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

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

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

			UNIT - I	*CO*	*PO*	**Marks**
	1	a)	With relevant reactions, explain the following; (i) Pitting corrosion (ii) Caustic embrittlement	*CO1*	*PO1*	**8**
		b)	What are concentration cells? Derive an expression for the EMF of the following cell; $Cu|CuSO_4$ (aq)(C1)$\|CuSO_4$ (aq)(C2) $|Cu$. Explain the applications of concentration cells.	*CO 2*	*PO 2*	**7**
		c)	Describe the construction and working of glass electrode.	*CO 1*	*PO 1*	**5**
			OR			
	2	a)	What is electroless plating? Differentiate between electroplating and electroless plating and mention the applications of electroless plating.	*CO 1*	*PO 1*	**8**
		b)	Explain the following; (a) Passivation of metal (b) Sacrificial anodic method of corrosion protection	*CO 1*	*PO 1*	**7**
		c)	Discus the construction and working of calomel electrode.	*CO 1*	*PO 1*	**5**
			UNIT - II			
	3	a)	Explain production and storage of hydrogen. Discuss advantages and disadvantages of hydrogen as fuel.	*CO 1,2*	*PO 1,2*	**8**
		b)	What is reformation of petrol? Reformation reactions help to enhance octane number: justify the statement with any three relevant reactions.	*CO 1,2*	*PO 1,2*	**7**
		c)	Elaborate the construction and working of Li-ion battery.	*CO 1*	*PO 1*	**5**
			UNIT - III			
	4	a)	What are polymer composites? Explain the synthesis of (a) Kevlar fibre and (b) Wood-polymer composites.	*CO 1,3*	*PO 1,7*	**8**
		b)	What are adhesives? Describe the synthesis and applications of epoxy resin.	*CO 1*	*PO 1*	**7**

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.

				CO 2	PO 2	**5**
		c)	A polymer sample contains 300 molecules of molecular weight 10000, another 400 molecules of molecular weight 11000, and additional 300 molecules of molecular weight 14000. Calculate number and weight average molecular weights and PDI. What is the significance of PDI?	CO 2	PO 2	**5**
			OR			
5		a)	What are biodegradable polymers? Discuss synthesis and degradation mechanism of polyglycolic acid.	CO1, 3	PO 1,7	**8**
		b)	What is glass transition temperature (Tg) of a polymer? Explain its significance. PVC has a higher Tg than polyethene: justify	CO 2	PO 2	**7**
		c)	Define plastics and resin. Outline the synthesis and applications of PMMA.	CO 1	PO 1	**5**
			UNIT - IV			
6		a)	Describe the manufacturing process of soda-lime glass with the help of a well labelled diagram. Why is annealing important in the manufacturing of glass?	CO 1	PO 1	**8**
		b)	What are refractory materials? Explain the properties and applications of refractories.	CO 1	PO 1	**7**
		c)	Discuss properties, composition and applications of any one aluminum alloy.	CO 1	PO 1	**5**
			UNIT - V			
7		a)	Define BOD and COD. Elaborate trickling filter process of waste water treatment.	CO 1,3	PO 1,7	**8**
		b)	Elaborate the ion-exchange method of softening of hard water. Explain the process of regeneration of resins.	CO 1	PO 1	**7**
		c)	A sample of water contains 20 mg/L of $Ca(HCO_3)_2$, 17 mg/L of $CaSO_4$, 12 mg/L of $CaCl_2$, 14 mg/L of $Mg(HCO_3)_2$, and 21 mg/L of $MgCl_2$. Calculate total hardness of the sample in terms of $CaCO_3$ equivalents. (Given: Molecular weights of $Ca(HCO_3)_2$ = 162.11; $CaSO_4$ = 136.14; $CaCl_2$ = 110.98; $Mg(HCO_3)_2$ = 146.34; and $MgCl_2$ = 95.21).	CO 2	PO 2	**5**

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