| Code No.: CH102BS/151AF | R20 | H.T.No. | | | 8 | R | | | | | | |
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**CMR ENGINEERING COLLEGE: : HYDERABAD**
**UGC AUTONOMOUS**
**I–B.TECH–I–Semester End Examinations (Supply) -June- 2025**
**ENGINEERING CHEMISTRY**
**(Common for CSD, CSM, ECE, MECH, AI&DS)**

**[Time: 3 Hours]** **[Max. Marks: 70]**

**Note:** This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART-A** **(20 Marks)**

| | | | |
|---|---|---|---|
| 1. | a) | What are the Units of Hardness of Water? | [2M] |
| | b) | Define Osmosis and Reverse Osmosis. | [2M] |
| | c) | Define Atomic Orbital and Molecular Orbital. | [2M] |
| | d) | Discuss any two salient features of Crystal Field Theory. | [2M] |
| | e) | Derive Nernst's Equation. | [2M] |
| | f) | Differentiate Primary and Secondary cells. | [2M] |
| | g) | Define Octane number and Cetane number. | [2M] |
| | h) | Discuss any two applications of CNG and LPG. | [2M] |
| | i) | List out the types of corrosion. | [2M] |
| | j) | Discuss Functionality of monomers with an example. | [2M] |

**PART-B** **(50 Marks)**

| | | |
|---|---|---|
| 2. | Explain the process involved in Ion-Exchange Process. | [10M] |
| | **OR** | |
| 3. | Estimate Hardness of water by complexometric method. | [10M] |
| 4. | Discuss the Molecular Orbital Energy Level diagrams of O2 and calculate the bond order and Magnetic nature of $O_2$. | [10M] |
| | **OR** | |
| 5. | Explain the Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral complexes. | [10M] |
| 6. | Discuss the reactions involved in the Pb-Acid storage battery with a neat diagram. | [10M] |
| | **OR** | |
| 7. | Construct the Calomel electrode with a neat diagram and explain the reactions involved in it. | [10M] |
| 8. | Write a brief note on Proximate and Ultimate analysis of Coal and its significance. | [10M] |
| | **OR** | |
| 9. | Determine the calorific value of Junker's gas calorimeter. | [10M] |
| 10. | Explain the mechanism involved in Electrochemical corrosion of rusting of Iron. | [10M] |
| | **OR** | |
| 11. | Discuss the Chain growth polymerisation mechanism with suitable example. | [10M] |

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