U.S.N.										

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

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E. **Semester: I / II**
Branch: CSE STREAM **Duration: 3 hrs.**
Course Code: 22CY1BSCCS / 22CY2BSCCS **Max Marks: 100**
Course: Applied Chemistry for Computer Science Engineering 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.

				CO	PO	Marks
			UNIT - I			
1	a)		Describe the construction and working of calomel electrode.	CO2	PO2	**5**
	b)		Predict the effect of these factors on the rate of corrosion: i) Electrode potential difference ii) Relative anodic and cathodic areas.	CO 3	PO 3	**5**
	c)		A concentration cell is constructed with two silver electrodes in contact with 0.01M and 10 M silver nitrate solution. Write cell representation, electrode reactions, and calculate cell potential at 298 K.	CO 3	PO 3	**5**
	d)		What is cathodic protection? Explain sacrificial anode method with suitable example.	CO 2	PO 2	**5**
			OR			
2	a)		Explain rusting of iron by electrochemical theory of corrosion	CO 2	PO 2	**5**
	b)		Explain the construction and working of glass electrode.	CO3	PO 3	**5**
	c)		Justify the following statements: i) EMF of a galvanic cell has to be always positive. ii) No current flows in a concentration cell when electrolyte concentration is equal at anode and cathode.	CO 3	PO 3	**5**
	d)		Explain the electroless plating of copper with relevant reactions.	CO3	PO 3	**5**
			UNIT - II			
3	a)		When 0.75 g of a benzoic acid subjected to complete combustion in a bomb calorimeter, the temperature of the surrounding water is increased from 23.6 ^{o}C to 28 ^{o}C. The weight of water taken and water equivalent of bomb calorimeter were 1.95 kg and 0.45 kg respectively. Calculate GCV and NCV. (Given: Specific heat of water is 4.186 kJ/kg/^{o}C, latent heat of steam is 2454 kJ/kg.	CO3	PO 3	**5**
	b)		Justify the statement: "Biodiesel is considered as a green fuel". Explain the synthesis of biodiesel by trans-esterification method.	CO 3	PO 3	**5**

		c)	Explain the construction working of Quantum Dot Sensitized Solar Cells.	*CO2*	*PO 2*	**5**
		d)	Explain the construction and working of Li-CoO_2 battery. Why water is not used as a solvent in Li-ion battery?	*CO 3*	*PO 3*	**5**
			UNIT - III			
	4	a)	A polymer sample has the following composition: 24 molecules have molecular mass 18,000 g/mol, 36 molecules have molecular mass 21,000 g/mol and remaining molecules have molecular mass 24,000 g/mol. Calculate the number average and weight average molecular mass of the polymer. Calculate PDI and comment on it.	*CO 3*	*PO 3*	**5**
		b)	Illustrate the importance of polymer composites as structural materials.	*CO 2*	*PO 2*	**5**
		c)	Appraise the statements: i) Kevlar is less flexible than nylons, ii) crystallinity of polymers is related to the chemical structure.	*CO 3*	*PO 3*	**5**
		d)	Write the synthesis and uses of the following polymers: i) Butyl Rubber ii) UF-Resin	*CO 2*	*PO 2*	**5**
			OR			
	5	a)	Define Tg of a polymer. Discuss the influence of branching chain and flexibility of a polymer on Tg.	*CO 2*	*PO 2*	**5**
		b)	What are biodegradable polymers? Describe the synthesis and application of polyglycolic acid.	*CO 2*	*PO 2*	**5**
		c)	What are conducting polymers? Illustrate the oxidative doping of polyacetylene to make it a conducting polymer.			**5**
		d)	Describe the synthesis and application of Kevlar fibers.	*CO 2*	*PO 2*	**5**
			UNIT - IV			
	6	a)	Describe the working of capacitor-based memory devices.	*CO 2*	*PO 2*	**5**
		b)	Explain the classification of liquid crystals with suitable examples.	*CO 2*	*PO 2*	**5**
		c)	Explain the working principle of QLED and mention its application.	*CO 2*	*PO 2*	**5**
		d)	Describe the importance of Jablonski diagram. Explain the transitions involved in it.	*CO 2*	*PO 2*	**5**
			UNIT-V			
	7	a)	What are electrochemical sensors? Explain its importance and application in the sensing of NOx.	*CO 2*	*PO 2*	**5**
		b)	In an experiment 25 cm^3 of sample hard water required 12.6 cm^3 0.018M EDTA solution for titration using EBT as an indicator. Under similar conditions same sample water after boiling and cooling required 8.7cm^3 of EDTA solution. Calculate the temporary, permanent and total hardness of water sample.	*CO 3*	*PO 3*	**5**
		c)	Describe the process of desalination of water by Electrodialysis method with a neat diagram.	*CO 2*	*PO 2*	**5**
		d)	Explain the E-waste treatment by pyrometallurgical method. Mention its significance.	*CO 2*	*PO 2*	**5**

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