

CBCS SCHEME

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BCHEE102/202

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2025 Chemistry for EEE Stream

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.*

| Module - 1 | | | M | L | C |
|------------|----|--|---|------|-----|
| Q.1 | a. | Explain conductors, Insulators and semiconductors on the basis of band theory. | 7 | L1,2 | CO1 |
| | b. | Explain the production of single crystal Si by float zone (FZ) process. | 6 | L2 | CO1 |
| | c. | What are conducting polymers? Explain the mechanism of conduction in poly acetylene. | 7 | L2 | CO1 |
| OR | | | | | |
| Q.2 | a. | What is electroless plating? Describe the electroless plating of copper. | 7 | L2 | CO1 |
| | b. | Define the following : i) Polymers ii) Number average molecular mass iii) Weight average molecular mass | 6 | L2 | CO1 |
| | c. | In a sample of polymers, 100 molecules have molecular mass 10^3 g/ mole, 250 molecules have molecular mass 10^4 g/mole and 300 molecules have molecular mass 10^5 g/mole. Calculate number average and weight average molecular mass of polymer. | 7 | L3 | CO1 |
| Module - 2 | | | | | |
| Q.3 | a. | What are batteries? Explain primary, secondary and reserved batteries with example. | 7 | L2 | CO2 |
| | b. | Explain the construction and working of Na-ion battery. Mention its application. | 6 | L2 | CO2 |
| | c. | What are fuel cells? Explain the construction and working of methanol oxygen fuel cell. | 7 | L2 | CO2 |
| OR | | | | | |
| Q.4 | a. | What are flow batteries? Explain the construction and working and applications of vanadium redox flow battery. | 7 | L2 | CO2 |
| | b. | What are photo-voltaic cells? Describe the construction and working of photo-voltaic cell. Mention its advantages and disadvantages. | 7 | L2 | CO2 |
| | c. | Explain the construction, working and application of Li-polymer electrolyte battery. | 6 | L2 | CO2 |
| Module - 3 | | | | | |
| Q.5 | a. | What is Metallic corrosion? Explain the electrochemical theory of corrosion taking iron as an example. | 7 | L2 | CO4 |
| | b. | What is Anodising? Describe the Anodising of Al. Mention its applications. | 7 | L2 | CO4 |

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|-------------------|----|---|---|----|-----|
| | c. | A steel sheet of area 100 inch ² is exposed to air near ocean. After one year period it was found to experience a weight loss of 486g due to corrosion. Given the density of steel in 7.9g/cm ³ . Calculate CPR in i) mpy ii) mmpy. | 6 | L2 | CO4 |
| OR | | | | | |
| Q.6 | a. | What is Cathodic Protection? Explain sacrificial anode method for the corrosion control. | 6 | L2 | CO3 |
| | b. | Identify and explain the type of corrosion taking place in the following cases: i) Bolt and nut made up of two different metal in contact with each other. ii) Presence of dust particles on the metal surface for a long time. | 7 | L2 | CO3 |
| | c. | What is e-waste? Explain the methods of e-waste disposal. | 7 | L2 | CO3 |
| Module – 4 | | | | | |
| Q.7 | a. | What are Nano materials? Explain any three size dependent properties of nano materials. | 7 | L2 | CO4 |
| | b. | Describe synthesis of nano materials by sol-gel method with examples. | 7 | L2 | CO4 |
| | c. | Give the properties and applications of i) OLED ii) QLED. | 6 | L2 | CO4 |
| OR | | | | | |
| Q.8 | a. | Write briefly about i) Nanofibres ii) Nano sensors | 7 | L2 | CO4 |
| | b. | What are perovskite materials? Give the properties and applications of perovskite materials in optoelectronic devices. | 6 | L2 | CO4 |
| | c. | What are liquid crystals? Explain the classification of liquid crystals with suitable examples. Mention their applications. | 7 | L2 | CO4 |
| Module – 5 | | | | | |
| Q.9 | a. | What are reference electrodes? Explain construction, working and application of calomel electrode. | 7 | L2 | CO5 |
| | b. | Explain the working principle and application of conductometric sensors. | 6 | L2 | CO5 |
| | c. | What are concentration cells? Calculate the e.m.f of the following concentration cell at 25°C and write its reactions $\text{Ag} \text{Ag}^+_{(0.01\text{M})} \text{Ag}^+_{(0.1\text{M})} \text{Ag}$ | 7 | L3 | CO5 |
| OR | | | | | |
| Q.10 | a. | Explain the working principle and application of electro chemical sensors. | 6 | L3 | CO5 |
| | b. | What are ion selective electrodes? Explain the construction and application of glass electrode. | 7 | L2 | CO5 |
| | c. | What are potentiometric sensors? Explain the principle Instrumentation and application of potentiometric sensor in the estimation of Fe. | 7 | L3 | CO5 |
