



First/Second Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Chemistry for EES

Max. Marks: 100

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

Module – 1			M	L	C
Q.1	a.	Explain classification of materials as conductors insulators and semi conductors on the basis of band theory.	7	L2	CO1
	b.	Explain the production of electronic grade silicon by Float Zone (F2) method.	6	L2	CO1
	c.	What is Electroless Plating? Describe electroless plating of copper in the manufacture of double – sided PCB.	7	L2	CO1
OR					
Q.2	a.	A polydisperse sample of polystyrene is prepared by mixing three monodisperse samples in the following proportions. 2g of 2000 molecular weight, 3g of 3000 molecular weight and 5g of 5000 molecular weight. Determine number average and weight average molecular weight. Find the index of polydispersity.	7	L3	CO1
	b.	Explain the preparation , properties and commercial applications of graphene oxide.	7	L2	CO1
	c.	What are Conducting Polymers? Explain the synthesis and mechanism of polyacetylene.	6	L2	CO1
Module – 2					
Q.3	a.	What are Batteries? Explain the classification of batteries with suitable example.	7	L2	CO2
	b.	Explain the construction and working of Lithium – Polymer battery. Mention its applications.	7	L2	CO2
	c.	What are Photovoltaic Cell? Describe the construction and working of a photovoltaic cell. Mention its advantages and disadvantages.	6	L2	CO2
OR					
Q.4	a.	What are Fuel cells? Explain the construction and working of methanol – oxygen fuel cell.	7	L2	CO2
	b.	What are Flow Batteries? Explain the construction and working of vanadium redox flow battery. Mention its applications.	7	L2	CO2

	c.	Explain the construction and working of sodium – ion battery. Mention its applications.	6	L2	CO2
Module – 3					
Q.5	a.	What is Metallic Corrosion? Explain electrochemical theory of corrosion taking iron as an example.	7	L2	CO3
	b.	Write a note on : i) Differential Metal Corrosion ii) Differential Aeration Corrosion	6	L2	CO3
	c.	What is E – waste? Explain the methods of e – waste disposal (any 3).	7	L2	CO3
OR					
Q.6	a.	Describe the extraction of copper and gold for e – waste.	7	L2	CO3
	b.	Explain the anodization process of corrosion protection.	6	L2	CO3
	c.	What is CPR? A sheet of corroded steel vessel was found in a submerged vessel. It was estimated that the original area of the plate was 10 inch ² and that approximately 2.6 kg has corroded away during the submersion. Assuming a corrosion penetration rate of 200 mpy for this metal in sea water, estimate the time of submersion in gears (Density of the metal is 7.9 g/cm ³).	7	L3	CO3
Module – 4					
Q.7	a.	What are Nano Materials? Explain any two size dependent properties of nano materials.	7	L2	CO4
	b.	Describe the synthesis of Nano materials by sol – gel method with example.	7	L2	CO4
	c.	Write a note on Nano fibers and Nano sensors.	6	L2	CO4
OR					
Q.8	a.	What are Liquid Crystals? Explain the classification and properties of liquid crystals.	7	L2	CO4
	b.	What are Perovskite Materials? Give the properties and applications of perovskite materials in optoelectronic devices.	7	L2	CO4
	c.	Describe the synthesis of nano materials by co-precipitation method with example.	6	L2	CO4

Module – 5

Q.9	a.	What are Reference Electrodes? Describe construction and working of calomel electrode.	7	L2	CO5
	b.	What is ion selective electrode? Explain the construction and working of glass electrode.	6	L2	CO5
	c.	Explain the principle , instrumentation and the application of potentiometric sensor in the estimation of Iron.	7	L3	CO5
OR					
Q.10	a.	Explain the principle , instrumentation and application of Colorimetric sensor in the estimation of copper.	7	L3	CO5
	b.	Explain how the strength of weak acid determined using a conductometric sensor.	7	L2	CO5
	c.	What are concentration cells? The EMF of the cell $\text{Cd} \text{Cd}^{2+} (0.0093 \text{ M}) \text{Cd}^{2+} (x \text{ M}) \text{Cd}$ is 0.086 V at 25°C. Find the value of 'x'.	6	L3	CO5

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