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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

	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
