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

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E.

Semester: I / II

Branch: Computer Science Stream

Duration: 3 hrs.

Course Code: 22CY1BSCCS / 22CY2BSCCS

Max Marks: 100

Course: Applied Chemistry for Computer Science Engg Stream

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

UNIT - I			COs	POs	Marks
1	a)	Explain the construction and working of a glass electrode. Elaborate on its application in the determination of pH of a solution.	CO2	PO2	7
	b)	What are surface conversion coatings? Describe the anodization of aluminum and its applications.	CO2	PO2	7
	c)	A brass sheet of area 400 in^2 is exposed to air near the ocean. After two years it was found to experience a weight loss of 375 g due to corrosion. Density of the brass sheet is 8.73 g/cm^3 . Calculate CPR in mpy and mmpp. ($K = 534$)	CO2	PO2	6
OR					
2	a)	Define metallic corrosion. Describe the electrochemical theory of corrosion by taking iron as an example.	CO2	PO2	7
	b)	Explain the electroless plating of copper with relevant reactions and mention its advantages.	CO3	PO7	7
	c)	The EMF of a concentration cell $\text{Ag} \text{AgNO}_3 (0.018\text{M}) \parallel \text{AgNO}_3 (X) \text{Ag}$ is found to be 0.083V at 298K. Write the cell reactions and calculate the value of X.	CO2	PO2	6
UNIT - II					
3	a)	“Reformation improves the quality of petrol”. Justify the statement with relevant reformation reactions.	CO3	PO7	7
	b)	Explain the construction and working of QDSSCs. Highlight its advantages over silicon based solar cells.	CO3	PO7	7
	c)	On burning of a chemical fuel in a Bomb calorimeter, the GCV was found to be 45.745kJ/kg. The temperature of the surrounding water increased by 2.7°C . The weight of water taken and water equivalent of bomb calorimeter were 3.5 kg and 0.385 kg respectively. Calculate the mass of chemical fuel and NCV. (Given: Specific heat of water = $4.186 \text{ kJ/kg}^\circ\text{C}$, Latent heat of steam is 2454 kJ/kg. % of H is 4.98%).	CO2	PO2	6

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 - III					
4	a)	Define Tg of a polymer. Discuss the influence of flexibility and crystallinity of polymers on Tg.	CO2	PO2	7
	b)	Appraise the statements: i) Kevlar is less flexible than nylons ii) tensile strength of polymers is related to their chemical structure.	CO2	PO2	7
	c)	A polymer sample has the following composition, 20% molecules have molecular mass 15,000 g/mol, 35% molecules have molecular mass 25000 g/mol and remaining molecules have molecular mass 20000 g/mol. Calculate the number average and weight average molecular mass of the polymer. Calculate PDI and comment on it.	CO2	PO2	6
OR					
5	a)	Write the synthesis and applications of the following polymers; i) Butyl rubber ii) U-F resin.	CO2	PO2	7
	b)	List the criteria for a polymer to exhibit electrical conductivity. Illustrate the oxidative doping of polyacetylene to make it a conducting polymer.	CO2	PO2	7
	c)	What are biodegradable polymers? Describe the synthesis and applications of polyglycolic acid.	CO3	PO7	6
UNIT - IV					
6	a)	What are memory devices? Explain the working of capacitor and resistor type memory devices.	CO3	PO7	7
	b)	What are liquid crystals? Discuss their classification.	CO3	PO7	7
	c)	Sketch and explain Jablonski's diagram.	CO2	PO2	6
UNIT-V					
7	a)	What are electrochemical sensors? Explain the construction and working of NOx sensor.	CO2	PO2	7
	b)	Define hardness of water. In an experiment, 25 cm ³ of hard water required 15.8 cm ³ of 0.02 M EDTA solution for titration using EBT as an indicator. Under similar conditions, same sample water after boiling and cooling required 9.5 cm ³ of EDTA solution. Calculate the temporary, permanent and total hardness of water sample.	CO2	PO2	7
	c)	Explain the hydrometallurgical extraction of copper. Analyze the ill effects of e-waste.	CO3	PO7	6
