

14. CARBON AND ITS COMPOUNDS

1 Mark Questions

I. 1. What are hydro carbons ? (As-1)

Ans. Hydrocarbons are the compounds of carbon and hydrogen.

2. How many types of Hydrocarbons ?

Ans. Hydrocarbons are two types 1) Saturated hydrocarbons (alkanes) and unsaturated Hydrocarbons (alkenes and Alkynes)

3. What is hybridisation ? What are hybrid orbitals ?

Ans. the redistribution of orbitals of almost equal energy in individual atoms to give equal number of new orbitals with identical properties like energy and shape is called "Hybridisation" The newly formed orbitals are called as "hybrid orbitals."

4. What is allotropy ? What are the allotropy forms of carbon ?

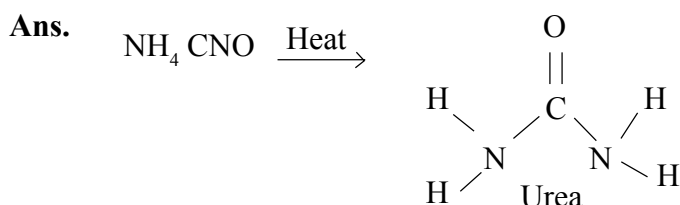
Ans. the property of an element to exist in two or more physical forms having more or less similar chemical properties but different physical properties is called allotropy. The allotropy forms of carbon are

1) Amorphous forms 2) Crystalline forms

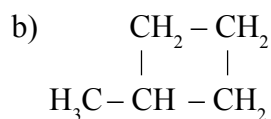
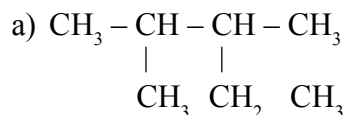
5. Write the names of crystalline allotropic forms of carbon ?

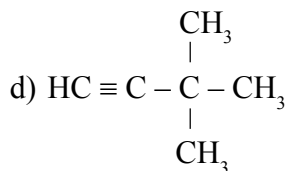
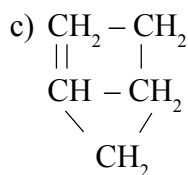
Ans. Diamond, graphite and buckminsterfullerene.

6. Write the chemical equation of preparation of urea ?



7. Classify the branched chain and closed chain compounds of the following ?





Ans. a, b and d are branched chain compounds

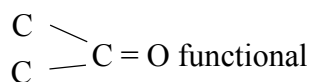
C is the closed chain compound

8. What are Aldehydes and Ketones ?

Ans. The hydrocarbons with functional group of -CHO are called aldehydes.'

Ex : Farmaldehyde, Accetal dehyde

The hydrocarbons with group are called ketones.



Ex : Acetone, Methyl ketone

9. What is Isomerism ? And what is Iromers ?

Ans. The phenomenon of possessing same molecular formula but different properties by the compounds is known as Isomerisom. The compound that eshibit isomerison are called Isomers.

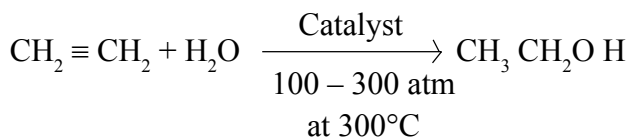
10. What are substitution reactions ?

Ans. A reaction in which an atom or a group of atoms in a given compound is replaced by other atom or groop of atoms is called a substitution reaction.

11. How ethyl alcohol is prepare from ethane ?

Ans. Ethanol is prepared on large scale from ethane by the addition of water vapour to it in the presence of catalysts P₂O₅, tungesten

Oxide at high pressure and temperator



12. What is P^ka?

Ans. P^ka is the negative value of logarithm of dissociation constant of an acid.

$$\text{P}^{\text{k}}\text{a} = \log_{10} \text{K}^{\text{a}}$$

13. What is saponification reaction ?

Ans. The sodium salts of these higher fatty acids being soaps the reaction is the soaps the rection is the soap formation reaction which is generally called as "Saponification reaction".

(or)

Alkaline hydrolysis of tristers of higher fatty acids producing soaps is called saponification.

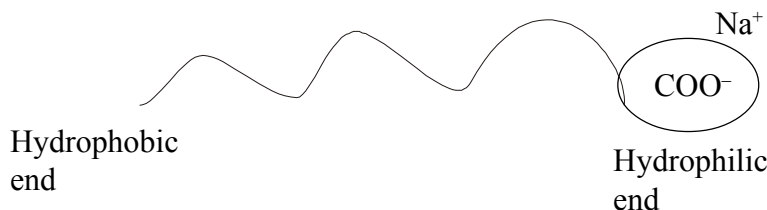
14. What is Micelle ?

Ans. A spherical aggregated of soap molecules in water is called micelle.

15. What are hydrophilic and hydrophobic parts in soaps ?

Ans. The polar end in soap with carboxy is called hydrophilic end.

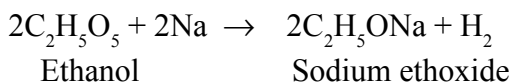
The non-polar end in soap with hydrocarbon chain in called hydrophobic end.



2 Mark Questions

16. What happens when a small piece of sodium is dropped into ethanol ?

Ans. When a small piece of sodium is dropped into ethanol, it shows brisk efferversence and liberats hydrogen gas and forms sodium ethoxide.



17. Define alkanes, alekeneus and alkynes ?

Ans. Alkanes : Hydro carbons containing only single bonds between carbon atoms are called alkanes.

Alkenes : Hydro carbons containing atleast one double bond between carbon atoms are called Alkenes.

Alkynes : Hydro carbons containing atleast one triple bond between carbon atoms are called Alkynes.

18. Suggesta chemical test to distinguish between ethanol and ethanoic acid and explain the procedure ?

- Ans.** 1) Take ethanol and ethonoic acid in two different test tubes.
 2) Add nearly 18 ml of sodium bicarbonate to each test tube.
 3) Lots and lots of bubbles and form will be observed from the test tube containing ethanoic acid.



- 4) Ethanol will not react with sodium bicarbonate and thus we won't observe any change in the test tube containing ethanol.

19. How do you appreciate the role of esters in everyday life ? (As-6)

- Ans.** 1) Esters contribute to the flavoures and frogrances of fruits and flowers.
 2) They are used as alternative medicine suppliments and vitamins.

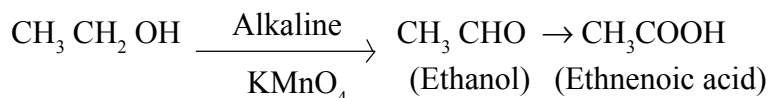
20. An orgomic compoundX with molecular formula C₂H₆O undergoes oxidation with alkaline KMnO₄ and forms the compound Y, that has molecular formulae C₂H₄O₂.

- a) Identify X and Y (b) write your observation regarding the product when the compound X is made to react with compound y which is used as a preservative for pickles.

Ans. a) X : C₂H₆O is Ethanol

Y : C₂H₄O₂ is Ethanoic acid.

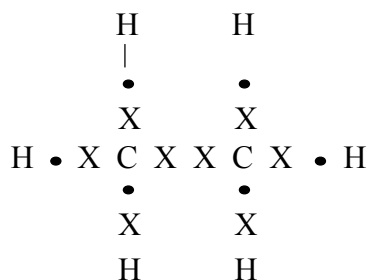
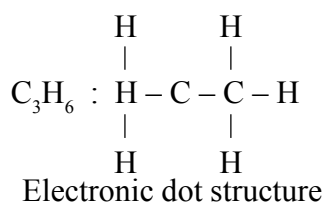
b) Ethyl alcohol undergoes oxidation to form the product acetaldehyde and finally Acetic acid.



Here CH₃COOH is used as preservative for pickles.

21. Draw the electronic dot structure of ethan molecule (C₂H₆)

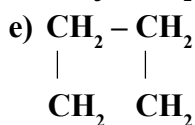
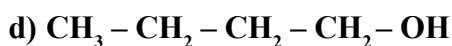
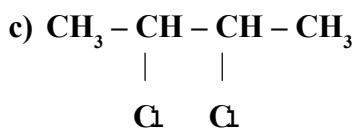
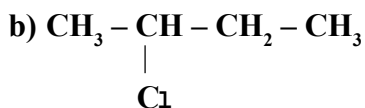
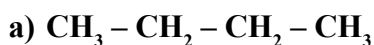
Ans.

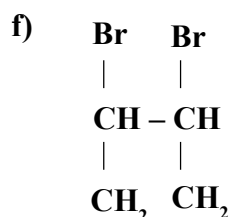


22. How do you condemn the use of alcohol as a social practice ?

- Ans. 1) Consumption of alcohol in the form of beverages is harmful to health.
 2) It causes severe damage to blood circulation system.
 3) Addition to alcohol drinking leads to heart diseases and damages the liver.
 4) It also causes ulcers in small intestines due to increased acidity and damages the digestive system.

23. Write the names of the following compounds ?



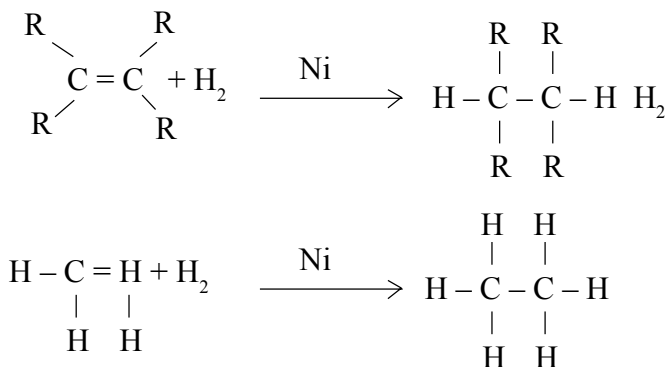


- Ans. a) Butane
 b) 2 – Chlorobutane
 c) 2, 3– dichlorobutane
 d) Butan – 1 – 0
 e) eyclobutane
 f) 1, 2 – dibromo cylobutane

4 Mark Questions

24. Explain with the help of a chemical equation, how an addition reaction is used in vegetable ghee industry ?

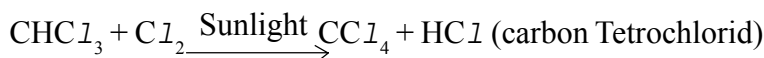
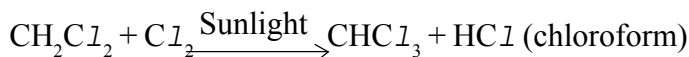
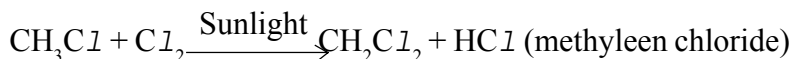
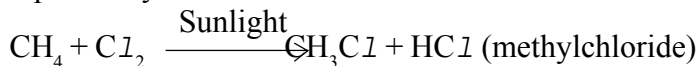
Ans. Addition reaction which is useful to vegetable ghee industry where the unsaturated oil can be changed into saturaed fat by adding hydrogen



25. Write the substitution reactions of alkhanes

How CH_3Cl , CH_2Cl_2 , CHCl_3 and CCl_4 are obtained from methane ?

Ans. When methane reacts with chlorine in the prusence of sunlight, Hydrogen atoms of CH_4 are replaced by chlorine atoms.



26. Explain the cleaning action of soap ?

Ans. 1) Soaps and detergents make oil and dirt present on the cloth come out into water thereby making the cloth clean.

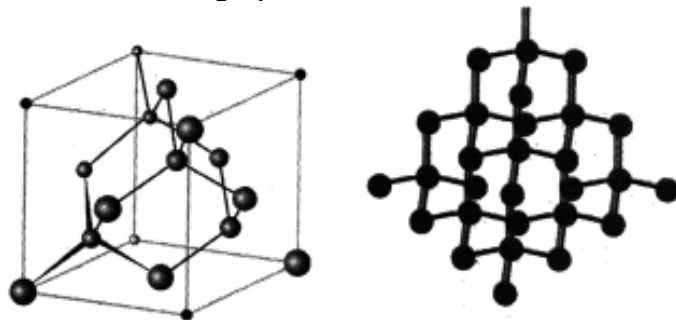
- 2) Soap has one polar end to end with carboxyl and one non-polar end. Hydro carbon chain)
- 3) The polar end is hydrophilic in nature and this end is attracted towards water.
- 4) The non-polar end is hydrophobic. In nature and it is attracted towards grease or oil on the cloth. But not attracted towards water.
- 5) When soap is dissolved in water, its hydrophobic ends attach themselves to dirt and remove it from cloth.
- 6) The hydrophobic end of the soap molecules move towards the dirt or greater particle.
- 7) The hydrophobic ends attached to the dirt particle and try to pull out.
- 8) The molecules of soap surround the dirt particles at the centre of the cluster and form a spherical structure called micelle.
- 9) These micelles remain suspended in water like particles in a colloidal solution.
- 10) The various micelles present in water do not come together to form a precipitate as each micelle repels the other because of the ion-ion repulsion.
- 11) Thus, the dirt particles remain trapped in micelles and are easily rinsed away with water. hence, soap micelles remove dirt by dissolving in water.

27. Write the differences of Esterification and Saponification.

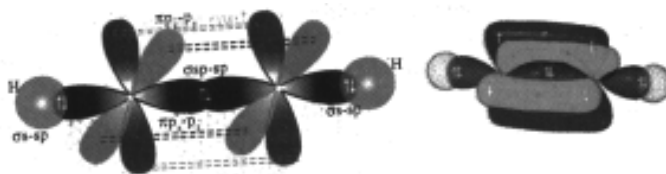
Ans.	Esterification	Saponification
	1. When carboxylic acid is react with in conc. H_2SO_4 to alcohol esters are formed $CH_3COOH + C_2H_5OH$ $\xrightarrow{\text{Conc } H_2SO_4}$ $CH_3COOC_2H_5 + H_2O$	1. When oil is react with carboxylic acid. CH_2-OH $ $ $CH-OH + Na$ $ $ CH_2-OH
	2. This is reversible reaction 3. This is use for preparation of different esters.	2. This is irreversible reaction. 3. This is use for preparation of soap.

5 Mark Questions

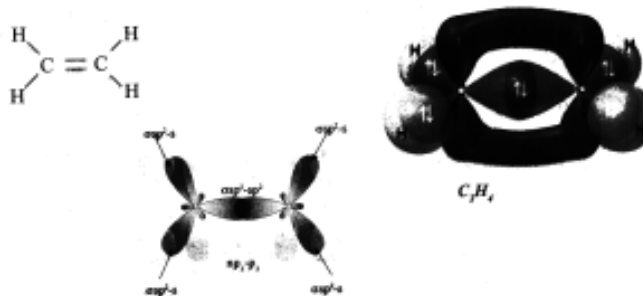
28. Draw the structure of Ethene (C_2H_4) by using SP^2 hybridisation ?



29. Draw the structure of Acetylene (C_2H_2) ?



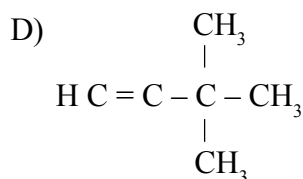
30. Draw the lattice structure and general structures of Diamond ?



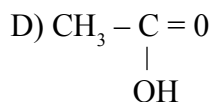
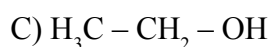
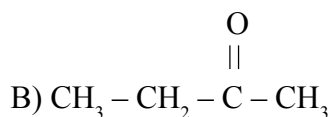
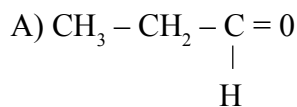
PART – B

I. Multiple Choice questions :

1. Bond angle in CH_4 is ()
 A) $109^\circ 28'$ B) $107^\circ 48'$ C) $104^\circ 31'$ D) 120°
2. Which of these is not a crystalline form of carbon ()
 A) Diamond B) Coal C) Graphite D) Buckminster fullerene
3. Which of these is a saturated hydrocarbon ()
 A) $CH-CH_2$
 |
 $CH-CH_2$
 B) $H C \equiv CH = CH_2$
 C) $CH_2-C-CH-CH$
 |
 CH_3
 D) CH_3-CH_2
 |
 CH_2-CH_3
4. Which of these is a closed chain compound ()
 A) $CH_3-CH-C-CH_3$
 | | |
 CH_3 CH_2 CH_2
 B) CH_2-CH_2
 | |
 H_3C-CH_2 CH_2
 C) $CH-CH_2$
 || |
 CH CH_2
 \ /
 CH_2



5. Which of these represent a ketone ()



6. Find the functional group in
$$\begin{array}{c} \text{NH}_2 \\ | \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$
 ()

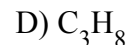
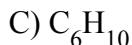
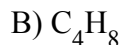
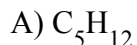
A) Ester

B) Amine

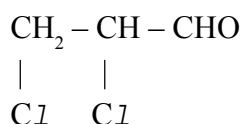
C) Ether

D) aldehyde

7. Identify the alkene ()



8. IUPAc Name of carbon compound ()



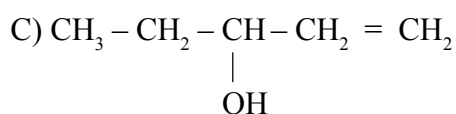
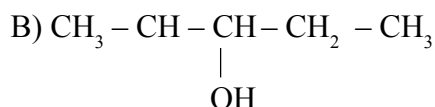
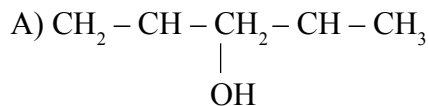
A) 1, 2 di chloro Ethanol

B) 2, 3 di chloro propanal

C) 1, 2, 3 di chloro propanol

D) none of the above

9. Identify the compound whose name is pent - 4 - en - 2 - 01 ()



D) None of the above

10. The functional group indicates carboxylic acid ()
A) – COOR B) –COOH C) –CHO D) –C = O
11. The suffix used for naming an aldehyde is ()
A) –ol B) –al C) –One D) –ene
12. Which one of the following hydrocarbon can show isomerism ? ()
A) C_2H_4 B) C_2H_6 C) C_3H_8 D) C_4H_{10}
13. The general formula of homologous series of 'Alkenes' is ()
A) C_nH_{2n+2} B) C_nH_{2n} C) C_nH_{2n-2} D) $C_{2n}H_{n+2}$
14. When acetic acid reacts with ethyl alcohol, we add conc. H_2SO_4 , it acts as and the process is called ()
A) Oxidizing agent, saponification
B) Dehydrating agent, esterification
C) Reducing agent, esterification
D) Acid & esterification
15. A few drops of ethanoic acid were to solid sodium carbonate. The possible results of the reactions are ()
A) A hissing sound was evolved
B) Brown fumes evolved
C) Brisk effervescence occurred
D) A pungent smelling gas evolved

II. Fill in the blanks.

1. Very dilute solution of ethanoic acid
2. Hydrocarbons containing double and triple bonds are called
3. A sweet odour substance formed by the reaction of an alcohol and a carboxylic acid is
4. Hydrocarbons having the general formula C_nH_{2n+2} are called
5. The reactive part of the organic molecule is called its group.
6. The process of burning of a hydrocarbon in presence of excess air to give CO_2 , H_2O with evolution of heat and light is known as
7. The organic compounds having the same molecular formula but different structures are known as
8. Type of reactions shown by alkanes is
9. When sodium metal is dropped in ethanol gas will be released.
10. A compound which is basic constituent of many cough syrups

II. Matching.

- | I. A | | B |
|------------|-----|--|
| 1. Ethene | () | A. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ |
| 2. Butane | () | B. $\text{CH}_2 = \text{CH}_2$ |
| 3. Propyne | () | C. $\text{CH}_3 - \text{C} = \text{CH}$ |
| 4. Pentyne | () | D. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{C} = \text{CH}$ |
| 5. Propane | () | E. $\text{CH}_3 - \text{CH}_2 - \text{CH}_3$ |
| | | F. $\text{CH}_3 - \text{CH}_2 - \text{CH} = \text{CH} - \text{CH}_3$ |
| | | G. $\text{CH} = \text{CH}$ |

- | II. A | | B |
|-------------|-----|--------------------------------|
| 1. Aldehyde | () | A. $-\text{COOH}$ |
| 2. Amine | () | B. $-\text{C} \equiv \text{O}$ |
| 3. Ketone | () | C. $-\text{COOR}$ |
| 4. Acid | () | D. $-\text{CHO}$ |
| 5. Alcohol | () | E. $-\text{NH}_2$ |
| | | F. $-\text{OH}$ |
| | | G. $-\text{CONH}_2$ |

- | III. A | | B |
|------------|-----|------------------------------|
| 1. Ethane | () | A. C_2H_4 |
| 2. Propene | () | B. C_2H_6 |
| 3. Butyne | () | C. C_3H_6 |
| 4. Pentene | () | D. C_2H_2 |
| 5. Ethyne | () | E. C_4H_6 |
| | | F. C_5H_{10} |
| | | G. C_2H_2 |

- | IV. A | | B |
|------------------|-----|---|
| 1. Ethanol | () | A. CH_3COOH |
| 2. Ethanoic acid | () | B. $\begin{matrix} \text{H}_2\text{C} - \text{CH} - \text{CH}_2 \\ \\ \text{OH} \end{matrix}$ |
| 3. Ethanal | () | C. $\text{CH}_3\text{CH}_2\text{OH}$ |
| 4. Ciycerol | () | D. $\text{C}_{17}\text{H}_{35}\text{COONa}$ |
| 5. Stearic acid | () | E. CH_3CHO |
| | | F. $\text{C}_{17}\text{H}_{35}\text{COOH}$ |
| | | G. $\text{CH}_3 \text{COONa}$ |

