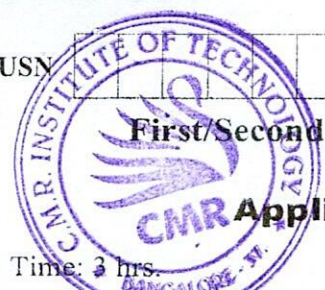


USN

BCHES102/202



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 <sub>x</sub> and NO <sub>x</sub> .		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 <sup>2</sup> (93 inch <sup>2</sup> ) 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 <sup>3</sup> . 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

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