

Code No: **R231118**

**R23**

**SET - 1**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM**  
**I B. Tech I Semester Supplementary Examinations June 2025**

**CHEMISTRY**

(Common to ECE & EEE)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part A, Part B.*  
*Part A is compulsory, Answer all questions.*  
*In Part B, Answer any one question from each unit.*

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**PART-A**

**(20 Marks)**

- 1 a) Outline the significance of  $\Psi$  and  $\Psi^2$ . [2]
- b) Derive de Broglie wave equation. [2]
- c) List the applications of graphine. [2]
- d) Outline the types of supercapacitors. [2]
- e) Define electrochemical cell. [2]
- f) List the factors affecting conductance. [2]
- g) Define carbon fibers and mention its applications. [2]
- h) Name the monomers of Nylon 6:6. [2]
- i) Define electromagnetic spectrum. [2]
- j) List the selection rules of IR-Spectroscopy. [2]

**PART-B**

**(50 Marks)**

**Unit-1**

- 2 a) Interpret MO Diagram of  $O_2^-$  and calculate bond order. [5]
- b) Discuss energy and wavefunction of a particle in one dimensional box. [5]

(OR)

- 3 a) Derive Schrodinger wave equation. [5]
- b) Discuss  $\pi$ -molecular orbitals of Benzene. [5]

**Unit-2**

- 4 a) Illustrate the concept of semiconductors. [5]
- b) Discuss Type-1 and Type-2 superconductors. [5]

(OR)

- 5 a) Mention the types of fullerenes. [5]  
b) Discuss the properties and applications of carbon nanotubes. [5]

**Unit-3**

- 6 a) Illustrate conductometric titrations of acid and bases. [5]  
b) Explain the basic principle and working of  $H_2$ - $O_2$  fuel cell. [5]

(OR)

- 7 a) Discuss construction and working of Li ion cell. [5]  
b) Explain electrochemical sensors. [5]

**Unit-4**

- 8 a) Explain the mechanism of free radical polymerization with suitable example. [5]  
b) Discuss preparation, properties and applications of Bakelite. [5]

(OR)

- 9 a) Differentiate thermoplastic and thermosetting plastic. [5]  
b) Explain biodegradable polymers. [5]

**Unit-5**

- 10 a) Discuss absorption laws of radiation. [5]  
b) Explain the instrumentation of IR spectroscopy. [5]

(OR)

- 11 a) Explain the instrumentation of HPLC. [5]  
b) Discuss the electronic transitions of UV spectroscopy. [5]

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