Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (Regular), JULY 2022

(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. Explain the principle of electrophoresis.
2. Differentiate the terms accuracy and precision.
3. Write a note on the application of microprocessors in instrumentation.
4. Explain the role of transducers in any instrumentation system.
5. What are the two broad categories of commercial pH meters?
6. Explain the design principle employed in infrared spectrophotometers.
7. Describe the analytical techniques used for measuring turbidity.
8. State the Bragg diffraction law.
9. Explain the importance of computer aided analysis for pollution control.
10. What are the techniques used for the measurement of Sulphur oxides and nitrogen oxides?

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Explain the types of errors observed in chemical analysis. (10)
    b) Discuss the limitations of analytical methods. (4)

OR

12. a) Explain the working of ion-exchange chromatography with a neat sketch. (10)
    b) Differentiate between analytical instruments and process instruments. (4)

MODULE II

13. a) Describe various techniques used for the measurement of non-electrical quantities. (8)
    b) Differentiate the characteristics of Detectors, Transducers and Sensors. (6)

OR

14. a) What is strain gauge? Explain its working principle and various applications. (8)
    b) With a neat sketch, explain the main components of a sensor. (6)

MODULE III

15. a) How atomic absorption spectrophotometry differs from flame photometry? (8)
    b) What is the difference between emission and absorption spectroscopy? (6)

OR

16. a) Explain the working principle and instrumentation of UV visible spectrophotometer with a neat sketch. (10)
    b) Define redox potential. (4)

MODULE IV

17. a) Explain the principle of operation of mass spectrometer with a neat sketch. (8)
    b) Differentiate between single beam filter fluorimeter and double beam filter fluorimeter. (6)

OR

18. a) How the operating principle of column chromatography differs from thin film chromatography? Explain with a neat configuration diagram. (10)
    b) Define refractive index. How can it be measured? (4)

MODULE V

19. a) Explain in detail about the various water pollution monitoring instruments. (10)
    b) Explain gravimetric method of analysis. (4)

OR

20. a) Discuss about process instrumentation and control in pilot experiments. (8)
    b) What are the benefits of instrumentation and control systems in wastewater treatment? (6)

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