



































































11. a) Haber process.  
b) Pressure increases rate of forward reaction increases.  
c) See the notes Page No : 6
12. a) CA / AC  
b) A  
c) Rate of forward and backward reaction equal.
13. a) A-SO<sub>2</sub>  
B-H<sub>2</sub>S<sub>2</sub>O<sub>7</sub>  
b) Dissolution of SO<sub>3</sub> in H<sub>2</sub>O is an exothermic so the droplets of H<sub>2</sub>SO<sub>4</sub> formed fog preventing further dissolution  
c) Contact process  
d) See the notes
14. a) oxidising property  
b) Dehydrating agent
15. a) Cu  
b) H<sub>2</sub>SO<sub>4</sub>  
c) Cu
16. a) NaNO<sub>3</sub>  
b)  $\text{NaNO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{NaHSO}_4 + \text{HNO}_3$
17. a) Black precipitate is formed  
b) Dehydrating nature

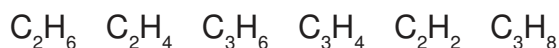
## UNIT-6

# Nomenclature of Organic Compounds and Isomerism

Organic Chemistry is the branch of chemistry that details with the carbon compounds. you have understood the position and importance of the element carbon in the periodic table. Carbon is a component in a variety of compounds. Understanding the topic, you will be able to write The Structural formula and IUPAC name of an Organic compound if its molecular formula is given and viceversa.

After realising the fact that there is a change of forming different types of compounds having the same molecular formula, the concept isomerism can be achieved important points.

- The valency of carbon is 4
  - There are compounds having single bond, double and triple bond between carbon atoms.
  - Hydrocarbons are compounds containing carbon and hydrogen only.
  - The open Chain hydrocarbons having only single bond between the carbon atoms are included in the Alkane Category
  - In alkanes, as all the 4 valencies of each carbon atom are satisfied by single bonds, they are known as saturated hydrocarbons.
  - The general formula of alkanes is  $C_n H_{2n+2}$
  - Hydrocarbons having double bond or triple bond between carbon atoms are commonly known as unsaturated hydrocarbons.
  - Hydrocarbons having a double bond between any two carbon atoms are considered as Alkenes.
  - The general formula of Alkyne is  $C_n H_{2n-2}$
  - A series of compounds which can be represented by a general formula, having a common difference of  $-CH_2-$  group between successive members is called a homologous series.
  - The members of homologous series show similarity in chemical properties. There is a regular gradation in their physical properties.
  - IUPAC has put forward some rules for naming of hydrocarbons.
  - The presence of certain atoms or groups imparts certain characteristic properties to organic compounds. They are called functional groups.
  - Compounds having same molecular formula but different chemical and physical properties are called isomers. The phenomenon is called Isomerism.
1. Some hydrocarbons are given. classify them into Alkane, Alkene, Alkyne.





2. Structural formula of some hydrocarbons are given, complete the table

Structural Formula	Molecular Formula
a. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_3$	
b. $\text{CH}_2\text{=CH-CH}_3$	
c. $\text{CH}\equiv\text{C-CH}_3$	
d. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3$	

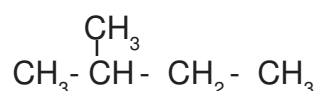
3. Certain hints about an hydrocarbon are given

- The main chain has 5 carbon atoms
  - It has no branches
  - All carbon atoms have single bonds
- a. What is the condensed formula of the compound
  - b. Write the IUPAC name of the compound

4. Complete the Table

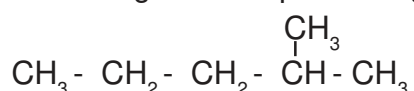
Structural Formula	IUPAC Name
a. $\text{CH}_4$	
b. $\text{CH}_3\text{-CH}_3$	
c. $\text{CH}_3\text{-CH}_2\text{-CH}_3$	
d. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_3$	
e. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3$	
f. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3$	

4. The structural formula of an organic compound is given below.



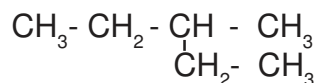
- a. How many atoms are present in the main chain of the compound?
- b. What is the position number of the carbon which contains a branch?
- c. What is the name of the branch?
- d. Write the IUPAC name of the compound.

6. The structural of an organic compound is given.



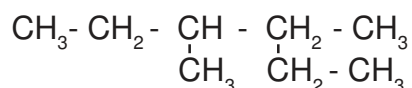
- a. How many carbon atoms are present in the main chain of the compound?
- b. What is the position number of the carbon which contains a branch?
- c. What is the name of the branch?
- d. Write the IUPAC name of the compound.

7. The structural of an organic compound is given.



- a. How many carbon atoms are present in the main chain of the compound?
- b. What is the position number of the carbon which contains a branch?
- c. What is the name of the branch?
- d. Write the IUPAC name of the compound.

8. The structural of an organic compound is given.



- a. How many carbon atoms are present in the main chain of the compound?
- b. What is the position number of the carbon which contains a branch?
- c. What is the name of the branch?
- d. Write the IUPAC name of the compound.

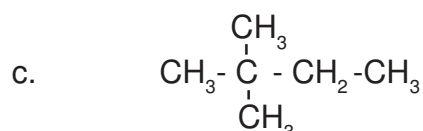
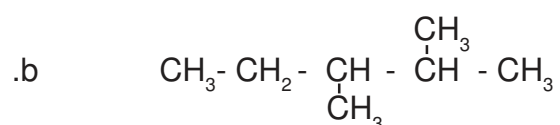
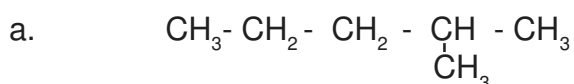
9. Write the structural formula of the hydrocarbons given below

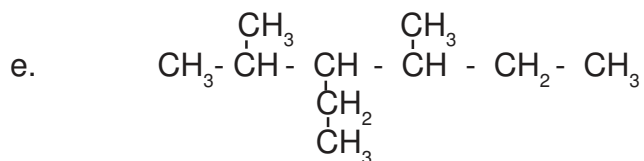
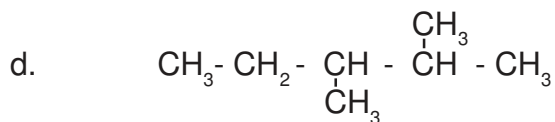
- a. 3-Methylpentane
- b. 2-Methylbutane
- c. 3-Ethylpentane
- d. 3-Ethylhexane

10. Given below are certain hints about a hydrocarbon

- a.
  - The main chain contain 5 carbon atoms
  - Second and Third carbon atoms carrying branches
  - Two branches are Methyl radical
- b. What are the position number of carbon atoms carrying the branches
- c. What are the name of the branches?
- d. Write the IUPAC name of the compound.

13. Write the IUPAC name of the hydrocarbons given below





14. Given below are certain hints about a hydrocarbon.

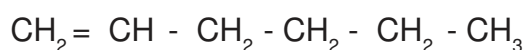
- There are 6 carbon atoms in it.
- The second carbon has a double bond.

- a. To which type of following does it belong? (Alkane, Alkene, Alkyne)
- b. Write the structural formula of the compound
- c. Write the IUPAC name of the compound.

15. Complete the Table

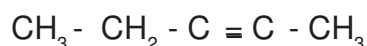
	Structural Formula	IUPAC Name
a.	_____ (a) _____	But-2-ene
b.	$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 = \text{CH}_2$	_____ (b) _____
c.	_____ (c) _____	Hex-3-ene
d.	_____ (d) _____	Pent-2-ene

16. The Structural formula of a hydrocarbon is given below



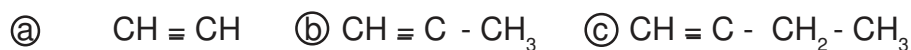
- a. Write the IUPAC name of the compound.
- b. What is the IUPAC name of this hydrocarbon when the double bond changes in to between second and third atom.

17. The Structural formula of a hydrocarbon is given below



- a. To which type of hydrocarbon does it belong? (Alkane, Alkene, Alkyne)
- b. Write the molecular formula of the compound
- c. Write the IUPAC name of the compound.

18. Write the IUPAC name



19. Given below are certain hints about a hydrocarbon.
- There are 5 carbon atoms in it.
  - There is a triple bond at the second carbon atom
- a. To which type of hydrocarbon does it belong? (Alkane, Alkene, Alkyne)
  - b. Write the structural formula of the compound
  - c. Write the IUPAC name of the compound.

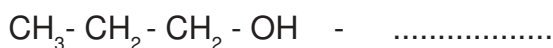
20. Complete the Table

Structural Formula	Number of carbon atom in main chain	Word Root	Position number of branch carrying carbon atom	Number of branch	IUPAC Name
1. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \overset{\text{CH}_3}{\underset{ }{\text{CH}}} - \text{CH}_3$	<u>  a  </u>	<u>  b  </u>	<u>  c  </u>	<u>  d  </u>	<u>  e  </u>
2. $\text{CH}_3 - \underset{\text{CH}_2 - \text{CH}_3}{\underset{ }{\text{CH}}} - \text{CH}_2 - \text{CH}_3$	<u>  f  </u>	<u>  g  </u>	<u>  h  </u>	<u>  i  </u>	<u>  j  </u>
3. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \underset{\text{CH}_2}{\underset{\text{CH}_3}{\underset{ }{\text{CH}}}} - \text{CH}_2 - \text{CH}_3$	<u>  k  </u>	<u>  l  </u>	<u>  m  </u>	<u>  n  </u>	<u>  o  </u>

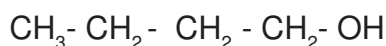
### Functional Groups

Carbon and hydrogen are not the only elements present in organic compounds. There are other atoms and groups of atoms present in the place of hydrocarbons. The presence of these atoms or groups imparts certain characteristic properties of organic compounds. They are called functional groups.

21. Fill in the blanks as given in the example.

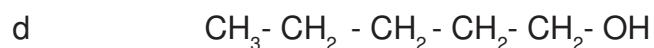
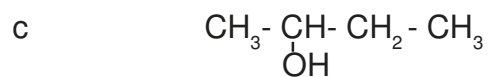
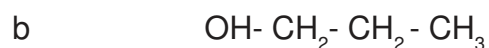
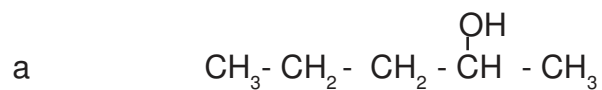


22. The structural formula of an organic compound is given below.

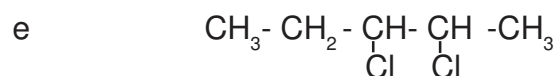
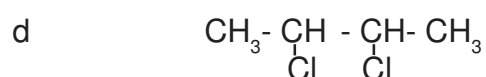
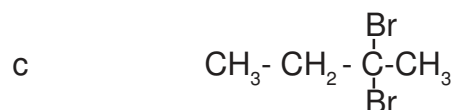
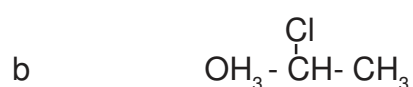
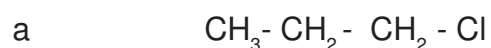


- a. Name of functional group of the compound?
- b. What is the common name of the compounds having this functional group?
- c. Write the IUPAC name of this compound.

23. Write the IUPAC name of the following compounds.



24. Write the IUPAC name of the following compounds.



25. Write the structural formula of the compounds is given below.

a. 2-Bromopentane

b. Dichlorobutane

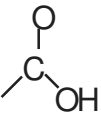
26. Complete the Table

Structural Formula	IUPAC Name
HCOOH	Methanoic Acid
$\text{CH}_3 - \text{COOH}$	<u>        </u> (a)
<u>        </u> (b)	Propanoic Acid
$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$	<u>        </u> (c)

27. Complete the Table

Structural Formula	IUPAC Name
$\text{CH}_3\text{-O-CH}_2\text{-CH}_3$	_____ (a) _____
_____ (b) _____	Ethoxyethane
$\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-O-CH}_3$	_____ (c) _____
_____ (d) _____	Ethoxypropane
$\text{CH}_3\text{-CH}_2\text{-O-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3$	_____ (e) _____

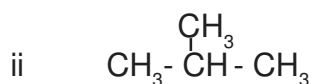
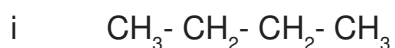
28. Complete the Table

Functional Group	Name of Functional Group
- OH	----- (a)
	----- (b)
- O - R	Alkoxy group

29. Write the structural formula of the compounds  $\text{CH}_4\text{H}_8$ . Write down the structural formula of one of its isomers which is an alicyclic compound Isomerism.

Compounds having same molecular formula, but different chemical and physical properties are called Isomers. Phenomenon is called Isomers.

30. Examine the two hydrocarbons given below.



- Write the molecular formula of the compound
- Write the IUPAC name of the compound
- What is the difference between these two compounds?
- What is the phenomenon known as?

31. Given below are certain hints about a hydrocarbon.

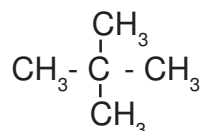
- The molecular formula of the compound is  $\text{C}_5\text{H}_{12}$
- Has a methyl radical as branch

- a. Write the IUPAC name of the compound
- b. Write the structural formula of two possible Isomers of this compound and write their IUPAC names

32. Given below are certain hints about a organic compound

- The molecular formula of the compound is  $C_3H_8O$
  - Has a hydroxil (-OH) group
- a. Write the structural formula and IUPAC names of the position Isomers of this compound.

33. The Structural formula of a hydrocarbon is given below.

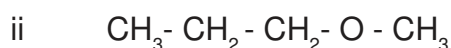
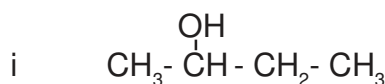


- a. Write the IUPAC name of the compound
- b. Write the structural formula of any one Isomers of the compound.
- c. What type of isomerism is shown by these compounds.

34. Given below are certain hints about an organic compound.

- Molecular formula is  $C_3H_8O$
  - This organic compound is an ether
- Write the structural formula and IUPAC names of functional Isomers of this compound.

35. The Structural formula of two organic compound are given.



- a. Write the IUPAC name of these two compounds.
- b. Write one similarity and one difference between these two compounds.
- c. What is this phenomenon known as.

36. Complete the Table.

Structural Formula	Molecular Formula	Functional Group	Functional Isomer of given Compound
$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{O} - \text{CH}_3$	<u>    a    </u>	<u>    b    </u>	<u>    c    </u>
$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH}$	<u>    d    </u>	<u>    e    </u>	<u>    f    </u>

## Cyclic or Ring Compound.

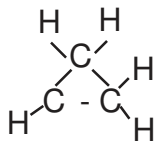
Cyclic and Ring Compounds are classified in to two.

- Alicyclic compounds
- Aromatic compounds

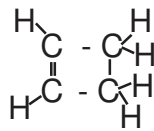
## Alicyclic Hydrocarbon

Alicyclic Hydrocarbon are cyclic Hydrocarbon similar to alkane, alkene and alkyne.

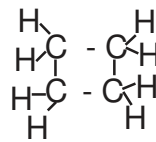
eg:



Cyclopropane



Cyclobutene

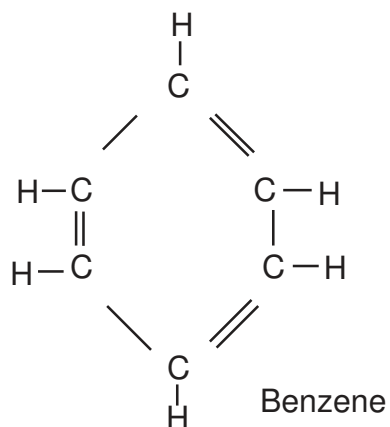


Cyclobutane

## Aromatic Hydrocarbon

Aromatic compounds are having their own aroma.

eg:



Benzene



## Answer Key

- 1.
- | Alkane   | Alkene   | Alkyne   |
|----------|----------|----------|
| $C_2H_6$ | $C_2H_4$ | $C_2H_2$ |
| $C_3H_8$ | $C_3H_6$ | $C_3H_4$ |
2. a)  $C_4H_{10}$ ,      b)  $C_3H_6$       c)  $C_3H_4$       d)  $C_5H_{12}$
3. a.  $CH_3 - CH_2 - CH_2 - CH_2 - CH_3$   
b. Pentane
4. a) Methane      b) Ethane      c) Propane      d) Butane  
e) Petane      f) Hexane
5. a) 4      b) 2      c) Methyl      d) 2-Methylbutane
6. a) 5      b) 2      c) Methyl      d) 2-Methylpentane
7. a) 5      b) 3      c) Methyl      d) 3-Methylpentane
8. a) 6      b) 3      c) Ethyl      d) 3-Ethylhexane
- 9.
- a.  $CH_3 - CH_2 - \underset{\substack{| \\ CH_3}}{CH} - CH_2 - CH_3$
- b.  $CH_3 - \underset{\substack{| \\ CH_3}}{CH} - CH_2 - CH_3$
- c.  $CH_3 - CH_2 - \underset{\substack{| \\ CH_2 \\ | \\ CH_3}}{CH} - CH_2 - CH_3$
- d.  $CH_3 - CH_2 - \underset{\substack{| \\ CH_2 \\ | \\ CH_3}}{CH} - CH_2 - CH_2 - CH_3$
- 10.
- a.  $CH_3 - \underset{\substack{| \\ CH_3}}{CH} - \underset{\substack{| \\ CH_3}}{CH} - CH_2 - CH_3$
- b. 2, 3-Dimethylpentane
11. a. 3, 4  
b. 3, 4-Dimethylpentane

- 12 a) 3, b). 2, 2, c) Methyl, d) 2, 2-Dimethylpropane
13. a) 2-Methylpentane  
 b) 2, 3-Dimethylpentane  
 c) 2, 2-Dimethylbutane  
 d) 3-Ethyl-2, 4 - Dimethylhexane
14. a) Alkene  
 b)  $\text{CH}_3\text{-CH}=\text{CH-CH}_2\text{-CH}_3$   
 c) Hex-2-ene
15. a.  $\text{CH}_3\text{-CH}=\text{CH-CH}_3$   
 b. Pent-1-ene  
 c.  $\text{CH}_3\text{-CH}_2\text{-CH}=\text{CH-CH}_2\text{-CH}_3$   
 c.  $\text{CH}_3\text{-CH}=\text{CH-CH}_2\text{-CH}_3$
16. a. Hex-1-ene  
 b. Hex-2-ene
17. a. Alkyne  
 b.  $\text{C}_5\text{H}_8$   
 c. Pent-2-yne
18. a) Ethyl b) Prop-1-yne c. But-1-yne  
 d) But-2-yne e) Hex-2-yne.
19. a) Alkyne b)  $\text{CH}_3\text{-C}=\text{C-CH}_2\text{-CH}_3$ , c) Pent-2-yne
20. a) 5 b) Pentane c) 2  
 d) Methyl e) 2-Methylpentane f) 5  
 g) pentane h) 3 i) Methyl  
 j) 3-Methylpentane k) 6 l) Hexane  
 m) 3 n) Ethyl o) Ethylhexane
- 21 Propan-1-ol
22. a. Hydroxyl  
 b. Alcohol  
 c. Butan-1-ol
23. a) Pentan-2-ol b) Propan-1-ol  
 c) Butan-2-ol d) Pentan-1-ol
24. a. 1-Chloropropane b) 2-Chloropropane  
 c. 2, 2-Dibromobutane d) 2, 3-Dichlorobutane  
 e. 2, 3-Dichloropentane
25. a.  $\text{CH}_3\text{-}\overset{\text{Br}}{\text{CH}}\text{-CH}_2\text{-CH}_2\text{-CH}_3$   
 b.  $\text{CH}_3\text{-}\underset{\text{Cl}}{\text{CH}}\text{-}\underset{\text{Cl}}{\text{CH}}\text{-CH}_3$

26. a. Ethanoic acid  
 b.  $\text{CH}_3 - \text{CH}_2 - \text{COOH}$   
 c. Butanoic acid
27. a. Methoxyethane  
 b.  $\text{CH}_3 - \text{CH}_2 - \text{O} - \text{CH}_2 - \text{CH}_3$   
 c. Methoxypropane  
 d.  $\text{CH}_3 - \text{CH}_2 - \text{O} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$   
 e. Ethoxybutane
28. a. Hydroxyl group  
 b. Carboxylic group  
 c. Alkoxy Group
29. a. 
$$\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{H}-\text{C} - \text{C}-\text{H} \\ | \quad | \\ \text{H}-\text{C} - \text{C}-\text{H} \\ | \quad | \\ \text{H} \quad \text{H} \end{array}$$
 Cychlobutane
30. a)  $\text{C}_4\text{H}_{10}$       b) i Butane      ii) 2-Methylpropane  
 c) Different Structural formulas      d) Chain Isomerism
31. a. 
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_3 \end{array}$$
  
 b.  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$       Pentane  
 c. 
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$
      2, 2-Dimethylpropane
32.  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH}$       Propan-1-ol  

$$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ | \\ \text{OH} \end{array}$$
      Propan-2-ol
33. a. 2, 2-Dimethylpropane  
 b.  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$   
 c. Chain Isomerism
34. a.  $\text{CH}_3 - \text{O} - \text{CH}_2 - \text{CH}_3$       Methoxyethane  
 b.  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH} / \begin{array}{c} \text{OH} \\ | \\ \text{CH}_3 - \text{CH} - \text{CH}_3 \end{array}$   
 Propan-1-ol / Propan-2-ol
35. a. i Butan-2-Ol      ii) Methoxyepropene  
 b. Same molecular formula, Different functional group  
 c. Functional Isomerism.
36. a.  $\text{C}_4\text{H}_{10}\text{O}$       b) Alkoxy      c)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{OH}$   
 d.  $\text{C}_4\text{H}_8\text{O}$       e) Hydroxyl      f)  $\text{CH}_3 - \text{O} - \text{CH}_2 - \text{CH}_3$

# UNIT-7

## CHEMICAL REACTIONS OF ORGANIC COMPOUNDS

Substances like plastic, Medicines, Soap, Detergent, Fuels, Alcohol etc. are organic compounds used in our day to day life. These organic compounds are prepared by using different organic reactions. Let us familiarise some of the chemical reactions of organic chemistry in this unit.

### Concepts

#### Different chemical reactions of organic compounds.

- Substitution reactions
- Addition reactions
- Polymerisation
- Combustion
- Thermal cracking

#### Some Important organic compounds

- Alcohols
  - Methanol
  - Ethanol
- Carboxylic acid
  - Ethanoic acid
- Esters
- Soap and Detergent

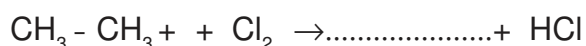
#### Substitution reactions

An atom or a group in a compound is replaced by another atom or group of atoms are called Substitution reactions.



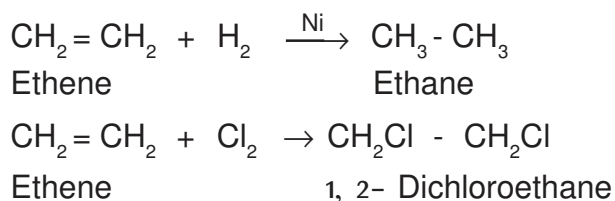
#### Activity 1

Fill in the blanks



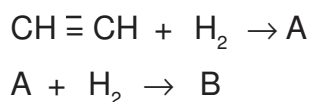
## Addition reactions

Unsaturated organic compounds with double bond or tripple bond react with  $H_2$ ,  $Cl_2$ ,  $HCl$ ,  $HBr$  etc. to form saturated hydrocarbons.



## Activity 2

The following equations represent, the addition reaction of ethyne with hydrogen. Identify the products A, B in the equation.



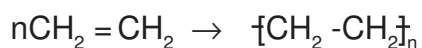
## Activity 3

Write the products in the following addition reactions

Addition Reactions	Products
a) $CH_3 - CH = CH_2 + Cl_2$	.....
b) $CH_3 - CH = CH - CH_3 + HCl$	.....

## Polymerisation

Large number of simple molecules combine together to form complex molecules.



Ethene                      Poly ethene (Polythene)

Monomer	Polymer	Uses
Ethene	Polyethene	Carrybags
Vinyl Chloride	Polyvinyl Chloride (PVC)	Pipes
Tetrafluroethene	Polytetrafluroethene (Teflon)	Non-stic Vesels
Isoprene	Polyisoprene (Natural rubber)	Tyres, Tubes

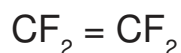
#### **Activity -4**

Simple molecules combine to form complex molecules are called polymerisation.

- Name the product obtained when Vinyl Chloride undergoes polymerisation.
- Write the chemical equation for this polymerisation reaction.

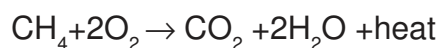
#### **Activity -5**

Write the structure of the polymer, when the following monomer undergoes polymerisation.



### **Combustion of Hydrocarbons**

Hydrocarbons combine with oxygen to form  $\text{CO}_2$ ,  $\text{H}_2\text{O}$  and heat.



Methane

Hydrocarbons are used as fuels because of the exothermic nature of the combustion process.

#### **Activity -6**

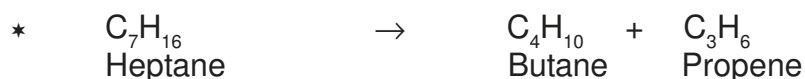
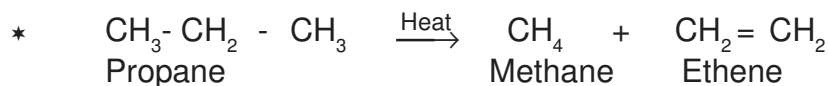
Write the balanced chemical equation for the combustion of butane ( $\text{C}_4\text{H}_{10}$ ).

## Thermal cracking

Some hydrocarbons with high molecular masses, when heated in the absence of air to form hydrocarbons with lower molecular masses.

❖ Factors that influence the products formed due to Thermal Cracking.

- Nature of the hydrocarbons
- Temperature
- Pressure.



### Activity -7

Thermal cracking helps to control pollution. Explain with example.

## Some Important Organic Compounds

### ● Alcohols

**Function group is -OH**

#### \* Methanol (CH<sub>3</sub>OH)

**Industrial Preparation:** Carbon monoxide treated with hydrogen in the presence of a catalyst at high temperature and pressure.

**Uses :**

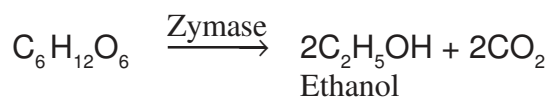
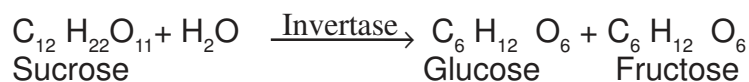
- Solvent in the manufacture of paint.
- manufacture of varnish and formalin

#### \* Ethanol (CH<sub>3</sub>-CH<sub>2</sub>-OH)

**Uses :**

- Fuel
- Beverage
- Preservative
- Solvent for medicins.

**Industrial Preparation :** Fermenting diluted molasses by adding yeast.







## Activity -10

Esters have the pleasant smell of fruits and flowers.

- Which are the reactants used for the preparation of propylethanoate ester?
- Write the chemical equation for this esterification reaction.

### ● Soap

- Fatty acids (palmitic acid, stearic acid, oleic acid) combines with glycerol to form oils and fats.
- Soap is the salt formed when oils and fats react with alkalies (Sodium hydroxide and Potassium hydroxide).

## Activity -11

How does soap remove dirt?

### ● Detergent

- Detergents are salt of sulphonic acid.
- Detergents are made from hydrocarbons obtained from coal and petroleum.

## Activity -12

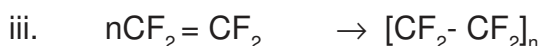
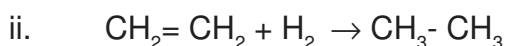
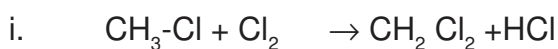
- Write the differences between soap and detergent.

## Model Questions

- Match Suitably

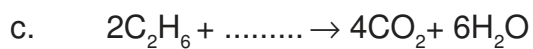
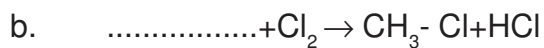
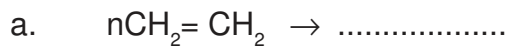
A reactants	B Products	C Name of the reaction
$\text{CH}_3\text{-CH}_2\text{-CH}_3$	$\text{CO}_2 + \text{H}_2\text{O}$	Substitution reaction
$\text{CH}_3\text{-CH=CH}_2 + \text{H}_2$	$\text{CH}_4 + \text{C}_2\text{H}_4$	Combustion
$\text{CH}_3\text{-CH}_2\text{-CH}_3 + \text{Cl}_2$	$\text{CH}_3\text{-CH}_2\text{-CH}_3$	Thermal cracking
$\text{CH}_3\text{-CH}_2\text{-CH}_3 + \text{O}_2$	$\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-Cl} + \text{HCl}$	Addition reaction

- Some reactions of hydrocarbons are given below

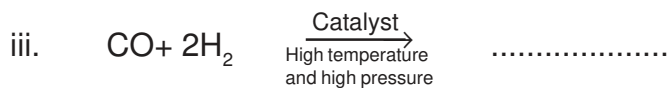
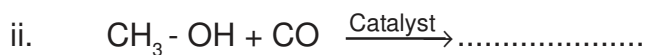
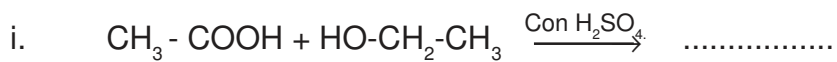


- Name the reaction when chloro methane is converted to dichloro methane.
- Identify the unsaturated compound in the (ii) reaction.
- Which polymer is used for coating on the inner surface of non-stick cookware?

3. Some reactions related to hydrocarbons are given below. Complete the equation.



4. Write the products formed in the following chemical reactions



5. Excessive use of the detergents cause environmental problems. Justify.

## Answer Key

1.  $\text{CH}_3\text{CH}_2\text{Cl}$
2. A.  $\text{CH}_2=\text{CH}_2$       B)  $\text{CH}_3-\text{CH}_3$     c.  $\text{CH}_3-\text{CH}_3$
3. a.  $\text{CH}_3-\text{CHCl}-\text{CH}_2\text{Cl}$   
b.  $\text{CH}_3-\text{CH}_2-\text{CHCl}-\text{CH}_3$
4. a. Polyvinyl Chloride  
b.  $n\text{CH}_2=\text{CHCl} \rightarrow \left\{ \text{CH}_2-\underset{\text{Cl}}{\text{CH}} \right\}_n$
5.  $\left\{ \text{CF}_2-\text{CF}_2 \right\}_n$
6.  $2\text{C}_4\text{H}_{10} + 13\text{O}_2 \rightarrow 8\text{CO}_2 + 10\text{H}_2\text{O}$
7. Plastic wastes can be converted to simpler molecules by thermal cracking.
8. Wood Spirit
9. a) Invertase, Zymase  
b) Fractional distillation
10. a) Propanol, Ethanoic acid  
b)  $\text{CH}_3\text{COOH} + \text{HO}-\text{CH}_2-\text{CH}_2-\text{CH}_3 \rightarrow \text{CH}_3-\text{COOCH}_2-\text{CH}_2-\text{CH}_3 + \text{H}_2\text{O}$
11. Non polar end of soap dissolves in oils. Polar end dissolves in water. Soap decreases the surface tension of water. Soap Molecules acts as a link between water and dirt

12.	Soap	Detergent
	<ul style="list-style-type: none"><li>● Salt of fattyacids</li><li>● Not lather in hard water</li><li>● Not causes environmental problems</li></ul>	<ul style="list-style-type: none"><li>● Salt of sulphonic acid</li><li>● Lather in hard water</li><li>● causes environmental problems</li></ul>

Model Questions : Answer Key

1	Reactants	Products	Name of the reaction
	$\text{CH}_3 - \text{CH}_2 - \text{CH}_3$	$\text{CH}_4 + \text{C}_2\text{H}_4$	Thermal cracking
	$\text{CH}_3 - \text{CH} = \text{CH}_2 + \text{H}_2$	$\text{CH}_3 - \text{CH}_2 - \text{CH}_3$	Addition reaction
	$\text{CH}_3 - \text{CH}_2 - \text{CH}_3 + \text{Cl}_2$	$\text{CH}_3 - \text{CH}_2 - \text{CH}_2\text{-Cl} + \text{HCl}$	Substitution reaction
	$\text{CH}_3 - \text{CH}_2 - \text{CH}_3 + \text{O}_2$	$\text{CO}_2 + \text{H}_2\text{O}$	Combustion

2. a) Substitution reaction  
 b) Ethene ( $\text{CH}_2 = \text{CH}_2$ )  
 c. Teflon  $\{ \text{CF}_2 - \text{CF}_2 \}_n$
3. a.  $\{ \text{CH}_2 - \text{CH}_2 \}$   
 b.  $\text{CH}_4$   
 c.  $7 \text{O}_2$
4. i.  $\text{CH}_3 - \text{COOCH}_2 - \text{CH}_3$   
 ii.  $\text{CH}_3 - \text{COOH}$   
 iii.  $\text{CH}_3 - \text{OH}$
5. Detergents increases the growth of algae. It decreases the quantity of oxygen for the breath of organisms in water and causes their destruction.

# MODEL QUESTION PAPER

## CHEMISTRY

Time: 1.30 hours

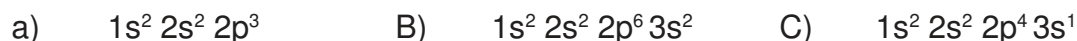
Total score : 40 Marks

### Instructions

- \* First 15 minutes is cool off time
- \* Read all questions carefully
- \* questions with scores 1,2,3 & 4 are categorised separately
- \* Five questions are given in each category. Answer any 4 questions from each category.
- \* Answer each questions by keeping time.

**Answer any four questions from 1 to 5. 1 score each (4x1=4)**

1. Find the wrong electronic configurations from the following and correct them



2. Find the number of water molecules in 18 g of water.

3. The method used to separate magnetic impurities from tinstore.....

4. Which of the following is an oxidation reaction?



5. PVC is a polymer used the preparation of pipes. What is the name of its monomer?

**Answer any four questions from 6 to 10 2 score each (4x2=8)**

6. Names of some alloy steels are given in the box.

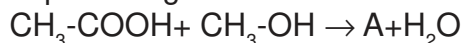
Alnico	Stainless Steel	Nichrom
--------	-----------------	---------

7. Find the number of mole atoms in the following samples and arrange them in the increasing order of number of atoms.

(hint : atomic mass : H = 1, Ca = 40)



8. See the question given

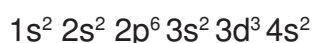


- a) Write the formula of A and complete the equation  
b) To which category of compounds does A belong?

9. The structure of a compound is  $\text{CH}_3\text{-CH=CH}_2\text{-CH}_3$

- a) To which category of hydrocarbon does this compounds belong?  
(Alkane, Alkene, Alkyne)
- b) Give the IUPAC name of the compound

10. The subshell electrone configuration of an element is



- a) What is the atomic number of this elements?
- b) To which group do this element belong?

**Answer any four questions from 11 to 15    3 score each**

**(4x3=12)**

11. Metals Mg, Zn, Fe and Cu of same size are taken in foru test tubes. Same amount of dil: HCl is added to them.

- a) Which metal reacts vigorously with dilute acid?
- b) Which gas is formed by the reaction of metals with dil : HCl acid?
- c) Which of these metals can displace Zn from  $ZnSO_4$  solution?

12. Complete the table. (Hint : atomic mass : He = 4, N = 14, O = 16)

Substance	Molecular mass	Amount taken (g)	Volume L	Number
$N_2$	28	(a)	22.4	(b)
$Cl_2$	71	(c)	(d)	$10 \times 6.00 \times 10^{23}$
$O_2$	(e)	160	(f)	$5 \times 6.022 \times 10^{23}$

13. a) Write examples for a pair of position isomers from the following compounds.

- $CH_3-O-CH_2-CH_3$
- $CH_3-O-CH_3$
- $CH_3-CH_2-CH_2-OH$
- $CH_3-\underset{\substack{| \\ OH}}{CH}-CH_3$

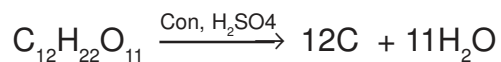
- b) Write the IUPAC name of the compound 4.
- c) Select a functional isomer of this compound from the give.

14. Some metals and solution are given in the box

$MgSO_4$ solution	$AgNO_3$ solution	$CuSO_4$ solution
KCl solution	Pb rod	Mg rod    Cu rod

- a) Select from the box the materials needed to construct a galvanic cell.
- b) Which is the anode of the cell constructed?
- c) Write the equation of the reaction taking place at the cathod of the cell.

15. A few drops of Conc.  $\text{H}_2\text{SO}_4$  are added to a little sugar crystals taken in a watch glass
- What will be the observation?
  - Analyse the equation and explain the reason



- Which property of sulphuric acid is exhibited here?

**Answer any four questions from 16 to 20 4 score each**

**(4x3=16)**

16. The electrolysis of molten NaCl is done in an electrolytic cell.
- Write is the product obtained at the cathod?
  - Write the chemical equation of the reaction taking place at the cathode.
  - If an equation solution of NaCl is electrolysed insted of molten NaCl, what products will be obtained at the anode and cathode?
17. Match Suitably

	Reactants	Products	Name of the Reaction
1.	$\text{CH}_3\text{-CH}_3\text{-Cl}_2$	$\text{CH}_3\text{=CH}_2\text{+CH}_4$	Addition Reaction
2.	$2\text{CH}_3\text{-CH}_3\text{+7O}_2$	$\text{CH}_3\text{-CH}_3$	Substitution Reaction
3.	$\text{CH}_2\text{=CH}_2\text{+H}_2$	$4\text{CO}_2\text{+ 6H}_2\text{O}$	Thermal cracking
4.	$\text{CH}_3\text{-CH}_2\text{-CH}_3$	$\text{CH}_3\text{-CH}_2\text{-Cl+HCl}$	Combustion

18. A glass rod dipped in con HCl is shown in a gas jar filled with ammonia.
- Write the observation
  - Sulphuric acid is not used to dry the ammonia gas. Why?
  - A System at equilibrium is given.
- $$\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightleftharpoons 2\text{NH}_{3(g)} + \text{heat}$$
19. The main chain of hydrocarbon is given  
C - C - C - C
- Complete the structurle formula.
  - Write the IUPAC name of this compound.
  - Write the IUPAC name of the compound obtained by adding a-COOH group in the first carbon atom of this compound.
20. Analyse the given subshell electronic configuration and answer the question
- A- $1s^2 2s^2 2p^6$   
 B- $1s^2 2s^2 2p^6 3s^2 3p^4$   
 C- $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2$   
 D- $1s^2 2s^2 2p^6 3s^2$
- Which among these elements shows -2 oxidation number?
  - Which is the element that does not take part in chemical reaction?
  - Which element shows different oxidation states?
  - Which among the given elements shows the lowest ionisation energy?