U.S.N.										

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

Autonomous Institute Affiliated to VTU

August 2023 Semester End Make-Up Examinations

Programme: B.E. **Semester: I**
Branch: CS/CS-IOT/AI&DS **Duration: 3 hrs.**
Course Code: 22CH1BSCCS **Max Marks: 100**
Course: Applied Chemistry for Computer Science Engineering Stream **Date: 16.08.2023**

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)	What are Ion selective electrodes? Explain the determination of pH using glass electrode for an unknown solution. Mention its applications.	**08**
	b)	The concentration cell: Mg| $MgNO_3$(0.25M) || $MgNO_3$(**x** M) |Mg at 35°C gives an EMF of 0.025 V. Find the concentration of $MgNO_3$ at the cathode and write cell reactions. Suggest on how the EMF of a concentration cell can be increased.	**06**
	c)	Justify the following statements: (i) The potential of the calomel electrode increases with a decrease in KCl concentration (ii) Anodizing is a surface conversion coating.	**06**

OR

2	a)	Corrosion is an electrochemical phenomenon: Justify the statement by taking corrosion on iron as a model.	**08**
	b)	With a suitable example predict the effect of the following factors on the rate of corrosion (i) pH (ii) Temperature	**06**
	c)	What is sacrificial anode method? Explain corrosion control of buried pipeline by sacrificial anode method.	**06**

UNIT - II

3	a)	When 1.25 g of a chemical fuel is subjected to complete combustion in a Bomb calorimeter, the temperature of the surrounding water increased from 24.9°C to 28.4°C. The weight of water taken and water equivalent of bomb calorimeter were 1.75 kg and 0.5 kg respectively. Calculate GCV and NCV of fuel. (Given: Specific heat of water = 4.186 kJ/kg/°C, Latent heat of steam is 2454 kJ/kg and % of Hydrogen is 4.9%	**04**
	b)	What is Quantum Dot Sensitized Solar Cell? Explain the working Principle, Properties and Applications.	**06**
	c)	Define biodiesel. Write transesterification reaction for production of biodiesel.	**04**
	d)	Describe the construction and working of Li-CoO_2 battery. Why water based electrolyte cannot be used in lithium batteries?	**06**

UNIT - III

4	a)	A polymer sample has the following composition, 10 molecules have molecular mass 10000 g/mol, 15 molecules have molecular mass 15000 g/mol and 20 molecules have molecular mass 18000. Calculate the number average and weight average molecular mass of the polymer. Calculate PDI and comment on it.	**06**
	b)	Write the synthesis and uses of (i) PMMA (ii) Butyl rubber.	**06**
	c)	Describe the synthesis and application of Kevlar fibers.	**04**
	d)	Justify the following statement: Polymer composites show superior properties to polymers.	**04**

OR

5	a)	Define Tg of a polymer. Discuss the influence of crystallinity and flexibility of a polymer chain on Tg.	**08**
	b)	Describe the synthesis and uses of polyglycolic acid.	**06**
	c)	What are conducting polymers? Explain oxidative doping of polyacetylene to make it a conducting polymer.	**06**

UNIT - IV

6	a)	What are Liquid crystals? Explain the classification of liquid crystals with suitable examples	**08**
	b)	Discuss the working principle of OLED.	**06**
	c)	Describe the importance of Jablonski's diagram with neat sketch.	**06**

UNIT - V

7	a)	What are Electrochemical Sensors? Explain their importance and application in the sensing of NOx.	**06**
	b)	In an experiment, 25 cm^3 of sample hard water required 13.7 cm^3 of 0.025 M EDTA solution for titration using EBT as an indicator. Under similar conditions another 25cm^3 of the same sample water after boiling and cooling required 9.4 cm^3 of EDTA solution. Calculate the temporary, permanent and total hardness of water sample	**04**
	c)	Explain the process of desalination of water by Electrodialysis method with a neat diagram.	**06**
	d)	What is E-waste? Explain the health hazard due to exposure to E-waste.	**04**

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