B   **720B1**   **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 (S, FE), NOVEMBER 2024
(2020 SCHEME)

Course Code	:	20CYT100
Course Name	:	**Engineering Chemistry**
Max. Marks	:	**100**

Duration:3 Hours

PART A
(Answer all questions. Each question carries 3 marks)

1. What are ion selective electrodes? Give one use of ion selective electrodes.

2. Define electroless plating. List any two uses of it.

3. What is the principle of MRI?

4. Write any three applications of UV-Visible spectroscopy.

5. What are the properties that TGA and DTA curves measure and how do they differ?

6. Why HPLC is a superior technique compared to column chromatography?

7. Draw the conformers of trans 1,4 -dimethyl cyclohexane

8. Write the structure and any two properties of ABS.

9. What are the causes for hardness of water? How is it expressed?

10. Differentiate between BOD and COD. Why COD is usually greater than BOD?

PART B
(Answer one full question from each module, each question carries 14 marks)
MODULE I

11. a) Explain the principle, experimental arrangement and procedure involved in the potentiometric redox titration for estimation of ferrous ions using suitable oxidising agent.   8
    b) Explain the procedure for the measurement of conductivity of a given solution.   6

OR

12. a) Define electrochemical series. Illustrate any four applications of electrochemical series.   10
    b) At 25ºC , the standard emf of a cell having reaction involving two electron charge is 0.395 V. Calculate the equilibrium constant for this reaction.   4

MODULE II

13. Draw the energy level diagrams for ethene, 1,3-Butadiene, 1,3,5-Hexatriene and benzene, indicating HOMO and LUMO. Arrange these compounds in the increasing order of λmax values and give justification for the arrangement. Why electronic transition takes place from HOMO to LUMO?   14

OR

14. a) Sketch the possible vibrations for H_2O. Which of these are IR active and why? $^{1}H^{19}F$ shows an   8

IR absorption at 4138 cm^{-1}. Find the force constant of the molecule. Given that 1 amu = 1.67 × 10^{-27} kg and c = 3 × 10^{10} cm s^{-1}.

b) Explain the different types of molecular vibrations.   6

MODULE III

15. a. Describe the principle behind column chromatography and how the column chromatographic procedure is done?   8

b. Discuss the various steps involved in TLC technique.   6

OR

16. a. Explain the principle, instrumentation and applications of SEM with the help of a neat diagram.   8

b. How are nanomaterials classified on the basis of dimension? Give one example for each.   6

MODULE IV

17. a) How is Polyaniline synthesised? Write any two properties and applications of polyaniline.   7

b) Explain the working of an OLED with a neat labelled diagram.   7

OR

18. a) What is isomerism? Explain any 4 types of structural isomerism with suitable examples.   10

b) Represent ethane using Newman projection formula and lactic acid using Fischer projection formula.   4

MODULE V

19. Explain primary, secondary and tertiary processes involved in sewage water treatment with the help of flow diagram.   14

OR

20. a) Explain disinfection methods using ozone and chlorine. Define breakpoint chlorination.   8

b) Explain ion exchange process used for softening of hardwater. How ion-exchange resins are regenerated?   6

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