

Code No: 07A61003

R07**Set No. 2**

III B.Tech II Semester Examinations, December 2010

ANALYTICAL INSTRUMENTATION
Instrumentation And Control Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Explain the Beckman Paramagnetic Oxygen analyzer with neat diagram. [16]
2. (a) Describe the constructional details and applications of a proportional counter with a neat sketch.
(b) Discuss about the dead time of the GM counter.
(c) Write short notes on the Geiger range. [8+4+4]
3. Explain in detail with necessary diagram the direct current plasma source. [16]
4. (a) With neat fig explain Glass Electrode in pH measurement.
(b) When a certain Conductance Cell was filled with a 0.01 M solution of KCl, whose Specific Conductance is 0.001409 mho / cm at 25 degree centigrade it had a resistance of 161.8 ohms and when filled with 0.0050 M NaOH it had a resistance of 190 Ohms. Calculate cell constant? [8+8]
5. Write short notes on:
(a) Photosensitive cells
(b) Photovoltaic cells
(c) Photoemissive cells
(d) Silicon diode detectors. [16]
6. (a) Write short notes on
i. Diffraction Grating Monochromator
ii. Prism Monochromator.
(b) "The density of a gas has a direct linear relation with the molecular weight of that gas". Justify this. [8+8]
7. What is a mass analyzer? Explain any two mass analyzer with neat sketches. [16]
8. Describe briefly chromatographic technique of separation. What do you Understand by Adsorption Chromatography, Partition Chromatography? [16]

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R07**Set No. 4**

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ANALYTICAL INSTRUMENTATION

Instrumentation And Control Engineering

Time: 3 hours

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Answer any FIVE Questions
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1. (a) Draw and explain OXYMAT-M Oxygen analyzer.
(b) With a neat characteristic curve explain Polarographic Cell. [8+8]
2. (a) Give the advantages of mass spectrometry.
(b) Write short notes on double resonance in NMR. [8+8]
3. (a) What are the advantages of atomic emission spectrometry ?
(b) What are the applications of plasma sources ? Explain. [6+10]
4. (a) Explain briefly the principle and operation of UV/visible spectrometer using Littrow prism.
(b) Explain how the above instrument is calibrated? [10+6]
5. Write down the differences between pH measurement and Conductivity measurement using a case study. [16]
6. (a) Write short notes on
 - i. Absorption Filters
 - ii. Interference filters.
(b) What is a Monochromator? Explain their use in analytical instruments. [8+8]
7. (a) Draw the circuit of Amplifier circuit used with Chromatograph and explain.
(b) Draw and explain the differential Flame Ionization Detector. [8+8]
8. Explain in detail the construction and working principle of any two types of radiation detectors with a neat diagram. [16]

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R07**Set No. 1**

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ANALYTICAL INSTRUMENTATION
Instrumentation And Control Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define pH. Explain the principle of operation of pH meter with a neat sketch.
(b) With neat sketch explain the construction and working principle of Silica analyzer. [8+8]
2. Draw and explain the block diagram of improved version of IR Gas analyzer. [16]
3. Write short notes on:
 - (a) Prism monochromators
 - (b) Grating monochromators. [8+8]
4. (a) With a neat sketch explain the injection system for liquid samples.
(b) Draw the arrangement for By-pass system for injecting samples and explain. [8+8]
5. Name different techniques for Oxygen analysis. Explain. [16]
6. (a) State the relation between concentration and absorbance .
(b) What are the advantages of flame photometry?
(c) Explain briefly the principle of flame photometry. [4+4+8]
7. Write short notes on
 - (a) Factors affecting the counting of pulses
 - (b) Possible radiation methods with different interaction techniques. [16]
8. (a) Explain in detail the construction and working principle of RF mass spectrometer.
(b) Compare the RF mass spectrometer with the other mass spectrometers. [6+10]

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R07**Set No. 3**

III B.Tech II Semester Examinations, December 2010

ANALYTICAL INSTRUMENTATION
Instrumentation And Control Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Give in detail the classifications of Chromatography. Briefly explain Liquid Chromatography. [16]
2. (a) Discuss the calibration method adopted for IR spectrometer.
(b) Give the advantages of FT spectroscopic technique. [8+8]
3. Explain the Beckman Paramagnetic Oxygen analyzer with neat diagram. [16]
4. (a) With neat schematic diagram describe the Vibrating Capacitor Amplifier type pH meter.
(b) Explain how output potential of pH electrode is related to pH value and also for H^+ ion concentration? Give Equations. [8+8]
5. Discuss in detail about the solid state detectors. [16]
6. (a) How do you think Hot Wire Thermal Conductivity analyzer is used in the gas Analysis.
(b) Write short notes on
 - i. Colorimetry
 - ii. Deviation from Beer's Law
 - iii. Chemiluminescence. [8+2+4+2]
7. Discuss in detail the various types of detectors used in IR spectrophotometers. [16]
8. Discuss in detail the magnetic resonance in NMR and the relaxation process. [16]
