B **585B1** **Total pages: 2**

Register No: …… Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER B.TECH DEGREE EXAMINATION(R), NOVEMBER 2024

Common to Chemical Engineering, Computer Science and Engineering & Electronics and Computer Engineering

(2024 SCHEME)

Course Code : 24BSE1003-B

Course Name : Analytical and Materials Chemistry

Max. Marks : 50 **Duration:2.5 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. What is IS 10500-2012 ? What is its significance?
2. List any three advantages of OLED.
3. List the reactions happening in the electrodes of Li-ion battery during charging and discharging.
4. How Nernst equation is utilised in the potentiometric estimation?
5. A dye solution of concentration 0.04 M shows an absorbance of 0.09 at 600 nm; while a test solution of the same dye shows absorbance of 0.044 under same conditions. Find the concentration of the test solution.

PART B

(Answer one full question from each module, each question carries 7 marks)

MODULE I

6. Standard hard water contains 15 g of $CaCO_3$ per liter, 20 ml of this required 25ml of EDTA solution for the titration, 100ml of sample hard water required 18ml of EDTA solution for the titration. 100ml sample hard water after boiling required 12 ml EDTA solution for the titration. Calculate the total and temporary hardness of the given sample of hard water, in terms of ppm. 7

OR

7. Define Chemical Oxygen Demand. Mention its significance. How is it determined? 7

MODULE II

8. Explain the preparation of Phenol-formaldehyde resin. Mention its two properties and applications. 7

OR

9. What are biological nanomaterials? Give an example. Describe the procedure for the preparation of iron oxide nanomaterials. 7

MODULE III

10. What is electrochemical corrosion? Explain corrosion prevention by sacrificial anodic protection and impressed current cathodic protection. 7

OR

11. Write Nernst expression for electrode potential and cell potential with terms explained. Write three applications of Nernst equation. 7

MODULE IV

12. Explain the instrumentation of X-ray diffraction studies (XRD) and list two applications of it. 7

OR

13. a. Illustrate the instrumentation of TGA apparatus with a neat block diagram. 5
    b. Interpret the TGA curve of calcium oxalate monohydrate ($CaC_2O_4.H_2O$). 2

MODULE V

14. Using appropriate examples, explain the various electronic transitions possible for molecules. 7

OR

15. Draw the vibrational modes of CO_2 and H_2O and identify their IR active modes. 7

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