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Question Paper Code : 31425

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fifth Semester

Electronics and Instrumentation Engineering

EI 2302/EI 52/10133 EI 505 – ANALYTICAL INSTRUMENTS

(Common to Instrumentation and Control Engineering)

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name the types of detectors used for IR spectrometry.
2. What is pyrolysis?
3. Define retention time.
4. Specify the properties of carrier gas.
5. Mention the principle of Dust and Smoke density measurement in Exhaust.
6. What is the use of gold films in Hydrogen Sulfide analyzer?
7. List the different types of electrodes used in pH measurements.
8. What is the use of blank in silica analyzer?
9. State the principle used in Electron spin resonance spectroscopy.
10. Define the term NMR.

PART B — (5 × 16 = 80 marks)

11. (a) Draw and Explain the schematic diagram of a typical double beam spectrophotometer. (16)

Or

- (b) What are non-dispersive spectrophotometers? Explain in detail the FTIR spectrometer. Also specify the advantages of the FTIR spectrophotometer. (16)

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12. (a) What are the two commonly used detectors in Gas Chromatography? Also explain any one detector in detail. (16)

Or

- (b) Explain the advantages of High-pressure liquid chromatography(HPLC). Also specify its applications. (16)
13. (a) With a block diagram, explain the method of measuring carbon monoxide using Non-dispersive Infrared Analyzer. (16)

Or

- (b) With a schematic diagram, explain the method of analyzing various flue gas content in smoke using Hotwire thermal conductivity analyzer. (16)
14. (a) What is meant by Selective Ion Electrodes? How it is classified? Also specify the advantages of Selective Ion Electrodes. (16)

Or

- (b) Explain the working principles of biosensors with a conceptual diagram Also specify the various parameters to be measured using Biosensor. (16)
15. (a) What are the basic components of Electron Spectroscopy? Also explain the working principle of Electron spectroscopy with a block diagram. (16)

Or

- (b) Explain in detail the construction and working principle of single focusing mass spectrometer. (16)
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