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Question Paper Code: 50546

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Fourth Semester

Electronics and Instrumentation Engineering

15UEI406 - ANALYTICAL INSTRUMENTATION

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- _____ spectrometer provides an accurate and non-destructive method of determining structure in liquids and soluble chemical compounds.
(a) NMR (b) IR (c) FTIR (d) Gratings
- The main application of conductivity measurement is analyzing
(a) viscosity (b) impurity (c) resistivity (d) turbidity
- To prevent corrosion of pipe, the fluid flowing through the pipe must be checked for
(a) moisture (b) pH (c) viscosity (d) dirt and dust
- The problem of Nebulizer blockage inherent in Pneumatic nebulizers is effectively overcome with _____ type of nebulizer.
(a) Babington (b) Cross flow (c) Ultrasonic (d) V groove
- _____ is the earliest method of detecting X-rays.
(a) Gas-proportional counters (b) Photographic film
(c) Solid state detectors (d) Photodetector
- Molecular weight can be directly determined using _____ spectrometry.
(a) Mass (b) IR (c) FTIR (d) FIR

7. Spectrometric instruments used in liquid chromatography are often called
- (a) Fluorimeter (b) Spectro flow monitor
(c) Absorption Filter (d) Interference Filter
8. _____ prisms are suitable for radiations essentially in the visible range.
- (a) Glass (b) Quartz (c) Monochromator (d) Gratings
9. _____ is used as detector when it is required to detect very weak light intensity.
- (a) Photomultiplier tube (b) High vacuum photosensitive cell
(c) Silicon Diode Rectifier (d) Diode Array
10. The photometry which is characterized by a high degree of constancy and reproducibility is
- (a) Flame photometry (b) Atomic absorption
(c) Spectrophotometers (d) Colorimeter

PART - B (5 x 2 = 10 Marks)

11. Write the application of Sodium analyzer.
12. State Lambert-Beer law.
13. List any four detectors used in gas chromatography.
14. Define Thermal Conductivity of a gas.
15. Mention the advantages of Mass spectrometry.

PART - C (5 x 16 = 80 Marks)

16. (a) Define pH. Brief the design criteria of pH meters. Explain anyone type of pH meter and its working principle in detail. (16)

Or

- (b) Explain with neat diagram a method of measuring oxygen dissolved in water. (16)
17. (a) Explain the single beam and double beam instruments used in UV spectrophotometer. (16)

Or

- (b) Draw and explain the arrangement of the major parts of single beam and double beam Atomic Absorption Spectrometer(AAS). (16)

18. (a) Draw the schematic diagram of a gas chromatograph and explain the components and working principle in detail. (16)

Or

- (b) Draw and explain the instrumentation of High Pressure Liquid Chromatograph (HPLC) in detail. (16)

19. (a) With neat diagram, describe the working principle of a H₂S analyser. (16)

Or

- (b) Draw the schematic representation of smoke and dust concentration measurement method in stack and explain its working principle in detail. (16)

20. (a) Write the basic principle of NMR. Discuss the working principle of NMR spectrophotometer and list any four application of NMR. (16)

Or

- (b) Draw the block diagram of a Mass spectrometer and describe the working principle in detail. (16)
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