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First/Second Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025

Applied Chemistry for CSE Stream

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain the working principle of conductometric sensors (Conductometry) and applied sensors (Colorimetry).	7	L2	CO1
	b.	Write a note on Disposable sensors? Explain its advantages over classical sensors.	7	L3	CO2
	c.	Describe the construction, working and applications of Lithium-ion battery and mention its applications.	6	L4	CO3
OR					
Q.2	a.	What are Electrochemical Sensors? Explain its applications in the measurement of Dissolved Oxygen (DO).	7	L3	CO2
	b.	What are Transducers? Explain the applications of Electrochemical gas sensors in sensing SO _x and NO _x .	7	L3	CO5
	c.	Describe the construction, working and applications of Sodium-ion battery and mention its applications.	6	L4	CO3
Module – 2					
Q.3	a.	Explain the types of organic memory devices by taking P-type and n-type semiconductor materials.	7	L2	CO2
	b.	What are Memory Devices? Explain the classification of electronic memory devices with examples.	7	L1	CO2
	c.	Explain any four properties of polythiophenes (P3HT) suitable for optoelectronic devices.	6	L2	CO4
OR					
Q.4	a.	Mention any four properties and applications of QLED.	7	L2	CO3
	b.	Mention any four properties and applications of LCD-displays.	7	L2	CO3
	c.	What are nanomaterials? Explain any four properties of poly (9-vinyl Carbazole) (PVK) suitable for optoelectronic devices.	6	L2	CO4
Module – 3					
Q.5	a.	Define metallic corrosion. Describe the electrochemical theory of corrosion by taking iron as an example.	7	L3	CO2

	b.	Describe galvanizing and mention its applications.	7	L2	CO3
	c.	Define electrolyte concentration cell. A galvanic cell is obtained by combining two copper electrodes of concentrations 0.1 and 0.5 M immersed in copper sulphate solution at 25°C. Give the cell reaction and calculate EMF of the cell.	6	L3	CO4
OR					
Q.6	a.	Explain the construction, working and applications of Calomel Electrode.	7	L2	CO2
	b.	What is CPR? A thick sheet of area 600 cm ² (93 inch ²) is exposed to air near the ocean. After a 6 months it was found to experience a weight loss of 360 g due to corrosion, if the density of the steel is 7.9 g/cm ³ . Calculate the corrosion penetration rate in mpy and mmpy (Given K = 534 in mpy and 87.6 mm/y)	7	L3	CO4
	c.	Explain : (i) Differential metal corrosion (ii) Water line corrosion.	6	L2	CO2
Module – 4					
Q.7	a.	In a sample of a polymer, 150 molecules have the molecular mass 100 g/mol, 200 molecules have the molecular mass 1000 g/mol, 350 molecules have the molecular mass 10,000 g/mol. Determine number average and weight average molecular mass. Find the Index of Polydispersity.	7	L3	CO4
	b.	Explain the preparation, properties and commercial applications of Kevlar.	7	L2	CO2
	c.	Explain the generation of hydrogen of Alkaline Water Electrolysis.	6	L2	CO3
OR					
Q.8	a.	Explain the synthesis of polyacetylene and mention its applications.	7	L2	CO2
	b.	Explain the generation of hydrogen by proton exchange membrane Electrolysis of water.	7	L2	CO3
	c.	Describe the construction and working of photovoltaic cells.	6	L2	CO2
Module – 5					
Q.9	a.	Describe the sources and composition of e-waste materials.	7	L2	CO1
	b.	Explain the ill effects of toxic materials used in manufacturing electrical and electronic products.	7	L2	CO1
	c.	Discuss the extraction of gold from e-waste.	6	L2	CO3
OR					
Q.10	a.	What are e-wastes? Explain the need for e-waste management.	7	L2	CO1
	b.	Write a brief note on role of stakeholders for example : Producers, Consumers, Recyclers and Statutory bodies.	7	L2	CO1
	c.	Explain the pyrometallurgy and direct recycling methods.	6	L2	CO2
