

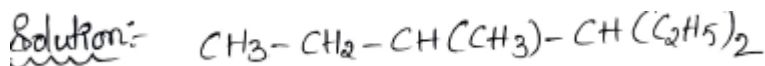
18. GOC - INTRODUCTION & NOMENCLATURE

SOLUTIONS

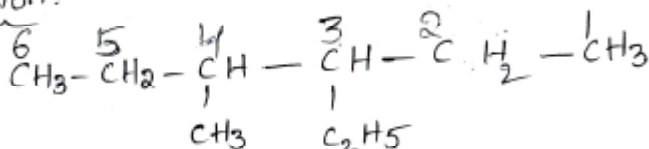
JEE MAIN LEVEL QUESTIONS

1. The correct IUPAC name of $\text{CH}_3\text{-CH}_2\text{-CH}(\text{CH}_3)\text{-CH}(\text{C}_2\text{H}_5)_2$ is
 (A) 4-Ethyl -3-methyl hexane (B) 3-Ethyl-4-methyl hexane
 (C) 4-Methyl-3-ethyl hexane (D) 2, 4, -Diethyl pentane

Answer:B



Expansion:-

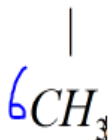
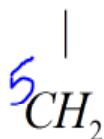
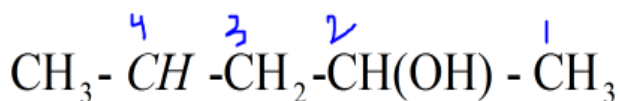


$\text{C}_2\text{H}_5 \rightarrow \text{Ethyl}$ $\text{CH}_3 \rightarrow \text{Methyl}$.

3-Ethyl-4-methyl hexane.

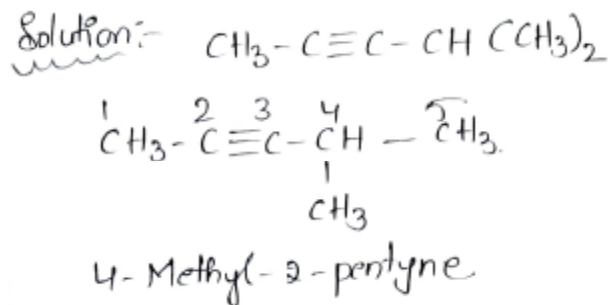
2. The IUPAC name of the compound is $\text{CH}_3\text{-CH}(\text{C}_2\text{H}_5)\text{-CH}_2\text{-CH}(\text{OH})\text{-CH}_3$
 (A) 4-Ethyl pentanol-2 (B) 4-Methyl hexanol-2
 (C) 2-Ethyl pentanol -2 (D) 3-Methylhexanol-2

Answer:B

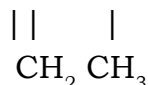


Solution:

3. The IUPAC name of $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}(\text{CH}_3)_2$ is
 (A) 4 - Methyl-2-pentyne (B) 4,4, -Dimethyl -2- butyne
 (C) Isopropylmethyl acetylene (D) 2-Methyl-4-pentyne

Answer:A

4. The IUPAC of $\text{C}_2\text{H}_5 - \text{C} - \text{CH} - \text{CH}_3$ is

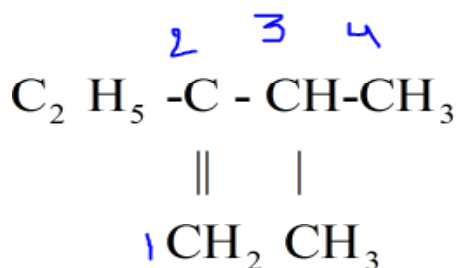


- 1) 3-methyl-2-ethyl butyne -1
 3) 3-ethyl-3-methyl-butene

- 2) 2-ethyl-3-methylbutene-1
 4) ethyl isopropyl ethane

Answer:2

Solution:



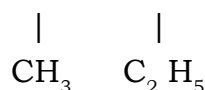
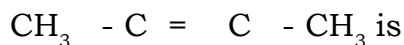
Longest chain = 4 carbons (but-)

Double bond starts at carbon 1 (-1-ene)

Substituents: Ethyl at carbon 2, Methyl at carbon 3

So, IUPAC name = 2-ethyl-3-methylbut-1-ene

5. The correct IUPAC name of

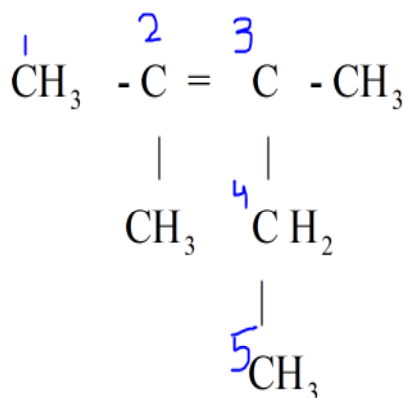


- 1) 1,2-diethyl butene
 3) 3, 4-dimethyl hex-3-ene

- 2) 2-ethyl-3-methyl pentene
 4) 2, 3-dimethyl pent-2-ene

Answer:4

Solution:



The longest continuous chain contains 5 carbons (include one methyl on the left and the ethyl on the right): parent = pent-2-ene (double bond between C2 and C3).

There are methyl substituents on C2 and on C3 → 2,3-dimethyl.

IUPAC name: 2,3-Dimethylpent-2-ene.

6. IUPAC name of $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$ is

- 1) 1, 2-Butadiene 2) 1,3-Butadiene 3) 1, 4-Butadiene 4) Butadiene

Answer:2

Solution: Longest chain of carbon atoms → 4 carbons → parent name = butane.

There are two double bonds → so the suffix becomes -diene.

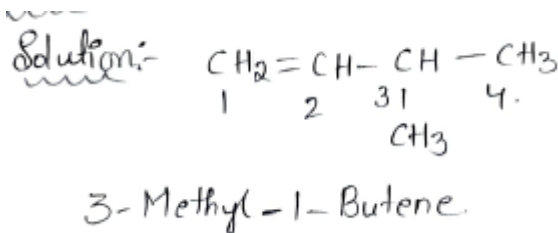
The double bonds are at C-1 and C-3 (when numbering from the leftmost double bond to give the lowest possible numbers).

IUPAC name: 1,3-Butadiene

7. IUPAC name of $\text{CH}_2 = \text{CH} - \text{CH}(\text{CH}_3)_2$ is

- 1) 1,1-Dimethyl -2-propane 2) 3-Methyl -1- butene
3) 2-vinyl propane 4) 1-Isopropyl ethylene

Answer:2

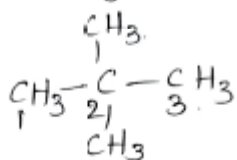


8. IUPAC name of $(\text{CH}_3)_3 \text{CCH}_3$ is

- 1) 1,1,1-Trimethylethane 2) 2,2,2-Trimethylpropane
3) 2,2,2-Trimethylethane 4) Dimethylpropane

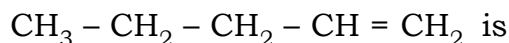
Answer:4

Solution:- $(\text{CH}_3)_3\text{C}-\text{CH}_3$.



2,2-Dimethylpropane.

9. The IUPAC name of the following compound



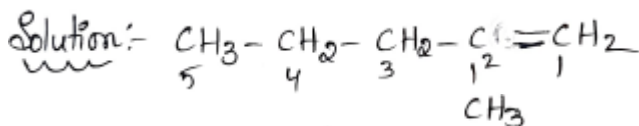
1) 2- Methylpentene-1

2) 4- Methylpentene-1

3) 1- Hexene

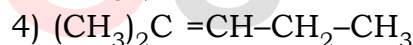
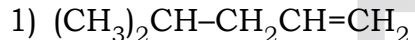
4) 3- Methyl pentene

Answer:1



2- Methyl pentene-1

10. The structure of 4-methylpentene-2 is



Answer:2

Educational Operating System

Solution: Parent chain: pent-2-ene $\rightarrow \text{CH}_3-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}_3$

Methyl group at carbon-4 $\rightarrow \text{CH}_3-\text{CH}=\text{CH}-\text{CH}(\text{CH}_3)-\text{CH}_3$

Condensed structure: $(\text{CH}_3)_2\text{CH}-\text{CH}=\text{CH}-\text{CH}_3$

11. $\text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}-\text{CH}_3$ IUPAC name is



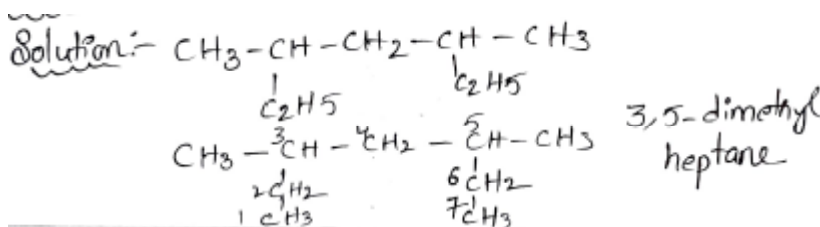
1) 2, 4 - diethyl pentane

2) 3, 5- dimethyl heptane

3) 3 - methyl 5 -ethyl hexane

4) 5 - ethyl -3- methyl hexane

Answer:2



ADVANCED LEVEL QUESTIONS

MULTIPLE CORRECT ANSWER TYPE

12. Which of the following statements is correct?

- 1) Hydrocarbons which contain only single bonds are said to be saturated
- 2) Saturated hydrocarbons are also called paraffins or alkanes
- 3) are represented by the general formula C_nH_{2n+2}
- 4) Compounds with double (=) or triple (\equiv) bond are said to be unsaturated hydrocarbons

Answer: 1,2,3,4

Solution:-

- Hydrocarbons which contain single bonds are saturated, they are called paraffins or alkanes.
 → General formula for alkanes is C_nH_{2n+2}
 → Compounds with '=', ' \equiv ' bond are called unsaturated hydrocarbons.

STATEMENT TYPE

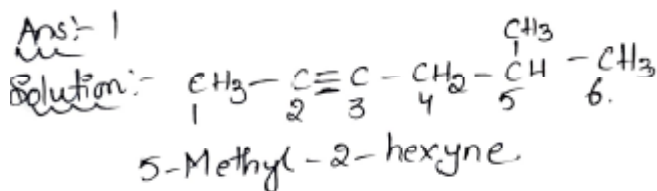
- 1) Both (A) and (R) are true and (R) is the correct explanation of (1)
 - 2) Both (A) and (R) are true and (R) is not the correct explanation of (1)
 - 3) (A) is true but (R) is false 4) (A) is false but (R) is true
13. A: When two or more substituents are present at the end of the parent chain which gives the lowest set of the locants is preferred for numbering
 R: Priority order will be given according to lowest locant rule.

Answer: 1

Solution:- When 2 or more substituents are present, the parent chain should be numbered to give the lowest set of locants based on lowest locant rule.

14. A: The IUPAC name of $CH_3 - CH = CH - C \equiv C - H$ is pent-3-en-1-yne
 R: Lowest Locant rule for multiple bond is preferred.

Answer: 1

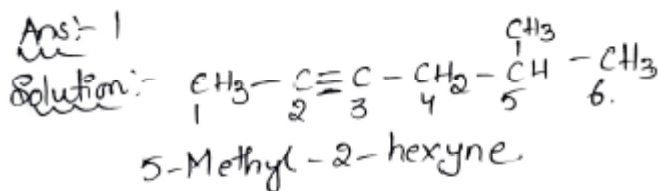


COMPREHENSION TYPE

In naming of Hydrocarbons, the parent carbon chain is numbered in a manner so as to give lowest number to that carbon atom linked by double (or) triple bond even if it Violates the rules of saturated hydrocarbons.

15. The IUPAC name of $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_2 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3$ is
- 1) 5 - Methyl - 2 - Hexyne
 - 2) 2 - Methyl - 4 - Hexyne
 - 3) 2 - yne - 5 - Methyl Hexane
 - 4) 1,1 - Dimethyl - 3 - Pentyne

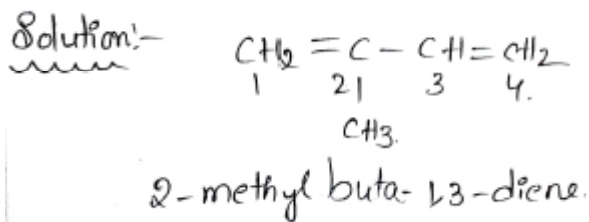
Answer:1



16. The IUPAC name of $\text{CH}_2 = \underset{\text{CH}_3}{\text{C}} - \text{CH} = \text{CH}_2$ is

- 1) 3 - Methyl buta - 1,3 - diene
- 2) 2 - Methyl buta - 1,3 - diene
- 3) Penta diene
- 4) 2 - Methyl pentene

Answer:2

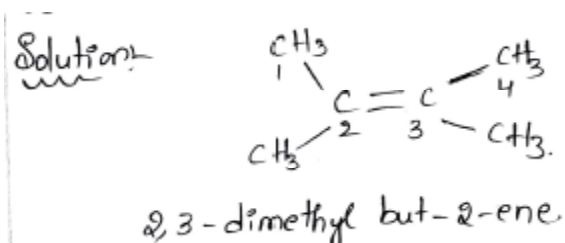


17. The IUPAC name of $\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ \diagdown \quad \diagup \\ \text{C} = \text{C} \\ \diagup \quad \diagdown \\ \text{CH}_3 \quad \text{CH}_3 \end{array}$ is

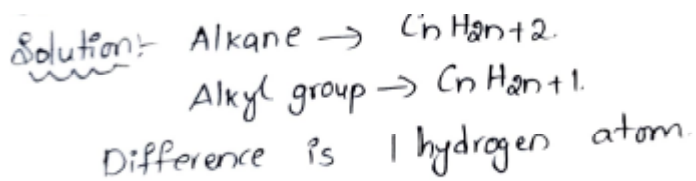
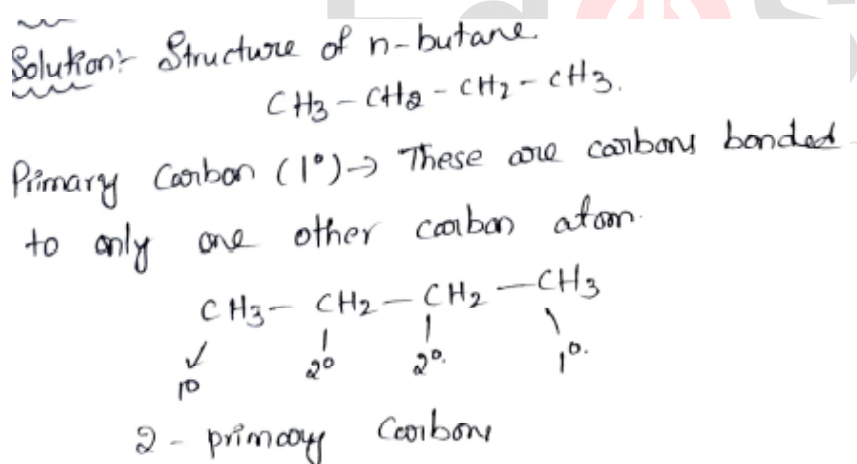
- 1) 2,3 - dimethyl but - 3 - ene
- 2) 2,3 - dimethyl but - 2 - ene

3) 2,3 - dimethyl but - 1 - ene

4) 2,3 - dimethyl but - 4 - ene

Answer:4**INTEGER TYPE**

18. Difference of Hydrogens between Alkane and Alkyl group is _____

Answer:119. Number of 1° carbons in n - Butane is _____**Answer:2****MATRIX MATCHING TYPE**

20. LIST - 1

(compound)

A) Neopentane

B) 2,2,3-Trimethyl pentane

C) Cyclohexane

LIST - 2

(type of carbons)

1) 1° , 2° , 3° carbons2) All are 2° -Carbons3) 1° , 2° , 3° , 4° - Carbons

D) Isopentane

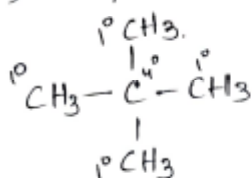
4) 1° and 4° Carbons

5) 1° and 2° Carbons

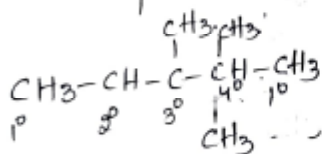
Answer: A-4, B-3, C-2, D-1

Solution:

A) Neopentane.

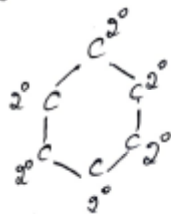


→ D) 1° and 4° Carbons.

B) 2,2,3-Trimethyl
pentane.

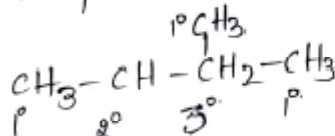
→ C) 1°, 2°, 3°, 4° Carbons

C) Cyclohexane



→ B) All are 2° Carbons.

D) Isopentane



→ A) 1°, 2°, 3° Carbons

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

1. The hydrocarbon residue derived by removing a hydrogen atom from an alkene is called :

- 1) Alkenyl group 2) Alkyle group 3) Alkynyl group 4) Aryl group

Answer:1

Solution: The hydrocarbon residue derived by removing a hydrogen atom from an alkene is called an alkenyl group

2. The unsaturated hydrocarbons with $C = C$ are called _____.

- 1) Alkanes 2) Alkenes 3) Alkynes 4) None

Answer:2

Solution: Unsaturated hydrocarbons containing a $C=C$ (double bond) are called alkenes.

3. The IUPAC name of acetylene is :

- (A) Ethane (B) Ethene (C) Ethylene (D) Ethyne

Answer:D

Solution: The IUPAC name of acetylene (C_2H_2) is ethyne

4. A compound with the molecular formula C_2H_2 must contain :

- (A) All single bonds (B) One double bond
(C) One triple bond (D) None of the above

Answer:C

Solution: A compound with the molecular formula C_2H_2 contains one triple bond.

5. The general formula of alkyne is :

- (A) C_nH_n (B) C_nH_{2n-2} (C) C_nH_{2n} (D) C_nH_{2n+2}

Answer:B

Solution: The general formula of alkynes is C_nH_{2n-2}

6. Alkynes have in their molecule :

- (A) Four hydrogen atoms more than in a molecule of corresponding alkane
(B) Two hydrogen atoms more than in a molecule of corresponding alkane
(C) Two hydrogen atoms less than in a molecule of corresponding alkane
(D) Two hydrogen atoms less than in a molecule of corresponding alkene

Answer:D

Solution: Alkynes have 2 hydrogen atoms less than alkenes

7. The general formula of alkane series is :

- (A) C_nH_{2n-2} (B) C_nH_{2n} (C) C_nH_{2n+2} (D) C_nH_{2n+4}

Answer:C

Solution: The general formula of alkane series is C_nH_{2n+2}

8. Primary suffix for unsaturated hydrocarbons is/are:

- 1) -ane 2) -ene 3) -yne 4) Both 2&3

Answer:4

Solution:Primary suffix for unsaturated hydrocarbons (those having double or triple bonds) are:

Double bond \rightarrow -ene

Triple bond \rightarrow -yne

9. Which of the following statement is correct?

- 1) The IUPAC name of alkenes ends with suffix -ene
2) The IUPAC name of alkynes ends with suffix -yne
3) The IUPAC name of alkanes ends with suffix -ane
4) All of these

Answer:4

Solution:All three statements are correct:

Alkenes \rightarrow end with -ene

Alkynes \rightarrow end with -yne

Alkanes \rightarrow end with -ane

10. Primary suffix for unsaturated hydrocarbons

- 1) ane 2) ene 3) yne 4) none

Answer:2,3

Solution:

For unsaturated hydrocarbons, the primary suffix indicates the presence of double or triple bonds.

ene \rightarrow for double bond ($C=C$)

yne \rightarrow for triple bond ($C\equiv C$)

Both are primary suffixes for unsaturated hydrocarbons

JEE MAIN LEVEL QUESTIONS

11. Alkenes are characterize by :

- (A) $C - C$ bonds (B) $C = C$ bonds (C) $C \equiv C$ bonds (D) Cyclic structure

Answer:B

Solution:Alkenes are unsaturated hydrocarbons that contain at least one carbon-carbon double bond ($C=C$)

12. The IUPAC name of $CH_3CH_2CH_2CH_3$ is :

- (A) Methylpropane (B) Ethylethane (C) Butane (D) 1, 2-dimethylethane

Answer:C

Solution:The structure $CH_3-CH_2-CH_2-CH_3$ has 4 carbon atoms in a straight chain.“?

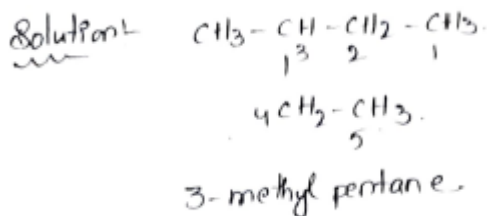
The IUPAC name is butane

13. The IUPAC name of $\text{CH}_3\text{CHCH}_2\text{CH}_3$ is :



- (A) 1, 1-methylethylpropane (B) 2-ethylbutane
(C) 1-methyl-1-ethylpropane (D) 3-methylpentane

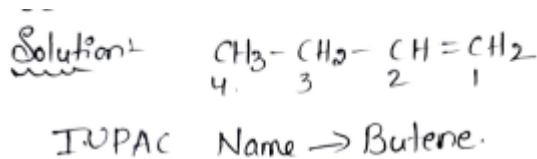
Answer:D



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

- (A) Butene (B) Isobutene (C) Butene-2 (D) 3-methylpropene

Answer:A

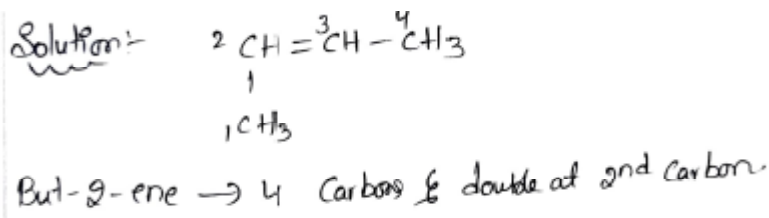


15. The IUPAC name of $\text{CH}=\text{CHCH}_3$ is :



- (A) Butene (B) Isobutene (C) But-2-ene (D) 3-methylprop-2-ene

Answer:C



16. The correct order of arrangement of rootword, suffixes and prefixes is ____

- 1) Primary prefix+Rootword+Primarysuffix+Secondarysuffix+Secondary prefix .
- 2) Secondary prefix+Primaryprefix+Rootword Primarysuffix+Secondarysuffix.
- 3) Secondary prefix+Rootword+Primaryprefix+Primarysuffix+Secondary suffix.
- 4) None

Answer:B

Solution:Secondary prefix+Primaryprefix+Rootword Primarysuffix+Secondarysuffix.

17. IUPAC name of $\text{CH}_2 = \text{CH}-\text{CH}=\text{CH}_2$ is

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

Answer:B

Solution:The longest chain has 4 carbon atoms \rightarrow buta-.

There are two double bonds \rightarrow -diene.

Number the chain from the end giving the lowest locants to the double bonds \rightarrow positions 1 and 3.

IUPAC name: Buta-1,3-diene (written as 1,3-butadiene)

18. IUPAC name of $\text{CH}_2 = \text{C} = \text{CH}_2$ is

- (A) Propadiene (B) 1, 1-propadiene
(C) 2, 2-propadiene (D) 1, 3-propadiene

Answer:A

Solution:For $\text{CH}_2 = \text{C} = \text{CH}_2$

3 carbon atoms \rightarrow propadiene

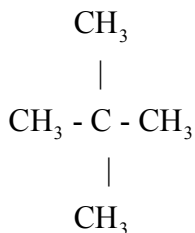
Double bonds at carbon 1 and 2

19. I.U.P.A.C name of neo-pentane is

- 1) 2- ethyl pentane 2) 2, 2- di methyl pentane
3) 2, 2- di methyl propane 4) 2- methyl propane

Answer:3

Solution:



EdoS
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Longest chain = propane

Two methyl groups on carbon 2 \rightarrow 2,2-dimethylpropane

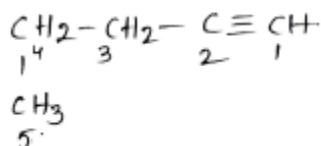
20. The IUPAC name of $\text{CH}_2\text{CH}_2\text{C}\equiv\text{CH}$ is :



- (A) Pentyne (B) 4-methylbutyne
(C) 1-methylbute-3-yne (D) Propylethyne

Answer:A

Solution:-



Pent-1-yne. or Pentyne.

ADVANCED LEVEL QUESTIONS

MULTIPLE CORRECT ANSWER TYPE

21. Which of the statements is correct

- 1) Alicyclic Compound is Saturated cyclic hydrocarbons
- 2) Aromatic Compounds (Unsaturated cyclic hydrocarbons)
- 3) ethyne trivial name is acetylene
- 4) propyne trivial name is methyl acetylene

Answer: 1,2,3,4

Solution:-

→ Alicyclic compound is saturated cyclic hydrocarbons.

→ Aromatic compounds are unsaturated cyclic hydrocarbons.

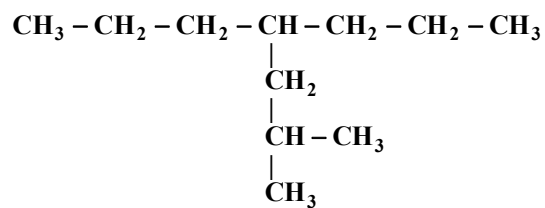
→ Ethyne's (C_2H_2) trivial name is acetylene.

→ Propyne's (C_3H_4) trivial name is methyl acetylene.

STATEMENT TYPE

- 1) Both (A) and (R) are true and (R) is the correct explanation of (1)
- 2) Both (A) and (R) are true and (R) is not the correct explanation of (1)
- 3) (A) is true but (R) is false
- 4) (A) is false but (R) is true

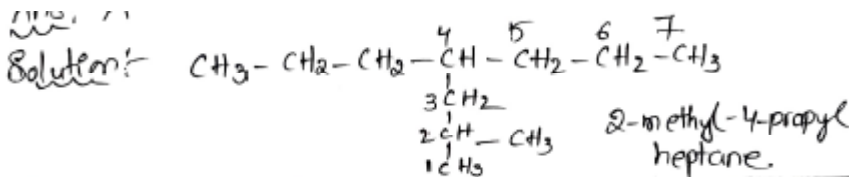
22. Assertion (A) : IUPAC name of



is 2-methyl-4-propyl heptane but not 4-(2-methyl propyl)heptane

Reason (R) : When there are two equally longest straight chains in a molecule, the longest straight chain having more branches is considered as parent alkane

Answer:A



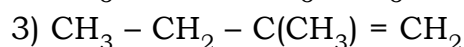
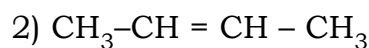
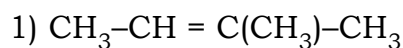
COMPREHENSION TYPE

IUPAC system is used to give a systematic name of an organic compound is generally derived by identifying the parent hydrocarbon and the functional group(s) attached to it.

The IUPAC name of any organic compound essentially consists of three parts.

(1) Root word 2. Suffix 3. Prefix

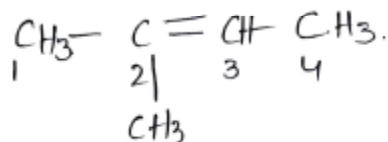
23. Structural formula of 2-methyl-2-butene is



Answer:1

Solution: 2-methyl-2-butene.

But \rightarrow 4 Carbon methyl \rightarrow CH_3 .



INTEGER TYPE

24. Number of carbons in root word Hex is _____

Answer:6

Solution: Number of carbons in root word Hex is 6

MATRIX MATCHING TYPE

25. Formula of alkane



IUPAC name of alkyl radical formed

p) Butyl

q) Methyl

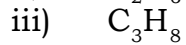
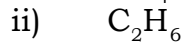


r) Ethyl

s) Propyl

Answer: i-q, ii-r, iii-s, iv-p

Solution:



q) Methyl

r) Ethyl

s) Propyl

p) Butyl

KEY

			TEACHING TASK							
JEE MAINS LEVEL QUESTIONS										
1	2	3	4	5	6	7	8	9	10	
B	B	A	2	4	2	2	4	1	2	
11(2)	JEE ADVANCED LEVEL QUESTIONS									
12	13	14	15	16	17	18	19	20		
1,2,3,4	1	1	1	2	4	1	2	A-4,B-3,C-2,D-1		
			LEARNERS TASK							
			CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)							
1	2	3	4	5	6	7	8	9	10	
1	2 D	C	B	D	C		4	4	2,3	
JEE MAINS LEVEL QUESTIONS										
11	12	13	14	15	16	17	18	19	20	
B	C	D	A	C	B	B	A	3	A	
JEE ADVANCED LEVEL QUESTIONS										
21	22	23	24	25						
1,2,3,4	A	1	6 i-q,ii-r,iii-s,iv-p							