

Reg No.: _____

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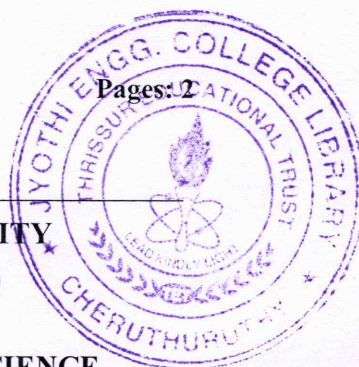
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

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

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|----|----|--|------|-----|
| 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

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|----|----|--|------|-----|
| 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

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|----|----|--|------|-----|
| 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] |
