U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Semester End Main Examinations

Programme: B.E. **Semester: I / II**
Branch: CSE STREAM **Duration: 3 hrs.**
Course Code: 22CH1BSCCS / 22CY2BSCCS **Max Marks: 100**
Course: Applied Chemistry for Computer Science Stream

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	What are secondary reference electrodes? Describe the construction and working of a Calomel electrode.	*CO1*	*PO1*	**6**
	b)	Analyze the effect of following factors on the rate of corrosion with suitable examples: (i) Relative areas of anode and cathode (ii) Nature of corrosion product	*CO2*	*PO2*	**8**
	c)	Define corrosion penetration rate. Calculate corrosion penetration rate in mpy and mmpy for the corrosion of an iron piece exposed to sulfuric acid over a period of 235 days if the weight loss is 235 g and area exposed is 23.5 $inch^2$. Density of iron is 7.86 g/cm^3 and K=534.	*CO2*	*PO 2*	**6**
		OR			
2	a)	Describe stress corrosion with a suitable example.	*CO 1*	*PO 1*	**6**
	b)	Analyze the advantages of electroless plating over electroplating and illustrate the electroless deposition of copper.	*CO 2*	*PO 2*	**8**
	c)	Calculate the concentration at the cathode in the following concentration cell at 30 ˚C if E_{cell} = 0.025V: $Cu/CuSO_4$ (0.025 M)//$CuSO_4$ (X)/Cu. When does the cell stop working?	*CO 3*	*PO 7*	**6**
		UNIT – II			
3	a)	Explain the construction and working of a Si based solar cell. Analyze its advantages.	*CO 3*	*PO 7*	**6**
	b)	Why GCV>NCV? Determine the Gross and Net calorific value of benzoic acid from the following Bomb Calorimeter experiment data: mass of fuel – 0.65 g, mass of water in the calorimeter-2.3 kg, water equivalent of calorimeter -0.56 kg, raise in temperature is 3.5 ˚C. Specific heat of water - 4.18kJ/kg/ ˚C and latent heat of condensation of steam - 2454 kJ/kg..	*CO 2*	*PO 2*	**8**
	c)	Justify: Aqueous solvents are not used in lithium batteries. Describe the construction and working of Li-CoO_2 battery.	*CO3*	*PO 7*	**6**

			UNIT – III			
	4	a)	Calculate the number average molecular weight, weight average molecular weight and PDI of a polymer with 30% macromolecules having molecular mass of 3500, 40% macromolecules having molecular mass of 3900 and rest with molecular mass of 4200.	*CO 2*	*PO 2*	**6**
		b)	Describe the synthesis and uses of (i) U-F resin and (ii) Polyglycolic acid.	*CO2*	*PO 2*	**8**
		c)	Justify: Tg of Nylon is greater than polyethylene. Interpret the influence of flexibility on Tg of a polymer.	*CO2*	*PO 2*	**6**
			OR			
	5	a)	What are conducting polymers? Explain the mechanism of conduction in polyacetylene.	*CO3*	*PO 7*	**6**
		b)	Illustrate the synthesis of (i) Nitrile rubber and (ii) PMMA. Mention their applications.	*CO2*	*PO 2*	**8**
		c)	Justify the statement "Tensile strength is a property of polymer ruled by its structure" with suitable examples.			**6**
			UNIT – IV			
	6	a)	Discuss the classification of liquid crystals.	*CO 2*	*PO 2*	**6**
		b)	Explain the principle of memory storage in (i) Capacitor type and (ii) Resistor type electronic memory devices.	*CO2*	*PO 2*	**8**
		c)	Highlight the advantages of using organic materials in optoelectronic devices. Describe the construction and working of OLED.	*CO3*	*PO 7*	**6**
			UNIT – V			
	7	a)	Calculate total, permanent and temporary hardness of a water sample containing 38 mg/L of $CaSO_4$, 23 mg/L of $Ca(HCO_3)_2$, 18 mg/L of $MgCl_2$ and 85 mg/L of $Mg(HCO_3)_2$. Molecular weights of $CaSO_4$, $Ca(HCO_3)_2$, $MgCl_2$ and $Mg(HCO_3)_2$ are 136g, 162g, 95g and 146g respectively.	*CO2*	*PO 2*	**6**
		b)	Discuss the principle of (i) potentiometric and (ii) conductometric sensor.	*CO2*	*PO 2*	**8**
		c)	Describe the pyrometallurgical extraction of copper.	*CO3*	*PO 7*	**6**

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