

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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

CHEMISTRY FOR CIVIL 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

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
<u>MODULE – 1</u>			
1.	a. Discuss the properties and application of iron alloys.	06	(2 : 1 : 1.2.1)
	b. Illustrate the process of setting and hardening of cement.	08	(3 : 1 : 1.2.1)
	c. Explain production of hydrogen by electrolysis of water.	06	(2 : 1 : 1.2.1)
OR			
2.	a. Define calorific value? Illustrate the determination of calorific value of solid fuel using bomb calorimeter.	08	(2 : 1 : 1.2.1)
	b. When 0.84 gm of a coal was burnt completely in a bomb calorimeter. The increase in temperature of 2655 gm of water was 1.85 °C, if water equivalent of calorimeter is 156 gm. Calculate the gross calorific value of coal.	06	(3 : 1 : 1.2.1)
	c. Explain synthesis of Bio-diesel. List the advantages of biodiesel	06	(2 : 1 : 1.2.1)
<u>MODULE – 2</u>			
3.	a. Illustrate construction, working and application of Photovoltaic cell.	06	(2 : 2 : 1.2.1)
	b. Define fuel cell? Illustrate construction, working and application of methanol –oxygen fuel cell.	08	(2 : 2 : 1.2.1)
	c. Define metal finishing? Mention the technological importance of metal finishing.	06	(2 : 2 : 1.2.1)
OR			
4.	a. Define corrosion? Explain electrochemical theory of corrosion for steel in concrete.	08	(2 : 2 : 1.2.1)
	b. Illustrate construction and working of Li-ion battery.	06	(2 : 2 : 1.2.1)
	c. Distinguish between electroplating and electroless plating.	06	(2 : 2 : 1.2.1)
<u>MODULE – 3</u>			
5.	a. Explain the determination of total hardness of water by EDTA solution.	07	(2 : 3 : 1.2.1)
	b. Define COD. Explain determination of COD of waste water.	07	(2 : 3 : 1.2.1)
	c. In COD test 30.2 ml and 14.5 ml of 0.04N FAS solution are required for blank and sample titration respectively. The volume of sample used was 25 ml. Find the COD of sample.	06	(3 : 3 : 1.2.1)
OR			
6.	a. What is nanomaterial? Write properties and engineering applications of carbon nanotubes.	07	(2 : 3 : 1.2.1)
	b. Explain the synthesis of nano-material by Sol-Gel process.	07	(2 : 3 : 1.2.1)
	c. Illustrate the reverse osmosis method for water purification.	06	(3 : 3 : 1.2.1)

MODULE – 4

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| 7. | a. | Explain the types of polymerization with example. | 06 | (2 :4 : 1.2.1) |
| | b. | Explain synthesis and application of Teflon. | 06 | (2 :4 : 1.2.1) |
| | c. | Calculate number average and weight average molecular weight for a polymer sample containing 2,4,5,6 molecules of molecular weights 2×10^5 , 3×10^5 , 4×10^5 and 5×10^5 g/mol respectively. | 08 | (3 :4 : 1.2.1) |

OR

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| 8. | a. | Explain synthesis, properties and industrial applications of Kevlar. | 06 | (2 :4 : 1.2.1) |
| | b. | Define adhesives. Write synthesis, properties and applications of epoxy resin. | 07 | (2 :4 : 1.2.1) |
| | c. | Define biodegradable polymers. Write synthesis & applications of polylactic acid (PLA). | 07 | (3 :4 : 1.2.1) |

MODULE – 5

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| 9. | a. | Explain lead–silver synthesis with the help of phase diagram. | 08 | (2 :5 : 1.2.1) |
| | b. | Explain the instrumentation and applications of conductometric sensor. | 06 | (2 :5 : 1.2.1) |
| | c. | Explain the theory and instrumentation of potentiometric sensor. | 06 | (2 :5 : 1.2.1) |

OR

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| 10. | a. | Define Phase rule and explain the terms Phase, Component and Degree of freedom with example. | 08 | (2 :5 : 1.2.1) |
| | b. | Illustrate the theory and instrumentation of Colorimetric sensor. | 06 | (2 :5 : 1.2.1) |
| | c. | List the advantageous of instrumental method of analysis. | 06 | (2 :5 : 1.2.1) |

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