



CHAPTER 6
CARBON AND ITS COMPOUNDS

SOLUTIONS

TEXTUAL QUESTIONS & ANSWERS

Answer to Text book, Page no. 111

1. Draw the structure of propane with the molecular formula C_3H_8 .

Ans:

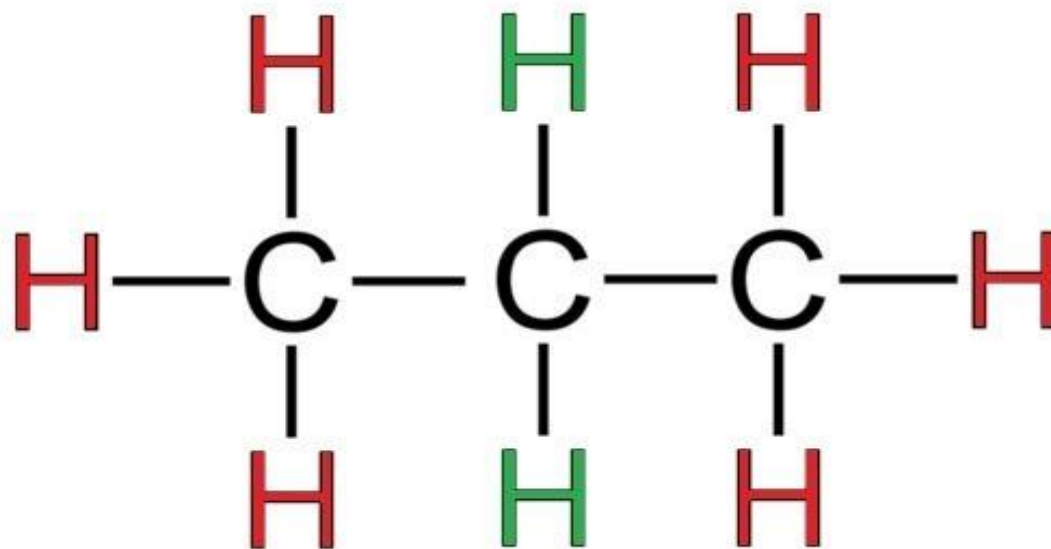


Fig. Structure of propane

2. Draw the electron dot structure of chloromethane with the molecular formula CH_3Cl .

Ans:

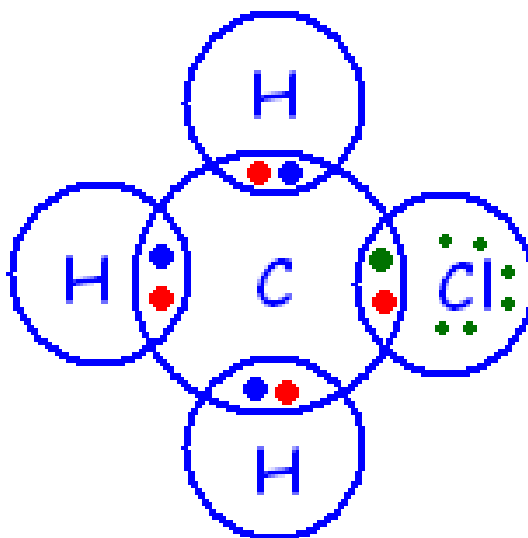
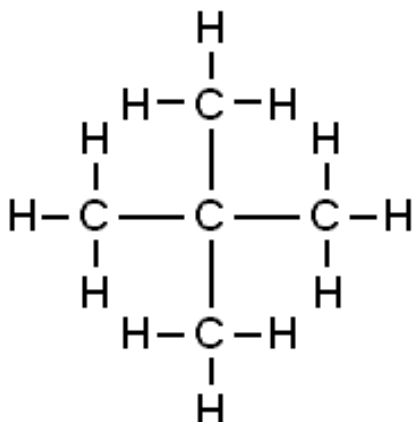


Fig. Electron dot structure of chloromethane



Answer to Text Book, Page no. 114.

1. Give the name of



Ans: 2,2-dimethyl propane.

2. (a) Write the possible carbon skeletons of C_5H_{12} .

(b) Then write the possible structures of C_5H_{12}

Ans: (a)

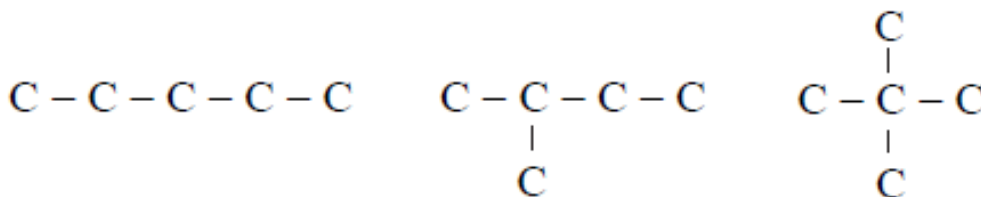


Fig. Diagrams showing the three possible carbon skeletons of C_5H_{12}

(b)

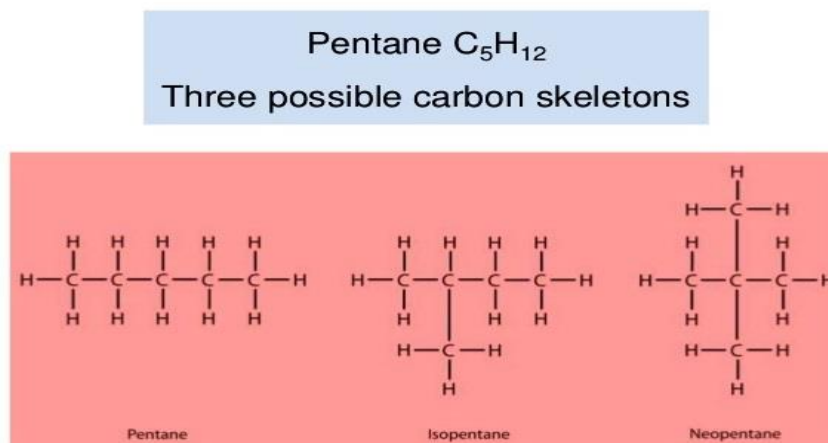


Fig. Diagrams showing the three possible carbon structures of C_5H_{12}



Answer to Text book, Page no.116

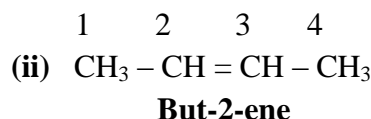
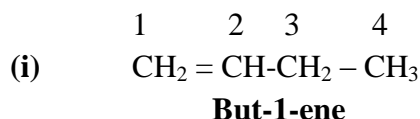
1. Why is the first member of alkene C_2H_4 ?

Ans. Alkenes are unsaturated hydrocarbons which contain double bond with general formula C_nH_{2n} . Hence the first member of alkene is C_2H_4 with double bond in between.

2. Why does butene have two names?

Ans. Butene has two names

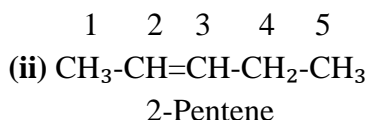
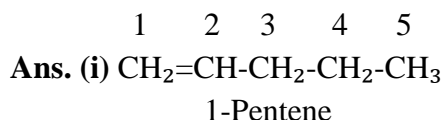
(i) But-1-ene (1-Butene) and (ii) But-2-ene (2-Butene)



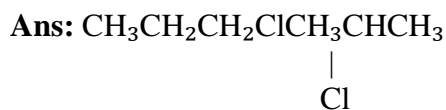
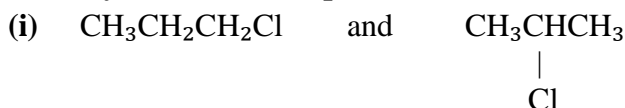
The C - C double bond in butene may lie between C-1 & C-2 or C-2 & C-3. Hence butene has two names.

Answer to Text book, Pages 116 & 117

1. Write the position isomers of pentene C_5H_{10} .

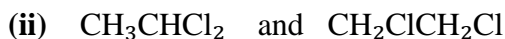


2. Identify the relationship between



1-chloropropane 2-chloropropane

Both have the same formula but different structures so they are position isomer. (position of Cl is in C₁ and C₂)

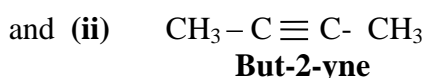
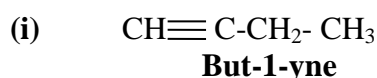


Ans: CH_3CHCl_2 is 1,1-dichloroethane and $\text{CH}_2\text{ClCH}_2\text{Cl}$ is 1,2-dichloroethane. They have the same formula but structures are different and hence structural isomers.

Answer to Text book, Page no.118

1. Why does Butyne has two isomers?

Ans. Butyne (C_4H_6) can have the two structural formulae as follows:



Hence butyne has two isomers.



(ii) Is there any other structural isomer of Butyne?

Ans: Butyne have two possible structures i.e., But-1-yne and But-2-yne. Hence, there is no other isomer of Butyne other than these two.

Text Book, Page no.120

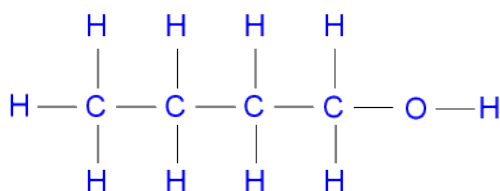
1. Write the homologous series of alcohols upto four carbon atoms.

Ans: Homologous series of alcohols upto four carbon atoms are as follows:

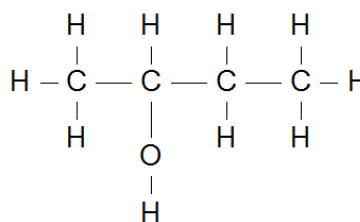
- (i) CH_3OH , Methanol
- (ii) $\text{CH}_3\text{CH}_2\text{OH}$ or $\text{C}_2\text{H}_5\text{OH}$, Ethanol
- (iii) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ or $\text{C}_3\text{H}_7\text{OH}$, Propanol
- (iv) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ or $\text{C}_4\text{H}_9\text{OH}$, Butanol

2. Write any two isomers of $\text{C}_4\text{H}_9\text{OH}$.

Ans: Isomers of $\text{C}_4\text{H}_9\text{OH}$ (i) Butane-1-ol and (ii) Butane-2-ol



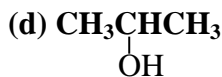
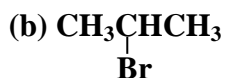
Butan-1-ol



Butan-2-ol

Answer to Text Book, page no. 123.

1. Let us name the following compounds:



Ans: (a) 1- Bromopropane

(b) 2-Bromopropane

(c) Propan-1-ol

(d) Propan-2 -ol

(e) Ethanal

(f) Propanoic acid

3. Draw the structures of

(a) 1 – Bromobutane

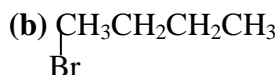
(b) 2-bromobutane

(c) Ethanoic acid

(d) Propanone

(e) Butanal

Ans. (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$



(c) CH_3COOH

(d) $\text{CH}_3\text{-CO-CH}_3$

(e) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$



Answer to Text Book Exercises, page no.130 &131

1. Why does graphite conduct electricity?

Ans. In graphite, each carbon atom is covalently bonded to only three neighbouring carbon atoms forming layers of hexagonal networks, separated by a comparatively larger distance. Because of this distance between two successive layers, the possibility of a covalent bond being formed between carbon atoms lying in opposite layers is ruled out. The fourth valence electron thus remains almost free. This enables the easy flow of electrons through graphite and makes a good conductor of electricity.

2. Why is diamond so hard?

Ans. In diamond, each carbon atom lies at the centre of a regular tetrahedron and is covalently bonded with four carbon atoms located at its four corners leaving no free electrons. The tightly bonded three dimensional tetrahedral arrangement of carbon atoms produce a rigid network and make diamond the hardest substance.

3. What is CNG? Give an use of it?

Ans. CNG (Compressed Natural Gas) is a natural gas found in earth's crust. It is used as fuel.

4. Draw the electron dot structure of ethane and count the number of covalent bond in a molecule.

Ans.

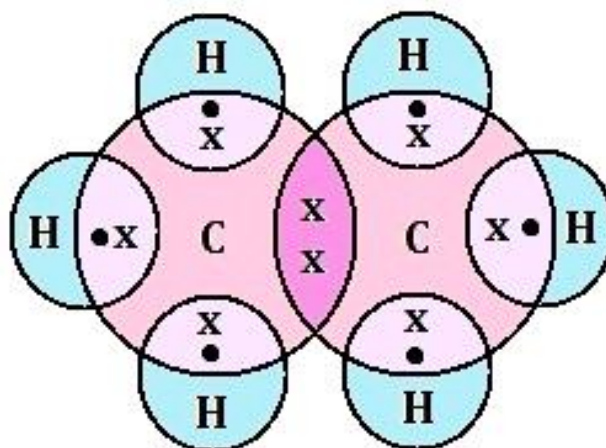


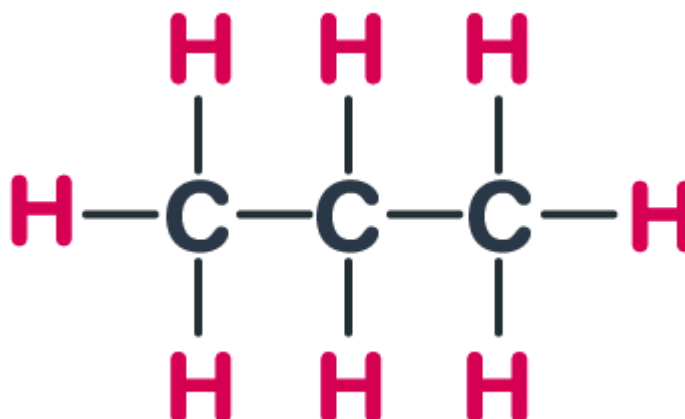
Fig. Electron dot structure of ethane

The number of covalent bond in ethane is seven (one C-C bond and six C-H bond)



5. Draw the structure of propane and find out the number of hydrogens which have similar properties.

Ans: The structure of propane is



The number of hydrogens which have similar properties in propane are 8 (eight).

6. Draw the structure of 2-methyl propane. How many types of carbon and hydrogen are there?

Ans.

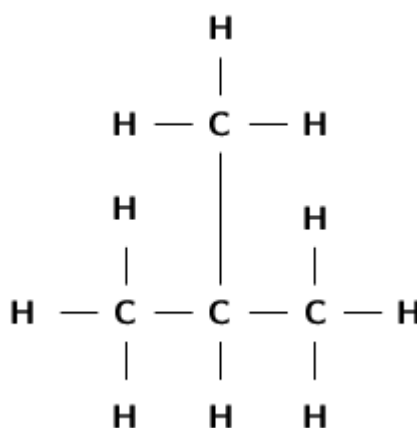


Fig. Structure of 2-methyl propane

In 2-methyl propane, there are three carbon atoms in a single chain and one carbon atom is branched. Seven hydrogen atoms are attached to the chain of three carbon atoms and three hydrogen atoms are attached to the branched carbon atom.



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7. What is the general formula of cycloalkanes?

Ans. The general formula of cycloalkanes is $C_n H_{2n}$.

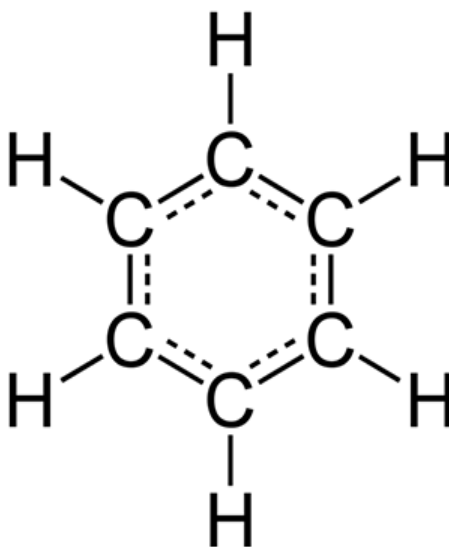
8. Can you write But-3-ene? If not why?

Ans. We cannot write But-3-ene. Because in Butene, double bond has to be assigned at lowest number as per IUPAC nomenclature.

9. Draw the structure of benzene molecule.

Ans.

STRUCTURE OF BENZENE



Benzene

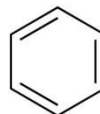
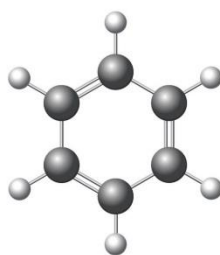


Fig. Structure of benzene



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10. What are important fractions obtained from petroleum? Mention their important uses.

Ans. Important fractions obtained from petroleum and their uses:

Fractions of petroleum	Uses
Gas	Fuel
Gasoline or petrol	Motor fuel
Kerosene	Household fuel & lighting purpose
Gas oil & diesel oil	Furnace fuel & for diesel engines
Lubricating oil & grease	For lubrication
Vaseline	For softening skin
Paraffin wax	For making candles
Asphalt	For road surfacing
LPG(Liquefied Petroleum Gas)	For cooking

11. Define functional groups. Write the functional groups of alcohol, aldehyde and carboxylic acid.

Ans. Heteroatoms and the group attached to the hydrocarbon part forms a stable molecule characterize the specific properties of the compound irrespective of the nature and length of the carbon chain. Such groups are called functional groups.

The functional groups of alcohol, aldehyde and carboxylic acid are hydroxyl (-OH), formyl or aldehydic (-CHO) and -oic acid (-COOH) respectively.

12. What is a word root?

Ans. A word root is the basic unit of the name of an organic compound. It is denoted by the number of carbon atoms present in the main chain of the molecule.

13. What are primary and secondary prefixes?

Ans. Primary prefix distinguishes open chain compound from ring compounds .e.g. in the cyclic compound, cyclobutane primary prefix, cyclo is used immediately before the word root.

Secondary prefix is the substitute of functional group and added immediately before the word root or primary prefix in alphabetical order.e.g.Fluoro (-F), Chloro(-Cl), Methyl(-CH₃)

14. What are primary and secondary suffixes?

Ans. A primary suffix is added to the word root to indicate whether the carbon chain is of single bonds or C-C multiple bonds. For example, saturated hydrocarbons have primary suffix -ane and called alkane as in Methane (CH₄), Ethane (C₂H₆) etc.

A secondary suffix is added to the primary suffix to indicate the nature of functional group present in the molecule. For example, alcohols have the secondary suffix -ol, such as ethanol (C₂H₅OH)and aldehydes have the secondary suffix (-al) suchas methanal (HCHO).

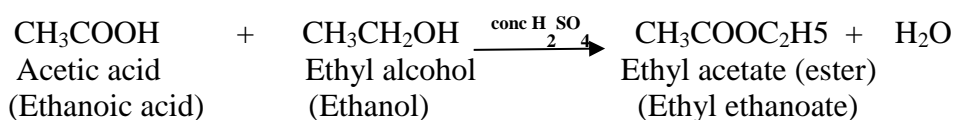


15. How is oxidation different from combustion?

Ans. Oxidation may be defined as the addition of oxygen or removal of hydrogen from a carbon compound. Complete oxidation of an organic compound to form carbon dioxide (CO₂) and water (H₂O) is called combustion. Hence, combustion is also an oxidation process.

16. Write equation for esterification reaction.

Ans. The reaction of acetic acid with ethyl alcohol in presence of an acid catalyst to form ester, ethyl acetate is an example of esterification reaction.



17. What is the formula of chloroform?

Mention one use of chloroform.

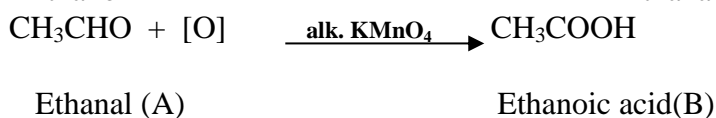
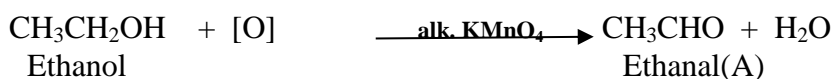
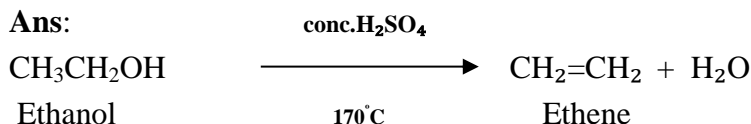
Ans. The formula of chloroform is CHCl₃. It is used as an anaesthetic.



EXTRA QUESTIONS AND ANSWERS

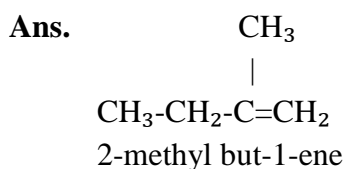
1. An alcohol on oxidation with alkaline KMnO_4 first gives A which on further oxidation gives B. The same alcohol on dehydration with conc. H_2SO_4 at 170°C gives ethene. Give the formula and the name of the alcohol and the two compounds A and B.

Ans. Since dehydration of the alcohol gives ethene, the alcohol is ethanol, $\text{C}_2\text{H}_5\text{OH}$. Oxidation of ethanol with alkaline KMnO_4 gives ethanal, CH_3CHO first and further oxidation gives ethanoic acid, CH_3COOH .



Therefore the alcohol is ethanol ($\text{CH}_3\text{CH}_2\text{OH}$) and the compound A is ethanol (CH_3CHO) and B is ethanoic acid (CH_3COOH)

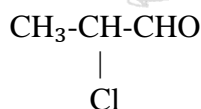
2. Write the structure of 2-methyl but-1-ene.



3. Define functional group of organic compounds. What are the components of a complete name of an organic compound? Write the name of a compound.

Ans. Heteroatoms and the group attached to the hydrocarbon part forms a stable molecule characterize the specific properties of the compound irrespective of the nature and length of the carbon chain. Such groups are called functional groups.

The components of a complete name of an organic compound are (i) word root (ii) primary prefix (iii) secondary prefix (iv) primary suffix and (v) secondary suffix



2-chloropropanal / β -chloropropionaldehyde

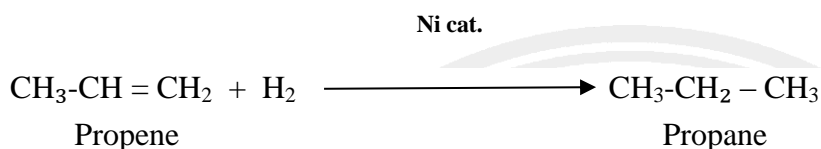
Here word root is "Prop", secondary prefix is "chloro", primary suffix is an (e) and secondary suffix is "al". So the name of the compound is 2-chloropropanal. The above compound is an open chain compound so primary prefix is not used.



4. An unsaturated hydrocarbon (A) is found to be a structural isomer of cyclopropane. This compound (A) on catalytic reduction with Ni/H_2 , gives an acyclic hydrocarbon (B). Identify the compounds (A) and (B).

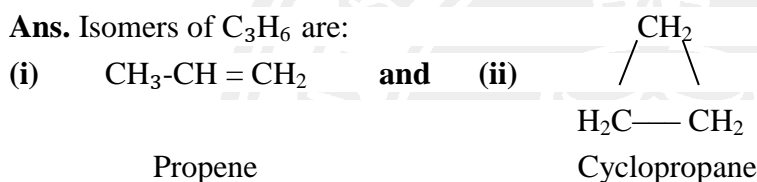
Ans. Cycloalkanes have the same general formula as that of alkenes. So the hydrocarbon (A) is propene (unsaturated).

Propene is reduced to propane in presence of Ni catalyst. Therefore the compound (B) is propane ($\text{CH}_3\text{CH}_2\text{CH}_3$)

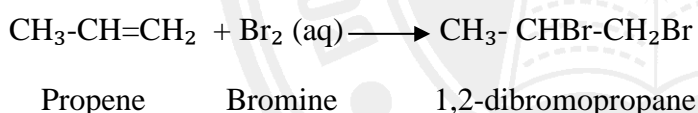


5. Write the structure and IUPAC name of the possible isomer having molecular formula C_3H_6 . Which of the isomers will undergo bromination reaction with bromine water? Write the reaction involved.

Ans. Isomers of C_3H_6 are:



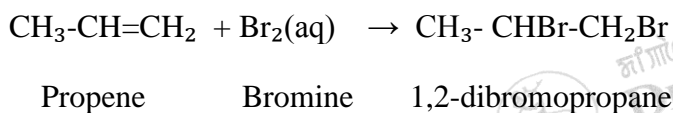
Propene will undergo bromination reaction with bromine water as it is an unsaturated hydrocarbon. The orange – red colour of bromine water will be discharged in the reaction .



Cyclopropane will not undergo bromination reaction as it is saturated hydrocarbon and cannot undergo addition reaction.

6. Give the name of the compound formed by the reaction of propene with bromine water.

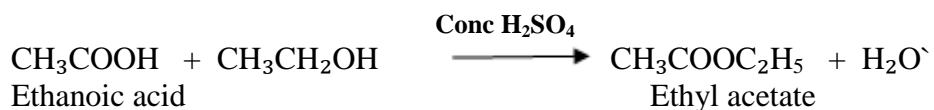
Ans. 1,2- dibromopropane



7. What is the functional group in alcohol ? What happens when ethanol is treated with ethanoic acid in presence of sulphuric acid? Write the reaction.

Ans. Functional group of alcohol is $-\text{OH}$. (hydroxyl group)

When ethanol is treated with ethanoic acid in presence of sulphuric acid, an ester, ethyl acetate(ethyl ethanoate) is formed along with water.



8. What are word root, primary suffix, secondary suffix and secondary prefix of 2-chloroethanol?

Ans. Word root - Eth

Secondary suffix - ol

Primary suffix - ane

Secondary prefix - chloro

- 9. Draw a proportionate structure of graphite showing the bond together.**

Ans.

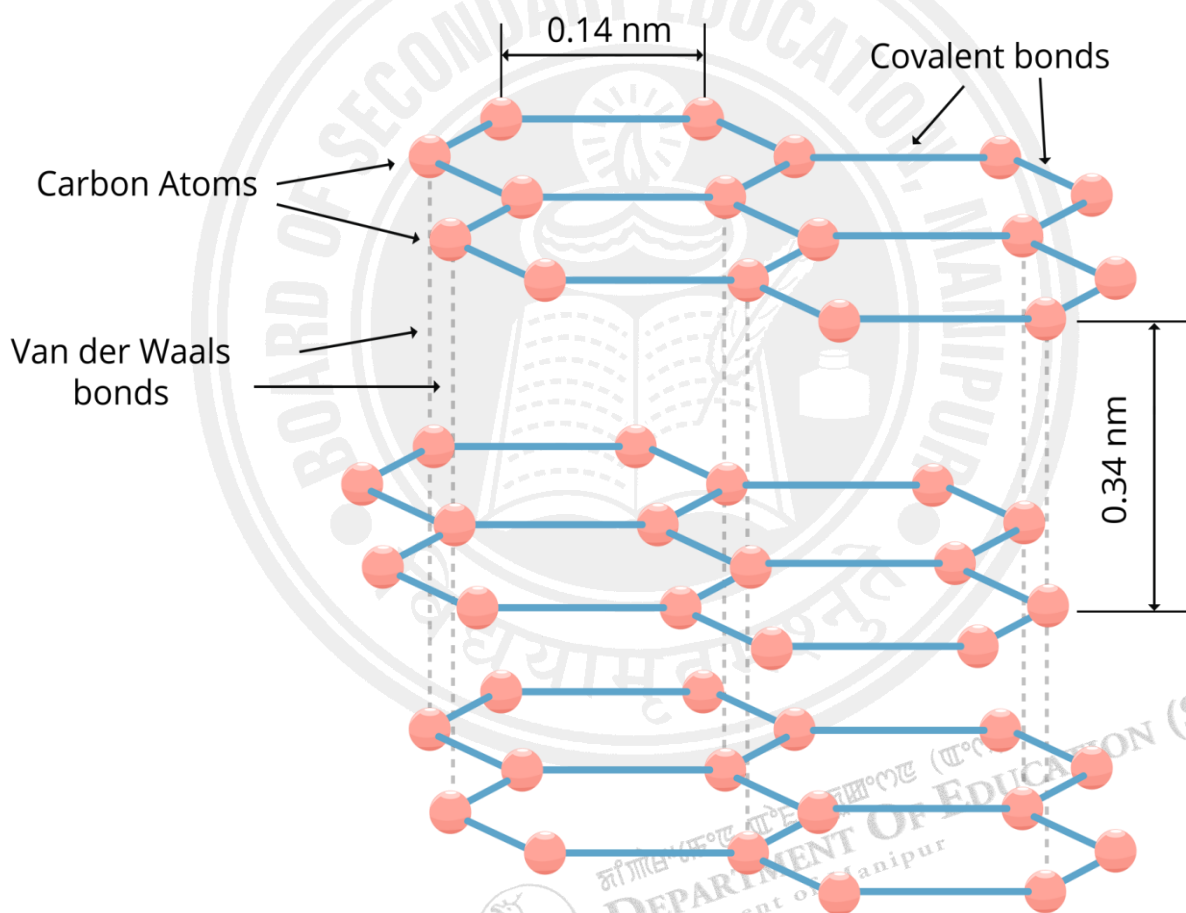
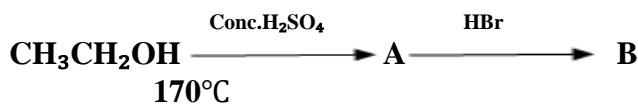


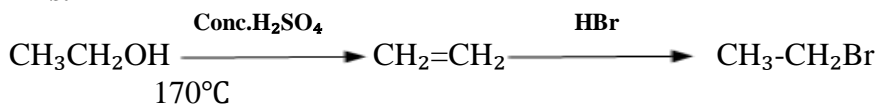
Fig. Structure of graphite showing the bond together



10. Complete the reaction by identifying A and B:



Ans.



(A) Ethene

(B) Bromoethane

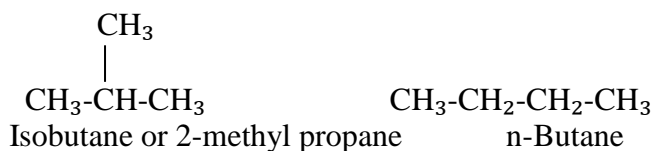
Therefore A is ethene and B is bromoethane.

11. What are isomers? Describe with suitable examples the types of isomerism shown by (i) Alkanes and (ii) Alkenes.

Ans. Compounds having the same molecular formula but having different structures are called isomers.

(i) Alkanes show structural isomerism.

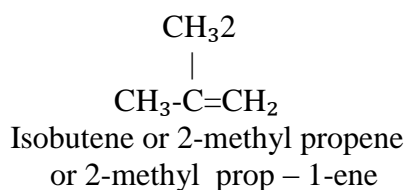
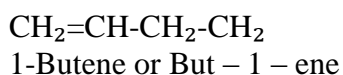
For example butane, C_4H_{10} shows structural isomerism (i) n- Butane and isobutane



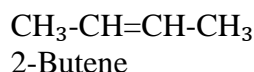
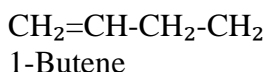
Isobutane and n-Butane have the same molecular formula but structures are different. So they are structural isomers and hence butane shows structural isomerism.

(ii) Alkenes show both structural isomerism and position isomerism

For example: butene can show both structural and position isomerism



1-Butene and isobutene have same formula but structures of carbon chains are different. Hence butene shows structural isomerism.



Here 1-Butene and 2-Butene have the same carbon chain but differ in the position of double bond. So they are position isomers. Hence butene also shows position isomerism.



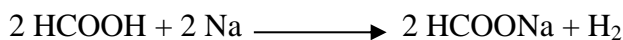
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12. General formula for a homologous series of compounds is $C_nH_{2n+1}COOH$. Write the chemical formula of the first member of the series. What product will be obtained when this compound is treated with sodium metal?

Ans. The chemical formula of the first member of the series is $HCOOH$ (Formic Acid or Methanoic Acid) .



Sodium Formate or Sodium methanoate

PROBABLE AND LAST YEAR QUESTIONS

- Q1. What makes Graphite a good conductor of electricity?

Ans:- It is due to the presence of free valence electrons in each carbon atom of graphite .

- Q2. How will you prove that diamond and graphite are allotropes of carbon?

Ans: When same amount of diamond and graphite burns completely, same amount of carbon dioxide will be formed without leaving any residue.

- Q3. Why is diamond a bad conductor of electricity while graphite is a good conductor?

Ans:- In diamond each carbon atoms is covalently bonded with four other carbon atoms leaving no valence electrons free to conduct electric current. In graphite, each carbon atom is covalently bonded with three other carbon atoms leaving one electron free in each carbon atom which can conduct electric current.

- Q4. Draw a proportionate structure of graphite showing the bond together.

Ans:-

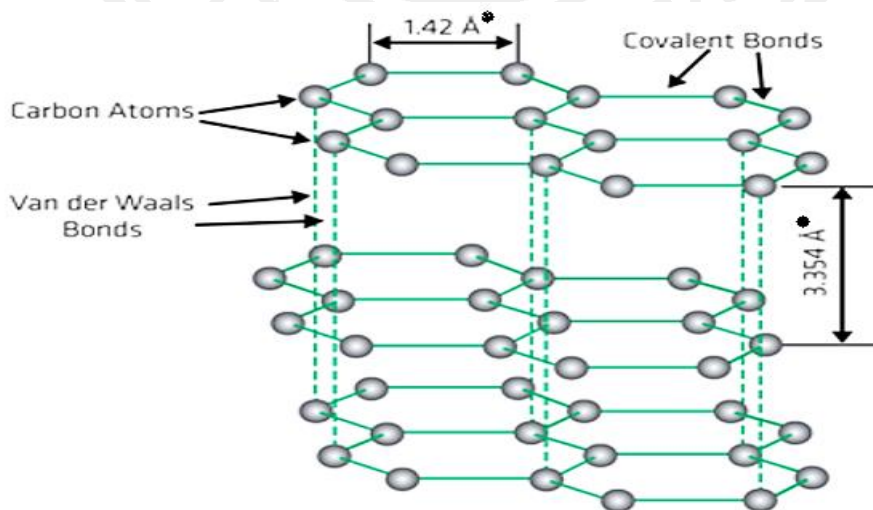


Fig. Diagram showing structure of graphite



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Q 5. What makes diamond extremely hard while graphite soft?

Ans:- The tightly bonded three dimensional tetrahedral arrangement of carbon atoms produces a rigid network and makes diamond extremely hard substance.

In graphite each carbon atom is covalently bonded to only three neighbouring carbon atoms forming layers of hexagonal network, separated by a comparatively layer distance. These layers slide over one another. This makes graphite soft to feel.

Q 6. Why are carbon compounds so numerous?

Ans:-

- (i) Carbon has capability to combine itself (catenation) to form long chain which acts as backbone for many compounds.
- (ii) It also has capability to form multiple bonds (double and triple bonds).

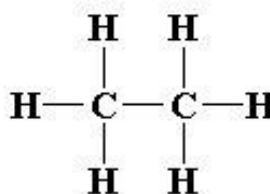
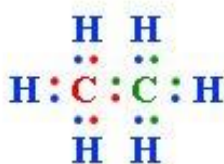
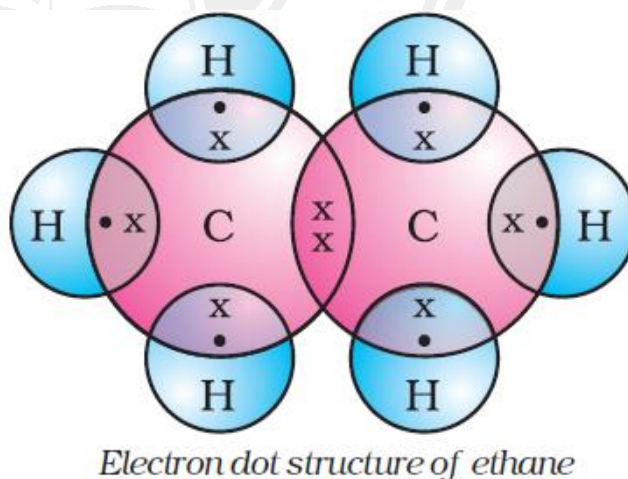
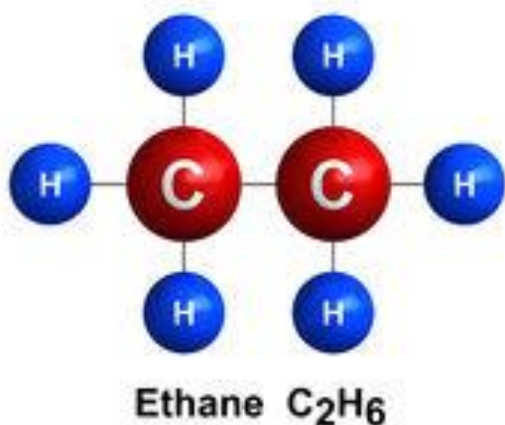
Q 7. What are hydro carbons? Describe the four different types of hydro carbons with examples and depict their electron dot and cross structure also.

Ans;- Compounds of carbon and hydrogen only are called hydro carbons.

Types of hydro carbons:-

(i) **Alkanes:-** These hydro carbons contains C – C single covalent bonds.

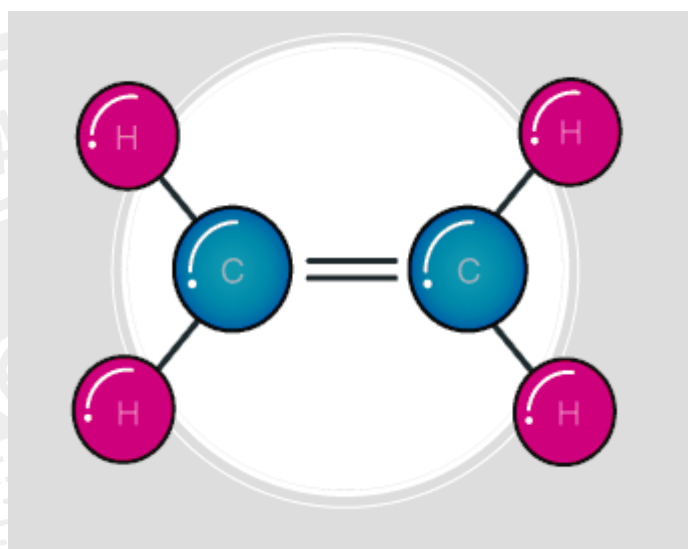
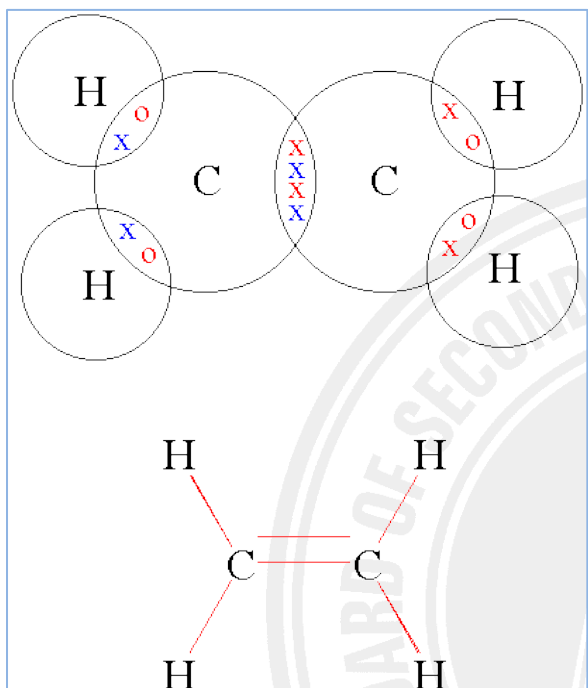
E g. Ethane, C_2H_6





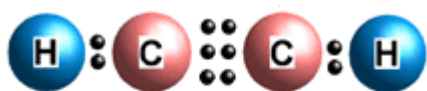
(ii) **Alkenes:-** These hydrocarbons contains at least a double covalent bond between two carbon atoms.

E.g. Ethene, C_2H_4

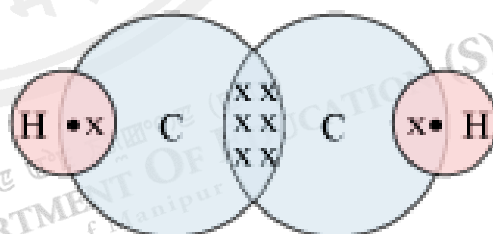
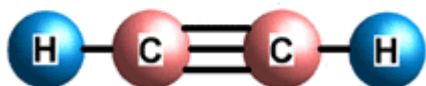


(iii) **Alkynes:-** These hydro carbon contains a triple bond between two carbon atoms.

e.g. Ethyne, C_2H_2



Ethyne C_2H_2



106.0 pm



120.3 pm



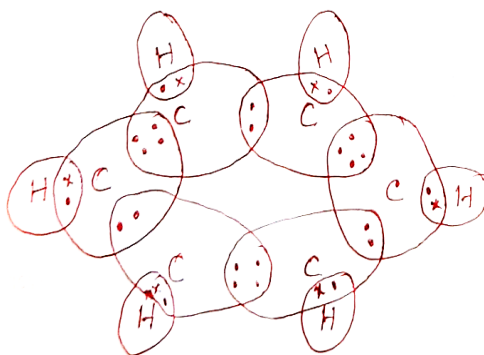
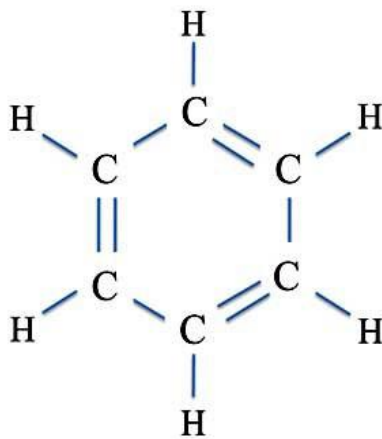
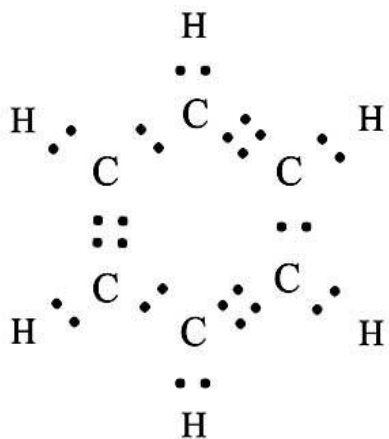
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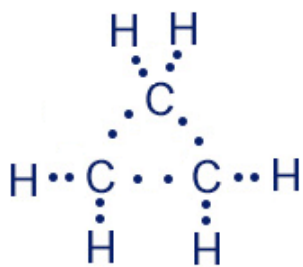
- (iv) **Arenes or Aromatic hydro carbon:-** These hydro carbon are cyclic and contains at least one benzene ring in which alternate double bonds between the carbon atoms is involved.

E.g. Benzene, C_6H_6

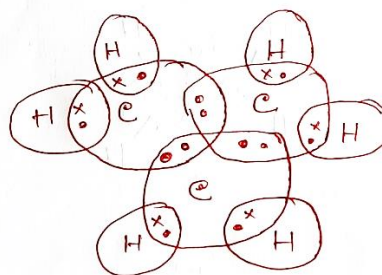


- (v) **Cycloalkanes:-** These hydro carbons are cyclic and contains carbon – carbon single covalent bonds .

E.g. Cyclopropane



cyclopropane





Q8. What are hydrocarbon? What are the main classes of hydrocarbons? Discuss structural isomerism of hydrocarbon with suitable examples (Both saturated and unsaturated hydrocarbon).

Ans: Compounds of carbon and hydrogen only are called hydrocarbons.

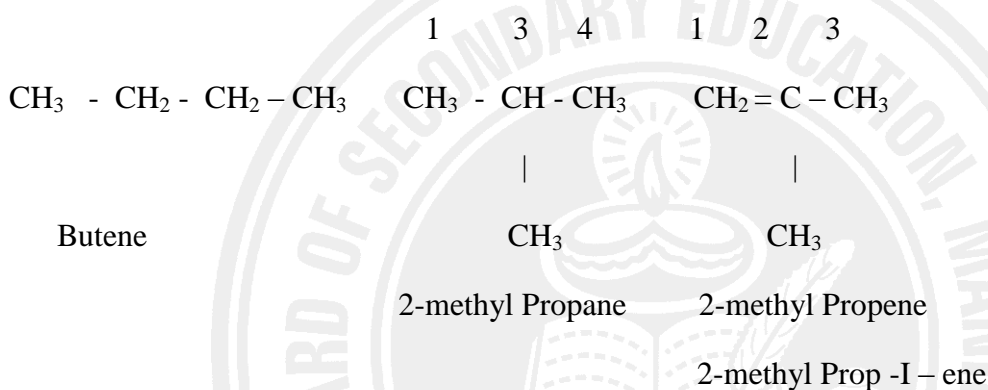
The main classes of hydro carbon are:-

(i) Saturated hydrocarbon. Alkanes, Cycloalkanes.

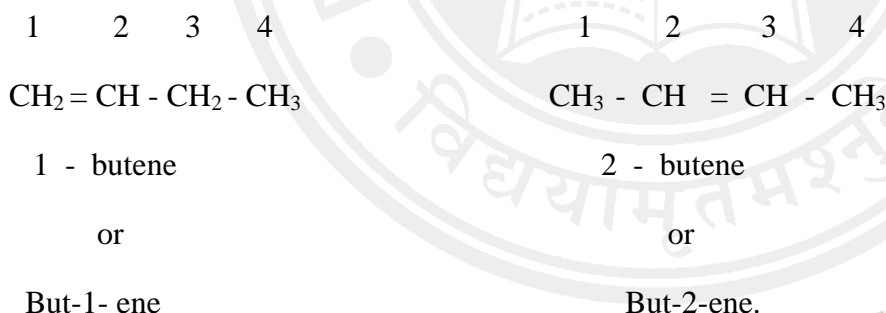
(ii) Unsaturated hydrocarbons. Alkene and Alkynes.

(iii) Aromatic hydrocarbons. (Arenes)

Structural Isomerism (saturated as well as unsaturated)



Position Isomers:-



Q 9. What are saturated and unsaturated hydro carbons? Give examples.

Ans:- Saturated hydrocarbons:-

Those hydrocarbons which contain carbon – carbon single bonds only are known as saturated hydrocarbons. **Examples:**





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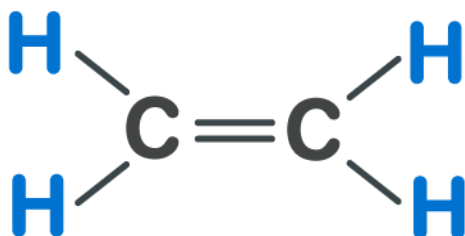
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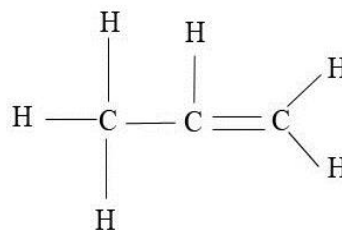
Unsaturated hydrocarbons:

Those hydrocarbons which contains carbon - carbon double or triple bonds are known as unsaturated hydrocarbons.

Example:



Ethene, C_2H_4



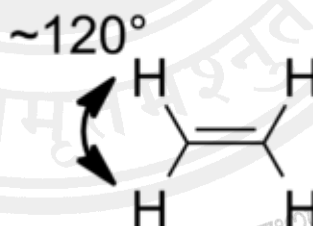
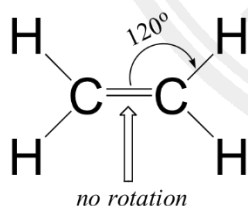
Propene, C_3H_6

Q 10. Give two properties to differentiate ethene from ethyne.

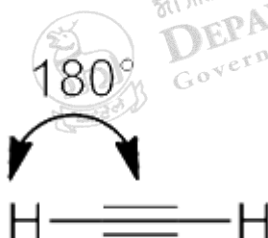
Ans: (i) In the molecule of ethene, there is a double covalent bond between the two carbon atoms and two carbon atoms are surrounded by four hydrogen atoms .

In the molecule of ethyne, there is a triple bond between two carbon atoms and the two carbon atoms are surrounded by only two hydrogen atoms.

(ii) The structure of ethene has bent shape whose bond angles are 120° each other.



The structure of ethyne is linear (straight molecule) whose bond angle is 180° .





Q11. Three jars contain C_2H_6 , C_2H_4 and C_3H_8 separately. How will you identify the jar containing C_2H_4 ?

Ans :- Bromine water test:-

Orange red colour of the bromine water will be discharged in the jar containing C_2H_4

When 1 or 2 drops of $Br(aq)$ are added to each jar.

Q12. There are two jars containing ethane and ethene separately. How will you identify the two jars? Give equation in support of your answer.

Ans:- Bromine water test:-

Orange red colour of the bromine water will be discharged in the jar containing C_2H_4

When 1 or 2 drops of $Br(aq)$ are added to each jar.

Equation: $CH_2 = CH_2 + Br_2(aq) \rightarrow CH_2Br - CH_2Br$

1, 2 – dibromo ethane (colourless).

Q13. Give IUPAC name of the compound CH_3CH_2COOH .

Ans:- Propanoic Acid .

Q14. A compound B, formed by replacement of two hydrogen atoms of methane by a Methyl ($-CH_3$) and hydroxyl group reacts with conc. H_2SO_4 at $170^\circ C$ to give compound C . The compound C decolorizes bromine water. Identify the compound B and C and also give reason for the decolourization of the bromine water.

Ans: B $\rightarrow CH_3CH_2OH$ (C_2H_5OH) Ethanol / Ethyl alcohol.

C $\rightarrow CH_2 = CH_2$ Ethene / Ethylene

Bromine from bromine water adds across the double bond of ethene and decolourises the solution.

$CH_2 = CH_2 + Br_2(aq) \rightarrow CH_2Br - CH_2Br$ 1, 2 – Dibromo ethane.

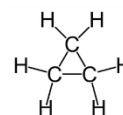
Q15. Name the reaction used for preparing vegetable ghee from vegetable oil.

Ans:- Hydrogenation reaction.

Q16. Give an example of structural isomers.

Ans:- Propene $CH_3 - CH = CH_2$

Cyclopropane.



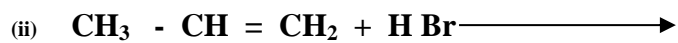
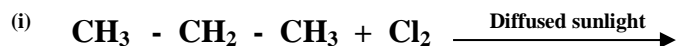


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Q17. Write the structure of the products for the following -

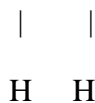
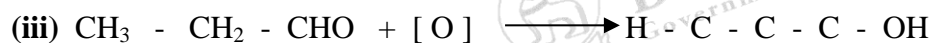
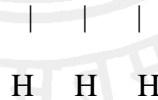
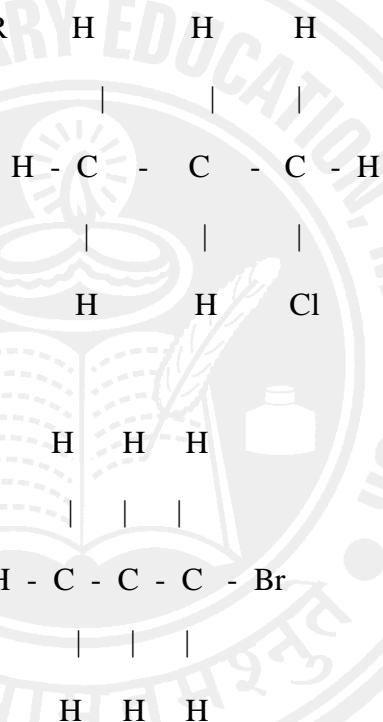


Ans:

Diffused Sunlight



OR

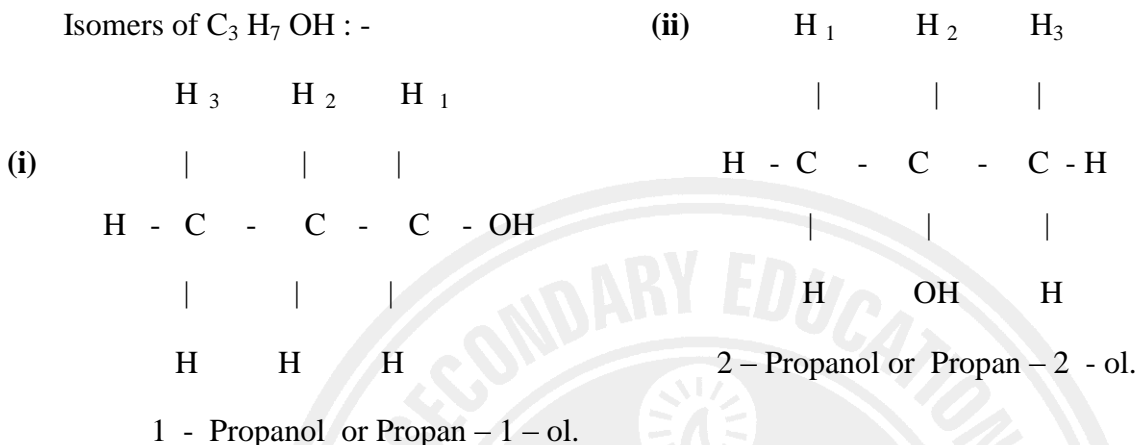




Q 18. Give the general formula of alcohol. Write the isomers of C_3H_7OH and name them. How does ethanol react (i) Sodium metal and (ii) conc. H_2SO_4 at $170^\circ C$. Write the relevant chemical equation.

Ans : - General formula of alcohol $\rightarrow C_n H_{2n+1} OH$.

Isomers of $C_3 H_7 OH$: -



The relevant chemical equations:



Sodium Ethoxide

Conc. H_2SO_4

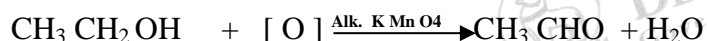


$170^\circ C$

Ethene

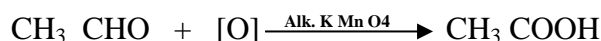
Q19. Aqueous solution of an organic compound 'A' having molecular formula $C_2 H_4 O_2$ turns blue litmus red. The compound is obtained by complete oxidation of ethanol with alkaline $K Mn O_4$ solution. When the compound A is heated with ethanol in presence of a little conc. $H_2 SO_4$ a sweet smelling substance 'B' is produced. What are the compounds 'A' and 'B'? Write chemical equations representing the formation of 'A' and 'B' as stated above.

Ans: 'A' is Acetic (or Ethanoic) acid and B is Ethyl Acetate (or Ethyl Ethanoate) ester.



Ethanol

Ethanal.



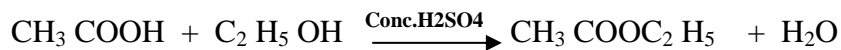
(A) Acetic (Ethanoic) Acid.



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Acetic Acid Ethyl Alcohol

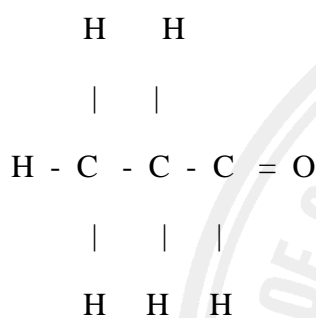
(B) Ethyl Acetate

Ethanoic Acid

Ethyl Ethanoate.

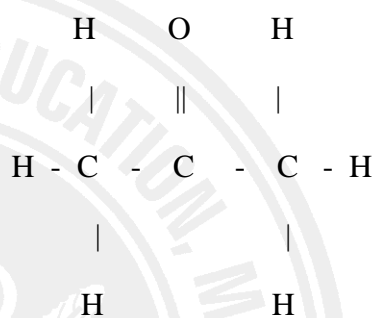
Q20. Give the IUPAC names and structural formula of an aldehyde and ketone both having the molecular formula $\text{C}_3\text{H}_6\text{O}$.

Ans. (i)



Propanal

(ii)



Propanone.

Q 21. Write reactions of the following conversions:

(i) Ethanol into Ethanoic Acid.

(ii) Propene into 1, 2 – dibromo propane.

(iii) Ethanol into ethyl ethanoate.

Ans: (i)

alk. KMnO_4

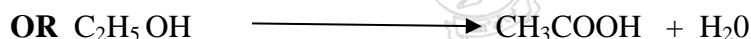


Ethanol

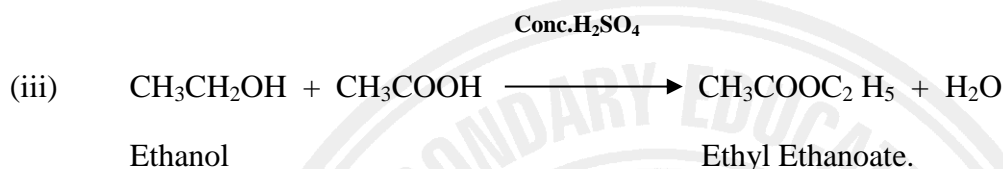
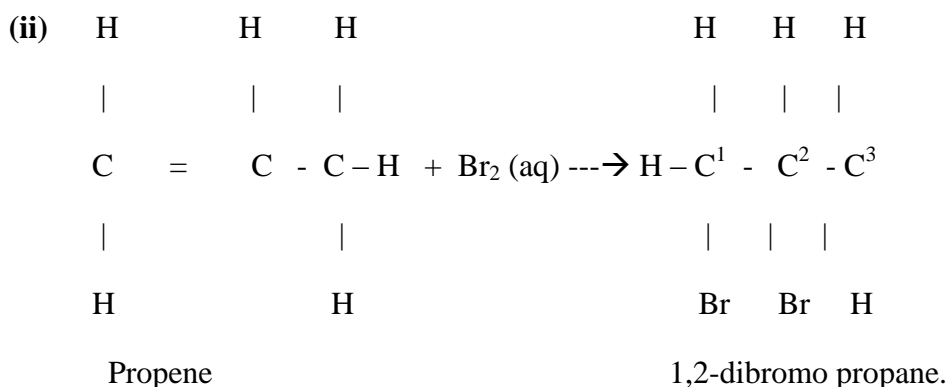
Ethanal



Ethanoic Acid.



Ethanoic Acid.



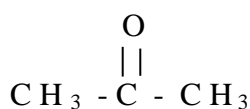
Q22. An unsaturated hydrocarbon having six hydrogen atoms on treatment with bromine water adds two atoms of bromine and forms a compound. Give the IUPAC name of the compound formed.

Ans:- 1,2- Dibromopropane .

Q23. What is homologous series ? Write the molecular formula of the lowest homologous of Ketone and Aldehyde.

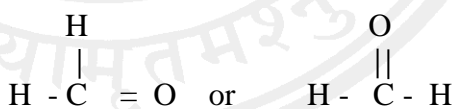
Ans:- Alkanes when arranged in order of increasing molecular mass constitute a series in which any two consecutive members (alkanes) differ by $-\text{CH}_2-$ or 14u is known as homologous series.

Lowest homologue of Ketone



Propanone

Lowest homologue of Aldehyde



Methanal

Q 24. What is homologous series ?

Ans:- Alkanes when arranged in order of increasing molecular mass constitute a series in which any two consecutive members (alkanes) differ by $-\text{CH}_2-$ or 14u is known as homologous series.

Q 25. An organic compound X with molecular formula $\text{C}_2\text{H}_4\text{O}_2$ often used as a preservative for pickles reacts with ethanol in the presence of a little conc H_2SO_4 to form a sweet smelling liquid Y. What are the substances 'X' and 'Y' ? Write chemical equation of the reaction involved.

Ans:-

'X' is Ethanoic acid / Acetic Acid, CH_3COOH



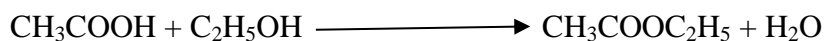
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'Y' is Ethyl Acetate $\text{CH}_3\text{COOC}_2\text{H}_5$.

Conc. H_2SO_4



Ethyl Acetate.

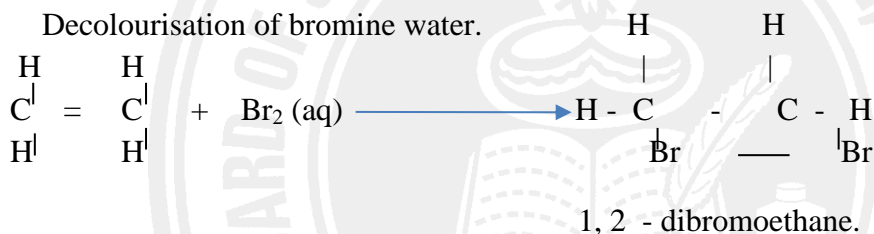
- Q 26.** An organic compound 'X' with molecular formula $\text{C}_2\text{H}_6\text{O}$ on heating with concentrated H_2SO_4 give a gaseous compound 'Y' which decolourises bromine water. What can be the compounds 'X' and 'Y'. Write the chemical equations for the conversion of 'X' to 'Y' and the decolourisation of bromine water by Y.

Ans:- Compound 'X' is ethanol ($\text{C}_2\text{H}_5\text{OH}$) and compound Y is ethene (C_2H_4).

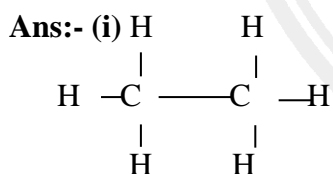
Conversion of X to Y.



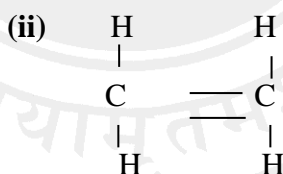
Decolourisation of bromine water.



- Q 27.** Draw the structural formula of an unsaturated and saturated hydro carbons containing at least two carbon atoms. How can they be distinguished experimentally.

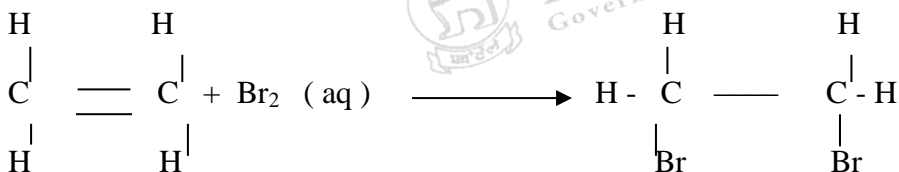


Ethane (saturated hydrocarbon).



Ethene (unsaturated hydrocarbon).

When one or two drops of bromine water are added to the Ethene, the orange red colour of bromine water will be discharged due to addition reaction.



1, 2 - dibromo ethane

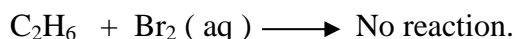


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There is no discharge of the colour of bromine water when added in the container containing ethane.



Q 28. How are the following pairs of compounds related?

(i) $\text{CH}_3\text{CHOHCH}_3$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$.

(ii) $\text{CH}_3\text{CH} = \text{CHCH}_3$ and $\text{CH}_3\text{CH} = \text{CH}_2$

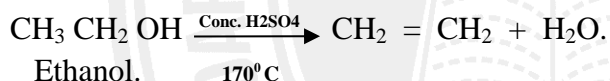
Ans:- (i) Position isomers / structural isomers.

(ii) Homologous series.

Q 29. An organic compound A on heating with concentrated H_2SO_4 at 170°C give a compound B. The compound B combines with hydrogen in the presence of nickel catalyst to form ethane. What are the compounds A and B? Write the reaction equation for the formation of compound B from A.

Ans:- Compound A is ethanol ($\text{CH}_3\text{CH}_2\text{OH}$).

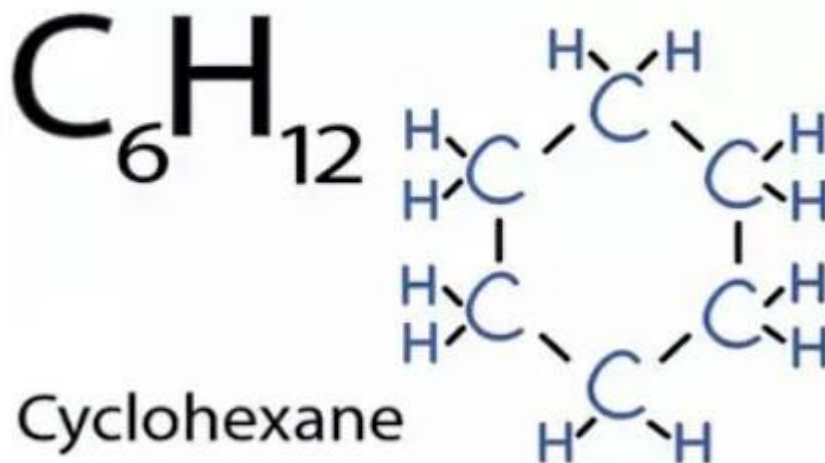
B is ethene ($\text{CH}_2 = \text{CH}_2$)



Q 30. Write the structural formula of cyclohexane.

Ans:

Here is the electron dot structure of cyclohexane:



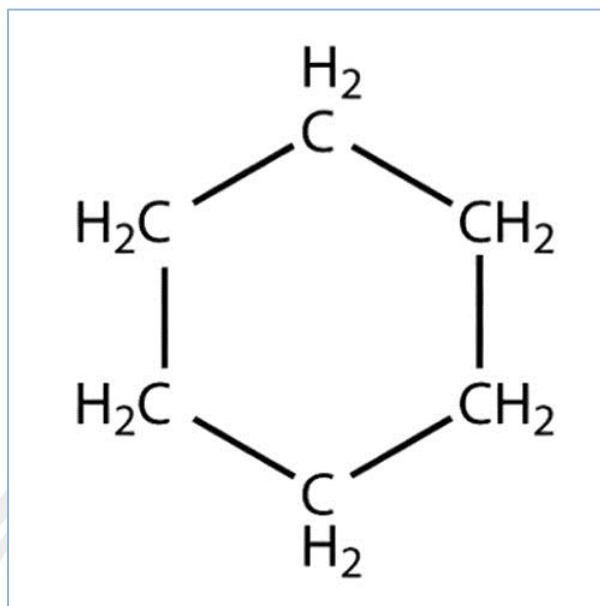
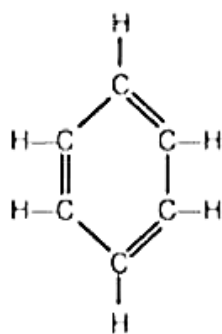
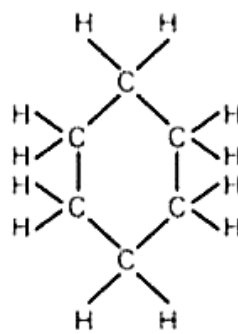


Fig. Structure of Cyclohexane

N.B. Structural difference between Benzene (C_6H_6) and Cyclohexane (C_6H_{12})



Benzene (C_6H_6)



Cyclohexane (C_6H_{12})

Fig. Diagrams showing structural difference between Benzene (C_6H_6) and Cyclohexane (C_6H_{12})

Q31. Write the formula (rule) for writing the complete name of an organic compound in IUPAC system.

Ans:-

Secondary Prefix + Primary Prefix + Word root + Primary Suffix + Secondary Suffix.



Q32. Why a person loses control over his body after drinking alcohol ?

Ans:- Alcohol has been believed to produce CNS (Central Nervous System) depression by a generalized membrane action by altering the state of membrane lipids ,therefore loses control over his body after drinking it.

