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

Autonomous Institute Affiliated to VTU

April 2023 Semester End Main Examinations

Programme: B.E. **Semester: I**
Branch: ETE/EI/ML **Duration: 3 hrs.**
Course Code: 22CH1BSCEE **Max Marks: 100**
Course: Applied Chemistry for Electrical Engineering Stream **Date: 08.04.2023**

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

1	a)	Define a concentration cell. EMF of the cell: Ag |$AgNO_3$ (C_1)||$AgNO_3$(C_2 = 0.2 M)|Ag is 0.8 V. Solve for C_1 at STP.	**06**
	b)	Define metal finishing and outline the technological importance of metal finishing.	**06**
	c)	What are Ion selective electrodes? Explain the construction of a glass electrode and its application in determination of pH of a solution	**08**

OR

2	a)	Describe the electrochemical theory of corrosion taking iron as an example.	**06**
	b)	What are reference electrodes? Explain the construction and working of calomel electrode.	**06**
	c)	Define cathodic protection. Describe the following methods: (a) sacrificial anode (b) impressed current.	**08**

UNIT - II

3	a)	Outline the construction and working of Lithium ion battery. Mention their advantages.	**06**
	b)	Solve for the net and gross calorific values of a sample of coke from the following data: mass of coke = 0.795 x 10^{-3} kg; mass of water = 2.5 kg; water equivalent of calorimeter = 1.3 kg; specific heat of water = 4.187 kJ/kg/K; rise in temperature = 1.8K; % of hydrogen in coke = 2.5; latent heat of steam = 2454 kJ/kg.	**06**
	c)	Explain the production and storage of Hydrogen and justify the statement: Hydrogen is a green fuel.	**08**

UNIT - III

4	a)	Solve for Number average and Mass average of a polymer which consists of 35% molecules having molecular mass 25000, 35% molecules having molecular mass 20000 and the remaining molecules having molecular mass 10000.	**06**
	b)	Outline the synthesis and applications of PMMA and butyl rubber.	**06**
	c)	What are conducting polymers? Outline the synthesis and conducting mechanism of polyacetylene.	**08**

OR

5	a)	What are polymer composites? Discuss the synthesis of Kevlar.	**06**
	b)	Outline the synthesis and applications of Nitrile rubber and UF-resin.	**06**
	c)	Define Tg. Explain structure and property relationship in polymers with reference to i) Strength and ii) Crystallinity.	**08**

UNIT - IV

6	a)	Outline the production of electronic grade silicon by float zone technique.	**06**
	b)	Explain Jablonski Diagram with a neat sketch.	**06**
	c)	Explain Conductors, Semiconductors and Insulators, based on band theory with examples.	**08**

UNIT - V

7	a)	Explain the size dependent properties of nanomaterials.	**06**
	b)	Outline the application of conductometric sensors in the estimation of acid mixture using standard NaOH solution.	**06**
	c)	Elaborate on the sources and effect of e-waste and discuss extraction of copper from E-waste.	**08**

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