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BCHEE102/202

First/Second Semester B.E./B.Tech. Degree Examination, June/July2023
Chemistry for EEE Stream

Time: 3 hrs. 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 handbook is permitted.

		Module – 1	M	L	C
Q.1	a.	Explain the terms conductors , semiconductors and insulators on the basis of Band theory.	6	L2	CO1
	b.	Explain the production of electronic grade silicon by Czochrolski (CZ) method.	7	L2	CO1
	c.	A polymer sample contains 1, 2, 3 and 4 molecular having molecular weight 1×10^5 , 2×10^5 , 3×10^5 and 4×10^5 respectively. Calculate number average and weight average molecular weight.	7	L3	CO1
		OR			
Q.2	a.	What are Conducting Polymers? Explain Conducting mechanism of poly acetylene.	7	L2	CO1
	b.	Explain the preparation , properties and applications of Graphene oxide (Hummers method).	7	L2	CO1
	c.	Define Electroless Plating. Describe the electroless plating of copper in the manufacture of double sided PCB. [Printed Circuit Board].	6	L2	CO1
		Module – 2			
Q.3	a.	Define the term Battery. Explain the classification of batteries with an example.	7	L1, L2	CO2
	b.	Define Fuel cells. Explain the construction , working and applications of Methanol – oxygen ($CH_3OH - O_2$) fuel cell.	7	L1, L2	CO2
	c.	What are Photovoltaic Cells? Explain the construction and working of Photovoltaic cell.	6	L1, L2	CO2
		OR			
Q.4	a.	Explain the Construction , working and applications of Vanadium Redox flow battery.	7	L2	CO2
	b.	Explain the Construction , working and applications of Polymer Electrolyte Membrane fuel cell (PEM).	7	L2	CO2
	c.	Explain the Construction , working and applications of Na – ion battery.	6	L2	CO2
		Module – 3			
Q.5	a.	Explain Electrochemical theory of corrosion by taking iron as an example.	7	L2	CO3

	b.	Explain the process of Galvanisation, with a neat diagram.	6	L2	CO3
	c.	Explain the methods of disposal of e – waste.	7	L2	CO3
		OR			
Q.6	a.	A thick steel sheet of area 300cm^2 is exposed to air near the ocean. After one year period it was found to experience a weight loss of 250 gm due to corrosion. Calculate the rate of corrosion in both mpy and mmpy. (density of steel is 7.9 g/cm^3).	7	L3	CO3
	b.	Explain differential Aeration corrosion with an example.	6	L2	CO3
	c.	What are the effects of e – waste on Environment and Human health?	7	L2	CO3
		Module – 4			
Q.7	a.	What are the Nanomaterials? Explain the size dependent properties of nanomaterials.	7	L2	CO4
	b.	Explain the properties and applications of nano fibres and nanosensor.	6	L2	CO4
	c.	Explain the properties and applications of Organic Light Emitting Diodes.	7	L2	CO4
		OR			
Q.8	a.	Explain the preparation of nano – material by Sol – gel method.	7	L2	CO4
	b.	Explain the properties and applications of Quantum Light Emitting Diodes (QLED's).	7	L2	CO4
	c.	Explain the properties and applications of Perovskite materials.	6	L2	CO4
		Module – 5			
Q.9	a.	What are Reference Electrodes? Explain construction , working and applications of Calomel electrode.	7	L1, L2	CO5
	b.	Explain the principle and instrumentation of colorimetric sensor and application in the estimation of copper.	7	L3	CO5
	c.	A concentration cell was constructed by immersing two copper electrodes in 0.1M and 1.0M CuSO4 solution , write the cell representation and cell reactions and calculate the EMF of the cell.	6	L3	CO5
		OR			
Q.10	a.	Explain the method of determination of pH by using glass electrode.	7	L2	CO5
	b.	Explain the working principle and applications of electrochemical sensors.	6	L2	CO5
	c.	Explain the principle and instrumentation of conductometric sensors and its applications in the estimation of weak acid.	7	L3	CO5

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