U.S.N.										

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

Autonomous Institute Affiliated to VTU

December 2023 Supplementary 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)	Define corrosion. Explain electrochemical theory of corrosion for rusting of iron.	*CO1*	*PO2*	**7**
	b)	Illustrate the principle of working of a concentration cell. Calculate EMF of the following concentration cell at 25 ^{0}C Cu (s) / Cu^{2+} (0.05M) // Cu^{2+} (5M) / Cu (s). Write the half-cell and net cell reactions.	*CO3*	*PO 3*	**7**
	c)	What are secondary reference electrodes? Explain the construction and working of calomel electrode.	*CO1*	*PO 2*	**6**
		OR			
2	a)	Illustrate the construction and working of glass electrode with a neat diagram. List out the advantages and disadvantages of glass electrode.	*CO2*	*PO 3*	**7**
	b)	Explain sacrificial anode and impressed current method in corrosion control.	*CO3*	*PO 3*	**7**
	c)	Elaborate the protection of aluminium article by anodization method.	*CO3*	*PO 2*	**6**
		UNIT - II			
3	a)	Distinguish GCV & NCV. On burning 1.15 g of a coal sample in a bomb calorimeter, the temperature of 3.5 kg of water in the calorimeter increased from 26.5 ^{0}C to 28.5 ^{0}C. Water equivalent of calorimeter is 325 g. Specific heat of water is 4.187 kJ/kg/^{0}C and latent heat of steam is 2458 kJ/kg. If the fuel contains 4% hydrogen, calculate its gross and net calorific values.	*CO3*	*PO 3*	**7**
	b)	With a neat diagram explain fluidized-bed catalytic cracking. Mention the advantages of fluidized bed catalytic cracking process.	*CO2*	*PO 3*	**7**
	c)	Lithium is one of the best anode material: justify the statement. Explain the construction and working of Li-CoO_2 battery.	*CO3*	*PO 2*	**6**

			UNIT - III			
	4	a)	Define glass transition temperature (Tg). Explain any three factors which affects Tg of a polymer.	*CO1*	*PO 2*	**7**
		b)	What are adhesives? Explain synthesis, properties and applications of epoxy resin.	*CO2*	*PO 3*	**7**
		c)	Explain the synthesis of: (i) PMMA (ii) Butyl rubber	*CO3*	*PO 2*	**6**
			OR			
	5	a)	Explain the synthesis, properties and applications of carbon fibre.	*CO3*	*PO 3*	**7**
		b)	What are biodegradable polymers? Explain the synthesis, properties and applications of polyglyolic acid.			**7**
		c)	In a sample of a polymer, 100 molecules have molecular mass 10^3 g/mol, 250 molecules have molecular mass 10^4 g/mol, and 300 molecules have molecular mass 10^5 g /mol, calculate the number average, and weight average molecular mass and PDI of the polymer.	*CO3*	*PO 3*	**6**
			UNIT - IV			
	6	a)	Explain properties and applications of iron and its alloys.	*CO 3*	*PO 2*	**7**
		b)	Explain the preparation, properties and applications of soda lime glass.	*CO 2*	*PO 3*	**7**
		c)	Based on the composition how are refractory materials classified? List out any three properties and applications of refractory materials.	*CO 3*	*PO 2*	**6**
			UNIT - V			
	7	a)	Distinguish temporary hardness and permanent hardness. Explain the removal hardness by ion exchange method.	*CO 2*	*PO 3*	**7**
		b)	Define COD. Explain the experimental determination of COD of an industrial waste water.	*CO 3*	*PO 2*	**7**
		c)	Explain the principle and procedure for conductometic estimation of a mixture of strong acid and weak acid using strong base.	*CO 2*	*PO 2*	**6**

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