

CHEMISTRY 9th (New Book)

CHAPTER NO 11

Hydrocarbon

Exercise: Multiple Choice Questions

1.	Hydrogen	2.	Mg
3.	CO ₂ and H ₂ O	4.	Because zinc acts as a reducing agent
5.	n-butane	6.	Addition
7.	Methane	8.	CH ₃ CH ₃
9.	Cracking	10.	5 Mole

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Short Question Answers

i. Difference between Organic and Inorganic Compounds.

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Organic Compounds	Inorganic Compounds
Definition	
Contain covalently bonded carbon as an essential component.	Made up of almost all elements except hydrocarbons.
Occurrence	
Found in living things (plants and animals).	Found in non-living things (rocks).
Example	
Carbohydrates, proteins	NaCl, CaCO ₃

ii. Why are organic compounds found in large numbers?

The existence of a large number of organic compounds is due to:

- (a) Catenation
- (b) Multiple Bonding
- (c) Isomerism
- (d) Strength of covalent bond

iii. Products of controlled oxidation of natural gas.

When natural gas (methane) is oxidized under controlled conditions, it forms:

- (a) Carbon dioxide (CO₂)
- (b) Water (H₂O)
- (c) A large amount of heat



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iv. How naphtha is decomposed.

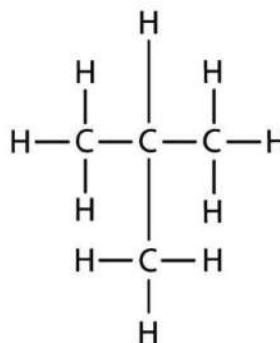
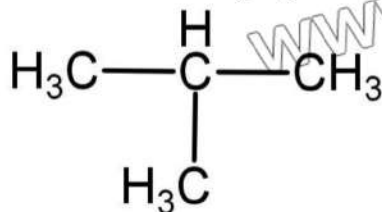
Naphtha fraction from petroleum is heated at around 500°C in the presence of a zeolite catalyst to give lower

hydrocarbons (alkanes and alkenes) containing 5 to 10 carbon atoms.

v. Write down the molecular formula, structural formula and the condensed formula for iso-butane.

Molecular Formula: C_4H_{10}

Structural Formula: (Depicted as a branched chain with a central carbon connected to three CH_3 groups and one H)



vi. How are organic compounds useful for us?

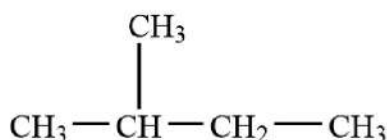
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- Uses as food (carbohydrates, proteins, fats, vitamins).
- Uses as clothing (natural and synthetic fibers).
- Uses as fuel (coal, petroleum, natural gas).

vii. Write down the names five such organic compounds which exist naturally?

- Methane
- Glucose
- Citric acid
- Cellulose
- Cholesterol

viii. Give IUPAC name to the following compound.



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2-methylbutane

ix. How do the melting and boiling points of alkanes change when we move from lower members to higher members?

They increase due to increasing attractive forces from increasing molecular mass. C_1 - C_4 are gases, C_5 - C_{10} are liquids, higher alkanes are solids.

Q#3: Constructed Response Questions

i. Why do alkanes show little reactivity towards the other reagents?

The strength of the single bond is difficult to break, requiring a significant amount of energy.

ii. Why does a mixture of natural gas and air explode?

Natural gas (primarily methane) is very flammable. When ignited, it undergoes combustion, releasing a large amount of heat along with CO_2 and H_2O vapor, causing an explosion.

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iii. How do you compare the melting and boiling points of inorganic and organic compounds?

Organic compounds have weak intermolecular forces (covalent bonds), leading to low melting and boiling points.

Inorganic compounds often have strong ionic bonds and attractive forces, leading to high melting and boiling points.

iv. Reactions of alkanes with chlorine takes place in the presence of sunlight. What is the role of sunlight in the reaction?

Sunlight generates a chlorine free radical from Cl_2 , which initiates the free radical mechanism for the reaction with alkanes.

v. How do you compare the boiling point of n-butane with that of iso-butane?

Straight-chain compounds (n-butane) have stronger intermolecular forces than branched-chain compounds (iso-butane), resulting in a higher boiling point for n-butane. "While iso-butane has straight chain three carbon atoms with one carbon as a branch. So, n-butane has higher boiling point than iso-butane."

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vi. Why are organic compounds not generally soluble in water?

Due to the principle "Like Dissolves Like". Organic compounds are mostly non-polar, while water is a polar solvent. Therefore, they are generally not soluble.

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