U.S.N.										

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

Autonomous Institute Affiliated to VTU

September 2024 Supplementary Examinations

Programme: B.E. **Semester: I / II**
Branch: Electrical Engineering Stream **Duration: 3 hrs.**
Course Code: 22CY1BSCEE / 22CY2BSCEE **Max Marks: 100**
Course: Applied Chemistry for Electrical 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.

		UNIT - I	CO	PO	Marks
1	a)	What are reference electrodes? Describe the construction and working principle of calomel electrode.	1	1	**7**
	b)	What are concentration cells? Explain with example. A concentration cell consists of two copper rods in $CuSO_4$ solutions, the concentration at one electrode system is 100 times more concentrated than the other. Represent the cell and solve the EMF of the cell at 300 K. Given F = 96500 C and R = 8.314 J/K/mol	2	2	**7**
	c)	Explain the type of corrosion taking place in the following cases. i. bolt and nut made up of two different metals in contact with each other. ii. dust deposition on a metal surface for a long time.	2	2	**6**
		OR			
2	a)	Describe the construction of glass electrode. Describe how the pH of the given solution is measured using a glass electrode.	1	1	**7**
	b)	What is corrosion? Explain electrochemical theory of corrosion taking iron as an example.	1	1	**7**
	c)	A thick brass sheet of area 400 $inch^2$ is exposed to moist air. After 2 years it was found to experience a weight loss 375 g due to corrosion. If the density of brass is 8.73 g/cm^3, K = 534. Calculate CPR in mpy and mmpy.	2	2	**6**
		UNIT – II			
3	a)	Describe the determination of calorific value of a solid fuel using bomb calorimeter.	1	1	**7**
	b)	Explain the construction and working principle of silicon based photovoltaic cell. Mention the advantages and disadvantages of PV cell.	1	1	**7**
	c)	What are batteries? Describe the construction and working of Li-ion battery.	1	1	**6**

			UNIT – III			
	4	a)	What is glass transition temperature? Explain any three factors that affect Tg.	2	2	**7**
		b)	Explain the synthesis and mention the applications of butyl rubber, and polyglycolic acid.	1	1	**7**
		c)	What are conducting polymers? Explain the mechanism of conduction in polyacetylene.	1	1	**6**
			OR			
	5	a)	A polymer sample contains 10, 20, 30 and 40 molecules having molecular weights 10^5, $2x10^5$, $3x10^5$ and $4x10^5$, respectively. Calculate the number average and weight average molecular weights of the polymer. Find PDI and comment on the result.	2	2	**7**
		b)	What are plastics? Explain the synthesis of UF resin. Mention its uses.	1	1	**7**
		c)	Justify that polymer composites are preferred as structural materials. Explain the synthesis of Kevlar.	3	7	**6**
			UNIT – IV			
	6	a)	Describe the mechanism of conduction in solids using band theory.	1	1	**7**
		b)	What are electronic memory devices? Explain the classification of memory devices.	1	1	**7**
		c)	Depict and explain all the transitions in a photoactive material using Jablonski's diagram.	1	1	**6**
			UNIT – V			
	7	a)	What are nanomaterials? Explain the synthesis of GO by Hummer's method. List out the properties and uses of GO.	1	1	**7**
		b)	What are optical sensors? Explain the instrumentation of colorimetric sensor and its application in the estimation of copper.	1	1	**7**
		c)	What is e-waste? Explain the effect of e waste on environment and human health.	3	7	**6**

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