

ANURAG Engineering College

(An Autonomous Institution)

I B.Tech II Semester Supplementary Examinations, Jan/Feb-2024

ENGINEERING CHEMISTRY

(COMMON TO ECE & CSE)

Time: 3 Hours**Max. Marks: 75****Section – A (Short Answer type questions)****(25 Marks)****Answer All Questions**

	Course Outcome	B.T Level	Marks
1. Explain linear combination of atomic orbitals (LCAO)	CO1	L2	2M
2. Explain M.O.T of benzene	CO1	L2	3M
3. Define Potable water	CO2	L1	2M
4. Explain types of hardness	CO2	L2	3M
5. List out anode, cathode and electrolyte used in Lead acid storage battery	CO3	L1	2M
6. Explain how the volume of metal oxide formed plays a key role in acting as a protective layer?	CO3	L2	3M
7. Summarize the role of NaBH ₄ in organic chemistry	CO4	L2	2M
8. Outline the synthesis of Aspirin.	CO4	L2	3M
9. Identify the monomers used for the synthesis of Bakelite	CO5	L2	2M
10. Outline the synthesis of PVC	CO5	L2	3M

Section B (Essay Questions)**Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) i). List out the Salient features of Molecular orbital theory. CO1 L3 5M
 ii). On the basis of MOT draw molecular orbital energy level diagram of N₂ 5M

OR

- B) i). Show through a diagram, the crystal field splitting of d-orbitals in octahedral complexes CO1 L3 5M
 ii). Apply MOT diagrams and calculate the bond order in F₂ and O₂ L3 5M

12. A) i) Determine the temporary, permanent and total hardness in ppm units for a water sample which showed the following analysis. Given CaCO₃ = 32.4 mg/lit, MgCO₃ = 29.2 mg/lit, NaCl = 5.85 mg/lit, CaCl₂ = 22.2 mg/lit, MgSO₄ = 1.2 mg/lit, organic matter = 15.5 mg/lit. Given: (Atomic weight of Ca – 40, H – 1, C – 12, O – 16, Cl – 35.5, S – 32, Mg – 24) CO2 L3 5M
 ii) With reactions explain why hard water does not form lather with soap? How can temporary and permanent hardness be removed? 5M

OR

- B) i) Define boiler troubles? Differentiate scales and sludges CO2 L3 5M
 ii) Differentiate Calgon conditioning and Phosphate conditioning. 5M

13. A) i) Classify the different types of batteries with examples. CO3 L3 5M
 ii) Develop Hydrogen-Oxygen fuel cell with a neat design and chemical reactions. List out the applications of fuel cells. 5M

OR

- B) i) Make use of cell reactions and explain the mechanism of electrochemical corrosion by oxygen consumption. CO3 L3 5M
ii) Utilize the cell reactions to explain the electroplating of copper 5M
14. A) Discuss Unimolecular Nucleophilic Substitution reactions (SN^1) with suitable example. CO4 L3 10M
- OR**
- B) With neat diagrams explain which conformation of n-butane is highly stable? CO4 L3 10M
15. A) What is natural rubber? Why the process of vulcanization is required for natural rubber? CO5 L3 10M
- OR**
- B) i) Compare Thermoplastics and Thermoset plastics with examples. CO5 L3 5M
ii) Explain the preparation, properties and applications of Thiokol rubber. 5M