Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN											Course Code	2	2	C	H	E	E	1	2

First Semester B.E. Degree Examinations, April/May 2023

CHEMISTRY FOR ELECTRICAL & ELECTRONICS ENGINEERING STREAM-I

Duration: 3 hrs **Max. Marks: 100**

Note: ***1. Answer any* FIVE *full questions, choosing* ONE *full question from each module.***
2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO:PI)*
		MODULE – 1		
1.	**a.**	Explain the production of electronic grade silicon by Float Zone method.	**06**	(2 :1 : 1.2.1)
	b.	What are the main sources of e-waste? Explain its effects on environment and human health.	**06**	(2 :1 : 1.2.1)
	c.	A polymer sample contains 10, 20, and 30 polymer chains of molecular weights 1000, 2000, and 3000 respectively. Calculate number average and weight average molecular weight of the polymer sample.	**08**	(3 :1 : 1.2.1)
		OR		
2.	**a.**	Explain any two methods of disposal of e-waste.	**06**	(2 :1 : 1.2.1)
	b.	What are conducting polymers? Explain the conducting mechanism of Polyacetylene.	**06**	(2 :1 : 1.2.1)
	c.	Apply the recycling method for extraction of copper and gold from e-waste. Mention the advantages of recycling of e-waste.	**08**	(3 :1 : 1.2.1)
		MODULE – 2		
3.	**a.**	Explain the construction, working & applications of Methanol-Oxygen fuel cell.	**06**	(2 :2 : 1.2.1)
	b.	Explain the construction, working and applications of Na-ion battery.	**06**	(2 :2 : 1.2.1)
	c.	What are solar cells? Explain the construction and working of solar PV cell, mention its advantages and disadvantages.	**08**	(2 :2 : 1.2.1)
		OR		
4.	**a.**	Explain the classification of batteries with examples.	**06**	(2 :2 : 1.2.1)
	b.	Explain the construction, working and applications of Li-ion battery.	**06**	(2 :2 : 1.2.1)
	c.	What are fuel cells? Explain the construction, working and applications of polymer electrolyte membrane fuel cell.	**08**	(2 :2 : 1.2.1)
		MODULE – 3		
5.	**a.**	Define Corrosion Penetration Rate. A thick steel sheet of area 100 in^2 is exposed to air near the ocean, after one year period it was found to experience a weight loss of 485 g due to corrosion, to what rate of corrosion in mpy and mm/yr does this correspond? Given density of steel = 7.9 g/cc. K = 87.6 for mmy and 534 for mpy.	**08**	(3 :3 : 1.2.1)
	b.	What is electroless plating? Distinction between electroplating and electro less plating.	**06**	(2 :3 : 1.2.1)
	c.	Explain differential metal corrosion with an example.	**06**	(2 :3 : 1.2.1)
		OR		

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**

6.	**a.**	Define corrosion? Apply electrochemical theory of corrosion for rusting of Iron.	**08**	(3 :3 : 1.2.1)
	b.	What is electroplating? Explain electroplating of chromium.	**06**	(2 :3 : 1.2.1)
	c.	What is galvanization? Explain the process of galvanization of Iron sheet with a neat diagram.	**06**	(2 :3 : 1.2.1)

MODULE – 4

7.	**a.**	Explain any two size dependent properties of nanomaterials.	**06**	(2 :4 : 1.2.1)
	b.	Discuss the properties and application of Organic Light Emitting Diodes.	**06**	(2 :4 : 1.2.1)
	c.	What are nano materials? Explain the synthesis of Nanomaterials by co-precipitation method with an example.	**08**	(2 :4 : 1.2.1)

OR

8.	**a.**	Discuss the classification, properties and applications of liquid crystals.	**08**	(2 :4 : 1.2.1)
	b.	Discuss the properties and applications of Perovskite materials.	**06**	(2 :4 : 1.2.1)
	c.	What is nano-sensors? Discuss its properties and applications.	**06**	(2 :4 : 1.2.1)

MODULE – 5

9.	**a.**	What are reference electrodes? Explain the construction, working and applications of calomel electrode.	**08**	(2 :5 : 1.2.1)
	b.	What are concentration cells? EMF of the cell $Cu\|CuSO_4(0.001M)\ \|\|CuSO_4(XM)\|Cu$ is 0.0595V. Find the value of X.	**06**	(3 :5 : 1.2.1)
	c.	Explain the principle, instrumentation and working of colorimetric sensors.	**06**	(2 :5 : 1.2.1)

OR

10.	**a.**	What is ion selective electrodes? Explain the construction and working of glass electrode.	**06**	(2 :5 : 1.2.1)
	b.	What are concentration cells? A cell is constructed by dipping two silver electrode in 0.01 M and 0.1 M Ag^+ solutions. Write cell representation, cell reaction and calculate emf of the cell at 25^0 C.	**08**	(3 :5 : 1.2.1)
	c.	Explain the principle, instrumentation and working of potentiometric sensors.	**06**	(2 :5 : 1.2.1)

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