

Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

2022 SCHEME

USN

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Course Code

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First / Second Semester B.E. Degree Summer Semester Examinations, September/October 2025

CHEMISTRY FOR ELECTRICAL AND ELECTRONICS ENGINEERING STREAM

Duration: 3 hrs

Max. Marks: 100

- Note:*
1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. Use of Chemistry Formula Handbook is permitted
 3. Missing data, if any, may be suitably assumed.

Q. No	Question	Marks	(RBTL:CO:PI)
<u>Module-1</u>			
1.	a. Explain conductors, insulators and semiconductors using band theory.	06	(2 :1 : 1.2.1)
	b. Describe extraction of gold from e-waste.	06	(2 :1 : 1.2.1)
	c. Calculate number average and weight average molecular weight of the polymer containing 1,2,3,4 polymer chains of molecular weights of 100, 200, 300, 400 respectively.	08	(3 :1 : 1.2.1)
(OR)			
2.	a. Explain the methods of disposal of e-waste.	06	(2 :1 : 1.2.1)
	b. Discuss production of electronic grade silicon by Czochralski process.	06	(2 :1 : 1.2.1)
	c. A polymer sample consisting four different chains out of which 4 number of chains have molecular weight 4×10^4 , 4 number of chains have molecular weight 4×10^4 , 5 number of chains have molecular weight 5×10^4 , 6 number of chains have molecular weight 6×10^4 , and 7 number polymer chains of molecular, 7×10^4 . Calculate number average and weight average molecular weight of the polymer.	08	(3 :1 : 1.2.1)
<u>Module-2</u>			
3.	a. Explain construction, working and applications of lithium-ion battery.	06	(2 :2 : 1.2.1)
	b. Explain construction, working and applications of methanol-oxygen fuel cell.	06	(2 :2 : 1.2.1)
	c. What are PV cells? Explain construction and working of photovoltaic cells. Mention advantage and disadvantages of PV cell.	08	(3 :2 : 1.2.1)
(OR)			
4.	a. Explain construction, working and applications of vanadium red-ox flow battery.	06	(2 :2 : 1.2.1)
	b. Explain construction, working and applications of sodium-ion battery.	06	(2 :2 : 1.2.1)
	c. Define battery. Explain classification of batteries with suitable examples.	08	(3 :2 : 1.2.1)
<u>Module-3</u>			
5.	a. Define corrosion control. With neat figure explain sacrificial method of corrosion control.	06	(2 :3 : 1.2.1)
	b. Define electro-less plating. Explain electro-less plating of copper.	06	(2 :3 : 1.2.1)

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

- c. Calculate mmy and mpy for specimen of metal of area of 200 cm^2 exposed to corrosive environment for one year undergoes a weight loss of 6.6 Kg. The density of alloy is 4.5 g/cm^3 . (K=87.6 for mmy and 534 for mpy). **08 (3 :3 : 1.2.1)**

(OR)

6. a. Explain electrochemical theory of corrosion taking rusting of Iron as example. **06 (2 :3 : 1.2.1)**
 b. Define galvanisation? Describe galvanization process. **06 (2 :3 : 1.2.1)**
 c. Define corrosion. Calculate CPR in mpy and mmy for tan alloy of area 300 square inches which undergoes a weight loss of 5.4 Kg. when exposed to corrosive environment for one year. The density of the steel sheet is 7.9 g/cm^3 . Given that, K-values for mmy and mpy are 87.6 and 534 respectively. **08 (3 :3 : 1.2.1)**

Module-4

7. a. Explain the properties and applications of Quantum Light Emitting Diodes (QLED's). **06 (2 :4 : 1.2.1)**
 b. Define nano-materials. Explain preparation of nanomaterials by co-precipitation method. **06 (2 :4 : 1.2.1)**
 c. Explain properties and applications of nanofibers and nano photonics. **08 (3 :4 : 1.2.1)**

(OR)

8. a. Explain the properties and applications of Organic Light Emitting Diodes (OLED's). **06 (2 :4 : 1.2.1)**
 b. Explain size dependent properties of anno-particles with reference to surface area, catalytic and conducting properties. **06 (2 :4 : 1.2.1)**
 c. Define nanomaterials. Explain synthesis of nanomaterials by sol-gel process. **08 (3 :4 : 1.2.1)**

Module-5

9. a. Explain different types of electrodes with examples. **06 (2 :5 : 1.2.1)**
 b. Explain theory and instrumentation of Colorimetry. **06 (2 :5 : 1.2.1)**
 c. What are concentration cells? EMF of the cell $\text{Zn/Zn}^{2+} (0.01\text{M}) // \text{Zn}^{2+} (x\text{M})/\text{Zn}$ at 25°C is 0.025 V. Write cell reactions and calculate the value of X. **08 (3 :5 : 1.2.1)**

(OR)

10. a. Explain theory and instrumentation of Conductometry. **06 (2 :5 : 1.2.1)**
 b. Define reference electrode. Explain construction and working of calomel electrode. **06 (2 :5 : 1.2.1)**
 c. A concentration cell is constructed by dipping two silver electrodes in 0.25N and 0.50N Ag^+ ion solution, Write cell representation, cell reaction and calculate emf of the cell at 25°C . **08 (3 :5 : 1.2.1)**

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