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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.

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. Ag(s) AgNO ₃ (0.018M) AgNO ₃ (1.2M) 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

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.

	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 $[-\text{CH}_2-\text{CH}_2-]$ R ₂₅₀ 50 % R $[-\text{CH}_2-\text{CH}_2-]$ R ₄₅₀ 30 % R $[-\text{CH}_2-\text{CH}_2-]$ 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
