Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S2 (R) Exam May 2025 (2024 Scheme)

Course Code: GCCYT122

Course Name: CHEMISTRY FOR PHYSICAL SCIENCE

Max. Marks: 60 Duration: 2 hours 30 minutes

PART A

(Answer all questions. Each question carries 3 marks)

			CO	Marks
1		What is the difference between HCV and LCV? How are they interrelated?	CO 1	(3)
2		Explain the sol-gel method for synthesizing nanomaterials with an example.	CO 1	(3)
3		Describe the construction of the Standard Hydrogen Electrode (SHE). Point out its limitations	CO 2	(3)
4		How does ICCP differ from sacrificial anodic protection?	CO 2	(3)
5		List any three applications of gas chromatography.	CO 3	(3)
6		Sketch the molecular vibrations of carbon dioxide and predict their IR activity.	CO 3	(3)
7		Compare the advantages and disadvantages of chemical and physical methods of water disinfection.	CO 4	(3)
8		Give any three methods for the disposal of solid waste.	CO 4	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

9	a)	What are the major raw materials used for the manufacturing of Portland cement? Point out the function of these ingredients.	CO 1	(4)
	b)	What are lubricants? Discuss the classification of lubricants with examples	CO 1	(5)
10	a)	What is graphene? Give any two methods to synthesize graphene.	CO 1	(4)
	b)	What are conducting polymers? Discuss the classification of conducting polymers and provide one example from each category.	CO 1	(5)

Module -2

11	a)	What are the materials used in the anode and cathode of a Li-ion battery? Explain the cell reaction during the charging and discharging of Li-ion battery.	CO 2	(4)
	b)	Differentiate between electroplating and electroless plating of copper. Point out the advantages of both methods.	CO 2	(5)
12	a)	Discuss the construction and working of H_2-O_2 fuel cell with acid electrolyte.	CO 2	(4)
	b)	What is glass electrode? How is it constructed? Explain the measurement of pH using glass electrode.	CO 2	(5)

Module -3

13	a)	What are the various types of electronic transitions are possible in organic molecules? Which of them are observed in UV-Visible spectroscopy?	CO 3	[4]
	b)	Draw the block diagram of SEM and explain the function of each major components. Give any two applications of SEM.	CO 3	[5]
14	a)	Explain how IR spectroscopy can be used for (i) the identification of functional groups and (ii) to distinguish inter molecular and intramolecular hydrogen bonding with examples?	CO 3	[4]
	b)	What is DTA? Sketch the DTA curve of calcium oxalate monohydrate in the presence and in the absence of oxygen. Explain the difference based on the nature of reactions involved.	CO 3	[5]

Module -4

15	a)	Explain the terms temporary hardness, permanent hardness and total hardness of water. Discuss the determination of total hardness by titration method.	CO 4	[4]
	b)	What are ion exchange resins? Give one example. How is it used for the demineralization of water and how exhausted resins are regenerated?	CO 4	[5]
16	a)	Explain the different stages in sewage water treatment with the help of a flow diagram.	CO 4	[5]
	b)	What is DO in water? What are the factors which govern the amount of DO in water?	CO 4	[4]

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