ORGANIC CHEMISTRY –
SOME BASIC PRINCIPLES & TECHNIQUES


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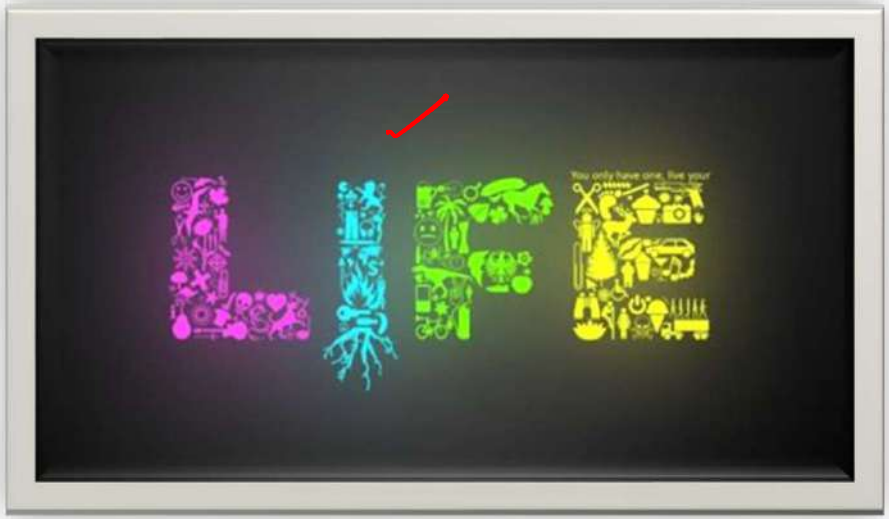
An Initiative by अमर उजाला

INTRODUCTION OF ORGANIC CHEMISTRY

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

ORGANIC



What does the word 'organic' means ?

Organic compounds are derived from living organisms.

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

ORGANIC CHEMISTRY

It is the study of compounds extracted from living organisms.

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Organic Compounds → **Contains carbon**

↓

It shows catenation.
(Ability of carbon atoms to combine, forming long chains)

Organic Chemistry

↓

Carbon Chemistry

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Introduction

What are organic compounds ?

Compounds which contain carbon

Organic compounds	Inorganic compounds
CH_4	NaCl
$C_6H_{12}O_6$	HCl
C_2H_5OH	H_2SO_4
	NaOH
	CO_2
	CO
	Na_2CO_3
	$NaHCO_3$
	NH_4CNO

So, the correct classification of the compounds is

But ....

CO, CO_2, metal carbonates and bicarbonates, cyanates are inorganic compounds though they contains carbon, because these compounds do not follow the properties of organic compounds.

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Organic Compounds	Inorganic Compounds
Extracted from living organism e.g.- Sugar ,  Urea ,etc. 	Study of non–living organism such as Rocks,  minerals, etc. 

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

In 1815	Berzelius
	

Proposed that a vital force was responsible for the formation of organic compounds

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

In 1828	Wohler

$$NH_4CNO \xrightarrow{\Delta} H_2N-\underset{\underset{O}{\|}}{C}-NH_2$$

(ammonium cyanate) (Inorganic)

(Urea) (Organic)

Synthesized first organic compound urea from inorganic compound.

So, Vital force theory was disproved by Wohler

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

In 1845	Kolbe

Synthesized acetic acid from its elements.

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

In 1856	Berthelot
	Synthesized methane.

→ Urea → Wholer

→ CH_3COOH → Kolbe

→ CH_4 → Berthelot

→ Amino Acid → Miller

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

1. Organic compounds are extracted from…

MCQs

Answer

1) Living organisms

2) Non living organisms

3) Earth crusts

4) Sea

2. First synthesized organic compound urea was obtained from…

Answer

1) Ammonium cyanide

2) Ammonium cyanate

3) Ammonium nitrate

4) All of these

IMPORTANCE OF ORGANIC CHEMISTRY

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Importance of organic chemistry

Organic compounds are used in ……

1)	**Pharmaceutical industries**	 Medicines
2)	**Petroleum industries**	   LPG, kerosene, etc.

Importance of organic chemistry

3)	**Dye industries**	 Indigo, azo dyes, etc.
4)	**Polymer industries**	  Nylon, terylene, etc.

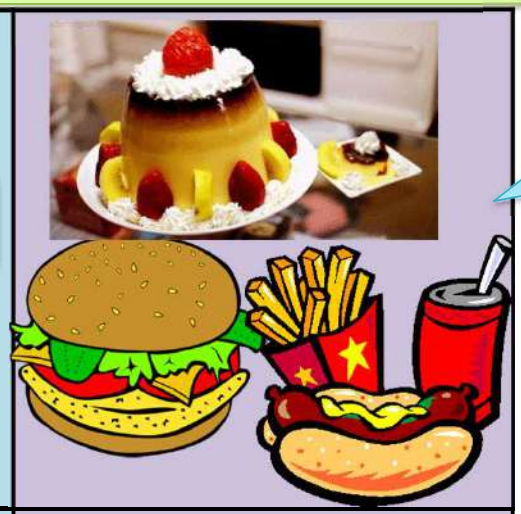
Importance of organic chemistry

5)	**Plastic industries**	
6)	**Cosmetic industries**	

Plastic bags, bottles, etc.

Perfumes, creams, talcum powders, etc.

Importance of organic chemistry

7)	**Food industries**	
8)	**Fertilizer industries** **Urea**	

Carbohydrates, fats, proteins, sweetening and flavouring agents, etc.

Importance of organic chemistry

9)	**Textile industries**	 
10)	**Soap industries**	

Nylon fibres, terylene fibres, natural and synthetic fibres, etc.

Soap products

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

- **Organic chemistry is the study of hydrocarbons and their derivatives**
- **Organic compounds are numerous in number due to**

  i) High catenation Carbon ability
  ii) Higher C-C bond dissociation energy
  iii) Carbon tetravalency.(Quadrivalency)
  iv) Compounds exhibiting isomerism.
  v) Carbon exhibiting bond multiplicity.

- **Ability of carbon atom to form long chains or rings is known as catenation.**
- **The element with highest catenation ability is carbon.**

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

- **The ability of carbon atom to form four bonds is known as tetra valency.**

- **To exhibit tetravalency carbon forms**
  - **i) All four single bonds**
  - **ii) Two double bonds**
  - **iii) One double bond, two single bonds**
  - **iv) One triple bond, one single bond**

- **Ground state electronic configuration of carbon is $1s^2\ 2s^2\ 2p^2$**

  Excited state electronic configuration of carbon is $1s^2\ 2s^1\ 2p^1_x\ 2p^1_y\ 2p^1_z$

- **For excitation, energy required is 501.6 $KJmol^{-1}$**

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Sl. no:	Hydro carbon	Hybridisation	C-C bond length	C-H bond length	Shape & Bond angle
1	Alkane	sp^3	1.54 A^o	1.09 A^o	Tetrahedral $109^o28'$
2	Alkene	sp^2	1.34 A^o	1.08 A^o	Trigonal planar 120^o
3	Alkyne	sp	1.20 A^o	1.06 A^o	Linear 180^o

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

σ and π bonds :

- σ Bond is formed by linear overlapping of atomic orbitals or hybrid orbitals.
- π Bond is formed by lateral overlapping of pure atomic orbitals.

Types of carbon and hydrogen:

- *Primary carbon (1^0 - carbon)*: Carbon is bonded to another carbon.
- *Primary hydrogen:* Hydrogen attached to primary carbon.

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

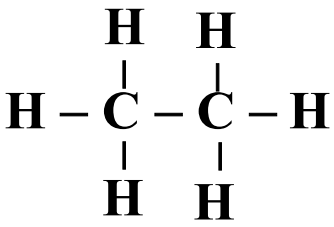
Types of carbon and hydrogen:

- ***Secondary carbon (2^0 - carbon)*: Carbon is bonded to another two carbon atoms.**
- **Secondary hydrogen is attached to secondary carbon.**
- ***Tertiary carbon (3^0 - carbon)*: Carbon is bonded to another three carbon atoms.**
- **Tertiary hydrogen is attached to tertiary carbon.**
- ***Quaternary carbon (4^0 - carbon)*: Carbon is bonded to another four carbon atoms.**

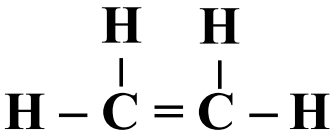
ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Structural representation of organic molecules :

1. Complete structural formula:



Ethane



Ethene

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Structural representation of organic molecules :

2. Condensed structural formula:

CH_3CH_3 $CH_2=CH_2$

Ethane *Ethene*

3. Bond line formula:

C_4H_{10} :

Butane *Cyclo butane*

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Structural representation of organic molecules :

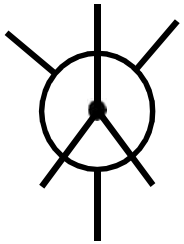
4. Three dimensional representation of organic molecules :

a. Wedge & dash formula

(Solid wedge)

(Dashed wedge)

b. Newman projections:



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MCQs

1.____was the first organic compound synthesized.

Answer

1) Acetic acid

2) Urea

3) Methane

4) Ethane

2. Urea was synthesized by _____

1) Wohler

2) Kolbe

3) Berthelot

4) Berzelius

Answer

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

3. Kolbe synthesized _____

1) Urea

2) Acetic acid ✓

3) Urotropine

4) Methane

Answer

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

4. Methane was synthesized by _____

1) Berthelot

2) Berzelius

3) Kolbe

4) Wohler

Answer

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

5. Vital force theory was put forward by _____

1) Berthelot

2) Kolbe

3) Wohler

4) Berzelius ✓

Answer

CHARACTERISTICS OF ORGANIC COMPOUNDS :

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Characteristics of organic compounds :

1)	Composition	Mainly contains carbon. It may contain H, O, S, N, X.
2)	Catenation	The ability of 'C' atoms to combine with one another to form long chains or rings.
3)	Conduction Property	Bad conductor of heat and Electricity
4)	Complexity	Most of the organic compounds form complexes

Characteristics of organic compounds :

5)	Combustibility	Most of the organic compounds are combustible i.e., reacts with O_2
6)	Melting and boiling point	Most of the organic compounds have low melting and boiling points

Characteristics of organic compounds :

7)	Isomerism	Compounds having same molecular formula but different structural formulae are called isomers and this property of organic compounds is known as isomerism.
8)	Solubility	Most of the organic compounds are insoluble in water but soluble in organic solvents.

Characteristics of organic compounds :

9)	Stability	Most of the organic compounds are less stable
10)	Multiple bonds	Carbon Can form multiple bonds, C–C, C = C, C ≡ C
11)	Linkage	Covalent linkage
12)	Polymerisation	Undergoes polymerisation for e.g. Ethene gives Polythene

Characteristics of organic compounds :

13)	Rate of reaction	Depending upon reactivity of the compounds, rate of reaction varies. Covalent organic reactions are generally slow
14)	Odour	Have characteristic odour eg. Ester → Sweet pleasant Amines → fishy.

Characteristics of organic compounds :

15)	Functional group	It is a part of the molecule or characteristic group of the molecules which largely determines properties of organic compound is called functional group e.g. –COOH (Carboxylic acid), – CHO (aldehyde), etc.
16)	Homologous series	A class of compounds in which successive members differ by $-CH_2-$ group are called homologous and the series of compounds is called homologues series. Ex: alkanes $CH_4, C_2H_6, C_3H_8, C_4H_{10}, C_5H_{12}$

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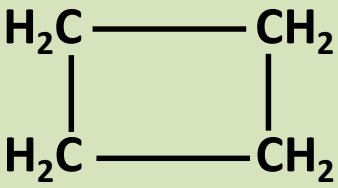
Classification of Organic compounds based on structure

$CH_3 - CH_2 - CH_2 - CH_3$	n–butane
	cyclobutane

n– butane is an open chain compound

Cyclobutane is a closed chain compound

What is the difference between this two structures ?

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Open chain compounds
(Aliphatic or Acylic Compounds)

$CH_3 - CH_2 - CH_2 - CH_3$	n–butane
$CH_3 - \underset{\displaystyle CH_3}{\underset{\vert}{CH}} - CH_3$	isobutane

n– butane is a straight chain compound

isobutane is a branched chain compound

What is the difference between this two structures ?

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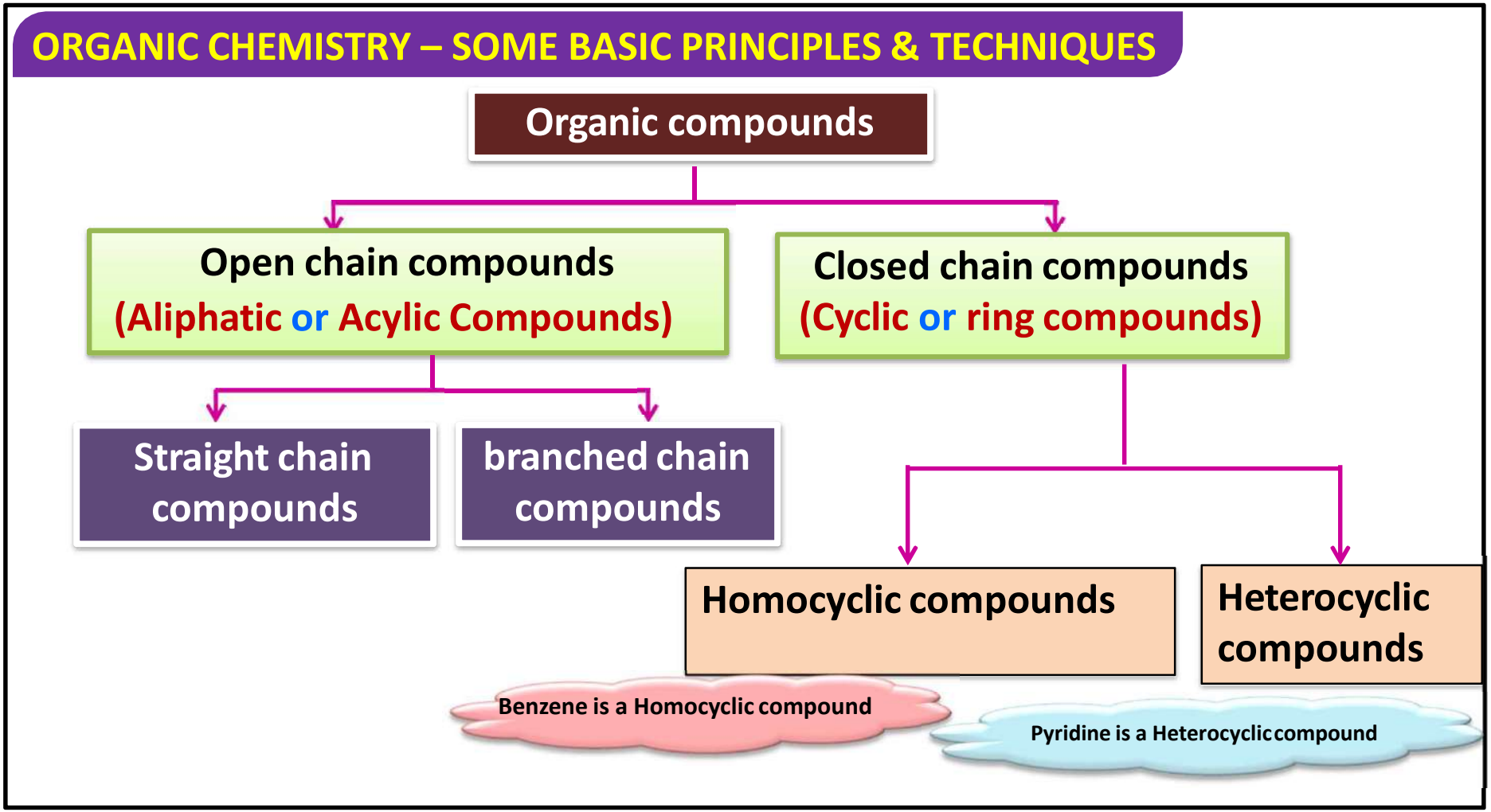

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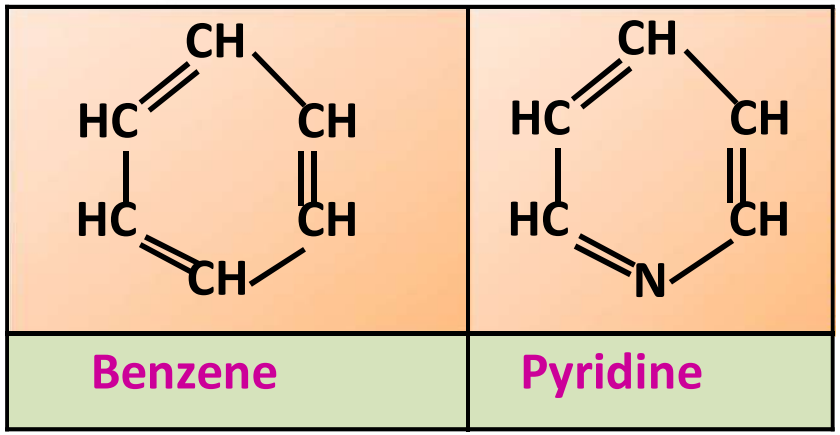
Closed chain compounds (Cyclic or ring compounds)



Compounds which include one or more hetero atoms like oxygen, nitrogen, sulphur, etc. in the ring of carbon atoms.

What is the difference between this two structures ?

Second structures has nitrogen as a hetero atom in the ring of carbon atoms.

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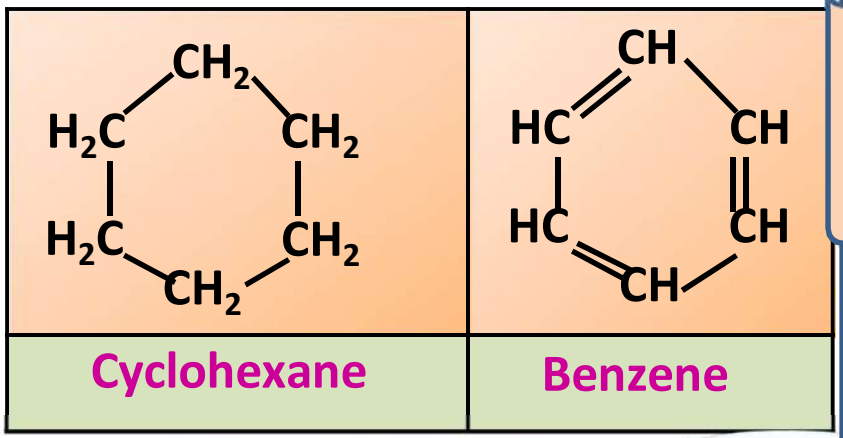
Homocyclic compounds (carbocyclic compounds)



Cyclohexane	Benzene

If homocyclic compounds contain at least one aromatic ring which **resembles benzene** in their chemical behaviour then those compounds are known as an aromatic compound

If in homocyclic compounds, carbon atoms are linked by **single bonds** only then the compounds are known as **Alicyclic compounds**

Benzene is a Aromatic compound

Cyclohexane is a Alicyclic compound

What is the difference between this two structures ?

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Homocyclic compounds

↓

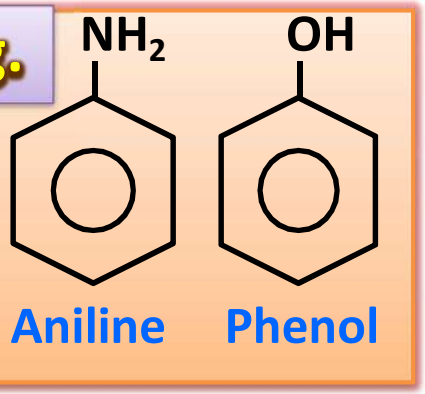
Aromatic compounds

↓

Benzenoid compounds

Contain at least one benzene ring

eg.



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Homocyclic compounds

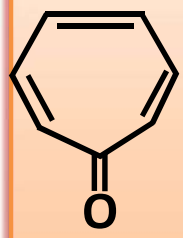
↓

Aromatic compounds

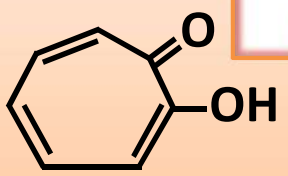
↓

Non-Benzenoid compounds

eg.



Tropone



Tropolone

Contain an aromatic ring other than benzene

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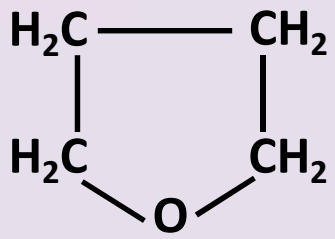
Heterocyclic compounds

Hetero - alicyclic compounds

Alicyclic compounds which contain at least one heteroatom in the ring

eg.



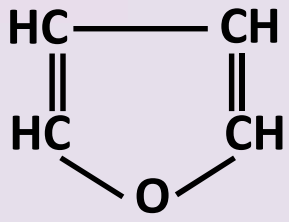
Tetrahydrofuran (THF)

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Heterocyclic compounds

Hetero - aromatic compounds

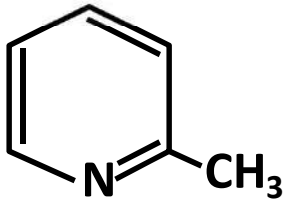
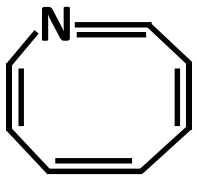
eg.



Furan

Aromatic compounds which contain at least one heteroatom in the ring

Hetero-aromatic compounds

- **Benzenoid compounds**
  - eg.
  - 
  - Picoline
- **Non-benzenoid compounds**
  - eg.
  - 
  - Azocine

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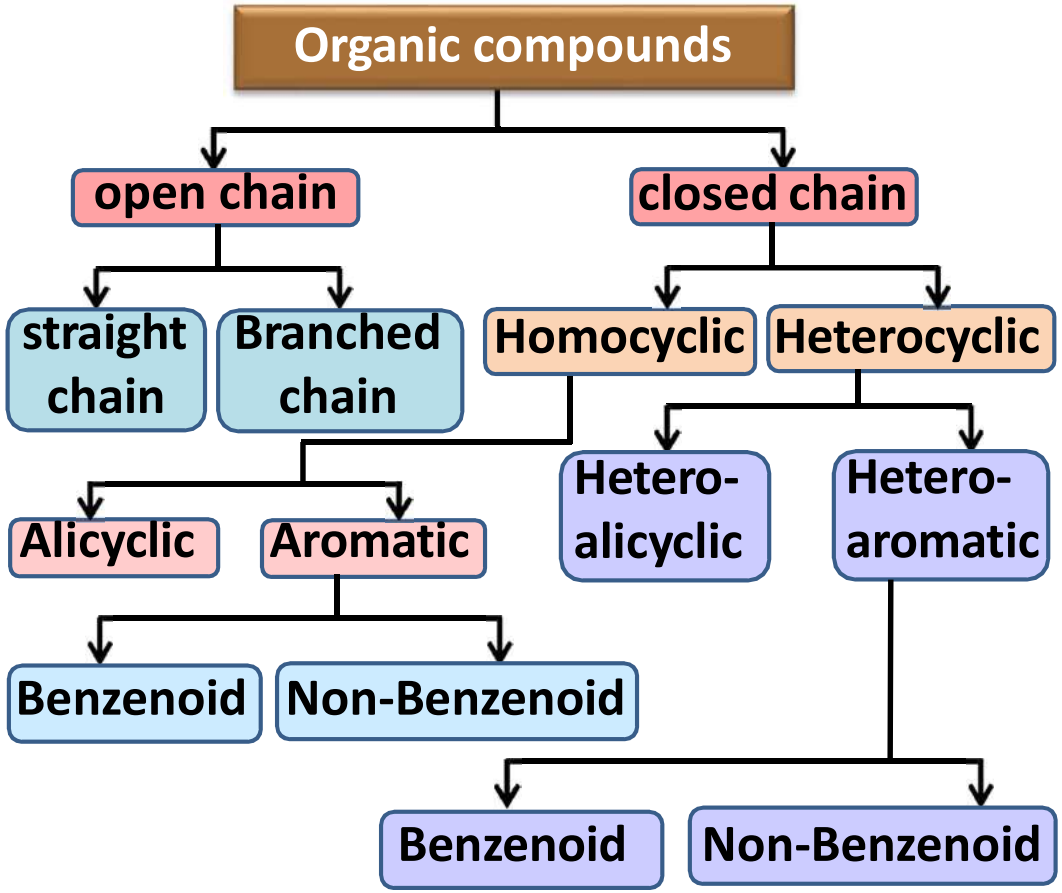


ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

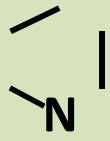
Q. Give the class of the following compounds based on their structures

No.	Structure	Name
1.	$H_3C - CH - CH_3$ CH_3	isobutane

Class of a compound
Open chain compound   ↓   Branched chain compound

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

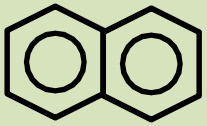
Q. Give the class of the following compounds based on their structures

No.	Structure	Name
2.		pyridine

Class of a compound
Closed chain compound ↓ Hetero-aromatic compound ↓ Benzenoid compound

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

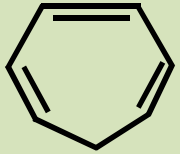
Q. Give the class of the following compounds based on their structures

No.	Structure	Name
3.		Naphthalene

Class of a compound
Closed chain compound
↓
Homocyclic compound
↓
Aromatic compound
↓
Benzenoid

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

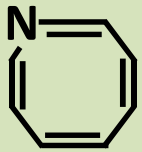
Q. Give the class of the following compounds based on their structures

No.	Structure	Name
4.	 O	Tropone

Class of a compound
Closed chain compound
↓
Homocyclic compound
↓
Aromatic compound
↓
Non- Benzenoid

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

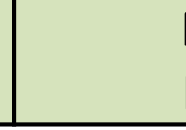
Q. Give the class of the following compounds based on their structures

No.	Structure	Name
5.		Azocine

Class of a compound
Closed chain compound ↓ Hetero-aromatic compound ↓ Non-Benzenoid

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

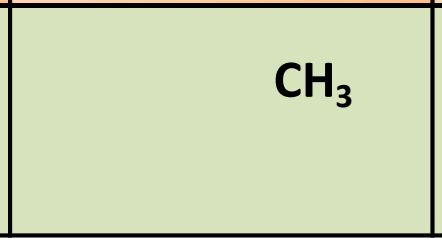
Q. Give the class of the following compounds based on their structures

No.	Structure	Name
6.		Piperidine

Class of a compound
Closed chain compound ↓ Hetero-alicyclic compound

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

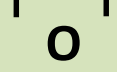
Q. Give the class of the following compounds based on their structures

No.	Structure	Name
7.		Toluene

Class of a compound
Closed chain compound ↓ Homocyclic compound ↓ Aromatic compound ↓ Benzenoid

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Q. Give the class of the following compounds based on their structures

No.	Structure	Name
8.		Furan

Class of a compound
Closed chain compound ↓ Hetero-aromatic compound

Homologous series

- **Successive members of the series differ from each other by methylene group ($-CH_2-$)**

For eg. A series of alkane

1) **$H-CH_2-H$ (Methane)**
2) **$H-CH_2-CH_2-H$ (Ethane)**
3) **$H-CH_2-CH_2-CH_2-H$ (Propane)**

Characteristics of Homologous series

1)	Homologous can be represented by the same general formula.
2)	Homologous have the same functional group.
3)	Since the successive members differ from their molecular formula by $-CH_2-$ group, they differ in molecular weight by 14 units.
4)	Homologues can be prepared by similar chemical methods.

Characteristics of Homologous series

5)	Homologues show similar chemical Properties.
6)	Homologues show gradation in physical properties such as melting point, boiling point, density, solubility, etc.

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

1. Organic compound mainly contains _____

MCQs

Answer

1) H

2) C

3) O

4) N

2. Successive members of homologous series differ from _____group

Answer

1) Methyl

2) Methine

3) Methylene

4) Nitro

3. Successive members of homologous series differ from their molecular weight by_____units

Answer

1) 12

2) 14

3) 8

4) 18

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

4. 3rd homologue of methane is _____

1) Propane

2) Ethane

3) Butane ✓

4) Pentane

Answer

5. Most of the organic compounds are soluble in _____ solvent.

Answer

1) Polar

2) Non-polar

3) Both a & b

4) None of these

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

IUPAC

NOMENCLATURE

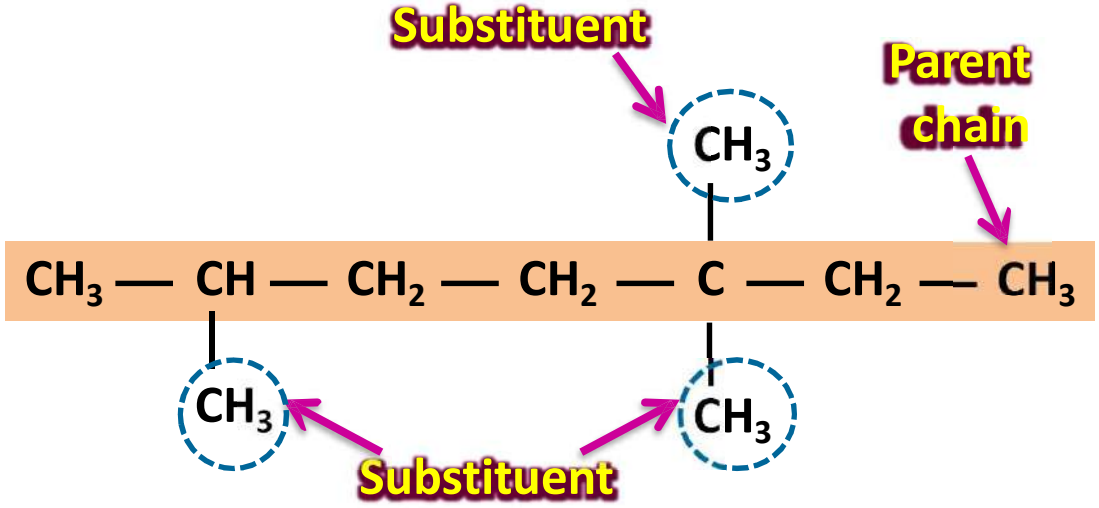
ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Rule 1

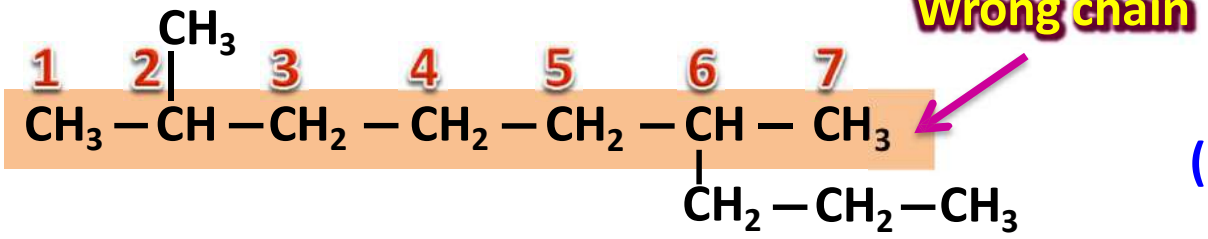
Rules

1) Longest chain rule :

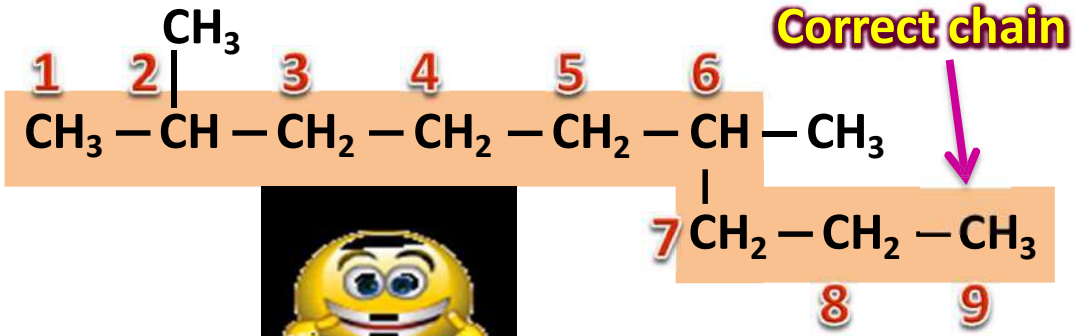
Select the longest continuous chain of carbon atoms. This is called the parent chain, carbon atoms which are not included in the parent chain are called as branched chain or substituent.



Note It may be noted that the longest chain may or may not be straight but it must be continuous.



(Contain 7 C atoms)



(Contain 9 C atoms)

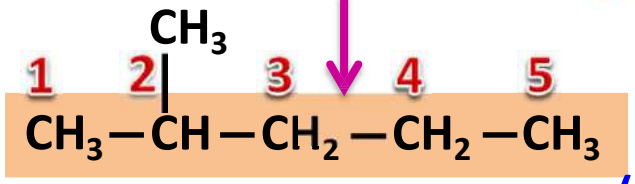
ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Rule 2

Lowest number rule :

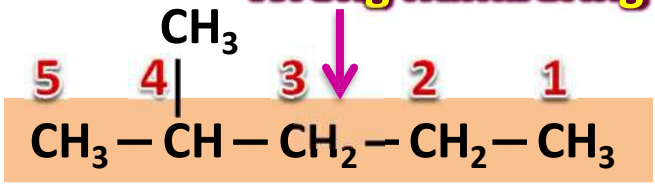
Number the carbon atoms of the parent chain as 1, 2, 3, 4 ……etc. Starting from that end which gives the lowest possible number to the carrying the substituent.

Correct numbering



(Contain 5 C atoms)

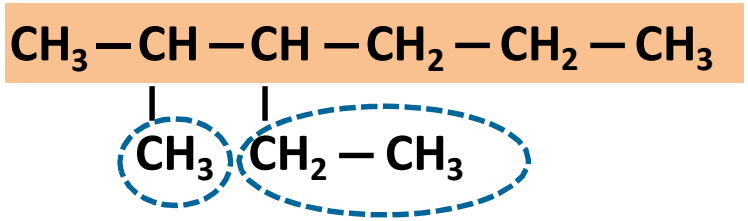
Wrong numbering



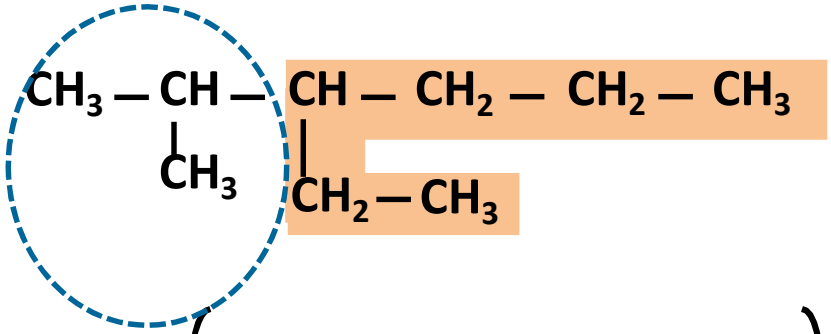
(Contain 5 C atoms)

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Rule 3 If the chains of equal length are possible, select the one with the larger number of side chains (substituent).



Contain 6 C atoms
With two alkyl substituent

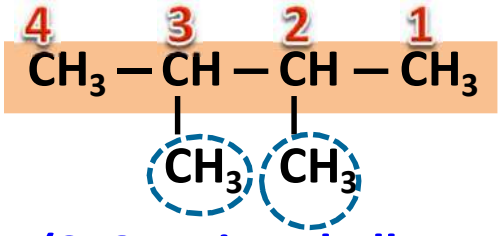


Contain 6 C atoms
With one alkyl substituent

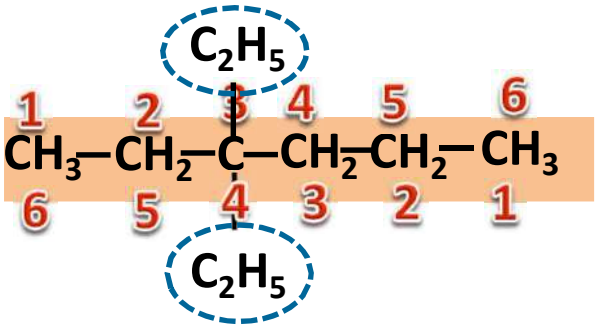
ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Rule 4

If the same substituent or side chain occurs more than once, the prefix Di (for 2), tri (for 3), tetra (for 4), penta (for 5) ……. etc., are attached to the names of the substituents.



(2, 3 – Dimethylbutane)



(3, 3 – Diethylhexane)

(3,3)
(Correct)

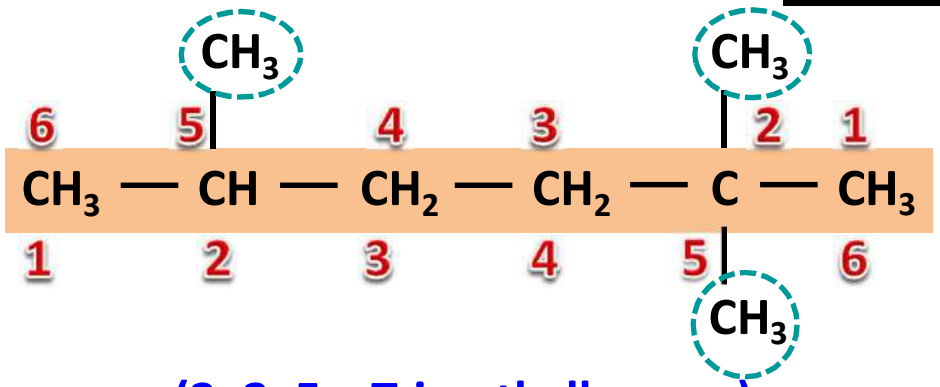
(4,4)
(Wrong)

3 + 3 = 6
4 + 4 = 8
6 < 8

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

(Correct)

(2,2,5)



(2, 2, 5 – Trimethylhexane)

(2,5,5)

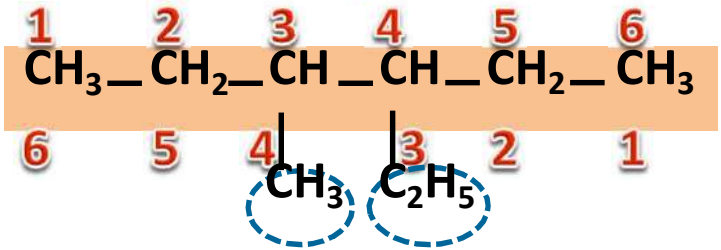
(Wrong)

2 + 2 + 5 = 9

2 + 5 + 5 = 12

9 < 12

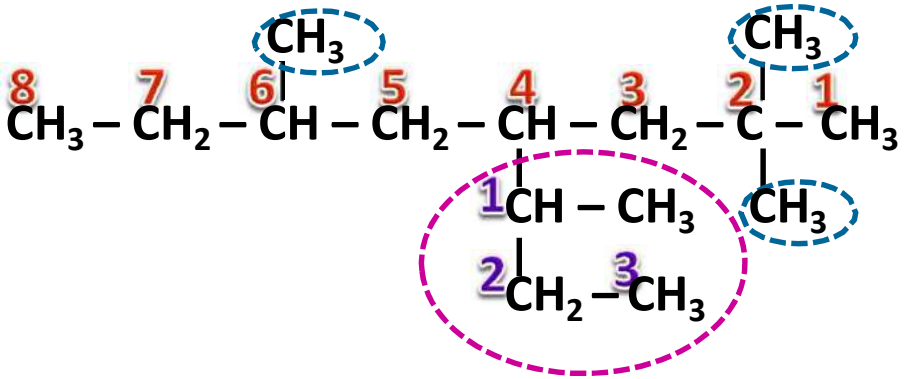
Rule 5 : If two different substituents are located at equivalent position from the two ends of the main chain, then the numbering of the chain is done insuch a way that the alkyl group which come first in alphabetical order gets the lower number.



4 – Ethyl – 3 – methylhexane (Wrong)

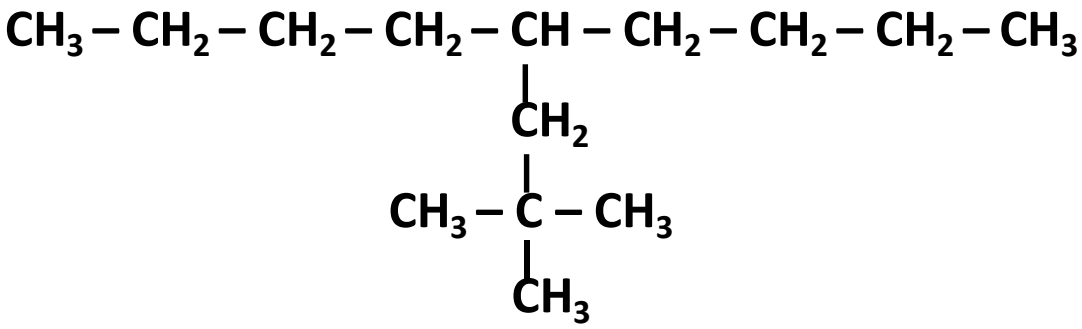
3 – Ethyl – 4 – methylhexane (Correct)

Nomanclature of complex substituents



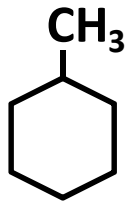
2, 2, 6 –Trimethyl–4 – (1–methylpropyl)octane

Q. Give the IUPAC name of the following compound

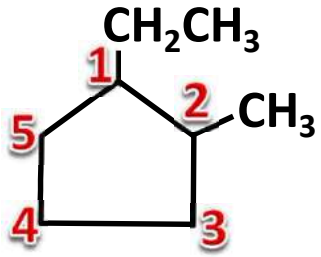


ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

IUPAC Nomanclature of alicyclic compounds



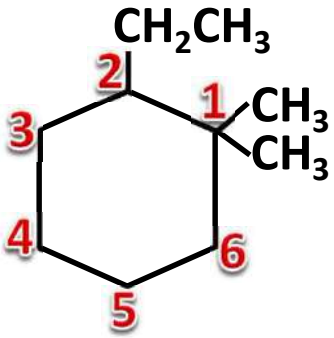
Methylcyclohexane



1–Ethyl –2–methylcyclopentane

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

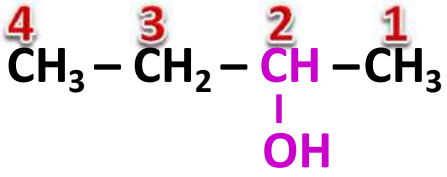
IUPAC Nomanclature of alicyclic compounds



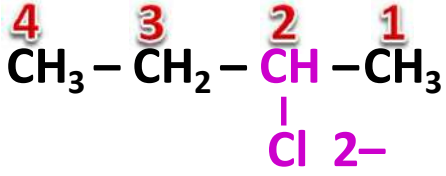
2–Ethyl–1, 1–dimethylcyclohexane

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

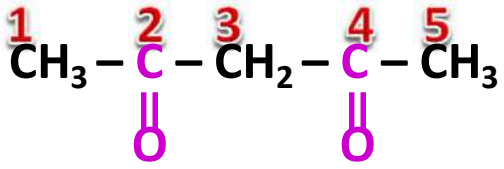
Nomenclature of organic compounds having one or more than one functional groups



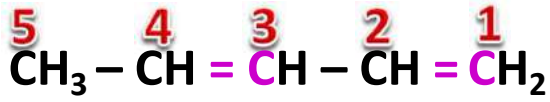
Butan–2–ol



2–Chlorobutane



Pentane– 2, 4–dione

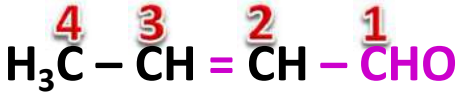


Penta– 1, 3–diene

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

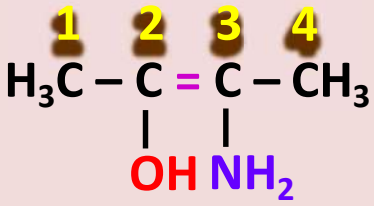
Priority for the functional groups

– COOH > – COOR > – $CONH_2$ > CN > –CHO > – CO – > – OH > –NH_2 > C = C > C ≡ C



But– 2–enal

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Structure	Name
	2–Hydroxypropanoic acid
	Pent–1–en–3–yne
	3–Aminobut–2–en–2–ol

Priority for the functional groups

$-COOH > -COOR > -CONH_2 > CN > -CHO > -CO- > -OH > -NH_2 > C=C > C\equiv C$

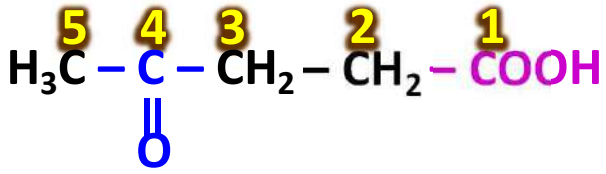
ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Priority for the functional groups

– COOH > – COOR > – $CONH_2$ > CN > –CHO > – CO – > – OH > –NH_2 > C = C > C ≡ C

Q. Give the IUPAC name of the following compounds

1)



4–Oxopentanoic acid

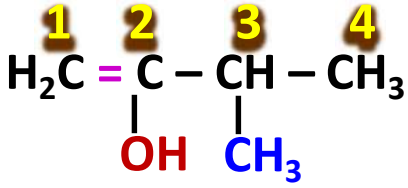
ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Priority for the functional groups

$-COOH > -COOR > -CONH_2 > CN > -CHO > -CO- > -OH > -NH_2 > C=C > C\equiv C$

Q. Give the IUPAC name of the following compounds

2)



3–Methylbut–1–en–2–ol

OBJECTIVE QUESTIONS
LEVEL-I

LEVEL - I

1) **Vital force theory was proposed by…**

1) Wohler

2) Berzelius ✔

3) Van't Hoff

4) Le bel

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

2) Vital force theory was disapproved by

1) Rutherford

2) Bohr

3) Berzelius

4) Wohler ✓

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

3) Urea was prepared first time in the laboratory by heating …

1) Ammonium cyanate

2) Ammonium cyanide

3) Ammonium cyanite

4) Ammonium isocyanide

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

4) **The first carbon compound prepared from its elements is…**

1) Urea

2) Acetic acid

3) Methane

4) Benzene

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

5) Organic compounds are numerous since

1) Carbon has high catenation ability

2) Tetravalency of carbon

3) Isomerism of organic compounds

4) All ✓

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

6) Alicyclic compounds are…. In nature

1) Aromatic

2) Aliphatic ✓

3) Both 1 and 2

4) Complexes

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

7) Heterocyclic compounds are …. in nature

1) Aliphatic

2) Aromatic

3) Aliphatic or Aromatic

4) Inorganic

8) Pyrrole is

1) An acyclic compound

2) An unsaturated aliphatic compound

3) An alicyclic compound

4) A heterocyclic aromatic compound

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

9) Pyridine is…

1) Heterocyclic compound

2) Unsaturated compound

3) Carbocyclic compound

4) Homocyclic compound

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

10) An example of alicyclic compound is…

1) Benzene

2) Hexane

3) Cyclohexane

4) Furan

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

11) An example of acyclic compound is…

1) Benzene

2) Hexane ✔

3) Cyclohexane

4) Furan

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

12) In homologous series, the consecutive members differ in structural formula by

1) CH

2) CH_3

3) CH_2 ✓

4) C_6H_6

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

13) Pick out a set of homologues…

1) C_2H_6, C_2H_4, C_2H_2, C_2H_5

2) C_6H_6, C_7H_8, C_9H_{10}, C_9H_{12}

3) CH_4, C_2H_6, C_3H_8, C_4H_{10}

4) C_2H_2, C_3H_4, C_4H_9, C_4H_{10}

14) According to Huckel's rule, a compound is said to be aromatic if it contains …

1) (4n+2) π bonds

2) (4n+2) σ bonds

3) (4n+2)C - atom

✓ 4) (4n+2) π electrons

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

15) Which of the following is alicyclic compound?

1) Cyclopentanol

2) Cyclohexane

3) Benzene

✓ 4) Both 1 and 2

16) Which of the following is an aromatic compound….

1) Phenol

2) Naphthalene

3) Pyridine

4) All ✓

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

17) Which of the following is not a heterocyclic organic compound?

1) Furan

2) Thiophene

3) Pyrrole

4) Cyclohexane ✓

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

18) Which of the following molecular formula belongs to the alkynes series?

1) C_7H_{14}

2) $C_{10}H_{22}$

3) C_9H_{16} ✓

4) $C_{16}H_{32}$

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

19) Which of the following statements is wrong?

1) In a general organic compounds have low m.pt and b.pt

2) Isomerism is common in organic compounds

3) Organic compounds cannot be synthesized in the laboratory

4) The number of organic compounds is very large

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

20) The minimum number of carbon atoms which a cycloalkane contain

1) 1

2) 2

3) 3

4) 4

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

BONDING

21) Energy required for the excitation of carbon atoms is…

1) 501.6 KJ/ mole

2) 827.0 KJ/ mole

3) 341.0 KJ/ mole

4) 610.0 KJ/ mole

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

22) The number of hybrid and unhybridised orbitals in ethane respectively are

1) 2 and 6

2) 6 and 6

3) 6 and 8

4) 8 and 6 ✓

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

23) The number of hybrid and unhybridised orbitals in ethene respectively is…

1) 8 and 6

2) 6 and 6 ✓

3) 2 and 4

4) 4 and 2

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

24) The number of hybrid and unhybridised orbitals in ethyne respectively are

1) 2 and 2

2) 2 and 6

3) 4 and 6

4) 6 and 4

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

25) The hybridization of carbon atoms in C-C single bond of $HC \equiv C - CH = CH_2$ are…

1) $sp^3 - sp^3$

2) $sp^2 - sp^3$

3) $sp - sp^2$ ✓

4) $sp^3 - sp$

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

26) An sp^3-hybrid orbital contains

1) 1/4 s-character

2) 1/2 s-character

3) 1/3 s-character

4) 2/3 s-character

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

27) Which of the following statement is not correct?

1) Double bond is shorter than a single bond

2) Sigma bond is weaker than a π(pi) bond

3) Double bond is stronger than a single bond

4) Covalent bond is stronger than hydrogen bond

28) Which of the following compounds does not contain a double bond or a triple bond?

1) C_2H_2

2) H_2O

3) N_2

4) HCN

29) The cylindrical shape of alkynes is due to

1) Three sigma C-C bonds

2) Three π C-C bonds

3) Two σ C-C and one π C-C bonds

4) one sigma C-C and one π C-C bonds

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

30) Which one is false in the following statements?

1) Each carbon in ethylene is in sp^2 -hybridization

2) Each carbon in acetylene is in sp-hybridization

3) Each carbon in benzene is in sp^2 -hybridization

4) Each carbon in ethane is in sp^2-hybridization

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

31) Select the molecule which has only one π bond…

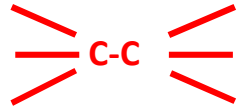
1) C_2H_2

2) C_3H_4O

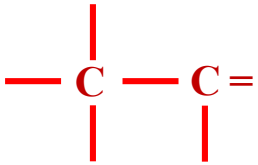
3) C_3H_6 ✓

4) $C_4H_6O_2$

32) Which of the following bonds is strongest?

1) 

2) $> C = C <$

3) 

4) $-C \equiv C-$

33) The hybridization involved in six carbon atoms of benzene is

1) Three sp^3 and three sp^2

2) All six sp

3) Three sp^2 and three sp

4) All six sp^2 ✓

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

34) sp^3 -hybridization leads to which shape of the molecule?

1) Tetrahedral

2) Octahedral

3) Linear

4) Trigonal planar

35) Which of the following has maximum C-H bond length?

1) C_2H_4

2) C_2H_2

3) C_2H_6

4) C_6H_6

36) Bond angle in ethene is

1) 120^0

2) 180^0

3) $109^0 28^1$

4) 111

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

37) The number of hybrid orbitals in ethylene are

1) 2

2) 4

3) 6 

4) 8

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

38) The type of overlapping present between two carbon atoms of acetylene is…

1) σ sp-sp

2) σ $sp^2 - sp^2$

3) σ $sp^3 - sp^3$

4) σ sp^3 - sp

39) Carbon shows maximum capacity of catenation because

1) Carbon shows variable valency

2) C-C bond strength is very low

3) In carbon there is one extra empty d-orbital


4) C-C bond strength is very high

40) The shortest C-C bond distance is found in

1) Diamond

2) Ethane

3) Benzene

4) Acetylene

41) When the hybridization state of carbon atom changes from sp^3 and sp^2 and finally to sp, the angle between the hybridized orbitals

1) Decreases gradually

2) Decreases considerably

3) Is not affected

4) Increases progressively

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

STRUCTURE FORMULAE

42)  Is the structure of

1) n-Hexane

2) Butane

3) Cyclo Hexane

4) pentane

43)  Comes under the family of

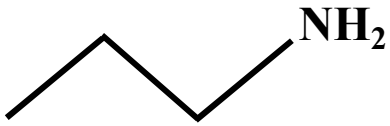
1) Alkenes

2) Cyclo alkenes

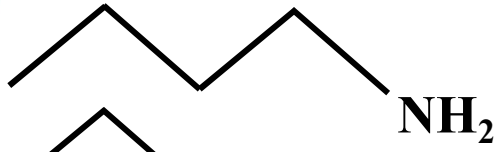
3) Alkanes

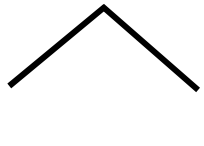
4) Alkynes

44) Butanamine-1 structure is shown as…

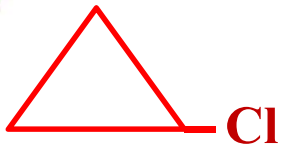
1) 

2) 

3) ✓ 

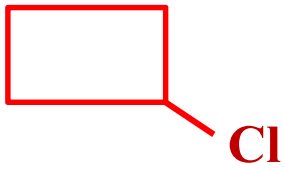
4) 

45) Chloro cyclo propane is written as

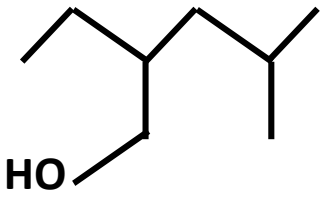
1) 

2) 

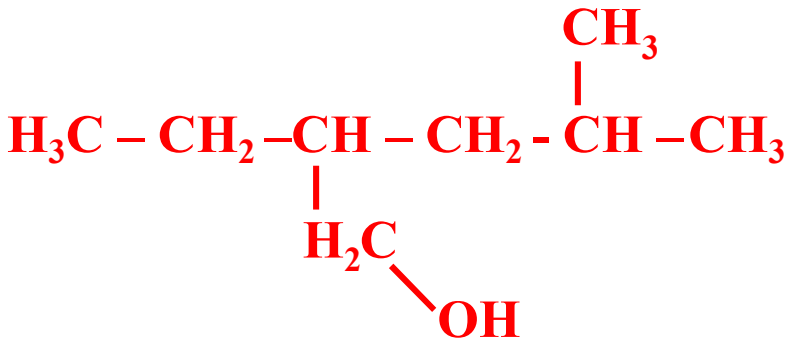
3) 

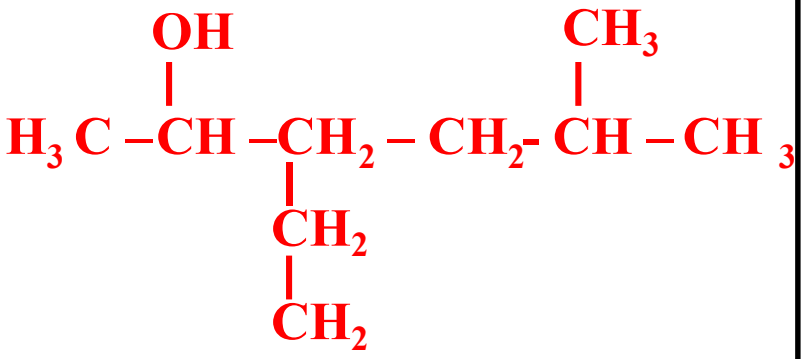
4) 

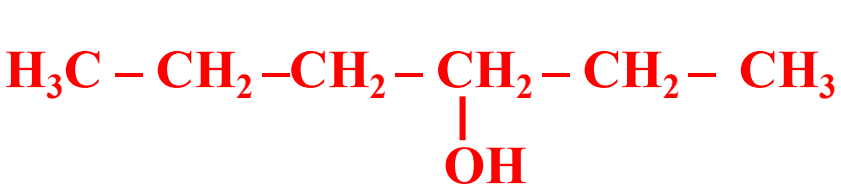
ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

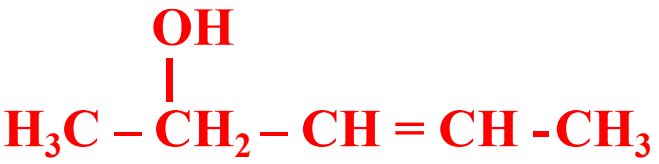
46) 

Structure is

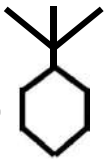
1) 

2) 

3) 

4) 

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

47)  Contains how many carbon atoms?

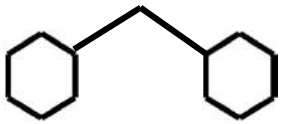
1) 9

2) 10

3) 11

4) 8

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

48)  Contains how many hydrogen atoms?

1) 13

2) 12

3) 24

4) 14

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

49)  Contains how many 2^0 carbons?

1) 1

2) 2

3) 3

✓ 4

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

50) The number of carbon atoms arranged linearly in the molecule

$$CH_3 - C \equiv C - CH = CH_3$$

1) 5

2) 4

3) 3

4) 2

OBJECTIVE QUESTIONS
LEVEL-II

LEVEL - II

1) Correct statements about homologous series…

a) Adjacent members of a group differ by a mass of 14

b) Adjacent members of group differ by one $-CH_2$ group

c) Members of homologous series can be prepared by the same general methods

d) Members of homologous series have same physical and chemical properties

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

Correct statement about homologous series…

The correct combination is

1) c, d **2) b, d**

3) a, b, c **4) All are correct**

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

2) Which of the following compounds will have only 1^0 and 2^0

i) Propane

ii) 2, 2, 3 trimethyl pentane

iii) 2 methyl propane

iv) n-propyl bromide

The correct combination is

1) All are correct

2) ii, iv

3) i, iv

4) ii, iii

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

3) The degree of unsaturation in pyridine molecule is…

1) 4

2) 3

3) 4

4) 2

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

4) The correct combination from following is

i) The first organic compound synthesised from it's constituent elements is urea

ii) Higher catenation ability of carbon is due to greater C-C bond energy

iii) The C-C bond length in C_6H_6 is shorter than that of C-C single bond length and greater than C-C double bond length

iv) The bond length of C-C bond is equal in ethylene and benzene

1) i and ii

2) ii and iii ✓

3) iii and iv

4) I, ii and iii

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

5) The correct combination among the following is

i) Benzene is alicyclic and aromatic

ii) Benzene is homocyclic and aromatic

iii) Benzene is carbo cyclic and aromatic

iv) Benzene is acyclic and aromatic

1) i and ii **2) ii and iii** ✓

3) iii and iv **4) i, ii and iii**

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

BONDING

6) C-H bond type in benzene is

1) σ sp - s

2) σ sp^2 - s ✓

3) σ sp^3 - s

4) σ p - p

7) Hybridisation of 2nd carbon in $CH_2=CH-CH_3$ is

1) sp

2) sp^2 ✓

3) sp^3

4) sp^3d

8) Hybridisation of carbon atom in CH_3^+ is

1) sp

2) sp^2 ✓

3) sp^3

4) sp^3d

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

9) Which hybrid orbitals are involved in the CH_3-CH = CH – CH_3 compound

1) sp and sp^3

2) sp^2 and sp^3

3) sp and sp^2

4) only sp^3

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

10) The ratio of σ and π bonds in benzene is

1) 3 : 1

2) 4 : 1

3) 1 : 4

4) 2 : 3

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

11) The ratio of pure and hybrid orbitals $H_2C = CH - CH = CH_2$

1) 7 : 12

2) 14 : 13

3) 6 : 5

4) 5 : 6 ✓

12) Which of the following does not contains all carbons sp^2 hybridised?

1) C_2H_4

2) C_6H_6

3) $CH_2 = CH - CH = CH_2$

4) CH ≡ C - C ≡ CH

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

13) Total numbers of hybrid orbitals present in $CH_2 = C = CH_2$ is...

1) 8

2) 6

3) 4

4) 2

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

14) Number of σ and π bonds present in a compound of molecular formula C_nH_{2n}

1) (3n + 1), 2

2) (3n - 1), 2

3) (3n - 1), 1 ✓

4) (3n - 3), 1

15) The bond length of C – C in hydrocarbons follow the order

1) $C_2H_6 > C_6H_6 > C_2H_4 > C_2H_2$

2) $C_2H_6 > C_2H_4 > C_2H_2 > C_6H_6$

3) $C_2H_2 > C_2H_4 > C_2H_6 > C_6H_6$

4) $C_6H_6 > C_2H_2 > C_2H_4 > C_2H_6$

16) The bond energy of C – C in hydrocarbon follow the order

1) $C_6H_6 < C_2H_2 < C_2H_4 > C_2H_6$

2) $C_2H_2 < C_2H_4 < C_2H_6 > C_6H_6$

3) $C_2H_6 < C_2H_4 < C_2H_2 > C_6H_6$

4) $C_2H_6 < C_6H_6 < C_2H_4 > C_2H_2$

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

17) The number of σ and π bonds between two carbon atoms of propyne are respectively

1) 6, 2

2) 1, 2

3) 2, 1

4) 2, 2

18) Hybridisation of terminal carbons in But-2-ene is…

1) sp^2

2) sp^3

3) sp

4) sp^3d

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

19) During pyrolysis of higher alkanes C – C bond breaks faster than the C-H bond because

1) C – C bond is stronger

2) C – H bond is weaker

3) C – C bond involves pi bond in alkane

4) The bond energy of C – C bond is less than that of C – H bond

20) Which statement is correct about the hybridization of carbon atoms in

$$\overset{1}{H}C \equiv \overset{2}{C} - \overset{3}{C} \equiv \overset{4}{C}H$$

1) C_1 and C_4 are sp^2 hybridised

2) C_2 and C_3 are sp^2 hybridised

3) All are sp hybridized ✓

4) All are sp^2 hybridised

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

21) Select the molecule having degree of unsaturation equal to two

1) CH = CH

2) CH = C - CHO

3) Both 1 and 2

4) $CH_3 - CH = CH_2$

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

22) Among the following which one has more than one kind of hybridization?

i) $CH_3CH_2CH_2CH_3$

ii) $CH_3CH = CHCH_3$

iii) $CH_2 = CH - C \equiv CH$

iv) $CH \equiv CH$

1) ii and iii

2) ii and i

3) iii and iv

4) iv

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

23) A hydrocarbon contains no multiple bond but has cyclic structures, such a compound can be grouped under

1) Alkane

2) Aromatic compound

3) Alkene

4) Alicyclic compound

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

24) Number of tertiary carbon atoms in tertiary butyl alcohol is…

1) 1

2) 2

3) 3

4) 4

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

25) A secondary (2^0) carbon atom is one that is joined to

1) 1 – alkyl group

2) 2 – alkyl groups

3) 3 – alkyl groups

4) 4 – alkyl groups

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

26) The number of 4^0 carbon atoms in 2, 2, 3, 4 – tetramethyl pentane

1) 1

2) 2

3) 3

4) 4

27) In which of the following compounds, all the 'C'atoms are sp^3 hybridized?

i) CH_4 ii) C_2H_6 iii) C_3H_8 iv) C_4H_{10}

1) i, ii, iii **2) ii, iv**

3) iii, iv **4) All are correct** ✓

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

28) The hybridization between carbon atom (1) and carbon atom (2) in the compound given below is

$$\overset{1}{N} \equiv \overset{2}{C} - \overset{3}{C}H = CH_2$$

1) sp^2 and sp^2

2) sp^3 and sp

3) sp and sp^2 ✓

4) sp and sp

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

29) Which of the following has all carbon atoms sp – hybridized?

1) $CH_3 - CH = CH - CH_3$

2) $CH_3 - C \equiv C - C\ H_3$

3) $HC \equiv C - C \equiv CH$

4) All the three above

30) The CI – C – CI angle in 1, 1, 2, 2 tetrachloroethene and tetrachloromethane respectively will be about

1) 120^0 and 109.5^0

2) 90^0 and 109.5^0

3) 109^0 and 90^0

4) 109.5^0 and 120^0

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

31) What hybrid orbitals will form the following compound?

$CH_3 - CH = CH - CH_2 - CH_3$

1) Sp and sp^3

2) Sp^2 and sp^3

3) Sp and sp^2

4) Only sp^3

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

32) Number of π-electrons in naphthalene is

1) 4

2) 3

3) 10

4) 14

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

33) Number of π-electrons in cyclobutadiene….

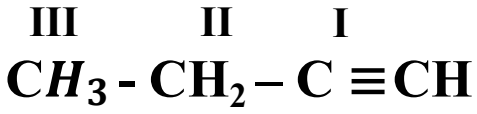
1) 2

2) 6

3) 4 ✓

4) 8

34) Which of the following carbon atoms is most electronegative?



1) II

2) I

3) III

4) All are equal

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

35) In which of the following, the bond length between carbon and carbon is equal

1) 2-Butene

2) Benzene

3) 1-Butene

4) Propyne

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

36) The bond length between sp^3 - hybridized carbon and other carbon atom is minimum in

1) Propane

2) Propyne ✓

3) Propene

4) Butane

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

37) The percentage of s-character of the hybrid orbitals in ethane, ethene and ethyne are respectively.

1) 50, 75, 100

2) 10, 20, 40

3) 25, 33, 50

4) 25, 50, 75

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

38) The number of π- and σ- bonds in benzene is…

1) 3 π + 12σ

2) 12 π + 12 σ

3) 6 π + 11 σ

4) 6 π + 6 σ

OBJECTIVE QUESTIONS
LEVEL-III

LEVEL - III

1) The % increase of s-character in the hybrid orbitals of carbon in CH_4, C_2H_4, C_2H_2 follow the order

1) $CH_4 > C_2H_4 > C_2H_2$

2) $C_2H_4 < CH_4 < C_2H_2$

3) $CH_4 < C_2H_4 < C_2H_2$

4) $C_2H_2 < C_2H_4 < CH_3$

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

2) Which compound given below has sp^3, sp^2 and sp orbitals in the ratio of 6 : 3 : 2

1) $CH_3 - CH = CH - CH_2 - C \equiv C - CH_3$

2) $CH_3 - CH = CH - CH_2 - C \equiv CH$

3) $CH_3 - CH_2 - C \equiv C - CH = CH_2$

4) $CH_3 - CH = CH - C \equiv CH$

3) The number of π electrons present in anthracene

1) 6

2) 10

3) 5

4) 14 ✓

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

4) The total number of hybrid orbitals in the following compounds $CH_3 - CH = CH - CH_3$

1) 8

2) 6

3) 14

4) 12

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

5) The number of σ and π bonds in acetone molecule are respectively

1) 1, 9

2) 1, 8

3) 9, 1

4) 10, 1

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

6) The C – C bond length in graphite is

1) 1.54 A^0

2) 1.34 A^0

3) 1.42 A^0 ✓

4) 1.25 A^0

7) The total number of bonds in tetra cyano methane

1) 8

2) 16

3) 9

4) 18

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

8) The molecule which used 12 hybridised orbitals for bonding is

1) Propane

2) 1, 3 – butadiene

3) 1, 3, 5 - hexatriyne

4) All

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

9) The compound 1, 2 – butadiene has…. Hybridised Carbon atoms

1)sp

2) sp^2

3) sp, sp^2, sp^3

4) sp, sp^2, sp^3

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

10) The ratio of the number of sp, sp^2 and sp^3 carbons in the compound given below is $H_2C = C = CH - CH_3$

1) 1 : 2 : 1

2) 2 : 1 : 1

3) 1 : 1 : 1

4) 1 : 2 : 3

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

11) The ratio of the number of sp, sp^2 and sp^3 orbitals in the structural compound given below is

$CH_3 - CH = C = CH - C \equiv C - CH_3$

1) 1 : 1 : 1

2) 2 : 2 : 1

3) 3 : 2 : 1

4) 3 : 3 : 4

12) A hydrocarbon contains 7 carbons. The hybridization of them respectively are sp^3, sp^2, sp^2, sp^3, sp, sp^3 identify the hydro carbon

1) $CH_3 - CH = CH - CH_2 - C \equiv CH$

2) $CH_3 - CH = CH - CH_2 - C \equiv C - CH_3$

3) $CH_3 - C \equiv C - CH_2 - CH_2 - CH_2 - CH_2$

4) $CH_3 - CH_2 - CH = CH - CH_2 - C \equiv CH$

OBJECTIVE QUESTIONS

PCQS

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

PCQS

1) The formal charges of C and O atoms in $CO_2\left(:\ddot{O}\right) = C = \ddot{O}:$ are, respectively (EAMCET-2012)

1) 1, -1

2) -1, 1

3) 2, -2

4) 0, 0

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

2) Match the following lists **(2004 E)**

List - I	List - II
A) Ethane	1) 2sp carbons
B) Ethylene	2) 6sp^2 carbons
C) Acetylene	3) 2sp^3 carbons
D) Benzene	4) 2sp^2 carbons
	5) 1sp and 1sp^2 carbons

The correct answer is

1) A – 3, B – 4, C – 1, D –2
2) A – 4, B – 5, C – 3, D –2
3) A – 1, B – 2, C – 3, D –4
4) A – 4, B – 3, C – 5, D –1

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

3) How many "methyl groups" are present in 2, 5 – dimethyl – 4 – ethyl heptane? (2003 M)

1) 2

2) 3

3) 4

✓ 5

4) The homologue of ethyne is **(2000 E)**

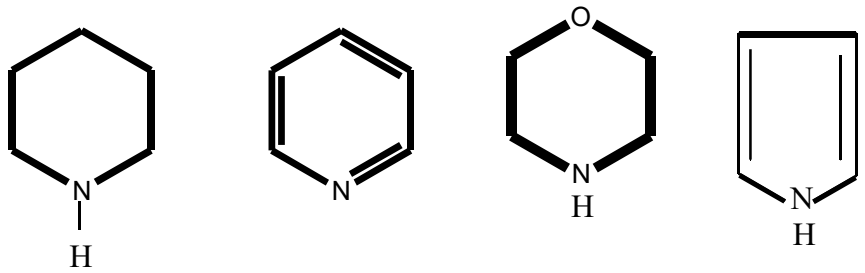
1) C_2H_4

2) C_2H_6

3) C_3H_8

4) C_3H_4

5) The order of basicity of the compounds



(I) (II) (III) (IV)

1) I > III > II > IV

2) III > I > IV > II

3) IV > I > III > II

4) II > I > III > IV

OBJECTIVE QUESTIONS
LEVEL-I

LEVEL - I

1) **The suffixes for alcohols, aldehydes and ketones, according to IUPAC system are respectively**

1) –ane, -al -ketone

2) –ol – al - ketone

3) –ol, -al, -one ✓

4) –ol, -ane, -one

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

2) The IUPAC name of alcohol is_____and that of aldehyde is_____

a) Alkanol, Alkanal

b) Alkanal, Alkanol

c) Alkanone, Alkanal

d) Alkanal, Alkanone

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

3) In I.U.P.A.C system naming of organic compounds which of the following functional group has more preference than others (in a poly functional compound)

1) –OH

2) –CHO

3) –CO–

✓ 4) $-CONH_2$

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

4) If a carbon compound has more functional groups, then order of preference while naming it according to IUPAC nomenclature

1) –CHO>-COOH-OH_2>-NH_2

2) –COOH>-CHO>-NH_2>-OH

3) –COOH>-OH>- NH_2>-CHO

✓ –COOH>-CHO>-OH>-NH_2

5) An organic compound contains –OH, –C≡C–, –CHO, –C(=O)– groups. According to IUPAC nomenclature, principal functional group is…

1) –C≡C–

2) –OH

3) –C(=O)–

4) –C(H)=O ✓

6) Which of the following statements is incorrect?

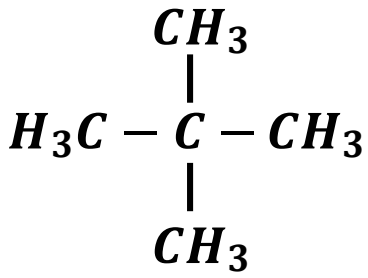
1) $-CH_2-$ contains secondary carbon atom

2) IUPAC names depend on structure

3) Root word indicates number of carbon atom in parent chain

4) Sum of numbers indicating position of substituents must be maximum in IUPAC system.

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

7) The correct IUPAC name of 

1) Neopentane

2) 2, 2-Dimethyl propane

3) Methyl Butane

4) Tertiary pentane

8) IUPAC name of $CH_2 = CH$ – group is

1) Vinyl

2) Ethyl

3) Ethenyl ✓

4) Ethynyl

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

9) IUPAC names of $CH_2 = CH - CH_2 -$ group is

1) 1-propenyl

2) 2-propenyl ✓

3) Allyl

4) Vinyl

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

10) IUPAC names of $CH_3 – CH = CH –$ group is

1) 1-propenyl

2) 2-propenyl

3) Vinyl

4) Allyl

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

11) Isobutyl group is

a) $CH_3 - CH_2 - CH_2 - CH_2-$

c) $- CH_2 - \underset{|}{CH} - CH_3$

CH_3

b) $CH_3 - CH_2 - \underset{|}{CH} - CH_3$

d)

CH_3

$|$

$- C -$

$|$

CH_3

CH_3

12) Secondary butyl group is …

a) $CH_3 - CH_2 - CH_2 - CH_2-$

b) $CH_3 - CH_2 - \underset{|}{CH} - CH_3$

c) $- CH_2 - \underset{|}{CH} - CH_3$ with CH_3 branch

d) $\begin{array}{l} CH_3 \\ | \\ - C - \\ | \\ CH_3 \end{array}$ CH_3

13) False statement regarding Isopentane is

1) It has 3 CH_3 groups

2) It has one CH_2 group

3) It has one CH group

4) It has carbon atom which is not bonded to hydrogen

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

14) The number of quaternary carbons and quaternary hydrogens in neopentane respectively are…

1) 1, 1

2) 1, 0

3) 1, 2

4) 0, 0

15) The number & type of carbon atoms present in neopentane are

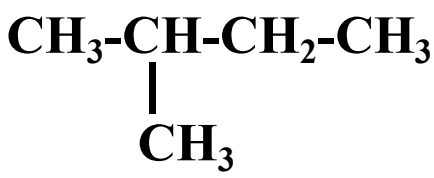
1) Four 1^0 carbons, one 4^0 carbon

2) Two 1^0 carbons, two 4^0 carbon

3) One 1^0 carbons, one 4^0 carbon

4) One 1^0 carbons, one 4^0 carbon

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

16) Total number of tertiary hydrogen atoms in  is

1) 1

2) 2

3) 43

4) 4

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

17) Which of the following compounds does not have any tertiary hydrogen atoms

1) $(CH_3)_3CCH_2CH_3$

2) $(CH_3)_2CHCH_2CH_3$

3) $(CH_3)_2CHCH(CH_3)_2$

4) $(CH_3)_3CH$

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

18) The number of linear carbon atoms in acetylene molecule are

1) 3

2) 2

3) 4

4) 5

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

19) The compound which has one isopropyl group is

1) 2, 2, 3, 3 – tetra methyl pentane

2) 2, 2 – dimethyl pentane

3) 2, 2, 3 – trimethyl pentane

4) 2 – methyl pentane

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

20) IUPAC name of $CH_2 = C = CH_2$ is…

1) Propa 1, 2-diene

2) 1, 1-propadiene

3) 2, 2-propadiene

4) 1, 3-propadiene

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

21) $CH_3 – CH = CH – C \equiv CH$ The correct IUPAC nameis

1) Pent – 3 – en – 1 – yne

2) Pent – 2 – ene, 4 – yne

3) 2 – pentene, 4 - pentyne

4) 1 – pentyne, 3 – pentene

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

22) The IUPAC name of $CHCl_3$ is…

1) Chloroform

2) Carbon trichloride

3) Trichloro methane ✓

4) None of these

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

23) IUPAC name of CH_3CHCl_2

1) Ethenedichloride

2) Dichloro ethane

3) 1, 1 – Dichloro ethane

4) Ethylidene chloride

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

24) IUPAC name of $CH_3 – O – CH_2 – CH_3$ is …

1) **Methoxy methane**

2) **Methoxy ethane** ✓

3) **Ethoxy methane**

4) **Ethoxyethane**

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

25) $CH_3 - CHO$ is called

1) Methanal

2) Acetaldehyde

3) Both 1 and 2

4) Ethanol

26) Acetone is the first member of

1) Alkanone family

2) Alkanol family

3) Alkanal family

4) Acid family

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

27) IUPAC name of HCOOH

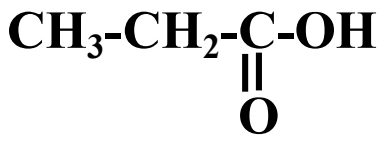
1) Formic acid

2) Methanoic acid

3) Ethanoic acid

4) Alkanoic acid

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

28) The compound 

1) Contain one hydroxy and ketonic group

2) Is called ethanoic acid

3) Is called propionic acid

4) Has ester group

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

29) The IUPAC name of CH_3CN is

1) Acetonitrile

2) Methyl cyanide

3) Ethane nitrile

4) All of these

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

30) Methyl amine is

1) Primary amine

2) Secondary amine

3) Tertiary amine

4) Quaternary amine

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

31) IUPAC name of $(CH_3)_2NH$ is…

1) Dimethyl amine

2) Dimethanamine

3) N-methyl methanamine

4) Diethylamine

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

32) $CH_3CH_2COOCH_2CH_3$ is called…

1) Ethyl ethanoate

2) Propyl ethanoate

3) Ethylpropanoate ✓

4) All

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

33) The correct IUPAC name is

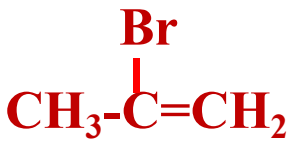
1) 3 – ethyl – 2 – methyl pentane

2) 2 – methyl – 3 – ethyl pentane

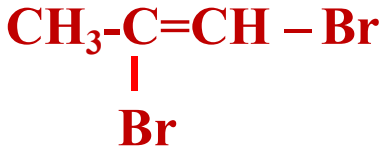
3) 2 – ethyl – 3 – methyl pentane

4) 3 – methyl – 2 – ethyl pentane

34) The structure of 3 – bromoprop – 1 – ene is

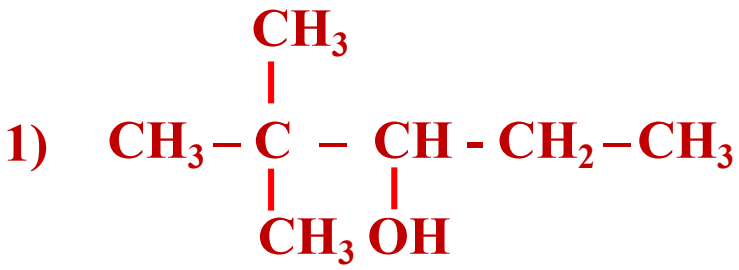
1) 

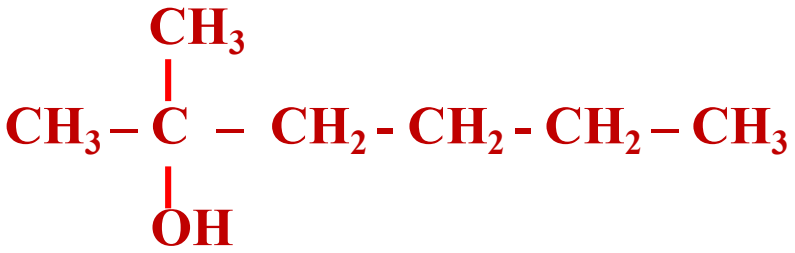
2) CH_3-CH=CH – Br

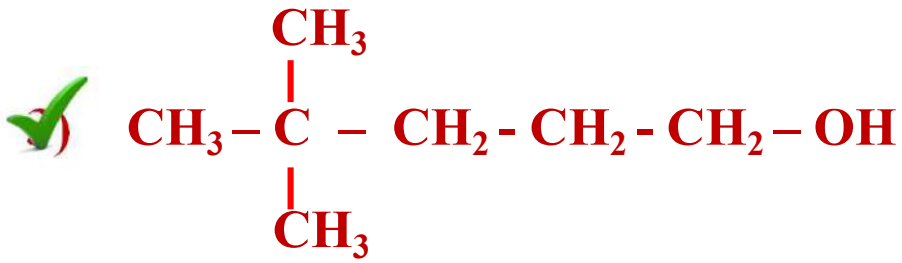
3) 

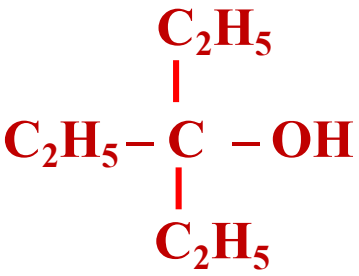
4) Br – CH_2-CH=CH_2

35) Neo – heptyl alcohol is correctly represented as

1) 

2) 

3) 

4) 

36) The structure of allylene is….

1) $CH_3 - CH = CH_2$

2) $CH_3 - CH = CH - CH_3$

3) $CH_3 - CH_2 - CH = CH_2$

4) ✓ $CH_3 - C \equiv CH$

37) The structure of 6 – hydroxy heptanal is

1) CH_3-CH_2-CH(OH)-CH_2-CH_2-CH_2-CHO

2) CH_3-CH_2-CH_2-CH(OH)-CH_2-CHO

3) CH_3-CH(OH)-CH_2-CH_2-CH_2-CHO

✔ 4) CH_3-CH(OH)-CH_2-CH_2-CH_2-CH_2-CHO

ORGANIC CHEMISTRY – SOME BASIC PRINCIPLES & TECHNIQUES

38) The correct structure of 7-hydroxy heptan-2-one is…

1) $HO - CH_2 - (CH_2)_4 - CH_2 - COCH_3$

2) ✓ $HO - CH_2 - (CH_2)_3 - CH_2 - COCH_3$

3) $HO - CH_2 - (CH_2)_3 - CH_2 - COOH$

4) $CH_3 - CH(OH) - (CH_2)_3 - CH_2 - COCH_3$