

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi.)

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Course Code

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Second Semester B.E. Degree Examinations Sept/Oct 2023

CHEMISTRY FOR CSE STREAM

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

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO: PI)</u>
<u>MODULE – 1</u>			
1.	a. Explain construction and working of Lithium-Ion battery.	06	2:1:1.2.1
	b. What are Fuel cells? Explain construction, working & applications of Methanol-oxygen fuel cell.	06	2:1:1.2.1
	c. Explain working principle and application of Electrochemical gas sensors for NO _x and SO _x .	08	3:1:1.2.1
OR			
2.	a. Explain construction and working of Sodium Ion battery.	06	2:1:1.2.1
	b. Explain working principle and application of Conductometric gas sensors	06	2:1:1.2.1
	c. Explain working principle of sensors for measurement of Dissolved Oxygen (DO)	08	3:1:1.2.1
<u>MODULE – 2</u>			
3.	a. Explain properties and application of organic light emitting diodes. (OLED'S).	06	2:2:1.2.1
	b. Write a note on ED model and ECD model of light emitting electrochemical cells.	06	2:2:1.2.1
	c. Mention classification of liquid crystals. Explain properties and application of any two of them.	08	2:2:1.2.1
OR			
4.	a. Explain properties and application of Quantum light emitting diodes. (QLED'S).	06	2:2:1.2.1
	b. Give an account on photoactive and electroactive materials used in optoelectronic devices.	06	2:2:1.2.1
	c. List the classification of electronic memory devices. Explain any two.	08	2:2:1.2.1
<u>MODULE – 3</u>			
5.	a. Explain Principle, Instrumentation of potentiometry.	06	2:3:1.2.1
	b. Define corrosion. Explain electrochemical theory of corrosion Taking rusting of iron as an example.	06	2:3:1.2.1
	c. A piece of corroded metal alloy plate was found in a submersed ocean vessel, it was estimated that the original area of the plate was 500 cm ² and approximately 4.3 Kg had corroded away during the submersion. Assuming a corrosion penetration rate of 5 mm/yr for this alloy in seawater, estimate the time of submersion in years. The density of alloy is 4.5 g/cm ³ , (K=87.6 for mmy).	08	3:3:1.2.1

OR

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| 6. | a. | Explain Principle, Instrumentation of Conductometric sensors with estimation of weak acid as an example. | 06 | 2:3:1.2.1 |
| | b. | Define reference electrode. Explain construction and working of Calomel electrode. | 06 | 2:3:1.2.1 |
| | c. | What are concentration cells? A cell is constructed by dipping Two copper electrodes in 0.01M and 0.1M CuSO ₄ solutions. Write cell representation, cell reaction and calculate emf of the Cell at 25 °C. | 08 | 3:3:1.2.1 |

MODULE – 4

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| 7. | a. | What are Conducting Polymers? Explain synthesis and conduction mechanism of Polyacetylene. | 06 | 2:4:1.2.1 |
| | b. | A polymer sample consisting of 1,2,3,4 polymer chains of molecular weights of 1000, 2000, 3000, 4000, respectively. Calculate number average and weight average molecular weight of the polymer. | 08 | 2:4:1.2.1 |
| | c. | What are PV cells? Explain construction and working of photovoltaic cells | 06 | 2:4:1.2.1 |

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| 8. | a. | Explain synthesis, properties and applications of Kevlar. | 06 | 2:4:1.2.1 |
| | b. | Calculate Number Average and Weight Average Molecular weight of the polymer sample consisting of 3, 5, 8 and 9 molecules having molecular weight 2×10^4 , 4×10^4 , 7×10^4 and 6×10^4 respectively. | 08 | 2:4:1.2.1 |
| | c. | Explain generation of hydrogen by electrolysis of water. | 06 | 2:4:1.2.1 |

MODULE – 5

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| 9. | a. | Give an account on toxic materials used in manufacturing electronic and electrical products | 06 | 2:5:1.2.1 |
| | b. | Describe in brief the role of stake holders in environmental management of e-waste. | 06 | 2:5:1.2.1 |
| | c. | Explain any three different approaches of recycling of e-waste. | 08 | 3:5:1.2.1 |

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| 10. | a. | Explain recovery of gold from e-waste. | 06 | 2:5:1.2.1 |
| | b. | Write a note on sources, Composition, Characteristics of e-waste | 06 | 2:5:1.2.1 |
| | c. | Discuss health hazards due to exposure to e-waste. | 08 | 3:5:1.2.1 |

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