Exam code- 433
Sub. Code: 2966

1125

M.Sc. Applied Chemistry/ Pharmaceutical, 3rd Semester
Paper-304 : Spectroscopic Instrumentation Techniques

Time Allowed: 3 hours

Max. Marks: 60

*Note: Attempt **five** questions in all, including Question No. IX (Unit-V) which is compulsory and selecting one question from each Unit I-IV.*

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UNIT-I

I. a) What is Lambert Beer's Law?
b) Discuss various radiation sources used in UV and visible absorption spectroscopy.
c) Compare single and double beam spectrophotometer with help of schematic diagram. (4,4,4)

II. a) Discuss in detail fundamentals of instrumentation for fluorescence. Also tell various factors affecting this.
b) Tell Derivative spectroscopy in brief. (8,4)

UNIT-II

III. Describe and compare in detail the construction, working principle, specific applications and limitations of different radiation sources used in IR spectroscopy. (12)

IV. a) What is the difference between normal IR and FT-IR spectroscopy? Explain properly.
b) Write a complete note on Thermocouples and Bolometer detector. (5,7)

UNIT-III

V. What are the basic sections of a mass spectrometer? Discuss properly the function of each component. (12)

VI. Discuss the following:
a) Quadrupole analyzer.
b) Double focusing analyzer.
c) Time of Flight. (4x3)

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UNIT-IV

VII. Explain the following NMR terms in detail:
   a) Spin-Spin coupling.
   b) Equivalent and Non-equivalent protons.
   c) Relaxation process in NMR. (4x3)

VIII. a) Write in brief about C-13 NMR spectroscopy.
   b) Discuss continuous –wave NMR spectrometer. (6,6)

UNIT-V

IX. Answer the following:
   a) What are Woodward and Fisher rules for conjugated dienes? Explain properly.
   b) Write a complete note on Photon detector.
   c) What is spark source spectrometry.
   d) Write about Chemical Shift in NMR spectroscopy. (4x3)

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