



I B.Tech I Sem Regular End Examination, July 2021

ENGINEERING CHEMISTRY**(EEE, CSE, CSM, CSI & INF)****Time: 3 Hours.****Max. Marks: 70**

Note: 1. Answer any FIVE questions.

2. Each question carries 7 marks.

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| 1 | a) Define molecular orbital and draw molecular orbital energy level diagram of N ₂ and CO, explain their magnetic nature and bond order. | 7M | 1 | 2 |
| | b) Explain postulates of crystal field splitting energy? | 7M | 1 | 1 |
| 2 | a) What is metallic bond? Explain it on the basis of molecular orbital theory. | 7M | 1 | 3 |
| | b) Write the crystal field splitting of d-orbitals in tetrahedral and octahedral complexes. | 7M | 1 | 2 |
| 3 | a) What is the need of disinfection of water? Explain chlorination and ozonization? | 7M | 2 | 2 |
| | b) Discuss the ion exchange process for water softening. | 7M | 2 | 2 |
| 4 | a) How to determine pH of unknown solution using glass electrode. | 7M | 3 | 3 |
| | b) Discuss various factors influencing the rate of corrosion. | 7M | 3 | 1 |
| 5 | a) 50 mL of a standard hard water containing 1 mg of CaCO ₃ per mL consumed 18 mL of EDTA. 50 mL of a water sample consumed 12 mL of same EDTA solution, using EBT indicator. Calculate the total hardness of water sample in ppm. | 7M | 2 | 2 |
| | b) Define standard electrode potential and explain how electrochemical series was formed? Give its applications. | 7M | 3 | 3 |
| 6 | a) Discuss sequence rules of absolute configuration with suitable examples. | 7M | 4 | 1 |
| | b) Explain oxidation of alcohols using CrO ₃ and reduction of carbonyl compounds using NaBH ₄ . | 7M | 4 | 2 |
| 7 | a) What are nucleophilic substitution reactions? Explain S _N 1 and S _N 2 mechanism. | 7M | 4 | 1 |
| | b) What are the applications of UV-Visible spectroscopy. | 7M | 5 | 2 |
| 8 | a) Describe the principle of IR spectroscopy and explain about various molecular vibrational modes. | 7M | 5 | 2 |
| | b) Explain shielding and deshielding of protons in ¹ H NMR spectroscopy. | 7M | 5 | 3 |