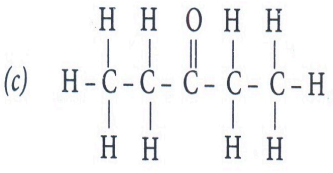


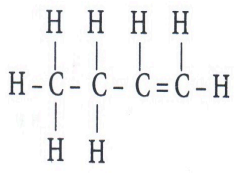


198) Identify and name the functional groups present in the following compounds.

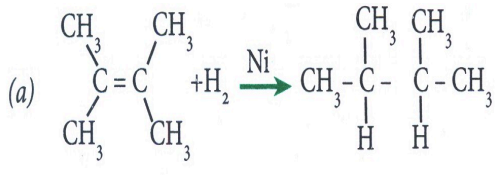


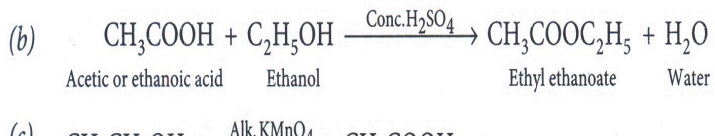


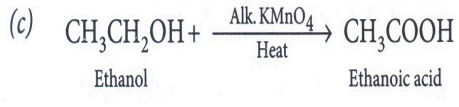




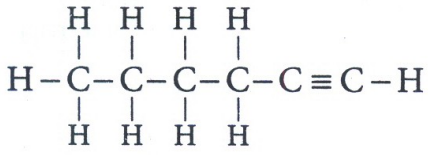
199) What is the role of metal or reagents written on arrows in the given chemical reactions?





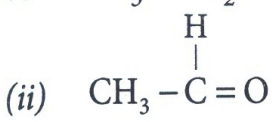


200) Name the following compound:



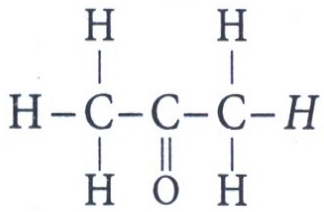
201) Name the following compounds:

(i) $CH_3 - CH_2 - OH$;

(ii) 

202) (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?

203) What is a homologous series of carbon compounds?

204) Write the name and molecular formula of the first member of the homologous series of alkynes

205) Write the name and formula of the 2ndmember of homologous series having general formula $C_{nH_{2n-2}}$

206) Write the name and formula of the 2nd member of homologous series having general formula C_nH_{2n+2}

207) Molecular formula of a hydrocarbon is C_3H_8 Draw its complete structure and write its name

208) Write next two members of the homologous series

209) Which of the following belong to the same homologous series?
$C_3H_8 C_4H_8 C_4H_6 C_3H_6$

210) Write the two succeeding members of the following homologous series:
C_2H_6'C_3H_8

211) What is the difference between two consecutive members in a homologous series in alkanes in terms of:
(i) Molecular mass,
(ii) Number of atoms of elements.

212) The molecular formula of 'A'. is $C_{10}H_{18}$ and 'B' is $C_{18}H_{36}$ Name the homologous series to which they belong

213) Name the following compounds
(i) $CH_3 - CH_2 - OH$
(ii) $CH_3 - C = O$

214) Which element exhibits the property of catenation to maximum extent and why?

215) Write the name and molecular formula of the fourth member of alkane series

216) Select saturated hydrocarbons from the followings
$C_3H_6 C_5H_{10}$ C_4H_{10} C_6H_{14} C_2H_4

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

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

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

220) Name the process of converting vegetable oil to vegetable ghee

221) Write the number of covalent bonds in the molecule of Ethane

222) Write the number of covalent bonds in the molecule of Propane C_3H_8

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

224) Write the name of each of the following functional groups
(a) -OH (b) $-\overset{\overset{O}{\|}}{C}-$

225) Write the number of covalent bonds in the molecules of butane C_4H_{10}

226) Mention the percentage of carbon in earth's crust.

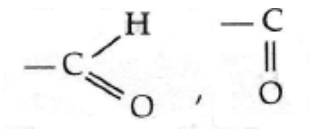
227) Name the functional group present in CH_3COCH_3 and state the name of this compound

228) Name a functional group present in
(i) CH_3CHO
(ii) C_2H_5COOH

229) Write the molecular formula of the following:
(i) Hexane, (ii) Benzene

230) Write the formula of functional group:
(i) aldehyde, (ii) alcohol

231) Given below are the formulae of some functional groups



232) Write molecular, electronic and structural formulae of ethene.

233) What is a covalent bond? What type of bond exists in (i) CCI_4 (ii) $CaCI_2$?

234) Why is it not easy for carbon to take part in the formation of ionic compounds ?

235) (i) What is a functional group?
(ii) State two properties of carbon which lead to huge number of carbon compounds we see around us.

236) List two differences between saturated and unsaturated hydrocarbons

237) Differentiate between addition reactions and substitution reactions shown by hydrocarbons.

238) (i) Write, the name of the following compounds:
(a) HCOOH, (b) $CH_3COCH_2CH_3$
(ii) Explain why carbon generally forms compounds by covalent bonds.

239) Write the name of the following compounds:

240) What is a hydrocarbon?

241) Give different forms in which carbon occurs in nature.

242) Name two types of hydrocarbon.

243) What are covalent bonds?

244) What is catenation?

245) Name two allotropes of carbon.

246) Why covalent compounds have low melting and boiling points?

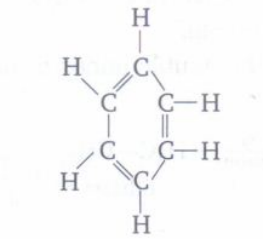
247) Define oxidising agents

248) Give the reaction to show how alcohol is converted into carboxylic acid.

249) Identify the compound

$$H-\overset{\overset{H}{|}}{\underset{\underset{H}{|}}{C}}-C\equiv C-H$$

250) Name the compound



251) Give two properties of ethanol

252) Give the formula for the functional group of aldehyde

253) What are heteroatoms?

254) Complete the following reaction

$$CH3 - \underset{\underset{CH3}{|}}{C} \equiv \underset{\underset{CH3}{|}}{CH3} - CH3 \xrightarrow[+H2]{Ni/pt}$$

255) Give the full form of IUPAC

256) How can esters be converted into soap?

257) How can we convert CH_3CH_2OH into C_2H_4?

258) What is the melting point of acetic acid?

259) How can you convert ethene into ethane?

260) What is addition reaction? Give one example.

261) What is esterification reaction?

262) Give two uses of methane gas.

263) What is isomerism?

264) Why can't we test hard water with detergents?

265) What is hydrophilic?

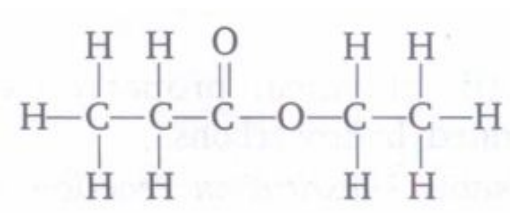
266) Name the second member of alkyne series

267) Give the names of the functional group

(i) -CHO

(ii) $-\overset{|}{c} = o$

268) The structural formula of an ester is



Name the alcohol and the acid from which it would have been formed.

269) Give the IUPAC name of acetic acid and propyl alcohol.

270) What will happen to the litmus solution in carboxylic acid?

271) Give the electron dot structure of CH_3CI and C_2H_2

272) Draw the electron dot structure of N_2 and NH_3.

273) What happens when ethanol bums in air

274) Give the IUPAC name and write the functional group present in vinegar

275) A compound has a molecular formula C_2H_6O. It is used as a fuel. Name the compound and name its functional group.

276) While cooking, if bottom of the vessel is getting blackened on the outside what does is mean?

277) What is the reactive site in 'the given hydrocarbon? Write its name.
$H_3C\text{-}CH_2\text{-}CH= CH\text{-}CH_3$

278) What is the difference in the number of carbon and hydrogen atoms between two successive members of a homologous series? Also give the difference in their atomic masses.

279) Name the peculiar/specific chemical property exclusive in case of saturated hydrocarbons and unsaturated hydrocarbons.

280) Why acetic acid is called glacial acetic acid

281) Why does carbon forms large number of compounds

282) Write the structural formula for bromopentane and ethanoic acid.

283) How does ethanoic acid react with carbonates and hydrogen carbonates? Show it with the equation.

284) Draw the structures of two isomers of butane.

285) A student bums a hydrocarbon in air and obtains sooty flame. Give two reasons for this observation

286) Wirte the general formula for each of the following hydrocarbons and give one example for each.
(i) Alkene
(ii) Alkyne

287) Name the functional groups of the following
(a) $CH_3\text{-}CI$
(b) $CH_3 - \overset{\overset{O}{\|}}{C} - OH$
(c) $CH_3 - \overset{\overset{O}{\|}}{C} - CH_3$
(d) C_2H_5OH

288) Explain substitution reaction with example.

289) Diamond and graphite show different physical properties although they are made up of carbon and shows same chemical properties. What is this property called?

290) What is denatured alcohol?

291) What is esterification and give its uses

292) Give difference between soap and detergent

293) Differentiate between ethanol and ethanoic acid on basis of the following test:
(i) Blue litmus test
(ii) Reaction with sodium bicarbonate
(iii) Sodium metal test

294) Giving chemical equations of the reactions write what happens when
(i) Ethanol is heated with excess of concentrated sulphuric acid at 443 K.
(ii) Ethanoic acid reacts with ethanol in presence of an acid.
(iii) Ester with molecular formula $CH_3COOC_2H_5$ reacts with sodium hydroxide.

295) How can you obtain the following from pure ethanol:
(i) Ethene
(ii) Ethanoic acid
(iii) Ester

296) Write the chemical equations for the following reactions:
(i) Conversion of oils into fats
(ii) Oxidation of ethanol
(iii) Ethanoic acid with sodium hydroxide.

297) An organic compound 'X' which is also called antifreeze mixture when mixed with water has the molecular formula C2H60. 'X' on oxidation gives a compound 'Y' which gives effervescence with a baking soda solution. What can X and Y be? Write their structural formula.

298) Complete and balance the following equations

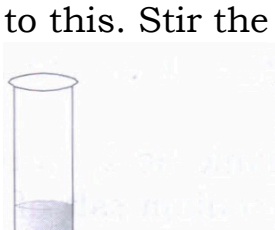
(a) $CH_3CH_2OH + O_2 \longrightarrow$

(b) $Na + CH_3CH_2OH \longrightarrow$

(c) $CH_3\text{-}CH_2OH \xrightarrow{conc.H_2SO_4}$

299) Give two Uses of ethanol and one harmful effect of it

300) Name the given compound



301) A, B, C are members of homologous series and their melting points are -183°C, -138°C, 130°C respectively. Among these

(i) Which member will have least number of carbon atoms?

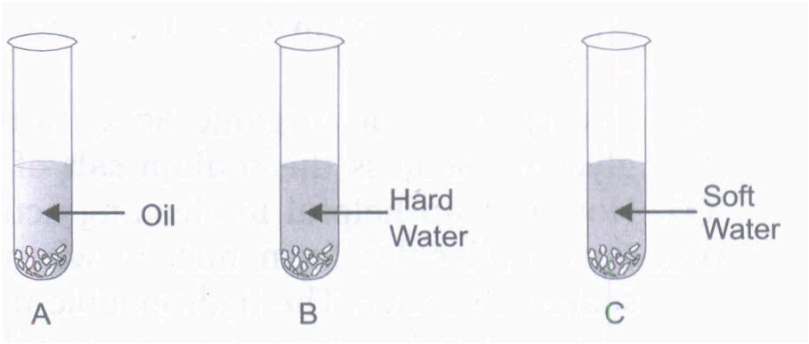
(ii) Which member will have maximum number of carbon atoms?

302) A hydrocarbon compound A is active ingredient of wine and cough syrup. A on oxidation with acidified $K_2Cr_2O_7$ forms compound B. Identify the compound A and B and write the chemical equations involved.

303) Write an activity to show the acidic nature of ethanol. Give the chemical equation of the reaction taking place

304) A compound 'X' has molecular formula C2H60 is saturated hydrocarbons and is a very good solvent. How can you convert it into unsaturated hydrocarbon? Identify X and show its conversion with the help of equation.

305) Take about 20 mL of castor oil in a beaker. Add 30 mL of 20% sodium hydroxide solution. Heat the mixture with continuous stirring for a few minutes till the mixture thickens. Add 5-10 g of common salt to this. Stir the mixture well, allow it to cool, soaps is obtained.



(a) Why do we use common salt to make soap?

(b) What will happen if you will add the above made soap solutions to the following test tubes A, B, and C.

(c) Can we use potassium hydroxide instead of sodium hydroxide.

306) The physical properties of a carbon compound is - It has pungent smell, m.p. is 156 K and b.p. is 351 K. Name the compound

307) Write the molecular formula of the following carbon compounds.

(a) Methane (b) Propane

(ii) Carbon compounds have low melting and boiling points. Why?

308) Which of the following is not observed In a homologous series? Give reason for your choice.

(i) Change in chemical properties

(ii) Difference in $-CH_2$ and 14u molecular mass

(iii) Gradation in physical properties

(iv) Same functional group

309) 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.

310) A compound 'X' on heating with excess conc. sulphuric acid at 443K 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 for the formation of 'Y' and also write the role of sulphuric acid in the reaction.

311) Heating an alcohol with concentrated sulphuric acid results in the dehydration of the alcohol to give the alkene as shown by the reaction of ethanol to give ethene.

$$CH_3CH_2OH \xrightarrow{\text{Hot conc. sulphuric acid}} CH_2 = CH_2$$

Pramila heated 2-butanol(shown below) with concentrated sulphuric acid.

$$CH_3CH_2\underset{\displaystyle OH}{\underset{|}{C}}HCH_3$$

Write the structural formulae of all the possible products of the reaction.

312) What is the role of metal or reagents written on arrows in the given chemical reactions?

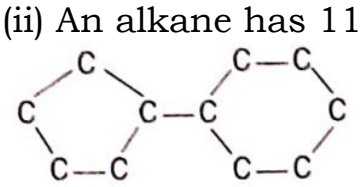
(i) $CH_3COOH + CH_3CH_2OH \xrightarrow{\text{Conc. } H_2SO_4} CH_3COOC_2H_5 + H_2O$

(ii) $CH_3CH_2OH \xrightarrow[\text{Heat}]{\text{Alk.KMnO}_4} CH_3COOH$

313) (i) Bromine water is a reddish solution of bromine (Br_2) in water. When shaken with an unsaturated hydrocarbon, the red colour of the bromine water disappears because the bromine is used up in an addition reaction.

Kohli has three test tubes containing hexane, hexene and hexyne respectively. Which of the three compounds can he identify using the bromine water test? Give a reason for your answer.

(ii) An alkane has 11 carbon atoms arranged within ring structures as shown below.



What is the molecular formula of the alkane?

314) Organic compounds belonging to different homologous series can be isomers. For example, propanal and propanone are isomers.

Can an alkane and an alcohol be isomers? Why or why not?

315) (i) How do the melting and boiling points of the hydrocarbons change with increase in molecular mass. Give reason.

(ii) Give the name of the following.

(a) An aldehyde derived from methane.

(b) Ketone derived from butane.

(iii) What is the advantage of detergent over soap?

Activity Based Questions 12 x 2 = 24

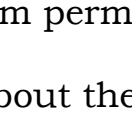
316) 1. Make a list of ten things you have used or consumed since the morning.

2. Compile this list with the lists made by your classmates and then sort the items into the adjacent Table.

3. If there are items which are made up of more than one material, put them into both the relevant columns of the table.

Things made of metal	**Things made of glass/clay**	**Others**

317) 1) Calculate the difference in the formulae and molecular masses for (a) CH_3OH and C_2H_5OH (b) C_2H_5OH and C_3H_7OH, and (c) C_3H_7OH and C_4H_9OH.
2) Is there any similarity in these three?
3) Arrange these alcohols in the order of increasing carbon atoms to get a family. Can we call this family a homologous series?
4) Generate the homologous series for compounds containing up to four carbons for the other functional groups given in Table

Hetero atom	**Class of compounds**	**Formula of functional group**
Cl/Br	Halo- (Chloro/bromo) alkane	—Cl, —Br (substitutes for hydrogen atom)
Oxygen	1. Alcohol	—OH
	2. Aldehyde	
	3. Ketone	$-\overset{\overset{O}{\|}}{C}-$
	4.Carboxylic acid	$-\overset{\overset{O}{\|}}{C}-OH$

318) 1. Take some carbon compounds (naphthalene, camphor, alcohol) one by one on a spatula and burn them.
2. Observe the nature of the flame and note whether smoke is produced.
3. Place a metal plate above the flame. Is there a deposition on the plate in case of any of the compounds?

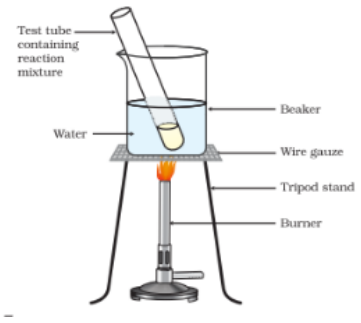
319) 1. Light a bunsen burner and adjust the air hole at the base to get different types of flames/presence of smoke.
2. When do you get a yellow, sooty flame?
3. When do you get a blue flame?

320) 1.Take about 3 mL of ethanol in a test tube and warm it gently in a water bath.
2. Add a 5% solution of alkaline potassium permanganate drop by drop to this solution.
3. Does the colour of potassium permanganate persist when it is added initially?
4. Why does the colour of potassium permanganate not disappear when excess is added?

321) 1. Drop a small piece of sodium, about the size of a couple of grains of rice, into ethanol (absolute alcohol).
2.What do you observe?
3.How will you test the gas evolved?

322) 1. Compare the pH of dilute acetic acid and dilute hydrochloric acid using both litmus paper and universal indicator.
2. Are both acids indicated by the litmus test?
3. Does the universal indicator show them as equally strong acids?

323) 1. Take 1 mL ethanol (absolute alcohol) and 1 mL glacial acetic acid along with a few drops of concentrated sulphuric acid in a test tube.
2. Warm in a water-bath for at least five minutes as shown in fig..
3. Pour into a beaker containing 20-50 mL of water and smell the resulting mixture.



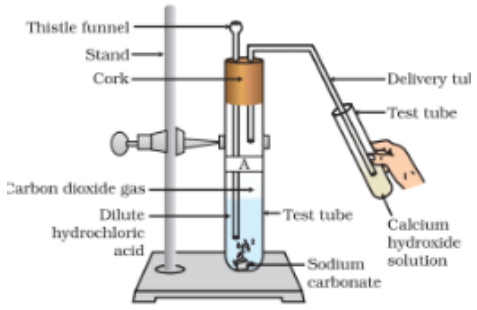
324) 1.Set up the apparatus as

(i) Take two test tubes, label them as A and B.

(ii) Take about 0.5 g of sodium carbonate (Na_2CO_3) in test tube A and about 0.5 g of sodium hydrogen carbonate ($NaHCO_3$) in test tube B.

(iii) Add about 2 mL of dilute HCl to both the test tubes. What do you observe?

(iv) Pass the gas produced in each case through lime water (calcium hydroxide solution) as shown in Fig and record your observations.



2.Take a spatula full of sodium carbonate in a test tube and add 2 mL of dilute ethanoic acid.

3.What do you observe?

4.Pass the gas produced through freshly prepared lime-water. What do you observe?

5.Can the gas produced by the reaction between ethanoic acid and sodium carbonate be identified by this test?

6.Repeat this Activity with sodium hydrogen carbonate instead of sodium carbonate.

325) 1. Take about 10 mL of water each in two test tubes.

2. Add a drop of oil (cooking oil) to both the test tubes and label them as A and B.

3. To test tube B, add a few drops of soap solution. Now shake both the test tubes vigourously for the same period of time.

4. Can you see the oil and water layers separately in both the test tubes immediately after you stop shaking them?

5. Leave the test tubes undisturbed for some time and observe. Does the oil layer separate out? In which test tube does this happen first?

326) 1. Take about 10 mL of distilled water (or rain water) and 10 mL of hard water (from a tubewell or hand-pump) in separate test tubes.

2. Add a couple of drops of soap solution to both.

3.Shake the test tubes vigorously for an equal period of time and observe the amount of foam formed.

4.In which test tube do you get more foam?

5.In which test tube do you observe a white curdy precipitate?

Note : If hard water is not available in your locality, prepare some hard water by dissolving hydrogencarbonates/ sulphates/chlorides of calcium or magnesium in water.

327) 1) Take two test tubes with about 10 ML of hard water in each.

2) Add five drops of soap solution to one and five drops of detergent solution to the other.

3) Shake both test tubes for the same period.

4) Do both test tubes have the same amount of foam?

5) In which test tube is a curdy solid formed?

3 Marks 48 x 3 = 144

328) Why is the conversion of ethanol to ethanoic acid an oxidation reaction?

329) What are oxidising agents?

330) What is an homologous series? Explain with an example.

331) How can ethanol and ethanoic acid can be differentiated on the basis of their physical and chemical properties?

332) What is hydrogenation? What is its industrial application?

333) Give a test that can be used to differentiate between saturated and unsaturated hydrocarbons.

334) 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

335) 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 bums with a pop sound. Identify P,Q and R and write the chemical equations of the reactions involved.

336) Write chemical equation of the reaction of ethanoic acid with the following
(a) Sodium; (b) Sodium-hydroxide: (c) Ethanol

337) 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?

338) (a) Complete the following equations
(i) $CH_3CH_2OH \xrightarrow[heat]{conc.H_2SO_4}$
(ii) $CH_3COOH + NaHCO_3 \longrightarrow$ (iii) $CH_4 + Cl_2 \xrightarrow{sunlight}$
(b) Write the name of the following:
(i) CH_3CH_2COOH (ii) CH_3CH_2Br
(c) Draw the electron dot structure of ethene(C_2H_4)

339) (a) Name the compound CH_3CH_2OH and identify its functional group.
(b) Give a chemical test to distinguish between ethanol and ethanoic acid.
(c) Name the product formed when an organic acid reacts with an alcohol in presence of an acid catalyst. What is the name assigned to this type of reaction?

340) (a) Name the compound CH_3COOH and identify its functional group.
(b) Give a chemical test to identify this compound.
(c) Name the gas evolved when this compound acts on solid sodium carbonate. How would you identify this gas?

341) (a) What is a 'homologous series' of substances?
(b) In an organic compound, which part largely determine its physical and chemical properties?
(c) Write a chemical equation to represent the reaction of ethanol with acidified solution of potassium dichromate.

342) (a) What is vinegar?
(b) Describe with a chemical equation, what happens when sodium hydrogen carbonate reacts with ethanoic acid.

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

(b) Describe a chemical test to distinguish between ethanol and ethanoic acid.
(c) Write a chemical equation to represent what happens when hydrogen gas is passed through an unsaturated hydrocarbons in the presence of nickel as a catalyst.

344) What is an 'esterification' reaction? Describe an activity to show esterification.

345) Out of HCl and CH_3COOH, which one is a weak acid and why? Describe an activity to support your answer

346) 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

347) Write the molecular formula of the following compounds and draw their electron-dot structures
(i) Ethane (ii) Ethene (iii) Ethyne

348) Give one commercial use and one domestic use of acetic acid.

349) A student wants to find the freezing temperature of acetic acid. List the materials required to do this test in the lab.

350) On adding sodium bicarbonate the acetic acid releases carbon dioxide gas, suggest two ways of testing this gas in the lab.

351) Why is acetic acid called a weak acid?

352) Soap is prepared in the lab by the reaction called saponification. Give one example of this reaction .

353) How is soap helpful in cleaning action?

354) State the conditions for obtaining the best cleansing action of soap.

355) What is the environmental impact of excess use of detergents?

356) How can you prepare a hard water in the lab and show the ineffective action of soap in it.

357) Differentiate between saturated and unsaturated hydrocarbons. Give one example for each.

358) The table shows the electronic structures of four elements.

Element	**Electronic stucture**
P	2, 6
Q	2, 8, 1
R	2, 8, 7
S	2, 8, 8

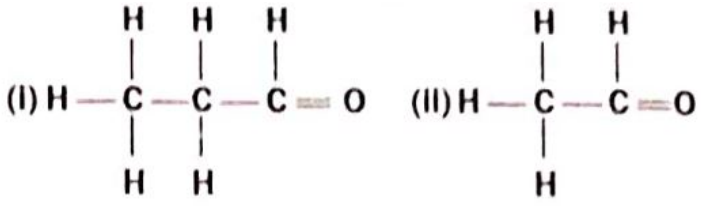
(i) ldentify which element(s) will form covalent bonds with carbon.
(ii) "Carbon reacts with an element in the above table to form several compounds." Give suitable reason.

359) An organic acid X is a liquid which often freezes during winter time in cold countries. It has molecular formula $C_2H_4O_2$. On warming with ethanol in the presence of a few drops of conc. H_2SO_4, a compound Y with sweet smell is formed.
(i) ldentify X and Y.
(ii) Write the chemical equation for the reaction involved.
(iii) What is the role of conc. H_2SO_4?

360) Give answers to the following statements.
(i) An allotrope of carbon which has a two dimensional layered structure in which each carbon atom is linked to 3 other carbon atoms in the same plane through covalent bonds.
(ii) An allotrope of carbon which looks like a soccer ball.
(iii) An allotrope of carbon which contains both single and double bonds.

361) (i) Explain the formation of calcium chloride with the help of electron dot structure. (Atomic numbers: Ca = 20; Cl = 17)
(ii) Why do ionic compounds not conduct electricity in solid state but conduct electricity in molten and aqueous state?

362) 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.

363) 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 compounds.

364) (i) Draw the electron dot structure for ethyne.
(ii) List two differences between the properties exhibited by covalent compounds and ionic compounds.

365) (i) How many isomers are possible for the compound with the molecular formula C_4H_8? Draw the electron dot structure of branched chain isomer.
(ii) How will you prove that C_4H_8 and C_5H_{10} are homologues?

366) A carbon compound 'A' having melting point 156 K and boiling point 351K, with molecular formula C_2H_6O is soluble in water in all proportions.
(i) ldentify 'A' and draw its electron dot structure.
(ii) Give the molecular formulae of any two homologues of 'A'.

367) (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?

368) Consider the molecular formula of the carbon compounds (i) and (ii) given below:
(i) C_3H_8O (ii) $C_3H_6O_2$
(a) Identify the functional groups in (i) and (ii) and write their structures.
(b) Are (i) and (ii) isomers? Give reason.
(c) 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.

369) (i) Define isomerism. Draw all possible isomers of butane.
(ii) "A compound 'X' on combustion gives a yellow flame with lots of smoke." What inference would you draw from this statement?
(iii) State the role of alkaline $KMnO_4$ in the reaction involving conversion of an alcohol to corresponding carboxylic acid.

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

371) A compound X is used in cough syrups and many tonics. It is also soluble in water in all proportions.
(i) Name the compound X. Write its chemical formula.
(ii) Which gas is evolved when the compound X reacts with sodium? How will you test the presence of this gas? Write the chemical equation involved in reaction of X with sodium.
(iii) Complete the following equation for X and identify Y.

$$X \xrightarrow[\text{Heat}]{\text{Alk. } KMnO_4} Y$$

372) 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. ldentify 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 concentrated sulphuric acid.

373) 'Conversion of ethanol to ethanoic acid is an oxidation reaction." Justify this statement giving the relevant equation for the chemical reaction involved.

374) 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?

375) In three test tubes A, B and C are three different liquids namely, distilled water, underground water and distilled water in which a pinch of calcium sulphate is dissolved, respectively are taken. Equal amount of soap solution is added to each test tube and the contents are shaken. In which test tube will the length of the foam (lather) be longest? Justify your answer.

Case Study Questions 12 x 4 = 48

376) 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

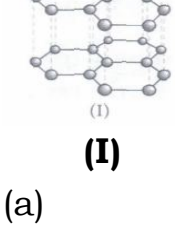
What is the general formula of this series?

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

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

377) 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?

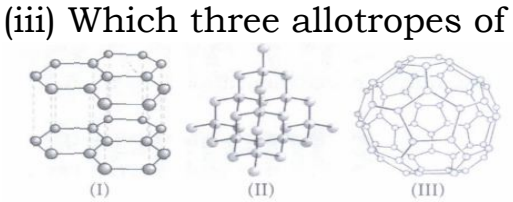
(a) Carbon atoms are held together by single covalent bonds.

(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.

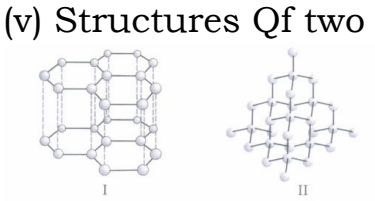
(II) Diamond is made up of billions of carbon atoms. Each carbon atom is bonded to four other carbon atoms in a tetrahedral manner to form a giant lattice. All carbon atoms are bonded by strong covalent bonds.

(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

378) 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**

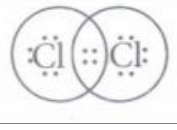
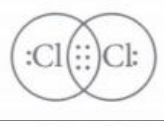
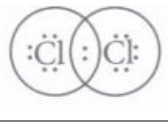
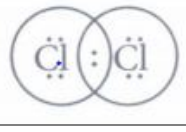
(iii) The shared pair of electrons is said to constitute a _____ bond between two hydrogen atoms.

(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) 

379) 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?

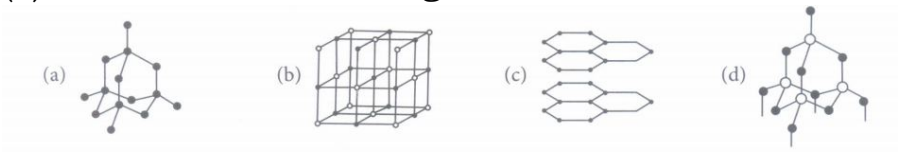
(a) Ionic **(b) van der Waals'** **(c) Covalent** **(d) None of these**

(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?



380) The compounds which have the same molecular formula but differ from each other in physical or chemical properties are called isomers and the phenomenon is called isomerism. When the isomerism is due to difference in the arrangement of atoms within the molecule, without any reference to space, the phenomenon is called structural isomerism. In other words, structural isomers are compounds that have the same molecular formula but different structural formulas, *i.e.*, they are different in the order in which different atoms are linked. In these compounds, carbon atoms can be linked together in the form of straight chains, branched chains or even rings.

(i) Which of the following sets of compounds have same molecular formula?

(a) Butane and iso-butane **(b) Cyclohexane and hexene**

(c) Prop anal and propanone **(d) All of these**

(ii) In order to form branching, an organic compound must have a minimum of

(a) four carbon atoms **(b) three carbon atoms**

(c) five carbon atoms **(d) any number of carbon atoms.**

(iii) Which of the following is an isomeric pair?

(a) Ethane and propane **(b) Ethane and ethene**

(c) Propane and butane **(d) Butane and 2-methylpropane**

(iv) Among the following the one having longest chain is

(a) neo-pentane **(b) *iso*-pentane**

(c) 2-methylpentane **(d) 2, 2-dimethylbutane.**

(v) The number of isomers of pentane is

(a) 2 **(b) 3** **(c) 4** **(d) 5**

381) Study the table related to three hydrocarbons A, B, C and answer the questions that follow.

Organic compound	Molecular formula
A	C_3H_5
B	C_5H_{10}
C	C_4H_6

(i) A, Band C are classified as hydrocarbons because

(a) they contain hydrogen **(b) they contain carbon**

(c) they contain both carbon and hydrogen **(d) none of these.**

(ii) Which of these organic compounds is an alkyne?

(a) A (b) B (c) C (d) All of these

(iii) C_5H_{10} belongs to

(a) C_nH_{2n+2} series **(b) C_nH_{2n} series**

(c) C_nH_{2n-2} series **(d) none of these.**

(iv) Identify the incorrect statement about these three hydrocarbons.

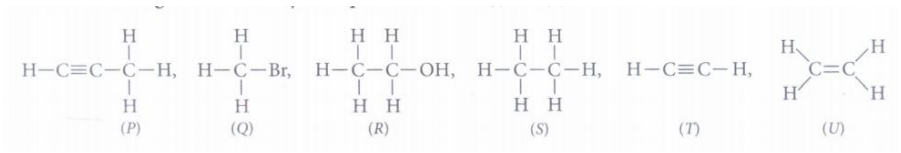
(a) All have different general formula. **(b) A and B differ by - CH2 unit.**

(c) C is an alkyne. **(d) B is an alkene.**

(v) General formula for alkane is

(a) C_nH_{2n} (b) C_nH_{2n+2} C_nH_{2n-2} (d) C_nH_n

382)



(i) Which of the following compounds belong to same homologous series?

(a) S and T (b) T and U (c) P and U (d) P and T

(ii) The functional group of compound (R) is

(a) alcohol **(b) aldehyde** **(c) ketone** **(d) carboxylic acid.**

(iii) Compound *(T)* belongs to homologous series of

(a) alkynes **(b) alkenes** **(c) alkanes** **(d) none of these.**

(iv) Which of the 'following compounds is unsaturated hydrocarbon?

(a) S (b) Q (c) U (d) R

(v) Which of the following compounds belongs to alkane series?

(a) P (b) S (c) T (d) U

383) The table given below shows six organic compounds *A, B, C, D, E* and *F* having different molecular formula:

Organic compound	**Molecular formula**
A	$C7H_{16}$
B	C_8H_{16}
C	C_4H_6
D	C_6H_{10}
E	C_5H_{10}
F	C_9H_{20}

(i) Which of the following compounds belong to same homologous series?

(a) *E* and *F* **(b) *B* and *C*** **(c) *A* and *B*** **(c) *A* and *B***

(ii) Which of the following is the member of the same homologous series as E?

(a) *D* **(b) *A*** **(c) *F*** **(d) *B***

(iii) Identify the correct statements.

(a) *A* and *F* are saturated hydrocarbons while all others are unsaturated hydrocarbons.

(b) *C* and *D* belong to a homologous series having general formula C_nH_{2n}

(c) *B* and *E* are alkynes.

(d) All the compounds have same physical and chemical properties.

(iv) Compound B is

(a) an alkane **(b) an alkene** **(c) an alkyne** **(d) none of these.**

(v) Compound (F) has a general formula

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

384) A hydrocarbon *(P)* has the molecular formula $C_{10}H_{22}$.A hydrocarbon *(Q)* has two carbon atoms less than *(P)* and belong to the same homologous series. A hydrocarbon *(R)* has two carbon atoms more than *(P)* and belong to the same homologous series.

(i) What is the molecular formula of *(Q)*?

(a) $C_{12}H_{26}$ **(b) C_8H_{16}** **(c) C_8H_{18}** **(d) C_8H_{14}**

(ii) To which homologous series do the compound *(P), (Q)* and *(R)* belong?

(a) C_nH_{2n} **(b) $C_2H_{2n-\ 2}$** **(c) C_nH_{2n+2}** **(d) $C_nH_{2n\ +\ 1}$**

(iii) What is the molecular formula of *(R)*?

(a) $C_{12}H_{26}$ **(b) $C_{12}H_{24}$** **(c) $C_{12}H_{22}$** **(d) $C_{12}H_{28}$**

(iv) Identify the correct statement about compounds *(P), (Q)* and *(R)*.

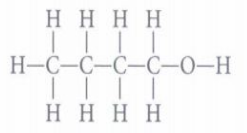
(a) They have same melting and boiling points. **(b) They have same chemical properties.**

(c) They have different general formula. **(d) They differ by $-CH_2$ unit.**

(v) Compounds *(P), (Q)* and *(R)* are

(a) alkanes **(b) alkenes** **(c) alkynes** **(d) none of these.**

385) An organic molecule has the following structure:



(i) To which homologous series does this molecule belong?

(a) Aldehydes (b) Ketones (c) Alcohols (d) Alkanes

(ii) What is the general formula of this homologous series?

(a) $C_nH_{2n+1}OH$ (b) C_nH_{2n+2} (c) $C_nH_{2n}O$ (d) $C_nH_{2n+1}CHO$

(iii) Which is the next member of this series?

(a) C_4H_9OH (b) C_3H_7OH (c) $C_5H_{11}OH$ (d) $C_6H_{13}OH$

(iv) Which is the third member of this series?

(a) C_3H_7O H (b) C_4H_9OH (c) C_2H_5OH (d) CH_3OH

(v) Which is the second member of this series?

(a) Ethanol (b) Methanol (c) Propanol (d) Butanol

386) A hydrocarbon is an organic chemical compound composed exclusively of hydrogen and carbon atoms. Hydrocarbons are naturally-occurring compounds and form the basis of crude oil, natural gas, coal, and other important energy sources. Hydrocarbons are highly combustible and produce carbon dioxide, water, and heat when they are burned. Therefore, hydrocarbons are highly effective as a source of fuel. Study the table related to three hydrocarbons P, Q, R and answer the questions that follow.

Organic Compound	**Molecular formula**
P	C_3H_8
Q	C_5H_{10}
R	C_4H_6

(i) P, Q and R are classified as hydrocarbons because

(a) they contain carbon

(b) they contain hydrogen

(c) they contain both carbon and hydrogen

(d) none of these.

P, Q and R are classified as hydrocarbons because these compounds are made up of carbon and hydrogen only.

(ii) Which of these organic compounds is an alkyne?

(a) P (b) Q (c) R (d) Both P and Q

(iii) C_3H_8 belongs to

(a) C_nH_{2n+2} series (b) C_nH_{2n} series (c) C_nH_{2n-2} series (d) none of these.

(iv) Identify the incorrect statement about these three hydrocarbons.

(a) All have different general formula.

(b) P, Q both differ by $-CH_2$ unit.

(c) P is an alkane.

(d) Q is an alkene.

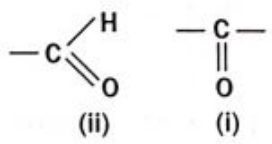
(v) General formula for alkyne is

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

387) 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.

(a) Write the molecular formula of first two members of homologous series having functional group -Br.

(b) Given below are the formulae of some functional groups.



(ii) (i)

Write the name of the 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.

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.

5 Marks 54 x 5 = 270

388) How many structural isomers can you draw for pentane?

389) Draw the structures for the following compounds.
(i) Ethanoic acid
(ii) Bromopentane*
(iii) Butanone
(iv) Hexanal
Are structural isomers possible for bromopentane?

390) Explain the nature of the covalent bond using the bond formation in CH_3Cl.

391) Draw the electron dot structures for
(a) Ethanoic acid
(b) H_2S
(c) Propanone
(d) F_2

392) Why does micelle formation take place when soap is added to water? Will a micelle be formed in other solvents such as ethanol also?

393) Explain the mechanism of the cleaning action of soaps.

394) A salt X is formed and a gas is evolved when ethanoic acid reacts with sodium hydrogen carbonate. Name the salt X and the gas evolved. Describe an activity and draw the diagram of the apparatus to prove that the evolved gas is the one which you have named. Also, write chemical equation of the reaction involved.

395) a) What are hydrocarbons? Give examples
b) Give the structural differences between saturated and unsaturated hydrocarbons with two example each.
c) What is a functional group? Give example of four different functional groups.

396) Name the reaction which is commonly used in the conversion of vegetable oils to fats. Explain the reaction involved in detail.

397) a) Write the formula and draw electron dot structure of carbon tetrachloride?
b) What is saponification? Write the reaction involved in this process.

398) Esters are sweet-smelling substances and are used in making perfumes. Suggest some activity and the reaction involved for the preparation of an ester with well labeled diagram.

399) A compound C (molecular formula, $C_2H_4O_2$) reacts with Na - metal to form a compound R and evolves a gas which burns with a pop sound. Compound C on treatment with an alcohol A in presence of an acid forms a sweet smelling compound S (molecular formula, $C_3H_6O_2$). On addition of NaOH to C, it also gives R and water. S on treatment with NaOH solution gives back R and A. Identify C, R, A, S and write down the reactions involved.

400) How would you bring about the following conversions? Name the process and write the reaction involved.
a) Ethanol to ethene.
b) Propanol to propanoic acid

401) Draw the possible isomers of the compound it molecular formula C_3H_6O and also give their electron dot structures.

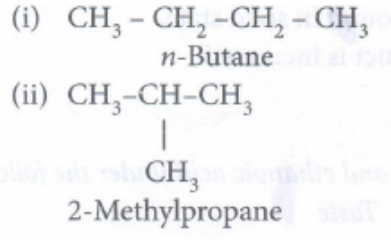
402) An organic compound A on heating with concentrated H_2SO_4 forms a compound B which on addition of one mole of hydrogen in presence of Ni forms a compound C. One mole of compound C on combustion forms two moles of CO_2 and 3 moles of H_2O. Identify the compounds A, B and C and write the chemical equations of the reactions involved.

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

404) (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?

405) Explain isomerism. State any four characteristics of isomers. Draw the structures of possible isomers of butane, C_4H_{10}

406) There are two isomers of butane, C_4H_{10}



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.

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

408) List in tabular form three physical and two chemical properties on the basis of which ethanol and ethanoic acid can be differentiated.

409) 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?

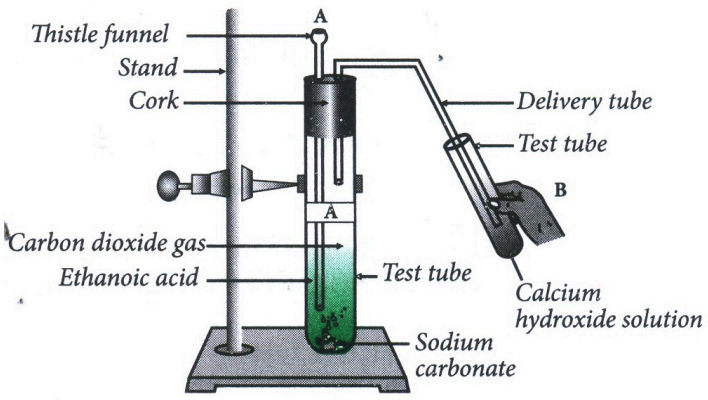
410) What are detergents chemically? List two merits and two demerits of using detergents for cleansing. State the reason for the suitability of detergents for washing, even in the case of water having calcium and magnesium ions.

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

412) State the reason why carbon can neither form C^{4+} cations for C^{4-} anions, but forms covalent compounds. Also state reasons to explain why covalent compounds:
(a) are bad conductors of electricity?
(b) have low melting and boiling points

413) 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?

414) Look at the below figure and answer the following questions:



a) What change would you observe in the calcium hydroxide solution taken in tube B?
b) Write the reaction involved in test tubes A and B respectively.
c) If ethanol is given instead of ethanoic acid, would you expect the same change?
d) How can a solution of lime water be prepared in the laboratory?

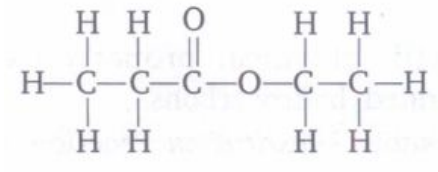
415) (a) Why does carbon form compounds mainly by covalent bonding?
(b) List any two reasons for carbon forming a very large number of compounds.
(c) An organic acid 'X' is a liquid which often freezes during winter time in cold countries, has the molecular formula, $C_2H_4O_2$. On warming it with ethanol in the presence of a few drops of concentrated sulphuric acid, a compound 'Y with a sweet smell is formed.
(i) Identify 'X' and 'Y.
(ii) Write a chemical equation for the reaction involved.

416) (a) What is homologous series of compounds? List any two characteristics of a homologous series.
(b) (i) What would be observed on adding 5% solution of alkaline potassium permanganate solution drop by drop to some warm ethanol taken in a test tube?
(ii) Write the name of the compound formed during the chemical reaction.
(c) How would you distinguish experimentally between an alcohol and a carboxylic acid on the basis of a chemical property?

417) (a) What is a functional group in a carbon compound? Identify the functional group present in CH_3COOH and C_2H_5OH.
(b) State the principle on which the cleansing action of soap is based.

418) (a) What is homologous series? Give one example.
(b) What will happens if ethanoic acid reacts with ethanol in the presence of an acid as a catalyst? Name the reaction. Write the chemical reaction for this reaction.
(c) Why are soaps ineffective in hard water?

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



Write the structural formula 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.

420) (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.

421) (a) State two properties of carbon which lead to a very large number of carbon compounds.
(b) Why does micelles formation take place when soap is added to water? Why are micelles not formed when soap is added to ethanol?

422) 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.

423) 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.

424) (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?

425) (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.

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

427) An organic compound 'A'. is widely used as a preservative in pickles and has a molecular formula $C_2H_4O_2$. This compound reacts with ethanol to form a sweet smelling compound 'B'.
(a) Identify the compound 'A'
(b) Write the chemical equation for its reaction with ethanol to form compound 'B'.
(c) How can we get compound 'A' and 'B'?
(d) Which gas is obtained when compound A. reacts with washing soda? Give the equation.
(e) Write an equation to obtain 'A'. back from 'B'.

428) Identify the compound A, B, C, D, and E in the following reaction:
(a) $CH_3CH_2OH \xrightarrow{A} CH_3COOH$
(b) $CH_3CH_2OH + CH_3COOH \xrightarrow[H_2SO_4]{conc.} B + H_2O$
(c) $B + NaOH \longrightarrow C_2H_5OH + C$
(d) $D + Na_2CO_3 \longrightarrow CH_3COONa + E + H_2O$
(e) $E + Ca(OH)_2 \longrightarrow F + H_2O$
white ppt.

429) (a) What do you mean by allotropy?
(b) What is isomerism?
(c) Give one example of homologus series, give two properties of it.
(d) What is the full form of IUPAC?

430) (a) What are hydrocarbons?
(b) Give difference between saturated and unsaturated hydrocarbons.
(c) Why does carbon form large number of compounds?

431)