

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2024**(2020 SCHEME)****Course Code : 20CHT294****Course Name: Instrumental Methods for Environmental Engineering****Max. Marks : 100****Duration: 3 Hours****PART A****(Answer all questions. Each question carries 3 marks)**

1. Write the mechanism of solvent extraction.
2. List out any three methods in environmental engineering used for the analysis of samples.
3. Define the terms i) Accuracy ii) Resolution, iii) Precision of a measuring instrument.
4. Distinguish between transducers and sensors with an example for each.
5. Explain the working principle flame photometry.
6. Explain Beer Lambert's law and its limitations.
7. Explain how the Bragg's equation is used to determine positions of atoms within a crystal?
8. Differentiate mobile and stationary phase in paper chromatography.
9. List out any two instruments to monitor i) Air pollution and ii) Water pollution.
10. Write the importance of P&ID with an example.

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

11. a) Explain any three instrumental methods used in environmental engineering. (14)

OR

12. a) What is electrophoresis? Explain the working of electrophoresis in separating and identifying very large molecules. (7)
- b) Explain the modes of operation of an ion exchange column to extract ions of different charges. (7)

MODULE II

13. a) Using a neat figure, explain the working principle of a strain gauge. (7)
- b) Describe the working principle of a temperature sensor with a neat sketch. (7)

OR

14. a) Classify transducers based on the signal being converted. (4)
- b) Describe the working of a piezoelectric transducer with a neat figure. (10)

MODULE III

15. a) Define pH of a solution. Describe the working principle and limitations pH electrode with a neatly drawn labelled diagram. (10)
- b) Identify two different optical methods of analysis in relation to their energy interaction with samples. (4)

OR

16. a) Describe with a neatly drawn labelled diagram explain the working of atomic absorption spectrophotometer for the analysis of metal ions in water samples. (14)

MODULE IV

17. a) Describe the working principle of a mass spectrometer with a neat figure. (8)
b) Explain the working principle and applications of scanning electron microscope. (6)

OR

18. Explain the working principle and applications of X ray diffraction. (14)

MODULE V

19. Explain and draw in detail the P&ID of a sewage treatment process. (14)

OR

20. Explain the factors affecting the design of process control instrumentation in a wastewater treatment plant. (14)
