

U.S.N.

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

Autonomous Institute Affiliated to VTU

February / March 2025 Semester End Main 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 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)	Elaborate on the following corrosion control methods i) anodization and ii) sacrificial anode method.	CO1	PO1	8
		b)	Illustrate differential aeration corrosion with appropriate example. Justify that pitting corrosion is a dangerous type of corrosion.	CO2	PO2	6
		c)	What are concentration cells. A concentration cell is constructed by dipping Cd electrodes in 0.15 and 0.35 M CdSO ₄ solutions at 31 °C. Calculate the EMF of the cell and write the overall cell reaction.	CO2	PO2	6
			OR			
	2	a)	Define corrosion. Using electrochemical theory of corrosion explain rusting of iron.	CO1	PO1	8
		b)	Explain the determination of pH using glass electrode.	CO1	PO1	6
		c)	A steel of area 100 inch ² is exposed to air near the seashore. After 1 year it was found that the steel sheet has lost 485g due to corrosion. What is the value of CPR in mils/year and in mm/year? Can such steel sheet be applicable for the construction purpose where the steel sheet is exposed?	CO2	PO2	6
			UNIT - II			
	3	a)	Describe with a neat diagram fluidized bed catalytic cracking. Justify the need for cracking.	CO1	PO1	8
		b)	Define GCV. From the following data calculate the rise in temperature of 2560 g of water, if 0.9 g of coal is completely burnt in a bomb calorimeter whose water equivalent mass is 440 g. The GCV of coal is 34450 kJ kg ⁻¹ and specific heat of water is 4.187 kJ kg ⁻¹ K ⁻¹ .	CO2	PO2	6
		c)	Describe the production of biodiesel. Justify: Biodiesel is a green fuel.	CO1	PO1	6
			OR			

	4	a)	Explain the production, storage and disadvantages of Hydrogen fuel.	CO1	PO1, 7	8
		b)	Explain the working principle and construction of Quantum dots sensitized solar cells(QDDSCs).	CO1	PO1	6
		c)	Describe the classification of batteries with suitable examples.	CO1	PO1	6
			UNIT – III			
	5	a)	Define conducting polymers. Describe the conduction mechanism of polyacetylene.	CO2	PO2	8
		b)	Calculate the number average molecular weight and weight average molecular weight of Polypropylene with the composition: $\begin{array}{c} \text{CH}_3 \\ \\ [-\text{CH}_2-\text{CH}-]_{100} \end{array} \quad 30 \%$ $\begin{array}{c} \text{CH}_3 \\ \\ [-\text{CH}_2-\text{CH}-]_{200} \end{array} \quad 30 \%$ $\begin{array}{c} \text{CH}_3 \\ \\ [-\text{CH}_2-\text{CH}-]_{300} \end{array} \quad 40 \%$ <p>Given: Atomic weight of C=12, H=1</p>	CO2	PO2	6
		c)	What are Biodegradable polymers? Explain the synthesis of poly lactic acid.	CO1	PO1	6
			OR			
	6	a)	Validate the following: (i) All simple organic molecules do not produce polymers. (ii) Nylon is stronger than polyethylene. (iii) Polymer composites are good structural materials.	CO2	PO2	8
		b)	Define Glass Transition Temperature. Describe any two factors effecting the Glass Transition Temperature.	CO2	PO2	6
		c)	Describe the synthesis, properties and applications of Kevlar.	CO1	PO1	6
			UNIT – IV			
	7	a)	Outline the classification of electronic memory devices.	CO1	PO1	8
		b)	With a neat diagram describe the construction and working of QLED.	CO1	PO1	6
		c)	Describe the production of electronic grade silicon by any suitable method.	CO1	PO1	6
			OR			
	8	a)	Outline the classification of electronic memory materials.	CO1	PO1	8
		b)	Describe the Band theory with suitable example.	CO1	PO1	6
		c)	Define Liquid crystals. Explain the classification of Liquid crystals.	CO1	PO1	6

			UNIT – V			
	9	a)	What are optical sensors? Explain the colorimetric estimation of copper using optical sensors.	<i>CO5</i>	<i>PO1, 2</i>	8
		b)	Describe the synthesis of graphene oxide by Hummer's method.	<i>CO1</i>	<i>PO1</i>	6
		c)	What is e-waste? Explain the need for e-waste management.	<i>CO1</i>	<i>PO1</i>	6
			OR			
	10	a)	Analyze the dependency of properties of nanomaterials on their size.	<i>CO2</i>	<i>PO2</i>	8
		b)	Describe the construction and working of a gas sensor.	<i>CO1</i>	<i>PO1</i>	6
		c)	Explain the estimation of acid mixture using conductometric sensors.	<i>CO5</i>	<i>PO1, 2</i>	6

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