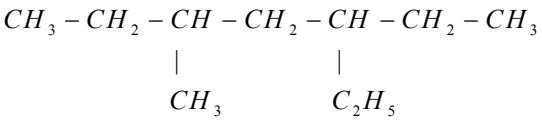
12. ALKANES

SOLUTIONS

TEACHING TASK

JEE MAINS LEVEL QUESTIONS

1. IUPAC name of the following compound

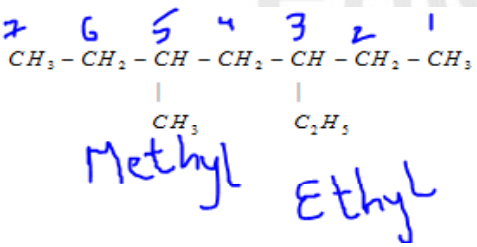


(FA & SA- 5 Marks / 8 Marks)

A) 3- Ethyl, 5-methyl heptane B) 5- Ethyl, 3-methyl heptane
C) 2- Ethyl, 5-methyl heptane D) 4- Ethyl, 5-methyl heptane

Answer:A

Solution:(Parent chain = heptane; substituents located at C-3 (ethyl) and C-5 (methyl).



IUPAC name:3- Ethyl- 5-methyl heptane

2. Both methane and ethane may be obtained by suitable one step reaction from
A) Ethyl iodide B) Methyl iodide C) Formaldehyde D) Acetaldehyde

Answer:B

Solution:Both methane (CH_4) and ethane (C_2H_6) can be obtained from methyl iodide (CH_3I)by the Wurtz reaction: $2CH_3I + 2Na \rightarrow C_2H_6 + 2NaI$

and by reduction, $CH_3I \rightarrow CH_4$.

3. In which of the following reactions in the prepration of ethane a new C-C bond is formed **(FA & SA- 2 Marks)**

A) Sabatier-Senderen's reaction B) Reduction of ethyl iodide
C) Decarboxylation D) Kolbe's electrolysis

Answer:D

Solution:In Kolbe's electrolysis, acetate ions are electrolyzed to form ethane:

$2CH_3COO^- \rightarrow C_2H_6 + 2CO_2 + 2e^-$

Here, a new C–C bond is formed between two methyl groups derived from acetate ions.

4. A hydrocarbon with molecular formula C_8H_{18} gives only one monochloro derivatives the compound is
   A)n-octane B) 2-methyl heptane
   C) 2,2,4-trimethyl pentane D) 2,2,3,3-tetramethyl butane

Answer:D

Solution:(It is the highly symmetrical isomer in which all H's are equivalent $\rightarrow$ only one monochloro product.

5. Which of the following compounds is not formed in the catalytic cracking of octane
   A) pentane B) butene C) propene D) Nonane

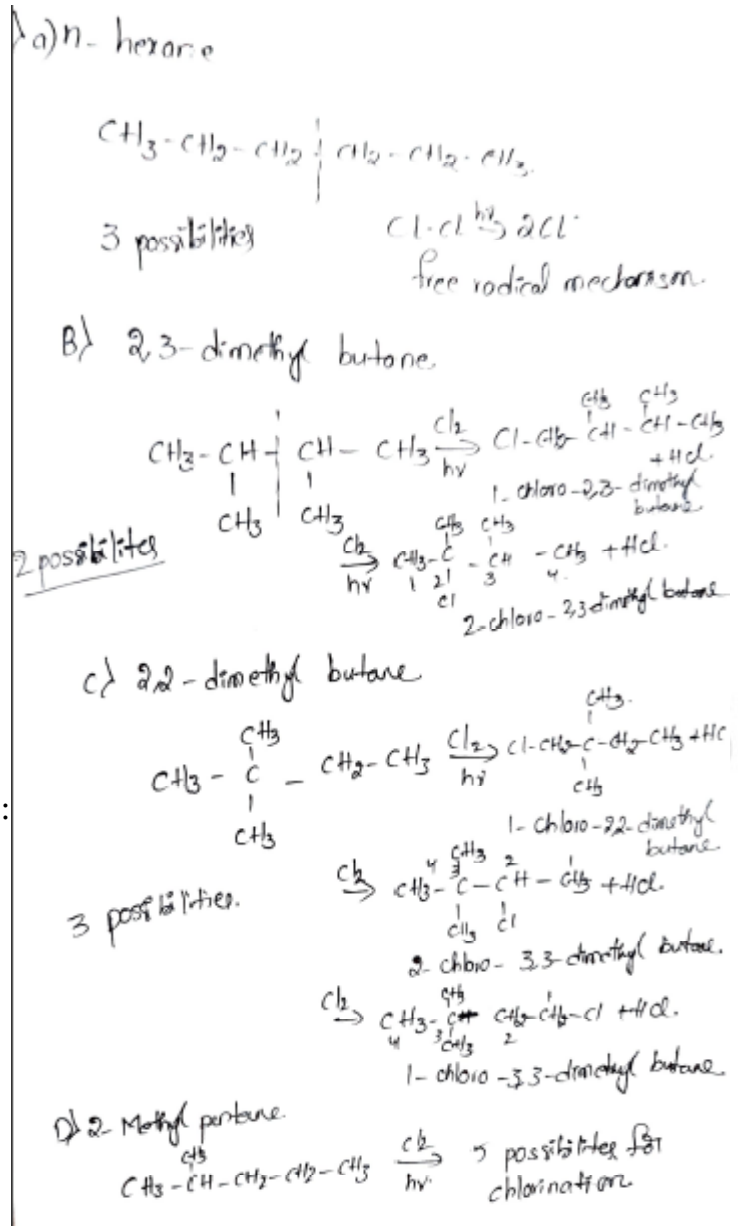
Answer:D

Solution:Catalytic cracking breaks larger hydrocarbons into smaller ones. Octane (C_8H_{18}) cracking produces smaller alkanes and alkenes like pentane, butene, propene — not a larger alkane like nonane (C_9H_{20}).

6. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is (AIEEE - 05)
   A) n - hexane B) 2,3 - dimethyl butane
   C) 2,2 - dimethyl butane D) 2 - methyl pentane

Answer:B

Solution:



7. The most important method of preparation of hydrocarbons of lower carbon number is –
   A) Pyrolysis of higher carbon number hydrocarbons
   B) Electrolysis of salts of fatty acids
   C) Sabatier Senderen's reaction
   D) Direct synthesis

Answer:A

Solution:A) Pyrolysis of higher carbon number hydrocarbons

This is cracking — the most important industrial method to break larger

hydrocarbons into smaller, more useful ones (e.g., gasoline range hydrocarbons).
The other options:
B) Kolbe's electrolysis — limited to symmetrical alkanes, not major industrial method.
C) Sabatier-Senderen's reaction — hydrogenation of alkenes to alkanes, not for lowering carbon number.
D) Direct synthesis — not a common general method.

8. Which one of these will react with sodium metal –
A) Ethyne B) Ethene C) Ethane D) Ether

Answer:A

Solution:Ethyne (C_2H_2) contains acidic hydrogen atoms, which react with sodium metal to form sodium acetylide and hydrogen gas

$$2C_2H_2 + 2Na \rightarrow 2C_2HNa + H_2$$

9. Bromination of alkane is initiated by a process of
A) Pyrolysis B) Substitution C) Homolysis D) Peroxidation

Answer:C

Solution:Bromination of alkanes proceeds via a free radical mechanism, which is initiated by the homolysis of the Br–Br bond when exposed to light or heat:

$$Br_2 \xrightarrow{h\nu} 2Br^{\cdot}$$

10. Final products of complete oxidation of hydrocarbon is
A) Acid B) Dihydric alcohol
C) Aldehyde D) H_2O+CO_2

Answer:D

Solution:Complete oxidation of a hydrocarbon (combustion) means reaction with oxygen until fully oxidized, producing only CO_2 and H_2O as final products.

11. Isomerisation in alkane can be brought by using
A) Al_2O_3 B) Fe_2O_3
C) $Anh.AlCl_3 / HCl\ at\ 200^0C$ D) $Conc.H_2SO_4$

Answer:C

Solution:Alkane isomerisation typically uses anhydrous aluminum chloride $AlCl_3$ and hydrogen chloride HCl as a catalyst at an elevated temperature and pressure (around 200°C) . These conditions facilitate the rearrangement of a straight-chain alkane into branched isomers, a process often used in petroleum refining to improve fuel quality

12. In aromatisation of n-hexane, the catalyst used is
A) Cr_2O_3 B)V_2O_5 C)Mo_2O_3 D)All

Answer:D

Solution:Various metal oxides such as Cr_2O_3, V_2O_5, Mo_2O_3 are used for dehydroaromatisation / reforming-type reactions

13. The most oxidised form of ethane is

A) CO_2 B) HCHO C) HCOOH D) CH_3COOH

Answer:A

Solution:The most oxidized form of ethane (C_2H_6) means converting all carbon atoms to their highest possible oxidation state.

Oxidation states of carbon:

In ethane (C_2H_6): -3 each

In CO_2: +4 each (highest possible)

In HCHO (formaldehyde): 0

In HCOOH (formic acid): +2

In CH_3COOH (acetic acid): -3 (CH_3) and +3 (COOH) average 0

Complete combustion of ethane gives CO_2, where carbon is in its maximum oxidation state (+4).

14. Conversion of high molecular weight hydrocarbons into low molecular weight hydrocarbons in the absence of air is known as

(FA & SA- 3 Marks / 4 Marks)

A) Polymerisation B) Hydrolysis C) Pyrolysis D) Isomerisation

Answer:C

Solution:The breaking down of high molecular weight hydrocarbons into simpler, low molecular weight hydrocarbons in the absence of air is called pyrolysis (cracking)

15. The following substance is used as anti knocking compound

A) TEL B) Lead tetrachloride

C) Lead acetate D) C_2H_5PbCl

Answer:A

Solution:Tetraethyllead historically used as anti-knock additive in petrol

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

1. Which of the following statements about alkanes are true?

a) Alkanes are saturated hydrocarbons.

b) Alkanes undergo addition reactions.

c) Alkanes have the general formula C_nH_{2n+2}.

d) Alkanes exhibit geometrical isomerism.

Answer:a,c

Solution:a) True — They contain only C–C and C–H single bonds.

b) False — Alkanes mainly undergo substitution reactions, not addition (addition is for alkenes/alkynes).

c) For acyclic alkanes without rings.

d) No double bonds, so no cis-trans isomerism in simple alkanes (though they can have conformational isomers, not usually called geometrical isomers in basic organic chemistry).

2. Consider the following reactions involving alkanes:
I. Combustion reaction II. Halogenation reaction
III. Substitution reaction with hydroxyl radical
IV. Isomerization reaction

Answer:I,II,III,IV

Solution:All of these are possible for alkanes:
I. Combustion — with O_2 to give CO_2 + H_2O.
II. Halogenation — free radical substitution with Cl_2/Br_2.
III. Substitution with hydroxyl radical — occurs in atmosphere with •OH (H-abstraction, not substitution at carbon directly but free radical chain leading to oxidation). In organic chemistry terms, hydroxyl radical abstracts H from alkane (first step of oxidation).
IV. Isomerization — branched from straight-chain via acid catalysts.

Assertion and Reason Type:

A) Both Assertion & Reason are true and R is the correct explanation of Assertion
B) Both Assertion & Reason are true and R is not the correct explanation of Assertion
C) Assertion is true, Reason is false.
D) Assertion is false, Reason is true.

3. **Assertion :** Alkanes are relatively unreactive compared to other hydrocarbons like alkenes and alkynes.
Reason : Alkanes have only single bonds between carbon atoms, which are harder to break than the double or triple bonds present in alkenes and alkynes.

Answer:C

Solution:Alkanes are less reactive than alkenes/alkynes (Assertion true).
The Reason's claim that single bonds are harder to break than double or triple bonds is misleading — a C=C has a s σ and a π bond; the π bond is relatively reactive (easy to attack), which is why alkenes/alkynes react more readily. So the Reason is not a correct statement/explanation

4. **Assertion :** Alkanes exhibit a relatively low reactivity compared to other organic compounds.
Reason : The carbon-carbon single bonds in alkanes are relatively strong, making them less prone to undergo chemical reactions.

Answer:A

Solution:Alkanes show low reactivity. One main reason is that they contain mostly strong, nonpolar C–C and C–H single bonds and lack reactive functional groups — this does make them less prone to many common reactions (so R correctly explains A)

6. **Assertion :** Alkanes can undergo combustion reactions to produce carbon dioxide and water.
Reason : Combustion of alkanes releases a large amount of energy due to the high bond energies in the carbon-carbon and carbon-

hydrogen bonds.

Answer:C

Solution:Assertion:True — complete combustion gives CO_2 + H_2O.

Reason: Misleading — High bond energies in reactants would mean harder to break, so less energy released. Actually, combustion is exothermic because the bonds in the products (C=O and O–H) are much stronger than in reactants. So the reason is false in its stated form.

7. **Assertion :** Alkanes can undergo halogenation reactions in the presence of halogens such as chlorine or bromine.
   Reason : The relatively weak carbon-halogen bond in the halogenated product makes the reaction favorable under appropriate conditions.

Answer:C

Solution:Alkanes undergo halogenation via a radical mechanism in presence of halogens/UV (Assertion true).

The Reason given — that the reaction is favorable because the C–X bond in the product is relatively weak — is not a correct general explanation of why halogenation proceeds (reaction mechanism and radical stability/bond dissociation energies govern the process

Comprehension Type:

Alkanes are hydrocarbons consisting entirely of single-bonded carbon and hydrogen atoms. These molecules are known for their relatively inert nature under standard conditions. However, they can undergo various reactions under appropriate conditions. One such reaction is halogenation, where alkanes react with halogens to form alkyl halides. The reactivity of alkanes in halogenation increases with increasing chain length and branching.

8. Consider the following statements regarding the halogenation of alkanes:
   I. The rate of halogenation of alkanes increases with increasing chain length.
   II. The rate of halogenation of alkanes decreases with increasing branching.
   III. The major product of the halogenation of 2-methylbutane with chlorine is 2-chloro-2-methylbutane.
   IV. The major product of the halogenation of cyclohexane with bromine is 1,2-dibromocyclohexane.
   Which of the statements are true?
   A) I and II only B) I and III only C) II and IV only D) III and IV only

Answer:B

Solution:

I — True. Longer chains have more abstractable H atoms (higher probability of H-abstraction), so overall halogenation rate (per molecule) increases with chain length.

II — False. Increased branching usually increases the proportion of more

reactive (secondary/tertiary) H atoms, so halogenation rate does not generally decrease with branching.

III — True. In 2-methylbutane the C-2 hydrogen is tertiary (most easily abstracted), so chlorination gives mainly substitution at C-2 ? 2-chloro-2-methylbutane.

IV — False. Cyclohexane radical bromination gives monobromocyclohexane (substitution). 1,2-dibromocyclohexane would be an addition product requiring a C=C; cyclohexane has none.

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CQU'S)

1. Alkanes are also known as

A) olefins B) unsaturated aliphatic hydrocarbons
C) saturated aromatic hydrocarbon D) paraffins

Answer:D

Solution:Alkanes are called paraffins (from Latin parum affinis = little affinity) due to their low reactivity.

2. The name fire damp is given to

A) methane B) ethane C) propane D) butane

Answer:A

Solution:"Fire damp" is the mining term for methane gas found in coal mines, which can cause explosions.

3. Hydrocarbon which is liquid at room temperature is

A) Pentane B) Butane C) Propane D) Ethane

Answer:A

Solution:Alkanes with 1–4 carbons are gases at room temperature; pentane (C_5H_{12}) is liquid.

4. Pyrolysis of Methane and Ethane respectively are

A) Exothermic & Endothermic B) Endothermic & Exothermic
C) Both are endothermic D) Both are exothermic

Answer:C

Solution:Both are endothermic (thermal decomposition requires heat)

5. Soda lime is

A) $NaOH$ B) $NaOH + CaO$ C) CaO D) Na_2CO_3

Answer:B

Solution:Soda lime is a mixture used in organic chemistry for decarboxylation, made mainly of CaO with some NaOH (and a little water).

6. Methyl bromide is converted into ethane by heating it in ether medium with

A) Al B) Mg C) Na D) Cu

Answer:C

Solution:Methyl bromide (CH_3Br) reacts with sodium in dry ether — this is the Wurtz

reaction, forming ethane (C_2H_6).

$2CH_3Br + 2Na \rightarrow C_2H_6 + 2NaBr$

7. Alkyl halides react with dialkyl copper reagents to give (AIEEE -2005)
   A) alkenes B)alkyl copper halide
   C)alkanes D)alkenyl halides

Answer:C

Solution:Dialkyl copper reagents (Gilman reagents) react with alkyl halides to give alkanes via a coupling reaction: $R_2CuLi + R'X \rightarrow R - R' + RCu + LiX$

This is a key method for forming C–C bonds to produce alkanes.

8. The reaction represents $C_{12}H_{26} \rightarrow C_6H_{12} + C_6H_{14}$
   A) subsititution B) synthesis C) cracking D) polymerization

Answer:C

Solution:cracking (breaking a larger alkane into smaller alkane + alkene).

9. Select the correct statement about alkanes
   A) they are polar in nature B) they are soluble in water
   C) they are non-combustible D) their dipole moment is zero

Answer:D

Solution:Alkanes are nonpolar molecules, insoluble in water, and highly combustible.

Hence, the correct statement is that their dipole moment is zero.

JEE MAINS LEVEL QUESTIONS

1. Alkanes are readily attacked by – **(FA & SA- 2 Marks)**
   A) Electrophiles B) Nucleophiles C) Free radicals D) bases

Answer:C

Solution:Alkanes undergo substitution reactions via free radical mechanisms (e.g., halogenation).

2. Isopropyl bromide undergoes Wurtz reaction to form –
   A) Hexane B) 2, 3-Dimethyl butane
   C) Propane D) Neohexane

Answer:B

Solution:Wurtz reaction with isopropyl bromide:

$2(CH_3)_2CHBr + 2Na \rightarrow (CH_3)_2CH - CH(CH_3)_2$

That is 2,3-dimethylbutane.

3. Alkanes can be prepared from Grignard reagents by reacting with –
   A) Alcohols B) Primary amines
   C) Alkynes D) All of them

Answer:D

Solution:Grignard reagents (RMgX) react with alcohols, primary amines, and alkynes — all of which contain acidic hydrogen — to form alkanes

4. Which reducing agent is used in Clemmensen reduction –

A) Zn/ HCl B) $LiAlH_4$ C) Zn-Hg/HCl D) Na/C_2H_5OH

Answer:C

Solution:Clemmensen reduction of carbonyl to methylene uses Zn-Hg amalgam with HCl.

5. Isomerisation in alkane may be brought about by using

A) Al_2O_3 B) Fe_2O_3 C) $AlCl_3$ and HCl D) concentrated H_2SO_4

Answer:C

Solution:Catalytic isomerization uses anhydrous $AlCl_3$ + HCl.

6. Formatio of alkane by the action of Zn on alkyl halide is called –

(FA & SA- 3 Marks / 4 Marks)

A) Frankland reaction B) Wurtz reaction

C) Cannizzaro's reaction D) Kolbe's reaction

Answer:A

Solution:Zn reduces RX $\rightarrow$ RH (alkyl halide $\rightarrow$ alkane).This is Frankland reaction

7. The hydrocarbon which is a liquid at room temperature is –

A) butane B) propane C) decane D) neopentane

Answer:C

Solution:Butane (C_4H_{10}) $\rightarrow$ gas

Propane (C_3H_8) $\rightarrow$ gas

Decane ($C_{10}H_{22}$) $\rightarrow$ liquid (bp ˜ 174°C)

Neopentane $\rightarrow$ gas

8. Which of the following will not produce ethane

A) Reduction of CH_3COOH with HI/P_4

B) Reduction of CH_3COCH_3 with HI/P_4

C) Decarboxylation of sodium propionate with soda lime

D) Hydrogenation of ethene in the presence of Ni.

Answer:B

Solution:A) Reduction of CH3COOH with HI/P_4 $\rightarrow$ $CH_3–CH_3$ $\rightarrow$ produces ethane

B) Reduction of CH_3COCH_3 with HI/P4 $\rightarrow$ $CH_3–CH_2–CH_3$ $\rightarrow$ propane, not ethane

C) Decarboxylation of sodium propionate $\rightarrow$ $CH_3–CH_3$ $\rightarrow$ produces ethane

D) Hydrogenation of ethene $\rightarrow$ CH3–CH3 $\rightarrow$ produces ethane

9. The thermal decomposition of alkanes in the absence of air is known as –

A) oxidation B) Combustion C) Hydrogenation D) pyrolysis

Answer:D

Solution:Pyrolysis (also called cracking) is the thermal decomposition of alkanes in the absence of air, leading to the formation of smaller alkanes and alkenes.

10. Methane can be prepared by :
A) Wurtz reactions B) hydrogenation
C) decarboxylation D) dehydrohalogenation

Answer:C

Solution:Methane can be prepared by heating sodium acetate with soda lime (decarboxylation): $CH_3COONa + NaOH \xrightarrow{CaO} CH_4 + Na_2CO_3$

The other methods:
Wurtz reaction gives higher alkanes (not methane).
Hydrogenation of alkenes/alkynes gives alkanes but methane preparation is not practical this way.
Dehydrohalogenation gives alkenes, not methane.

11. Whihc of the following alkyl halides is not suitable for Corey-House synthesis of alkanes –
A) CH_3l B) C_2H_5Br C) $CH_3CH_2CH_2CH_2l$ D)$(CH_3)_3$ CBr

Answer:D

Solution:Corey-House reaction: R2CuLi + R'–X $\rightarrow$ R–R'
Tertiary halides (sterically hindered) do not react well.
$(CH_3)_3$ CBr$\rightarrow$ tertiary $\rightarrow$unsuitable

12. An alknae is most likely to react with –
A) A free radical B) An alkali
C) An electrophilic D) A nucleophile

Answer:A

Solution:Alkanes undergo free-radical substitution.

13. The most volatile alkane is : **(FA & SA- 5 Marks/8 Marks)**
A) n-pentane B) isopentane C) neopentane D) n-hexane

Answer:C

Solution: Volatility depends on boiling point:
Neopentane (2,2-dimethylpropane) is highly branched $\rightarrow$ weaker intermolecular forces $\rightarrow$ lowest boiling point $\rightarrow$ most volatile.
n-pentane and isopentane have higher boiling points than neopentane.
n-hexane has even higher boiling point.
Order of boiling points:
neopentane < isopentane < n-pentane < n-hexane

14. Which of the following reactions does not involved a C–C bond formation?
A) Hydrolysis of a Grignard reagent
B) Combination of two alkyl free radicals
C) Corey-House synthesis of alkanes
D) RNa + R – Br ® R – R + NaBr

Answer:A

Solution:

A) Hydrolysis of Grignard reagent: $RMgX + H_2O \rightarrow RH + Mg(OH)X \rightarrow$ no new C–C bond

B) Combination of two alkyl radicals: forms new C–C bond

C) Corey-House synthesis: forms C–C bond

D) $RNa + R–Br \rightarrow R–R + NaBr$ (Wurtz reaction) $\rightarrow$forms C–C bond

15. Wurtz reaction on a mixture of ethyl halide and isobutyl halide gives –

A) Butane and isobutane

B) Butane and 2, 5-dimethylhexane

C) Butane,2,5-dimethylhexane and isohexane

D) Butane and isohexane

Answer:C

Solution:Ethyl halide ($C_2H_5–X$) + isobutyl halide ($(CH_3)_2CH–CH_2–X$) in Wurtz reaction gives:

$C_2H_5–C_2H_5 \rightarrow$ butane

$(CH_3)_2CH–CH_2–CH_2–CH(CH_3)_2 \rightarrow$ 2,5-dimethylhexane

$C_2H_5–CH_2–CH(CH_3)_2 \rightarrow$isohexane (2-methylpentane)

16. Which reducing agent is used in Clemmensen reduction ?

A) Zn/HCl B) $LiAlH_4$ C) Zn-Hg/HCl D) Na/C_2H_5OH

Answer:C

Solution:Clemmensen: carbonyl $\rightarrow CH_2$ using Zn-Hg amalgam and HCl.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type :

1. Which of the following statements are true regarding the physical properties of alkanes?

A) As the number of carbon atoms increases, the boiling point increases.

B) Alkanes are generally soluble in water.

C) Alkanes have higher densities compared to water.

D) Alkanes show decreasing flammability with increasing molecular weight.

Answer:A,D

Solution:

A) True $\rightarrow$ Boiling point increases with increasing molecular weight because van der Waals forces increases

B) False$\rightarrow$ Alkanes are non-polar, insoluble in water.

C) False $\rightarrow$Densities of alkanes are less than water (~0.6–0.8 g/cm^3).

D) True $\rightarrow$ Flammability decreases with increasing molecular weight; smaller alkanes are more volatile and ignite easily

2. Regarding the nomenclature of alkanes:

A) Alkanes with straight-chain structure are named using the prefix "iso-

B) The systematic names of alkanes are based on the number of carbon atoms present in the longest continuous chain.

C) Alkanes with branched structures are named using the prefix "neo-".

D) Alkanes with cyclical structures are named using the prefix "cyclo-".

Answer:B,D

Solution:A) False → Straight-chain alkanes are not named with "iso-"; "iso-" is for branched chains with a terminal methyl group.

B) True → Systematic names are based on the longest continuous chain.

C) False →"Neo-" is used when a carbon atom is bonded to four other carbons (tetramethyl).

D) True → Cyclic alkanes are named using the prefix "cyclo-"

Assertion and Reason Type :

A) Both Assertion & Reason are true and R is the correct explanation of Assertion

B) Both Assertion & Reason are true and R is not the correct explanation of Assertion

C) Assertion is true, Reason is false.

D) Assertion is false, Reason is true.

3. **Assertion :** Alkanes can be converted to alcohols through the process of hydration in the presence of a strong acid catalyst.

   Reason : The addition of water across the carbon-carbon double bond in alkanes leads to the formation of alcohols via Markovnikov addition.

Answer:D

Solution:Assertion: False → Alkanes are saturated hydrocarbons; they do not have C=C bonds, so they cannot undergo direct acid-catalyzed hydration. Hydration works for alkenes, not alkanes.

Reason: False →There is no C=C in alkanes, so this statement is also incorrect

4. **Assertion :** Alkanes can undergo substitution reactions with halogens in the presence of sunlight or heat.

   Reason : The weak carbon-hydrogen bonds in alkanes can be replaced by halogen atoms in a substitution reaction mechanism.

Answer:A

Solution:Assertion: True → This is classic free radical halogenation (e.g., $CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$ in sunlight).

Reason: True but not entirely correct explanation → The reaction happens via free radicals initiated by light/heat, not simply because C–H bonds are weak

Comprehension Type:

Alkanes are saturated hydrocarbons composed entirely of single bonds between carbon atoms. They are characterized by their molecular formula C_nH_{2n+2}. One important property of alkanes is their boiling point, which is primarily determined by the size of the molecule and the strength of the London dispersion forces between the molecules. As the molecular size increases, the surface area and hence the London dispersion forces increase, leading to higher boiling points. However, branching in alkanes can significantly affect their boiling points due to the altered surface area and molecular shape.

5. Which of the following statements regarding the boiling points of alkanes is true?
A) Boiling points of linear alkanes are generally lower than those of their branched isomers.
B) Boiling points of alkanes increase linearly with the number of carbon atoms in the chain.
C) Boiling points of cyclic alkanes are always higher than those of linear alkanes with the same number of carbon atoms.
D) Boiling points of alkanes are solely determined by the strength of hydrogen bonding between molecules.

Answer:B

Solution:A) False — The opposite is true: branched alkanes have lower boiling points than their linear isomers due to decreased surface area and weaker London dispersion forces.
B) True — As the carbon chain length increases, molecular weight and London forces increase, causing a steady rise in boiling point (though not perfectly linear, it's generally a smooth increase).
C) False — Cyclic alkanes often have higher boiling points than branched isomers but not always higher than linear alkanes. For example, cyclohexane (bp 80.7°C) vs. n-hexane (bp 68.7°C) — here it is higher, but not "always" true for all sizes; the statement is too absolute and fails for some comparisons.
D) False — Alkanes have no hydrogen bonding; boiling points depend on London dispersion forces.

KEY

				TEACHING TASK					
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
A	B	D	D	D	B	A	A	C	D
11	12	13	14	15					
C	D	A	C	A					
			JEE ADVANCED LEVEL QUESTIONS						
1	2	3	4		6	7	8		
A,C	A,B,C,D	C	A		C	C	B		
				LEARNERS TASK					
			CONCEPTUAL UNDERSTANDING QUESTIONS (CQU'S)						
1	2	3	4	5	6	7	8	9	
D	A	A	C	B	C	C	C	D	
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
C	B	D	C	C	A	C	B	D	C
11	12	13	14	15	16				
D	A	C	A	C	C				
			JEE ADVANCED LEVEL QUESTIONS						
1	2	3	4	5					
A,D	B,D	D	A	B					