Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023

(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. Differentiate between process and analytical instruments.
2. List out any three advantages of instrumental methods over chemical methods of analysis.
3. Mention the working principle of a strain gauge.
4. Highlight any three important features of eddy current type accelerometers.
5. Draw an electromagnetic spectrum with any four radiations in the increasing order of its wavelength.
6. Write a short nots on the working of hollow cathode lamp used in spectroscopy.
7. Define resolution and magnification of a microscope.
8. List any three industrial applications of mass spectrometer.
9. List any three types of gas analyzers used in industries.
10. Write the differences between lab scale and pilot scale instrumentation.

PART B

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

MODULE I

11. a) Describe the working of centrifugal solvent extractor using a neat schematic diagram. (7)
    b) Discuss about gel electrophoresis and its principle. (7)

OR

12. a) Describe the mechanism of water desalination using ion-exchange units. (7)
    b) Explain the four types of systematic errors with examples. (7)

MODULE II

13. Illustrate the principle and working mechanism of any three pressure sensors. (14)

OR

14. With the help of neat diagrams, explain the principle and working mechanism of thermocouples and resistance thermal detectors. (14)

MODULE III

15. Identify the analytical instrument used to find the functional groups present in samples. Explain the working principle of the instrument with the help of a neat schematic diagram. (14)

OR

16. Identify the instrument used for the quantitative analysis of metals in liquid samples using light absorption. Discuss the working of the instrument and its applications using a schematic diagram. (14)

MODULE IV

17. Illustrate the working principle and applications of an analytical instrument works on the principle of Bragg's law. (14)

OR

18. Explain the process of separation of organic pollutants using gas chromatography with a neat sketch. (14)

MODULE V

19. a) Highlight the significance of computer aided analysis in pollution control. (7)
    b) Discuss briefly on the tools used for industrial pollution analysis. (7)

OR

20. Explain in detail about the various factors affecting the design of instrumentation for controlling the wastewater treatment process. (14)

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