

Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

2022 SCHEME

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Course Code

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First / Second Semester B.E. Degree Examinations, February 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.

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
<u>Module-1</u>			
1.	a. Define conducting polymer. Explain mechanism of conduction in Polyacetylene by doping method.	06	(2 : 1 : 1.2.1)
	b. Write a note on sources and effect of e-waste on environment and human health.	06	(2 : 1 : 1.2.1)
	c. A polymer sample consisting of 1, 2, 3, 4 polymer chains of molecular weights of 1000, 2000 3000, and 4000, respectively. Calculate number average and weight average molecular weight of the polymer.	08	(3 : 1 : 1.2.1)
(OR)			
2.	a. Explain production of electronic grade silicon by Float Zone (FZ) method.	06	(2 : 1 : 1.2.1)
	b. Explain recovery of gold from e-waste.	06	(2 : 1 : 1.2.1)
	c. Calculate number average and weight average molecular weight of the polymer sample consisting of 1, 3, 5 and 7 molecules having molecular weight 1×10^4 , 3×10^4 , 5×10^4 and 7×10^4 respectively.	08	(3 : 1 : 1.2.1)
<u>Module-2</u>			
3.	a. Define battery. Explain construction and working of Lithium Ion battery.	06	(2 : 2 : 1.2.1)
	b. What are fuel cells? Explain construction, and working of methanol-oxygen fuel cell.	06	(2 : 2 : 1.2.1)
	c. What are PV cells? Explain construction, working and applications of photovoltaic cells.	08	(2 : 2 : 1.2.1)
(OR)			
4.	a. Explain advantages and disadvantages of PV Cells.	06	(2 : 2 : 1.2.1)
	b. Explain construction, and working of Polymer Electrolyte Membrane (PEM) fuel cell.	06	(2 : 2 : 1.2.1)
	c. Define reserve battery. Explain construction, working and applications of vanadium redox flow battery.	08	(2 : 2 : 1.2.1)
<u>Module-3</u>			
5.	a. Define electroplating. Explain electroplating of chromium.	06	(2 : 3 : 1.2.1)
	b. Explain differential aeration corrosion by taking pitting corrosion as an example.	06	(2 : 3 : 1.2.1)
	c. Define Corrosion. Apply electrochemical theory of corrosion for rusting of iron.	08	(3 : 3 : 1.2.1)

(OR)

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| 6. | a. | Define electroless plating. Explain electroless plating of copper in the manufacture of double sided PCB. | 06 | (2 :3 : 1.2.1) |
| | b. | Distinction between electroplating and electroless plating. | 06 | (2 :3 : 1.2.1) |
| | c. | Calculate CPR in both mpy and mm/yr for the thick steel sheet of area 220 inch ² which experiences a weight loss of 4.0 Kg after one year. The density of the steel sheet is 7.5 g/cm ³ . Given K for mmy and mpy are 87.6 and 534 respectively. | 08 | (3 :3 : 1.2.1) |

Module-4

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| 7. | a. | Explain classification of liquid crystals with examples. | 06 | (2 :4 : 1.2.1) |
| | b. | Explain properties and applications of Organic Light Emitting Diodes (OLED'S). | 06 | (2 :4 : 1.2.1) |
| | c. | Explain synthesis of nanomaterial by Sol-Gel method. | 08 | (2 :4 : 1.2.1) |

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| 8. | a. | Explain properties and application of Quantum Light Emitting Diodes (QLED'S). | 06 | (2 :4 : 1.2.1) |
| | b. | Explain properties and applications of nano-fibers and nano-photonics. | 06 | (2 :4 : 1.2.1) |
| | c. | Explain size dependent properties of nanomaterials (surface area, catalytic, conducting). | 08 | (2 :4 : 1.2.1) |

Module-5

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| 9. | a. | Define reference electrode. Explain construction and working of calomel electrode. | 06 | (2 :5 : 1.2.1) |
| | b. | Explain instrumentation of conductometric sensors with estimation of weak acid as an example. | 06 | (2 :5 : 1.2.1) |
| | c. | What are concentration cells? Emf of the cell Ag/Ag ⁺ (0.03 M)//Ag ⁺ (xM)/Ag at 25 °C is 0.101 V. Write cell reaction and calculate the value of X. | 08 | (3 :5 : 1.2.1) |

(OR)

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| 10. | a. | Explain principle and instrumentation of colorimetric sensors. | 06 | (2 :5 : 1.2.1) |
| | b. | Explain instrumentation of potentiometry with estimation of iron. | 06 | (2 :5 : 1.2.1) |
| | c. | What are concentration cells? A cell is constructed by dipping two cadmium electrode in 0.02 M and 0.2 M CdSO ₄ solutions. Write cell representation, cell reaction and calculate emf of the cell at 25 °C. | 08 | (3 :5 : 1.2.1) |

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