

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.****Branch: Civil Engineering Stream****Course Code: 22CY2BSCCV****Course: Applied Chemistry for Civil Engineering Stream****Semester: II****Duration: 3 hrs.****Max Marks: 100**

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)	Explain the corrosion of iron based on electrochemical theory.	CO2	PO2	6
		b)	With a neat diagram, explain the construction and working of calomel electrode.	CO 2	PO2	6
		c)	Discuss the classification of electrochemical cells.	CO 1	PO 1	4
		d)	An iron metal lost 33×10^{-3} g of weight when it is immersed in de-aerated acidic solution for 24 hours. Calculate the corrosion penetration rate for the exposed area of 5 in^2 . Given, $K = 534$ and the density of metal = 7.87 g/cm^3 .	CO 2	PO 2	4
			OR			
	2	a)	What is cathodic protection? With neat diagram, describe the corrosion control by sacrificial anode method.	CO 2	PO 2	6
		b)	Describe the experimental method of determination of pH of a given solution using glass electrode.	CO 2	PO 2	6
		c)	Describe the electroless plating of copper with relevant reactions.	CO 2	PO 2	4
		d)	Evaluate the EMF of the given concentration cell at 298 K. $\text{Ag(s)} \mid \text{AgNO}_3(0.018\text{M}) \parallel \text{AgNO}_3(1.2\text{M}) \mid \text{Ag(s)}$	CO 3	PO 3	4
			UNIT-II			
	3	a)	What is calorific value? Explain the determination of calorific value of solid fuel by Bomb Calorimeter.	CO 2	PO 2	6
		b)	With suitable reaction, explain the synthesis of bio-diesel. Mention its advantages.	CO 2	PO 2	6
		c)	What is petroleum cracking? Justify its need.	CO 2	PO 2	4
		d)	Explain the following battery characteristics: (i) Cycle life (ii) Energy efficiency	CO 2	PO 2	4
			UNIT - III			
	4.	a)	Define the following terms: i) Elastomers ii) Polymer composites iii) Glass transition temperature	CO 2	PO 2	6

	b)	Evaluate the number average molecular weight and weight average molecular weight of the following polymers with different compositions of polymer chains (neglect the mol. mass of R) Polyethylene R [-CH ₂ -CH ₂ -] R ₂₅₀ 50 % R [-CH ₂ -CH ₂ -] R ₄₅₀ 30 % R [-CH ₂ -CH ₂ -] R ₅₀₀ 20 %	CO 3	PO 3	6
	c)	Give the synthesis and applications of epoxy resin.	CO 2	PO 2	4
	d)	Distinguish between thermoplastic and thermosetting polymers.	CO 1	PO 1	4
		OR			
5.	a)	How are the following polymers synthesized? i) PMMA ii) Butyl rubber. Mention their applications.	CO 2	PO 2	6
	b)	Discuss the structure-property relationship of polymers with reference to tensile strength and chemical resistance.	CO 2	PO 2	6
	c)	Elaborate the synthesis and applications of carbon fiber.	CO 2	PO 2	4
	d)	What are biodegradable polymers? Mention their properties and applications.	CO 2	PO 2	4
		UNIT - IV			
6.	a)	What are alloys? Distinguish between ferrous and non-ferrous alloys.	CO2	PO 2	6
	b)	What is cement? Explain the manufacturing of cement by wet process.	CO2	PO 2	6
	c)	Discuss the properties and applications of glass.	CO2	PO 2	4
	d)	How refractories are classified based on chemical composition?	CO2	PO 2	4
		UNIT-V			
7.	a)	Describe the various components of colorimeter.	CO2	PO 2	6
	b)	Explain the determination of total hardness of water by complexometric titration.	CO3	PO 3	6
	c)	Calculate COD of waste water sample if volume of 0.025 N FAS required for back and blank titration are 13.5 mL and 18.0 mL, respectively. Volume of waste water taken for titration is 25 mL.	CO 4	PO 3	4
	d)	Discuss the variation in conductance for the titration of mixture of strong acid and weak acid against strong base.	CO4	PO 3	4
