

SAMPLE PAPERS
DIPLOMA FIRST SEMESTER EXAMINATION 2025 (JUT)
ENGINEERING CHEMISTRY
DIPLOMA WALLAH

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Full Marks: 70 | **Time:** 3 Hours

Instructions:

1. Question No. 1 is **compulsory**.
 2. Answer any **FOUR** questions from the remaining (Q. 2 to Q. 7).
 3. All questions carry equal marks (14 marks each).
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Q.1 Multiple Choice Questions (Answer all 7) [2 x 7 = 14 Marks]

i. Which subatomic particle was discovered by J.J. Thomson?

- a) Proton b) Neutron c) Electron d) Positron

ii. Atoms of the same element with different mass numbers are called:

- a) Isobars b) Isotopes c) Isotones d) Isomers

iii. The bond formed by the complete transfer of electrons from one atom to another is:

- a) Covalent b) Metallic c) Electrovalent d) Hydrogen bond

iv. Which of the following is a strong electrolyte?

- a) Acetic acid b) NH_4OH c) NaOH d) Pure water

v. The process of heating the ore in the absence of air below its melting point is:

- a) Roasting b) Calcination c) Smelting d) Refining

vi. Natural rubber is a polymer of:

- a) Ethylene b) Isoprene c) Vinyl Chloride d) Styrene

vii. Which gas is primarily responsible for Global Warming?

a) N₂ b) O₂ c) CO₂ d) H₂

Q.2

A. State the postulates of Bohr's Atomic Model. Discuss its limitations in detail.

B. Define Corrosion. Explain the mechanism of atmospheric corrosion and discuss Galvanization as a protective method.

Q.3

A. Explain the Arrhenius Theory of Ionization and list the factors that affect the degree of ionization.

B. Define Metallurgy. Explain the steps involved in the concentration of ores using the Froth Floatation process.

Q.4

A. What are Polymers? Differentiate between Addition and Condensation polymerization with one example each.

B. Define Water Pollution. Discuss the various sources of water pollution and its prevention methods.

Q.5

A. Explain the four Quantum Numbers (n, l, m, s) and state their significance in defining the position of an electron.

B. Write a detailed note on E-waste: its origins, harmful effects on the environment, and management.

Q.6

A. Explain the formation of NaCl (Ionic bond) and Cl₂ (Covalent bond) using Lewis dot structures.

B. Describe the construction and working of a Lead-Acid Storage Cell with a neat labeled diagram.

Q.7 Write Short Notes on any FOUR: [3.5 x 4 = 14 Marks]

A. Distinction between Orbits and Orbitals.

B. Faraday's First Law of Electrolysis.

C. Composition and uses of Gun Metal.

D. Difference between Thermoplastic and Thermosetting plastics.

E. Causes and effects of the Greenhouse Effect.

MODEL SOLUTIONS (PAPER – 1)

MCQ Answer Key:

i. c) Electron | ii. b) Isotopes | iii. c) Electrovalent | iv. c) NaOH | v. b) Calcination | vi. b) Isoprene | vii. c) CO₂

Short Answer Highlights (Q.7):

- **Orbits vs Orbitals:** Orbits are circular paths (2D); Orbitals are 3D spaces where electron probability is high.
 - **Gun Metal:** 88% Copper, 10% Tin, 2% Zinc. Used for bearings and hydraulic fittings.
 - **Faraday's 1st Law:** $W = ZIt$ (Mass deposited is proportional to charge passed).
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