

FACULTY OF SCIENCE

M. Sc. IV – Semester (CBCS&Non-CBCS) Examination, May / June 2016

Subject : Physics / Applied Electronics

Paper – II : (CB-Spectroscopy)

Time : 3 Hours

Max. Marks: 80

Note : Answer all questions from Part–A and Part–B. Each question carries 4 marks in Part–A and 12 marks in Part – B.

**PART – A (8 x 4 = 32 Marks)
(Short Answer Type)**

- 1 Explain briefly about spin-split interaction.
- 2 What is Landé interval rule? Give an example.
- 3 Explain briefly about type of molecular spectra.
- 4 What is effect of isotope on rotational spectra?
- 5 What is Raman effect? Explain.
- 6 What is rule of mutual exclusion principle ? Give an example.
- 7 Differentiate between NMR and ESR spectroscopy
- 8 What is chemical shift? Explain.

**PART – B (4 x 12 = 48 Marks)
(Essay Answer Type)**

- 9 (a) How do you evaluate the spectral terms arising in the case of equivalent and non equivalent electrons?
OR
(b) Discuss the fine structure of spectra of elements with more than one valence electron.
- 10 (a) Obtain the energy expression for an energy level in the case of rigid and non rigid diatomic molecule.
OR
(b) Explain the salient features of vibrational rotational spectra. Give the energy expression.
- 11 (a) Explain about the classical and quantum theories of Raman effect.
OR
(b) Explain the principle and instrumentation involved in IR spectrophotometer.
- 12 (a) What are Bloch equations? Derive these equations.
OR
(b) Give the experimental details of NMR spectroscopy.
