SHIKSHA CLASSES

Sub. : Science **Answer Paper** **Marks : 30**

Std. : Xth - CBSE **4. Carbon and Carbon Compounds**

SECTION 'A' **(Each - 1 Marks)**

Q.1. Which of the followings is the major constituent of the liquified petroleum gas?

Ans : d) Butane

OR

How many number of carbon atoms are joined in a spherical molecule of buckminsterfullerene?

Ans : b) 60

Q.2 : Write the molecular formula of cyclobutane?

Ans : C_4H_8.

OR

Write the I.U.P.A.C name of $CH_3\ CH_2\ CH = CH_2$.

Ans : But - 1 - ene.

Q.3 : Assertion (A) : Carbon forms strong and stable bonds.
Reason (R) : Carbon is tetravalent and the carbon atom is small in size.

Ans : b) Both A and R are true but R is not the correct explanation of the assertion.

Q.4 : Assertion(A) : Carbon compounds can form chain, branched and ring structures.
Reason (R) : Carbon exhibits the property of catenation.

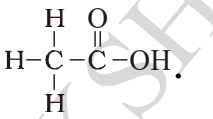
Ans : a) Both A and R are true and R is correct explanation of the assertion.

Q.5: Assertion (A) : Alkanes give addition reaction.
Reason (R) : Addition reactions are a characteristic property of unsaturated hydrocarbons.

Ans : d) A is false but R is true.

Q.6 : Draw the structure of CH_3COOH molecule.

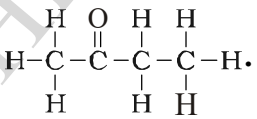
Ans :



OR

Draw the structure of butanone molecule ($CH_3\ CO\ C_2H_5$).

Ans :



Q.7: Read the following and answer any two questions from 5(i) to 5(iii) **(2 Mark)**

Homologous series is ---------- chemical properties.

i) Each member of Homologous series differ by ------.

Ans : a) $-CH_2-$.

ii) Each member of homologous series is differ by ------ in its molcular mass

Ans : d) 14u.

iii) Which of the following compounds belong to same homologous?

Ans : a) C_2H_6 and CH_4O.

Q.8: The number of isomers of pentane is

Ans : b) 3

Q.9: Why does carbon form compounds mainly by covalent bonding?

Ans : d) All the above.

Q.10: A soap molecule has a

Ans : d) hydrophilic head and hydrophobic tail

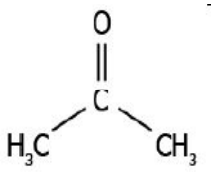
Q.11: The property of self-linkage among identical atoms to form long chain compounds is known as:

Ans : a) Catenation

Q.12: Ester is formed by the reaction between:

Ans : a) An acid and an alcohol

Q.13: The following image represents a carbon compound.



Which functional group is present in the compound?

Ans : d) Ketone

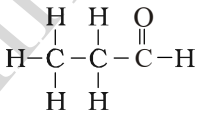
Q.14: A student studies that vinegar, which is a diluted form of ethanoic acid, freezes during winter. What does this suggest about the physical properties of pure ethanoic acid?

Ans : b) It has a low melting point

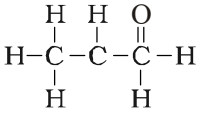
SECTION (B) (Each - 2 Mark)

Q.15 : Draw the structural formulae of the possible isomers for the compound with molecular formula C_3H_6O.

Ans : The given organic compounds represents two structural isomers which are actually functional isomers in nature.

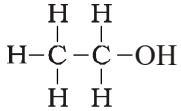


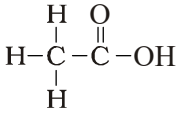
Propanal



Propanone

Q.16 : Write the IUPAC names of the following compounds.

i) 

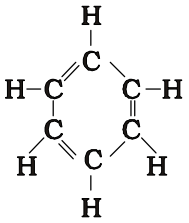
ii) 

Ans : i) Ethanol ii) Ethanoic acid.

OR

Draw the structure of benzene (C_6H_6).

Ans :



SECTION (C) **(Each - 3 Mark)**

Q.17 : Write the IUPAC name of the following structural formulae.

i) $CH-\underset{\underset{Br}{|}}{CH}-CH_3$ **ii)** $CH_3-CO-CH_2-CH_3$ **iii)** $CH_3-CH_2-CH_2-CH_2-OH$

Ans : i) 2 Bromopropane ii) 2 Butanone iii) Butane – 1 – ol

Q.18: How ethanol is converted into ethanal?

Ans : When ethanol is treated with 5% solution of chromium oxide in glacial ethanoic acid, it is oxidised to acetaldehyde(ethanal). The chromium oxide acts as mild oxidising agent.

$$CH_3CH_2OH+[O]\xrightarrow[CH_3COOH]{\text{acidified } K_2Cr_2O_7 \text{ in}}CH_3CHO+H_2O$$

$$CH_3CHO+[O]\xrightarrow[H_2SO_4]{Na_2Cr_2O_7}CH_3COOH+H_2O$$

OR

a) Why do covalent compounds have low melting points and boiling points?

Ans : The molecules in covalent compounds are held by weak van der waal's forces, hence they have low melting points and boiling points as compared to ionic compounds.

b) How are carboxylic acids different from mineral acids from ionisation points of view?

Ans : Carboxylic acids (like CH_3COOH) ionise to a very small extent in solution and give very small amount of H^+ ions. Thus, they are weak acids as compared to the mineral acids.

c) What is an ester?

Ans: Ester is an organic compound formed by the reaction of carboxylic acid with alcohol in presence of acid as catalyst. Water is the by product in this reaction.

$$CH_3COOH + C_2H_5OH \xrightarrow{H^+} CH_3COOC_2H_5 + H_2O$$

Carboxylic Alcohol Ester Water

SECTION (D) **(5 Mark)**

Q.19 : Explain the given reactions with the examples :

a) Hydrogenation reaction **b) Oxidation reaction**

c) Substitution **d) Saponification reaction**

e) Combustion reaction

Ans : **a) Hydrogenation reaction :** Unsaturated hydrocarbons add hydrogen in the presence of nickel catalyst to give saturated hydrocarbons.

$$R_2C = CR_2 + H_2 \xrightarrow{Ni} R_2C(H) - CR_2(H)$$

b) Oxidation reaction : Ethanol is oxidised to ethanoic acid in the presence of alkaline $KMnO_4$ on heating. $CH_3CH_2OH \xrightarrow[Heat]{Alk.KMnO_4} CH_3COOH$

c) Substitution reaction : In the presence of sunlight, chlorine is added to hydrocarbons.

$$CH_4Cl_2 \xrightarrow{Sunlight} CH_3Cl + HCl$$

d) Saponification reaction : $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$ Ester used in the peparation of soap.

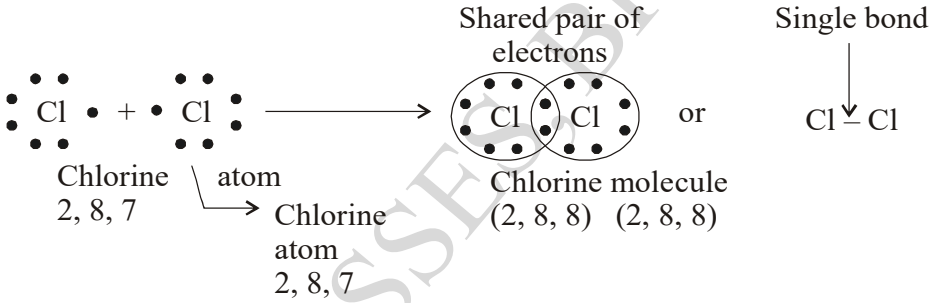
e) Combustion reaction : Most carbon compounds release a large amount of heat and light on burning.

$CH_4 + O_2 \rightarrow CO_2 + 2H_2O +$ heat and light.

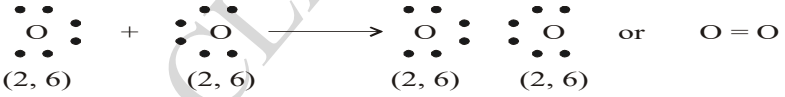
OR

Write the electronic dot structures of Cl_2, O_2, HCl, CH_4 and NH_3.

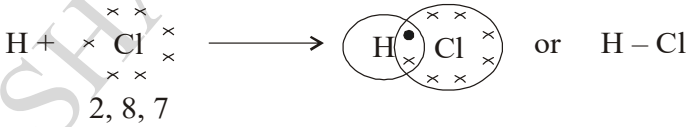
Ans : i) Cl_2



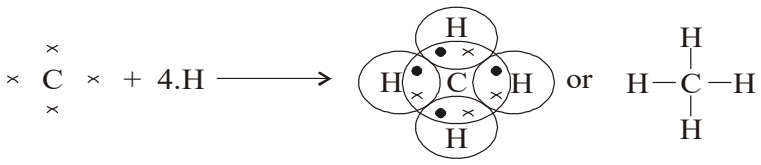
ii) O_2



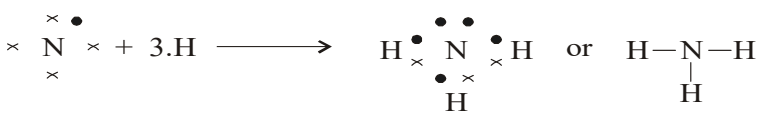
iii) HCl



iv) CH_4



v) NH_3



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