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Total Number of Pages: 1

M.TECH
EIPC103

1st Semester Regular/Back Examination – 2014
ANALYTICAL INSTRUMENTATION
BRANCH(S): APPLIED ELECTRONICS & INSTRUMENTATION
ENGINEERING, ELECTRONICS & INSTRUMENTATION ENGINEERING

Time: 3 Hours

Max marks: 70

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.



- Q1 Answer the following questions: (2x10)
- a) List the important considerations in evaluating an instrumental method?
 - b) What are the various light sources used for Atomic Absorption Spectrometry?
 - c) Describe the principle of operation of Scintillating counter.
 - d) How are Larmor frequency and Magneto-gyric ratio related?
 - e) How do you eliminate the interference of spurious signals caused by the stray cosmic radiations in a scintillating counter?
 - f) Differentiate between X – ray absorption and X – ray emission.
 - g) Is chromatography a method of analysis in analytical instrumentation? Why?
 - h) Define "Potentiometry, Conductometry and Coulometry" methods of electro-chemical instrumentation.
 - i) State the differences between classical and instrumental methods of analysis giving suitable examples.
 - j) Define "Chemical Shift" in NMR?
- Q2 a) Using the schematic diagram of a mass spectrometer describe each component and explain the operation. (5)
- b) How can you increase the resolution of the mass spectrometer? Which types of elements are not distinguishable in this instrument? (5)
- Q3 a) Describe the operation of a Gas chromatograph using a schematic diagram. (5)
- b) Explain the laws of photometry and describe one application for each. (5)
- Q4 a) Explain the working of a single coil scanning NMR spectrometer using suitable diagram. (5)
- b) When does nuclear magnetic resonance occur? What is spin-spin coupling? (5)
- Q5 a) Describe the operation of a double beam UV spectrometer using a suitable diagram. (5)
- b) Explain the working of proportional counter and Giger-Muller counter. (5)
- Q6 a) Draw the schematic of an X – ray tube and describe its operation. (5)
- b) What is an electron probe micro analyser? Using a suitable diagram explain how it works. (5)
- Q7 a) Using a suitable chart with varying wave length explain how does radiant energy interact with matter at different frequency ranges of the spectrum? (5)
- b) Draw the flow diagram of a liquid chromatograph and describe the working of the same. (5)
- Q8 Write short notes on any two (5+5)
- a) Raman spectroscopy
 - b) Electron Microscope
 - c) Auger Technique
 - d) Flame photometry