



BK BIRLA CENTRE FOR EDUCATION
SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY | CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL



PRE MID TERM EXAMINATION -2024-25

CHEMISTRY (043)

Class : XI
Date : 07/01/2025

Duration: 1 Hr
Max. Marks: 25

Answer Key

Section A: 1-Mark Questions

- Which of the following is an example of an electrophile?**
Answer: (c) H^+
Explanation: Electrophiles are electron-deficient species that accept electron pairs. H^+ is an electron-deficient ion.
- Identify the correct IUPAC name of the compound $CH_3 -CH_2 -CH=CH_2$.**
Answer: (a) 1-Butene
Explanation: The double bond starts at the first carbon in this compound.
- What is the general formula of alkanes?**
Answer: (b) C_nH_{2n+2}
Explanation: Alkanes are saturated hydrocarbons and follow this formula.
- Assertion (A): Alkanes are saturated hydrocarbons.**
Reason (R): Alkanes contain only sigma bonds between carbon atoms.
Answer: (a) Both A and R are correct, and R explains A.
- Assertion (A): Benzene is more stable than expected from its structure.**
Reason (R): Benzene undergoes addition reactions readily.
Answer: (c) A is correct, but R is incorrect.
Explanation: Benzene is stable due to resonance and primarily undergoes substitution, not addition reactions.

Section B: 2-Mark Questions

- Define the term functional group. Give an example of a compound containing a functional group.**
Answer:
A functional group is an atom or group of atoms within a molecule that determines the chemical properties of the molecule.
Example: -OH in ethanol (C_2H_5OH).
- Differentiate between homolytic and heterolytic bond fission with examples.**
Answer:
 - Homolytic fission:** The bond breaks equally, and each atom gets one electron.
Example: $Cl_2 \rightarrow Cl\cdot + Cl\cdot$
 - Heterolytic fission:** The bond breaks unequally, and one atom gets both electrons.
Example: $H-Cl \rightarrow H^+ + Cl^-$

8. Write the structure and IUPAC name of the following compounds:
 (a) Alkene: $\text{CH}_3 - \text{CH}=\text{CH}-\text{CH}_2 - \text{CH}_3 \rightarrow \text{Pent-2-ene}$
 (b) Alkyne: $\text{CH}\equiv\text{C}-\text{CH}_2 - \text{CH}_3 \rightarrow \text{But-1-yne}$
9. Explain the term resonance with reference to benzene. Draw its resonance structures.

Answer:

Resonance is the delocalization of π -electrons in a molecule to stabilize it.

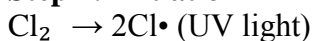
Resonance structures of benzene:

Section C: 3-Mark Questions

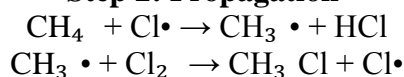
10. Write the mechanism of the free radical substitution reaction of methane with chlorine.

Answer:

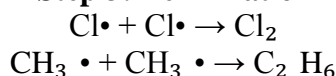
Step 1: Initiation



Step 2: Propagation



Step 3: Termination



11. What are isomers? Write the structural isomers of C_4H_{10} and name them using IUPAC rules.

Answer:

Isomers: Compounds with the same molecular formula but different structures.

- **n-Butane:** $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$
- **Iso-Butane (2-methylpropane):**

12. Convert the following:

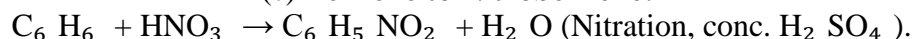
(a) **Ethene to Ethane:**



(b) **Ethene to Ethanol:**



(c) **Benzene to Nitrobenzene:**



13. Write short notes on the following:

(a) **Aromaticity:**

Aromatic compounds follow Huckel's rule: $(4n + 2) \pi$ -electrons. Benzene is aromatic with 6 π -electrons.

(b) **Electrophilic substitution reactions of benzene:**

- **Nitration:** $C_6 H_6 + HNO_3 \rightarrow C_6 H_5 NO_2 + H_2 O$
- **Halogenation:** $C_6 H_6 + Cl_2 \rightarrow C_6 H_5 Cl + HCl$ ($FeCl_3$ catalyst).