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NEET SYLLABUS

General introduction, classification and IUPAC nomenclature of organic compounds :

OBJECTIVES

After studying this unit, we will be able to :

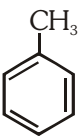
- *understand reasons for tetravalence of carbon and shapes of organic molecules;*
- *write structures of organic molecules in various ways;*
- *classify the organic compounds;*
- *name the compounds according to IUPAC system of nomenclature and also derive their structures from the given names;*

*"Don't take rest after your first victory because if you fail in second,
more lips are waiting to say that your first victory was just luck."*

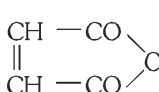
A.P.J. Abdul Kalam

CLASSIFICATION & NOMENCLATURE

BEGINNER'S BOX-1

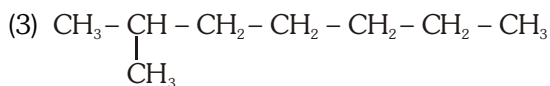
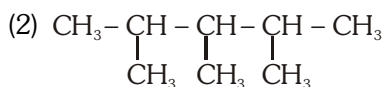
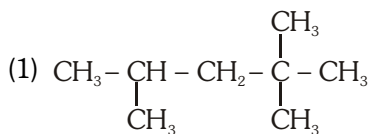
- How many 1° , 2° & 3° H atoms are present in  [Toluene] respectively :-
 (1) 3, 0, 5 (2) 3, 5, 0 (3) 4, 3, 0 (4) 0, 5, 3
- What is hybridisation of each carbon atom in following compound
 $\text{HC} \equiv \text{C} - \text{CH} = \text{CH} - \text{CH}_3$
 (1) $sp, sp^2, sp^2, sp^2, sp^3$ (2) sp, sp, sp^2, sp^2, sp^3
 (3) sp, sp, sp^2, sp^3, sp^3 (4) $sp, sp^2, sp^2, sp^3, sp^3$
- Which one is not correct for a homologous series -
 (1) All members have a general formula
 (2) All members have same chemical properties
 (3) All members have same physical properties
 (4) All members have same functional group

BEGINNER'S BOX-2

- How many carbon atom are present in third homologue of methyl ether.
 (1) 1 (2) 2 (3) 3 (4) 4
- Which of the following is not a hetero cyclic compound
 (1) Thiophene (2) Furane (3) Benzene (4) Pyridine
- In structure , how many hetero atoms are present ?
 (1) 1 (2) 2 (3) 3 (4) 4

BEGINNER'S BOX-3

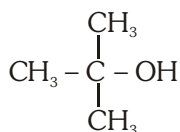
- Which of the followings is incorrect name :-
 (1) Isopropyl (2) Ter. butyl (3) Neo butyl (4) Neo pentyl
- Which of the followings is secondary radical :-
 (1) $\text{CH}_2=\text{CH}-$ (2) $(\text{CH}_3)_3\text{C}-$ (3) C_6H_5- (4) $\text{CH}_3-(\text{CH}_2)_2-\text{CH}_2-$
- Which of the followings is isooctane :-



(4) None

BEGINNER'S BOX-4

1. Common name of given compound is :-



- (1) Neobutyl alcohol (2) Isobutyl alcohol
 (3) Tertiary butyl alcohol (4) Secondary butyl alcohol
2. Which of the following is Crotonic acid ?
 (1) $\text{CH}_2 = \text{CH} - \text{COOH}$ (2) $\text{CH}_3 - \text{CH} = \text{CH} - \text{CHO}$
 (3) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$ (4) $\text{CH}_3 - \text{CH} = \text{CH} - \text{COOH}$
3. What is derived name of Neopentyl alcohol :-
 (1) Isopropyl carbinol (2) n-Butyl carbinol
 (3) Tertiary butyl carbinol (4) Ethyl methyl carbinol

Format for IUPAC name :

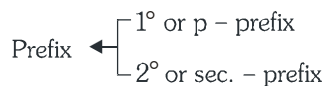
s - prefix	+	p - prefix	+	word root	+	p - suffix	+	s - suffix
Substituents with locants		cyclo		Alk word according to carbon in parent C chain		- ane - ene - yne		According to main functional group given in priority table

(a) **Locant** : Locants are separated by (,) comma.

- Locants and alphabets are separated by hyphen (-). [2, 3 - dimethyl pentane]
- di, tri, iso, neo and cyclo are neither separated by comma nor by hyphen

(b) **Prefix** :- According to substituents .

Prefix (es) are written in alphabetical order before root word.



Cyclo is 1° prefix and used for cyclic compound.

2° prefix is used for substituents and written before 1° prefix.

For acyclic compounds : 2° prefix + Root word + 1° suffix + 2° suffix.

Substituents	Prefix
— R	Alkyl group
— X (F, Cl, Br, I)	Halo
— O — N=O	Nitrite
— CH_2OH	Hydroxy methyl
— NHC_2H_5	Ethyl amino

Substituents	Prefix
— OR	Alkoxy
— $\text{N} \begin{smallmatrix} \nearrow \text{O} \\ \searrow \text{O} \end{smallmatrix}$	Nitro
— N = O	Nitroso
— CH_2Cl	Chloro methyl

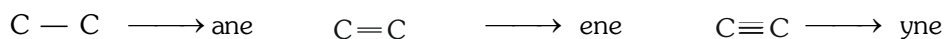
(c) **Word root** : According to number of carbons in parent C-chain.

Number of carbons	Root word
1	Meth
2	Eth
3	Prop
4	But
5	Pent

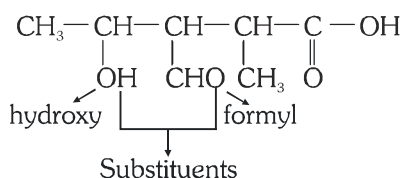
Number of carbons	Root word
6	Hex
7	Hept
8	Oct
9	Non
10	Dec

Number of carbons	Root word
11	Undec
12	dodec
13	tridec

(d) **Primary suffix :-** According to saturation and unsaturation.



(e) **Secondary Suffix :-** According to senior most of F. G.



3-Formyl-4-hydroxy-2-methyl pentanoic acid

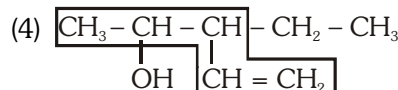
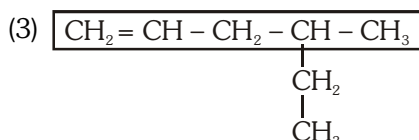
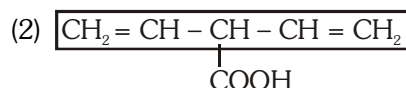
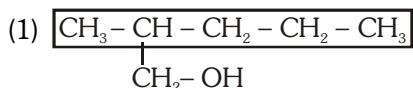
S. NO.	Functional group	Prefix	Suffix
1.	— (C) OOH (carboxylic acid) — COOH	×	oic acid carboxylic acid
2.	— SO ₃ H (sulphonic acid)	sulpho	sulphonic acid
3.	$\begin{array}{c} \text{O} \\ \\ -(\text{C}) > \text{O} \\ \\ -(\text{C}) > \text{O} \\ \\ \text{O} \end{array}$ (anhydride)	×	oic anhydride
4.	— (C) OOR (ester) — COOR	×	alkyl ----- oate alkoxy carbonyl or carbalkoxy alkyl ----- carboxylate
5.	— (C) OX (acid halide) — COX	×	oyl halide halo formyl carbonyl halide
6.	— (C) ONH ₂ (amide) — CONH ₂	×	amide carbamoyl carboxamide
7.	— (C) N (cyanide) — CN	×	Nitrile cyano carbonitrile
8.	— N $\equiv$ C (isocyanide)	isocyano/carbyl amino	isonitrile/carbyl amine
9.	— (C) HO (aldehyde) — CHO	oxo formyl	al carbaldehyde
10.	— (C) — (Ketone) $\begin{array}{c} \text{O} \\ \\ -(\text{C}) - \end{array}$	keto/oxo	one
11.	— OH (alcohol)	hydroxy	ol
12.	— SH (thio alcohol)	mercapto	thiol
13.	— NH ₂ (amine)	amino	amine

Note : (C) atom written in brackets means that it has been included in the parent chain.

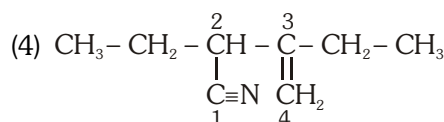
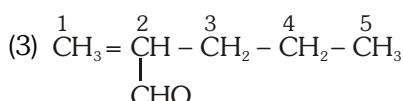
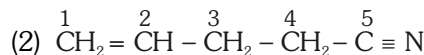
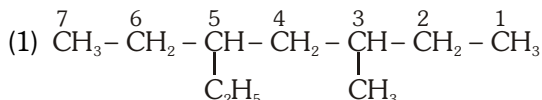
SUBSTITUENTS	PREFIX	SUBSTITUENTS	PREFIX
— R	alkyl	— X	halo
— NH ₂	amino	$\text{— N} \begin{array}{l} \nearrow \text{O} \\ \searrow \text{O} \end{array}$	nitro
— O—N=O	nitrito	— N = O	nitroso
— OCH ₂ CH ₃	ethoxy	— CH ₂ —OH	hydroxy methyl
— CH ₂ —Cl	chloro methyl	— NH—CH ₃	methyl amino
— S—	thio		
$\text{CH}_3\text{—}\overset{\text{O}}{\underset{\parallel}{\text{C}}}\text{—O—}$	acetoxy/ethanoyloxy	$\text{CH}_3\text{CH}_2\text{—}\overset{\text{O}}{\underset{\parallel}{\text{C}}}\text{—O—}$	propanoyloxy
$\text{C}_6\text{H}_5\text{—}\overset{\text{O}}{\underset{\parallel}{\text{C}}}\text{—O—}$	benzoyloxy	—OR	Alkoxy
		—OC ₆ H ₅	Phenoxy

BEGINNER'S BOX-5

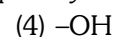
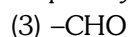
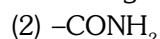
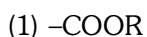
1. Which of the following selected chain is correct :-



2. Which of the following has correct numbering according IUPAC :-

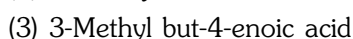
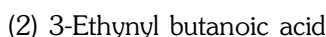
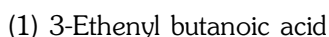
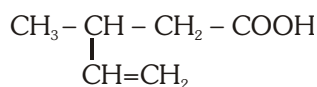


3. Which of the following functional group has highest priority according to priority table :-

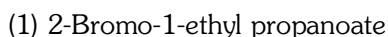
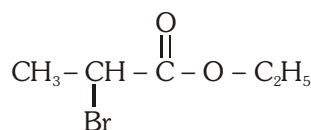


BEGINNER'S BOX-6

1. Correct IUPAC name of compound is :-



2. Correct IUPAC name of compound is :-



3. IUPAC name of $\text{CH}_3-\overset{\text{O}}{\parallel}\text{C}-\text{O}-\overset{\text{O}}{\parallel}\text{C}-\text{CH}_3$ is :-

- (1) Acetic anhydride (2) Methanoic anhydride
(3) Ethanoic methanoic anhydride (4) Ethanoic anhydride

ANSWER KEY

BEGINNER'S BOX-1	Que.	1	2	3
	Ans.	2	2	3
BEGINNER'S BOX-2	Que.	1	2	3
	Ans.	4	3	1
BEGINNER'S BOX-3	Que.	1	2	3
	Ans.	3	3	1
BEGINNER'S BOX-4	Que.	1	2	3
	Ans.	3	4	3
BEGINNER'S BOX-5	Que.	1	2	3
	Ans.	4	4	1
BEGINNER'S BOX-6	Que.	1	2	3
	Ans.	4	3	4

EXERCISE-I (Conceptual Questions)

Build Up Your Understanding

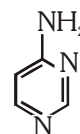
CLASSIFICATION

- The hybrid state of C-atoms which are attached to a single bond with each other in the following structure are : $\text{CH}_2=\text{CH}-\text{C}\equiv\text{CH}$
 (1) sp^2 , sp (2) sp^3 , sp
 (3) sp^2 , sp^2 (4) sp^2 , sp^3
- The third member of the homologous series of aliphatic aldehydes has the structure :-
 (1) $\text{CH}_3\text{CH}_2\text{CHO}$ (2) $\text{CH}_3(\text{CH}_2)_2\text{CHO}$
 (3) $\text{CH}_3\text{COCH}_2\text{CH}_3$ (4) CH_3COCH_3
- Molecular formula $\text{C}_4\text{H}_8\text{O}_2$ represents :-
 (1) An acid only
 (2) An ester only
 (3) An alcohol only
 (4) An acid and an ester also
- The higher homologue of dimethylamine ($\text{CH}_3-\text{NH}-\text{CH}_3$) has the structure :-
 (1) $\text{CH}_3-\text{N}(\text{CH}_3)_2$
 (2) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{NH}_2$
 (3) $\text{CH}_3-\text{NH}-\text{CH}_2-\text{CH}_3$
 (4) $\text{CH}_3-\text{CH}(\text{NH}_2)-\text{CH}_3$
- The third member of the family of alkenynes has the molecular formula :-
 (1) C_6H_6 (2) C_5H_6
 (3) C_6H_8 (4) C_4H_4
- The number of olefinic bonds in the given compound is/are :-
 $\text{CH}_2=\text{CH}-\text{C}(=\text{O})-\text{CH}=\text{CH}-\text{C}\equiv\text{N}$
 (1) 2 (2) 3
 (3) 1 (4) 4
- The number of acetylenic bonds in the given compound is/are :-
 $\text{HC}\equiv\text{C}-\text{C}(=\text{O})-\text{CH}=\text{CH}-\text{C}\equiv\text{N}$
 (1) 2 (2) 3
 (3) 1 (4) 4

- The number of C-atoms in second member of an ester is/are :
 (1) 2 (2) 3
 (3) 4 (4) 5

- Which of the following is an example of symmetrical or simple ether :
 (1) $\text{CH}_3-\text{C}(=\text{O})-\text{CH}_3$
 (2) $\text{CH}_3-\text{O}-\text{CH}_2-\text{CH}_3$
 (3) $\text{CH}_3-\text{CH}_2-\text{O}-\text{CH}_2-\text{CH}_2-\text{CH}_3$
 (4) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{O}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_3$

- The number of hetero atoms present in the following compound is/are :

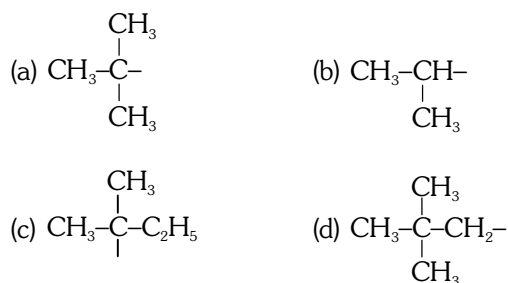


- (1) 2 (2) 3
(3) 1 (4) 4
- The minimum number of carbon atoms in an alkane having four primary carbon atoms are :-
 (1) 4 (2) 8
 (3) 5 (4) 6
- Which of the following compound has sp -hybridised carbon atom :-
 (1) CH_3COOH (2) CH_3COCH_3
 (3) $\text{CH}_3\text{CH}_2\text{CN}$ (4) $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$
- In compound $\text{HC}\equiv\text{C}-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_3$, the C_2-C_3 bond is the type of :-
 (1) $\text{sp} - \text{sp}^2$ (2) $\text{sp}^3 - \text{sp}^3$
 (3) $\text{sp} - \text{sp}^3$ (4) $\text{sp}^2 - \text{sp}^2$
- Which of the following represents the given mode of hybridization $\text{sp}^2-\text{sp}^2-\text{sp}-\text{sp}$ from left to right :-
 (1) $\text{H}_2\text{C}=\text{CH}-\text{C}\equiv\text{CH}$ (2) $\text{HC}\equiv\text{C}-\text{C}\equiv\text{CH}$
 (3) $\text{H}_2\text{C}=\text{CH}-\text{CH}=\text{CH}_2$ (4) $\text{H}_2\text{C}=\text{C}=\text{C}=\text{CH}_2$
- Which of the following pair of compounds are homologues :-
 (1) 1-Propanol & 2-Propanol
 (2) Ethanol & Propanal
 (3) Acetone & Acetaldehyde
 (4) Acetic acid & Butyric acid

16. Which of the following homologous series has incorrect general formula :-
 (1) Alkyne C_nH_{2n-2}
 (2) Alkanol $C_nH_{2n+2}O$
 (3) Alkanal $C_nH_{2n+1}O$
 (4) Carboxylic acid $C_nH_{2n}O_2$
17. The Cl-C-Cl bond angle in 1,1,2,2-tetrachloro ethene and tetrachloro methane respectively are:-
 (1) 120° and 109.5° (2) 90° and 109.5°
 (3) 109.5° and 90° (4) 109.5° and 120°
18. Minimum number of carbon atoms present in an ester are :-
 (1) 2 (2) 1 (3) 4 (4) 3
19. Which of the following has general formula C_nH_{2n}
 (1) Only Alkyne
 (2) Only Alkane
 (3) Aromatic hydrocarbon
 (4) Alkene & cyclic Alkane
20. Which compound has alkyne group
 (1) C_7H_{14} (2) $C_{10}H_{22}$
 (3) C_9H_{16} (4) $C_{16}H_{32}$

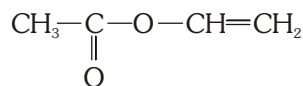
COMMON AND DERIVED NAME

21. Which of the following are tertiary radicals :-



- (1) a and b (2) b and c
 (3) a and c (4) b and d

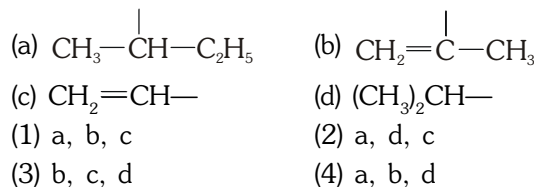
22. Common name of the given compound is :-



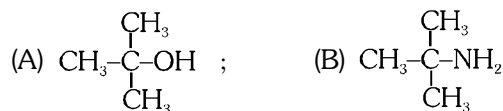
- (1) vinyl acetate (2) acryl acetate
 (3) methyl acrylate (4) Vinyl ethanoate

23. A primary amine has amino group ($-\text{NH}_2$) attached to:-
 (1) A primary carbon atom only
 (2) A secondary carbon atom only
 (3) A tertiary carbon atom only
 (4) A primary, secondary or tertiary carbon atom

24. Which of the following are secondary radicals :-



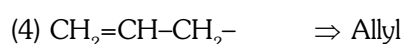
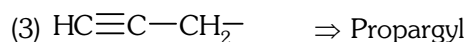
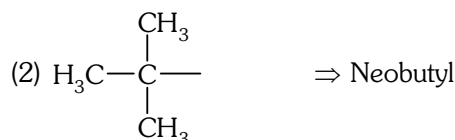
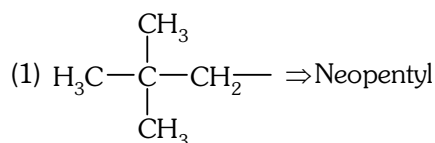
25. Examine the following structures :-



Which of the following statement is correct :-

- (1) A is tertiary alcohol while B is tertiary amine
 (2) A is primary alcohol while B is primary amine
 (3) A is tertiary alcohol while B is primary amine
 (4) A is primary alcohol while B is tertiary amine

26. Which of the following is not a correct match

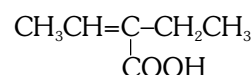


IUPAC NAME

27. The IUPAC name for isobutyl chloride is :-

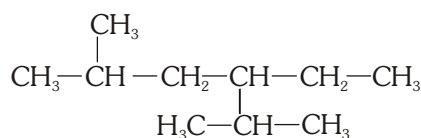
- (1) 2-Methyl-2-chloro butane
 (2) 2-Chloro-2-methyl butane
 (3) 1-Chloro-2-methyl propane
 (4) 2-Methyl-3-chloro propane

28. The IUPAC name of given compound is :-



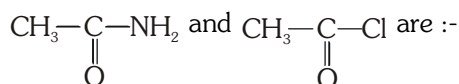
- (1) 3-Carboxy-2-pentene
 (2) 2-Ethylidene butanoic acid
 (3) 2-Ethyl-2-butenic acid
 (4) 3-Ethyl-2-buten-4-oic acid

29. The IUPAC name for the given structure is :-



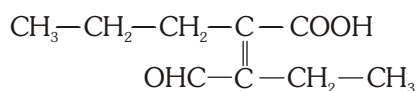
- (1) 3-Isopropyl-4-methylhexane
- (2) 4-Isopropyl-3-methylhexane
- (3) 3-Ethyl-2,5-dimethylhexane
- (4) 2-Ethyl-3-isopropylpentane

30. The IUPAC name for



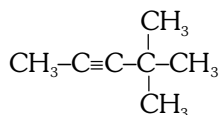
- (1) 1-Amino-1-oxo ethane, 1-chloro ethanal
- (2) 1-Amino ethanal, acetoxy chloride
- (3) 1-Oxoethanamine, ethanoyl chloride
- (4) Ethanamide, Ethanoyl chloride

31. The number of carbon atoms in the principle chain of the given compound are :-



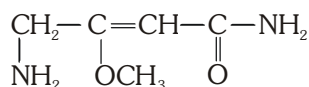
- (1) 7
- (2) 5
- (3) 4
- (4) 6

32. The IUPAC name of given compound is :-



- (1) Methyl tertiarybutyl acetylene
- (2) t-Butyl propyne
- (3) 4,4-Dimethyl-2-pentyne
- (4) 1,3,3,3-Tetramethyl ethyne

33. The IUPAC name of the compound is :-

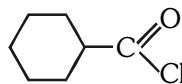


- (1) 4-Amino-2-methoxy-1-amino-2-butene
- (2) 4-Amino-3-methoxy-2-butenamide
- (3) 2-Methoxy-1,4-diamino-2-butenal
- (4) 1-Amino-2-methoxy-3-amino propene

34. The IUPAC name of $\text{CH}_3-\text{CH}_2-\text{NH}-\text{CH}_3$ is :-

- (1) Methyl ethyl amine
- (2) 1-methyl amino ethane
- (3) N-methyl ethan amine
- (4) N-ethyl methan amine

35. The IUPAC name for the compound is :-

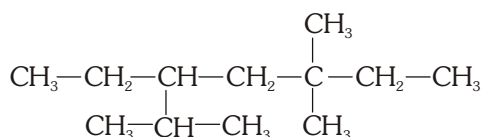


- (1) Cyclohexanoyl chloride
- (2) Cyclohexane carbonyl chloride
- (3) 1-Chloro cyclohexanal
- (4) Chloro cyclohexyl methanal

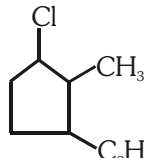
36. The IUPAC name of $\text{HC}\equiv\text{C}-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}_3$ is

- (1) 3-Methyl-2-penten-4-yne
- (2) 3-Methyl-3-penten-1-yne
- (3) 3-Methyl-4-pentyn-1-ene
- (4) 3-Methyl pentenyne

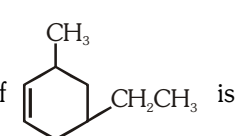
37. The IUPAC name of the structure is :-



- (1) 3-Isopropyl-5,5-dimethyl heptane
- (2) 5-Ethyl-3,3,6-trimethyl heptane
- (3) 3,3-Dimethyl-5-isopropyl heptane
- (4) 3-Ethyl-2,5,5-trimethyl heptane

38.  has the IUPAC name :-

- (1) 3-Chloro-1-ethyl-2-methyl cyclopentane
- (2) 1-Chloro-3-ethyl-2-methyl cyclopentane
- (3) 4-Chloro-1-ethyl-5-methyl cyclopentane
- (4) All are correct

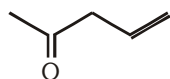
39. The IUPAC name of  is :-

- (1) 1-Methyl-5-ethyl cyclohex-2-ene
- (2) 5-Ethyl-3-methyl cyclohex-1-ene
- (3) 4-Ethyl-6-methyl cyclohex-1-ene
- (4) 1-Ethyl-5-methyl cyclohex-3-ene

40. $\text{H}-\text{C}(=\text{O})-\text{CN}$ in IUPAC called :-

- (1) Cyano methanal
- (2) 2-Oxo ethane nitrile
- (3) Cyano ethanal
- (4) Formonitrile

41. The IUPAC name for the compound is :-



- (1) 2-Acetyl prop-1-ene (2) Pent-1-en-4-one
(3) Pent-4-en-2-one (4) Formyl propene

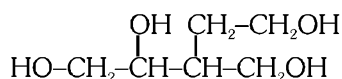
42. Which is incorrect IUPAC name :-

- (1) 3-Pentyne
(2) 3-Methyl-2-butanone
(3) 2-Ethyl-3-methyl-1-butene
(4) 3-Ethyl-2-methyl pentane

43. The IUPAC name of $\text{H}_2\text{N}-\text{C}_6\text{H}_4-\text{OCH}_3$ is :-

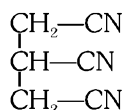
- (1) 1-Methoxy-4-amino benzene
(2) Aminophenyl methyl ether
(3) 4-Methoxy aniline
(4) None of the above

44. The IUPAC name of the given compound is :-



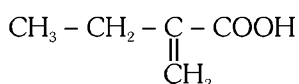
- (1) 3-Hydroxymethyl pentane-1,4,5-triol
(2) 3-Hydroxyethyl butane-1,2,4-triol
(3) 4-Hydroxyethyl-1,2,4-trihydroxy butane
(4) 3-Hydroxymethyl pentane-1,2,5-triol

45. The IUPAC name of the given compound is :-



- (1) 1,2,3-Tricarbonitrile propane
(2) Propane-1,1,1-tricarbylamine
(3) Propane-1,2,3-tricarbonitrile
(4) 3-Cyano pentane dicyanide

46. Number of carbon atoms in the principle carbon chain in the given compound are :-

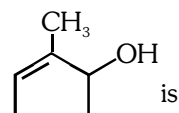


- (1) 4 (2) 3
(3) 2 (4) 5

47. Wrong IUPAC name is :-

- (1) $\text{CH}_3\text{CH}_2\text{CONH}_2$ Propanamide
(2) $\text{CH}_3\text{CH}_2\text{COOCH}_3$ Methyl propanoate
(3) $\text{CH}_3-\text{CH}(\text{CH}_3)-\text{CH}=\text{CH}-\text{CH}_3$ 2-Methyl pent-3-ene
(4) $\text{CH}_3\text{CH}_2-\text{O}-\text{CH}(\text{CH}_2\text{CH}_3)-\text{CH}_3$ 2-Ethoxy butane

48. The IUPAC name of the compound

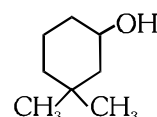


- (1) 2-Methyl cyclopent-1-en-2-ol
(2) 3-Methyl cyclopent-2-en-1-ol
(3) 2-Methyl cyclopent-2-en-1-ol
(4) 3-Methyl cyclopent-1-en-2-ol

49. The IUPAC name of $\text{CH}_3\text{COOCH}_2\text{COOH}$ is :-

- (1) Acetic anhydride
(2) Formyl ethanoate
(3) Butane-2,4-dione
(4) Ethanoic methanoic anhydride

50. The IUPAC name of given compound is :



- (1) 3,3-Dimethyl-1-hydroxy cyclohexane
(2) 1,1-Dimethyl-3-hydroxy cyclohexane
(3) 3,3-Dimethyl-1-cyclohexanol
(4) 1,1-Dimethyl-3-cyclohexanol

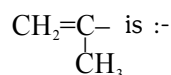
51. IUPAC name of $(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)_2$ is :-

- (1) 2,2-Dimethyl butane (2) 2,3-Dimethyl butane
(3) 2,4-Dimethyl butane (4) 1-Methyl pentane

52. IUPAC name of $\text{CH}_2=\text{CH}-\text{CH}_2-\text{Cl}$ is :-

- (1) Allyl chloride
(2) 1-Chloro-3-propene
(3) 3-Chloro-1-propene
(4) Vinyl chloride

53. The IUPAC name of the following group

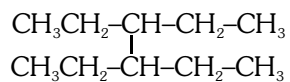


- (1) Isopropenyl (2) 1-Methylethenyl
(3) 2-Methylethynyl (4) None of the above

54. $\text{CH}_3-\text{CH}=\text{CH}-\text{C}\equiv\text{CH}$ has IUPAC name :-

- (1) Pent-2-en-4-yne
(2) Pent-4-yn-2-ene
(3) Pent-1-yn-3-ene
(4) Pent-3-en-1-yne

55. The IUPAC name of the following compound



- (1) 3, 4 - Dimethyl octane
 (2) 3-sec pentyl pentane
 (3) 3, 4 - Diethyl hexane
 (4) 3, 4 - Dimethyl hexane

56. Correct IUPAC name is :-

- (1) 3-Methyl-2-ethylpentane
 (2) 2-Ethyl-3-methylpentane
 (3) 3-Ethyl-2-methylpentane
 (4) 2-Ethyl-2-methylpentane

EXERCISE-I

ANSWER KEY

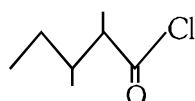
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	1	4	3	3	1	3	2	4	1	3	3	3	1	4
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	3	1	1	4	3	3	1	4	4	3	2	3	3	3	4
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	2	3	2	3	2	2	4	2	2	2	3	1	3	4	3
Que.	46	47	48	49	50	51	52	53	54	55	56				
Ans.	2	3	3	4	3	2	3	2	4	3	3				

EXERCISE-II (Previous Year Questions)

AIPMT/NEET & AIIMS (2006-2018)

AIPMT-2006

1. The general molecular formula, which represents the homologous series of alkanols is
 (1) $C_nH_{2n}O_2$ (2) $C_nH_{2n}O$
 (3) $C_nH_{2n+1}O$ (4) $C_nH_{2n+2}O$

2. The IUPAC name of  is :-

- (1) 3,4-Dimethylpentanoyl chloride
 (2) 1-Chloro-1-oxo-2,3-dimethylpentane
 (3) 2-Ethyl-3-methylbutanoyl chloride
 (4) 2,3-Dimethylpentanoyl chloride

AIPMT-2008

3. In the hydrocarbon

$$\begin{array}{ccccccc} CH_3 & - & CH & = & CH & - & CH_2 & - & C \equiv & CH \\ 6 & & 5 & & 4 & & 3 & & 2 & 1 \end{array}$$

 The state of hybridization of carbons 1, 3 and 5 are in the following sequence :-
 (1) sp , sp^2 , sp^3 (2) sp^3 , sp^2 , sp
 (3) sp^2 , sp , sp^3 (4) sp , sp^3 , sp^2

AIPMT-2009

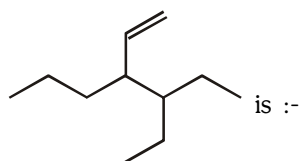
4. The IUPAC name of the compound having the formula $CH \equiv C - CH = CH_2$ is :-
 (1) 1-buten-3-yne (2) 3-buten-1-yne
 (3) 1-butyne-3-ene (4) but-1-yn-3-ene

AIPMT Mains-2010

5. The IUPAC name of the compound $CH_3CH=CHC \equiv CH$ is :-
 (1) Pent-3-en-1-yne (2) Pent-2-en-4-yne
 (3) Pent-1-yn-3-ene (4) Pent-4-yn-2-ene

AIPMT Pre.-2011

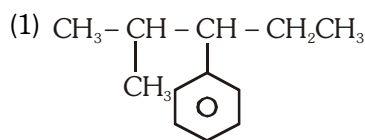
6. The correct IUPAC name of the compound



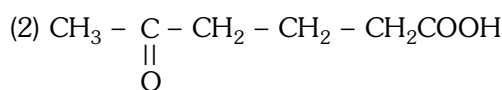
- (1) 4-Ethyl-3-propyl hex-1-ene
 (2) 3-Ethyl-4-ethenyl heptane
 (3) 3-Ethyl-4-propyl hex-5-ene
 (4) 3-(1-ethyl propyl) hex-1-ene

AIPMT Pre.-2012

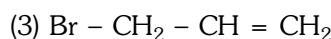
7. Which nomenclature is not according to IUPAC system?



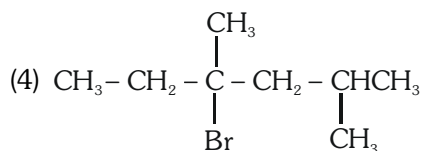
2-Methyl-3-phenylpentane



5-Oxohexanoic acid



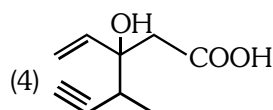
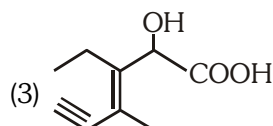
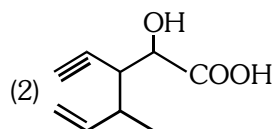
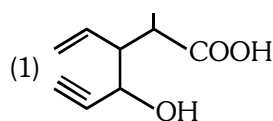
1-Bromo-prop-2-ene



4-Bromo,2,4-di-methylhexane

NEET UG-2013

8. Structure of the compound whose IUPAC name is 3-Ethyl-2-hydroxy-4-methylhex-3-en-5-ynoic acid is :-

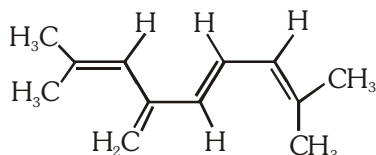


AIPMT-2014

9. Which of the following organic compounds has same hybridization as its combustion product CO_2 ?
- (1) Ethane (2) Ethyne
(3) Ethene (4) Ethanol

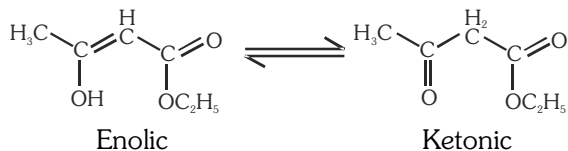
AIPMT-2015

10. The total number of π -bond electrons in the following structure is :-



- (1) 8 (2) 12 (3) 16 (4) 4

11. The enolic form of ethyl acetoacetate as below has:-



- (1) 16 sigma bonds and 1 pi - bond
(2) 9 sigma bonds and 2 pi - bonds
(3) 9 sigma bonds and 1 pi - bond
(4) 18 sigma bonds and 2 pi - bonds

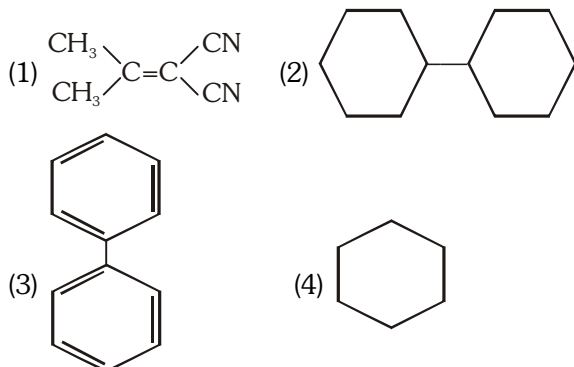
NEET-I 2016

12. The pair of electron in the given carbanion, $\text{CH}_3\text{C} \equiv \text{C}^\ominus$, is present in which of the following orbitals ?

- (1) 2p (2) sp^3
(3) sp^2 (4) sp

NEET-II 2016

13. In which of the following molecules, all atoms are coplanar ?

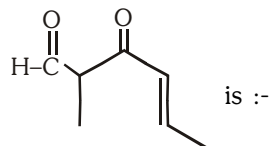


AIIMS 2016

14. In which of the following multiple bond is absent:-
- (1) CH_3CN (2) HCOOH
(3) CH_2N_2 (4) C_3H_6

NEET(UG) 2017

15. The IUPAC name of the compound



- (1) 5-formylhex-2-en-3-one
(2) 5-methyl-4-oxohex-2-en-5-al
(3) 3-keto-2-methylhex-5-enal
(4) 3-keto-2-methylhex-4-enal

AIIMS 2017

16. IUPAC name for given compound is -

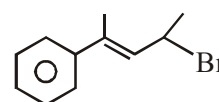
- (1) 2-Amino-4-ethyl-5-methyl hexan-1-ol
(2) 2-Amino-4-isopropyl-hexan-1-ol
(3) 5-Amino-3-ethyl-2-methyl hexan-6-ol
(4) 4-Ethyl-2-amino-5-methyl hexan-1-ol

NEET(UG) 2018

17. Which of the following molecules represents the order of hybridisation sp^2 , sp^2 , sp, sp from left to right atoms ?
- (1) $\text{HC} \equiv \text{C} - \text{C} \equiv \text{CH}$
(2) $\text{CH}_2 = \text{CH} - \text{C} \equiv \text{CH}$
(3) $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$
(4) $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$

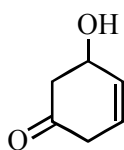
AIIMS 2018

18. IUPAC name of the compound



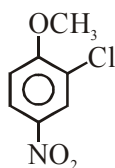
- (1) 2-Phenyl-4-bromopentane
(2) 4-Bromo-2-phenylpent-2-ene
(3) 2-Bromo-4-phenylpentene
(4) 4-Phenyl-2-bromopentane

19. IUPAC name of the given compound is



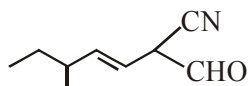
- (1) 3-Hydroxycyclohex-4-en-1-one
- (2) 5-Hydroxycyclohex-3-enone
- (3) 5-Ketocyclohex-2-enol
- (4) 3-Ketocyclohex-5-enol

20. IUPAC name of the given compound



- (1) 2-chloro-4-nitroanisole
- (2) 1-chloro-3-nitro-6-methoxybenzene
- (3) 3-chloro-1-nitro-4-methoxybenzene
- (4) 1-chloro-2-methoxy-5-nitrobenzene

21. Correct IUPAC name of the given compound



- (1) 2-cyano-5-methylhept-3-en-1-al
- (2) 2-Formyl-5-methylhept-3-ene-1-nitrile
- (3) 5-Ethyl-2-cyanohept-3-enal
- (4) 2-Cyano-5-ethylhex-3-enal

EXERCISE-II (Previous Year Questions)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	4	4	4	1	1	1	3	3	2	1	4	4	3	4	4
Que.	16	17	18	19	20	21									
Ans.	1	2	2	2	1	2									

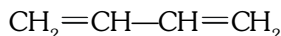
EXERCISE-III (Analytical Questions)

Check Your Understanding

1. The number of π bonds and σ bonds in the structure  respectively are :-

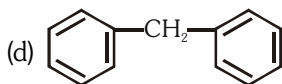
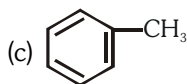
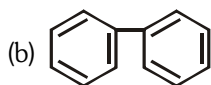
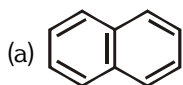
(1) 8, 5 (2) 8, 6
(3) 3, 8 (4) 5, 13

2. The geometry of the compound is :-



(1) Tetrahedral (2) Linear
(3) Planar (4) Pyramidal

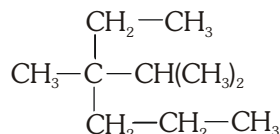
3. Which of the following have only 2° H-atom :



Correct code is :

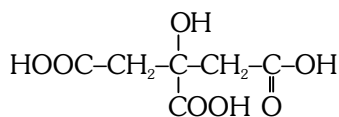
(1) a and b (2) a, b and d
(3) a, c and d (4) a, b, c and d

4. The IUPAC name of the given structure is :-



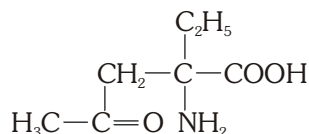
(1) 3-Methyl-3-isopropyl hexane
(2) 3-Isopropyl-3-methyl hexane
(3) 3-Ethyl-2,3-dimethyl hexane
(4) 2,3-Dimethyl-3-ethyl hexane

5. The IUPAC name of the given compound is :



(1) 3-Carboxy-3-hydroxy butane dioic acid
(2) 2-Hydroxy propane-1,2,3-tricarboxylic acid
(3) 3-Hydroxy butane dioic acid
(4) 2-Bis(carboxymethyl)-2-hydroxy ethanoic acid

6. The IUPAC name of given compound is :-



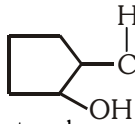
(1) 2-Oxo-4-amino-4-ethyl pentanoic acid
(2) 2-Amino-4-oxo-2-ethyl pentanoic acid
(3) 3-Amino-3-carboxy-5-hexanone
(4) 2-Amino-2-ethyl-4-oxo pentanoic acid

7. The IUPAC name from the incorrect name 4-Amino-3-hydroxy-2-butene is :-

(1) 1-Amino-2-hydroxy-2-butene
(2) 4-Amino-2-buten-3-ol
(3) 1-Amino-2-buten-2-ol
(4) 1-Amino-2-butenol

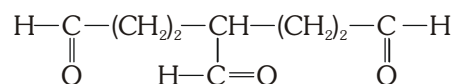
8. The correct IUPAC name of 2-chloro-3-butanol is :-

(1) 3-Chloro-2-hydroxy butane
(2) 3-Chloro-2-butanol
(3) 3-Hydroxy-2-chloro butane
(4) 2-Chloro-3-hydroxy butane

9. The IUPAC name for  is :-

(1) 2-Hydroxy cyclopentanal
(2) 2-Formyl-1-hydroxy cyclopentane
(3) 2-Hydroxy cyclopentane carbaldehyde
(4) Cyclopentane-2-ol-1-al

10. The IUPAC name of the compound is :-



(1) 1,4,7-Triheptanal
(2) 1,3,5-Triformyl pentane
(3) 3-Formyl heptane dial
(4) 1,3,5-Pentane tricarbaldehyde

11. $\text{CH}_3-\text{O}-\text{C}(=\text{O})-\text{CH}_2-\text{COOH}$

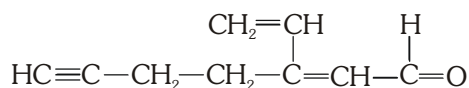
The IUPAC name of the above compound is :-

(1) 2-Acetoxy ethanoic acid
(2) 2-Methoxycarbonyl ethanoic acid
(3) 3-Methoxyformyl ethanoic acid
(4) 2-Methoxyformyl acetic acid

12. The IUPAC name of $\text{Cl}-\text{C}(=\text{O})-\text{OC}_2\text{H}_5$ is :-

(1) Ethoxy formyl chloride
(2) Ethoxy methanoyl chloride
(3) Ethyl chloro methanoate
(4) Ethoxy carbonyl chloride

13. The IUPAC name of the compound is :-

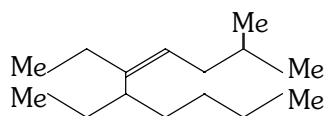


- (1) 3-(1-butyryl)-2,4-pentadienal
- (2) 5-Ethynyl-3-vinyl-2-pental
- (3) 3-Vinyl-2-hepten-6-ynal
- (4) 5-Acetyl-3-ethenyl-2-pental

14. The IUPAC name of $\text{CH}_3\text{CH}_2\text{NHCHO}$ is :

- (1) N-formyl ethanamine
- (2) Ethyl amino methanal
- (3) N-ethyl methanamide
- (4) N-ethyl methanol

15. The IUPAC name of the structure is :-



- (1) 2,4,5-Triethyl-3-nonene
- (2) 5,6-Diethyl-2-methyl-4-decene
- (3) 2,4,5-Triethyl-3-octene
- (4) 3-Ethyl-5-methyl-3-heptene

16. has the IUPAC name :

- (1) Ethyl-2-keto cyclopentane carboxylate
- (2) 2-Cyclopentanone-1-carbethoxy
- (3) 2-Ethylcarbonate cyclopentanone
- (4) 1-Keto-2-carbethoxy cyclopentanone

17. has the IUPAC name :-

- (1) 3,4-Dimethyl-1-penten-3-ol
- (2) Isopropyl-3-methyl vinyl carbinol
- (3) 2,3-Dimethyl-4-penten-3-ol
- (4) None of the above

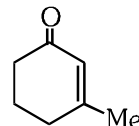
18. Which of the following has wrong IUPAC name

- (1) 5-Ethyl-1-methylcyclohexene
- (2) 5-Bromo-6-chloro-1-cyclohexen-3-yne
- (3) 1,2-Dimethylcyclopropane
- (4) 2-Methylcyclopent-4-en-1-ol

19. The IUPAC name of is :-

- (1) 3,4-Dihydroxy benzoic acid
- (2) 2,3-Dihydroxy benzoic acid
- (3) 4-Carboxy-2-hydroxy phenol
- (4) 4-Carboxy benzene-1,2-diol

20. The IUPAC name of the given compound is :-

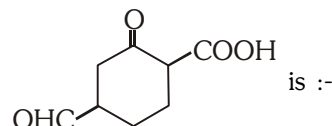


- (1) 3-Methyl-2-cyclohexenone
- (2) 2-Methyl-3-cyclohexenone
- (3) 1-Oxo-3-methyl cyclohexene
- (4) 2-Oxo-6-methyl cyclohexene

21. The IUPAC name of is :-

- (1) 2,3-Dimethyl hexane
- (2) 2-Ethyl-4-methyl pentane
- (3) 3-Ethyl -2-methyl pentane
- (4) 2,4-Dimethyl hexane

22. IUPAC name of



- (1) 6-Oxo-4-formyl cyclohexane carboxylic acid
- (2) 4-Formyl-2-oxo cyclohexane carboxylic acid
- (3) 4-Formyl-2-oxo cyclohexanoic acid
- (4) 1-Carboxy-4-formyl-2-oxo cyclohexane

23. Which is correct IUPAC name :-

- (1) $\text{CH}_3-\text{C}(=\text{O})-\text{CH}_2-\text{Br}$ 1-Bromopropanone

- (2) 1,3,5-Cyclohexanetrione

- (3) 2-Ketocyclopentanecarbaldehyde

- (4) All are correct

24. Which of the following compounds has wrong IUPAC name ?

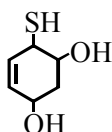
(1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOCH}_2\text{CH}_3 \rightarrow$ Ethylbutanoate

(2) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2-\text{CHO} \rightarrow$ 3-Methylbutanal

(3) $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_3 \rightarrow$ 2-Methyl-3-butanol

(4) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\overset{\text{O}}{\underset{\text{||}}{\text{C}}}-\text{CH}_2-\text{CH}_3 \rightarrow$ 2-Methyl-3-Pentanone

25. Following compound is named as :-



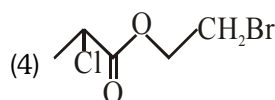
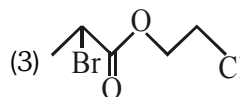
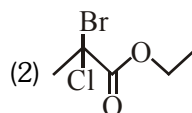
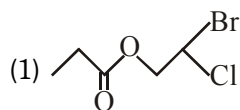
(1) 6-Mercaptocyclohex-4-ene-1,3-diol

(2) 1-Mercaptocyclohex-2-ene-4,6-diol

(3) 1-Mercaptocyclohex-5-ene-2,4-diol

(4) 4-Mercaptocyclohex-2-ene-1,5-diol

26. Structure of the compound Ethyl 2-bromo-2-chloropropanoate is :-



EXERCISE-III (Analytical Questions)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	4	3	2	3	2	4	3	2	3	4	2	3	3	3	2
Que.	16	17	18	19	20	21	22	23	24	25	26				
Ans.	1	1	4	1	1	4	2	4	3	1	2				

EXERCISE-IV (Assertion & Reason)

Target AIIMS

Directions for Assertion & Reason questions

These questions consist of two statements each, printed as Assertion and Reason. While answering these Questions you are required to choose any one of the following four responses.

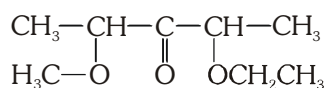
- (A) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
 (B) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
 (C) If Assertion is True but the Reason is False.
 (D) If both Assertion & Reason are false.

1. **Assertion:-**  is called cyclohexanenitrile.

Reason :- It contains six carbon atoms in the ring and CN as substituent.

- (1) A (2) B (3) C (4) D

2. **Assertion :-** The IUPAC name of



is 2-ethoxy-4-methoxy pentan-3-one.

Reason :- Larger substituents are assigned lower locants.

- (1) A (2) B (3) C (4) D

3. **Assertion :-** The IUPAC name for $\text{HC}\equiv\text{C}-\text{CH}_2-\text{CH}=\text{CH}_2$ is pent-4-en-1-yne.

Reason :- If there is a choice, a triple bond is always given a lower locant than a double bond.

- (1) A (2) B (3) C (4) D

4. **Assertion :-** Benzene is a carbocyclic compound.

Reason :- It has three π bonds in the cycle.

- (1) A (2) B (3) C (4) D

5. **Assertion :-** Number of bond angles of 120° and $109^\circ 28'$ in butenyne are 6 and 2 respectively.

Reason :- It's molecular formula is C_4H_6 .

- (1) A (2) B (3) C (4) D

6. **Assertion :-** Neopentane forms only one mono substituted compound.

Reason :- It has only one type of carbon atoms.

- (1) A (2) B (3) C (4) D

7. **Assertion :-** $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$ is a planar compound.

Reason :- It has 9σ bonds and 2π bonds.

- (1) A (2) B (3) C (4) D

8. **Assertion :** Acetic acid is an unsaturated compound.

Reason : It has two double bonds.

- (1) A (2) B (3) C (4) D

EXERCISE-IV (Assertion & Reason)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8
Ans.	4	3	4	2	4	3	2	4

[illegible]