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: ECE / EE **Duration: 3 hrs.**
Course Code: 22CH1BSCEE / 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? Outline the construction and working of calomel electrode with a neat diagram.		*CO2*	*PO2*	**6**
	b)	Explain the electroless plating of copper in PCBs		*CO 2*	*PO2*	**6**
	c)	Define corrosion. Illustrate differential aeration corrosion with suitable example.		*CO 2*	*PO 2*	**8**
		[OR]				
2	a)	Discuss the construction and working of Glass Electrode.		*CO 2*	*PO 2*	**6**
	b)	What is cathodic protection? Explain impressed current method.		*CO 2*	*PO 2*	**6**
	c)	What are concentration cells?. Explain their importance, calculate EMF for the following cell. $Cu\|Cu^{2+}(0.02M)\|\|Cu^{2+}(0.2M)\|Cu$ at 298K.		*CO 2*	*PO 2*	**8**
		UNIT-II				
3	a)	Explain the principle, properties and applications of quantum dot sensitized solar cells (QDSSCs).		*CO 3*	*PO 2*	**6**
	b)	Outline the construction and working of Li-CoO_2 battery with a neat diagram.		*CO 2*	*PO*	**6**
	c)	Justify GCV>NCV. On burning 0.96 x 10^{-3} kg of a fuel in a bomb calorimeter, the temperature of 2.75 kg of water was increased by 2.7 °C. Water equivalent of calorimeter, specific heat of water and latent heat of steam are 0.385 kg, 4.187 kJ/kg/K and 2455 kJ/kg respectively. If the fuel contains 5% hydrogen, solve for its gross and net calorific values.		*CO 3*	*PO 3*	**8**
		UNIT - III				
4	a)	A polymer sample contains 2, 3 and 4 molecules having molecular weights 2 x 10^3, 3 x10^3 and 4 x 10^3 respectively. Solve for the number average and weight average molecular weight and PDI of the polymer.		*CO 3*	*PO 3*	**6**
	b)	What are conducting polymers? Outline the synthesis and conducting mechanism of polyacetylene.		*CO 2*	*PO 2*	**6**

		c)	Explain the synthesis properties and applications of : (i) PMMA (ii) Butyl rubber	*CO 3*	*PO 2*	**8**
			[OR]			
	5	a)	Define Tg. Discuss the influence of stereo regularity and molecular mass on Tg	*CO 2*	*PO 2*	**6**
		b)	Write the synthesis and application of following polymers: i) Urea-Formaldehyde resin ii) Nitrile rubber	*CO 2*	*PO 2*	**6**
		c)	What are biodegradable polymers? Write the synthesis reactions and degradation reactions of polyglycolic acid.	*CO 2*	*PO 2*	**8**
			UNIT-IV			
	6	a)	Describe the synthesis of Silicon by Czochralski's Crystal pulling method.	*CO 2*	*PO 2*	**6**
		b)	Illustrate the different types electronic transitions using Jablonski diagram.	*CO 2*	*PO 2*	**6**
		c)	Explain the concept of electronic memory. Outline the classification of electronic memory materials with suitable examples.	*CO 2*	*PO 2*	**8**
			UNIT - V			
	7	a)	Describe any three size dependent properties of nanomaterials.	*CO*	*PO*	**6**
		b)	What is e-waste? Summarize the effects of e-waste on environment and human health.	*CO*	*PO*	**6**
		c)	What are optical sensors? Explain the instrumentation and estimation of copper using optical sensor.	*CO*	*PO*	**8**

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