

**FACULTY OF SCIENCE**

**M.Sc. IV-Semester (New)(CBCS/Non-CBCS) Examination, April / May 2014**

**Subject: Physics / Applied Electronics  
Paper- II (C.B. Paper-I): 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 What is Ritz combination principle? Explain.
- 2 What information do you get from Lande interval rule?
- 3 Give the salient features of vibration - rotation spectra.
- 4 What is Raman effect? Explain.
- 5 How do you find out structural information from Raman and IR Spectra?
- 6 What is chemical shift? Explain.
- 7 Explain about hyperfine splitting in ESR.
- 8 Write some of the applications of ESR.

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

- 9 (a) Explain the characteristic features of spectra of alkali elements in detail.  
**OR**  
(b) What are equivalent and non equivalent electrons? Obtain the spectral terms arising in the case of  $p^2$  and  $p.p.$  configurations.
- 10 (a) Discuss the salient features of energy levels of rigid rotator and non-rigid rotator.  
**OR**  
(b) Explain the vibrational structure of a diatomic molecule. Describe the importance of potential energy curves.
- 11 (a) Explain the instrumentation involved in Raman spectrometer and give the details.  
**OR**  
(b) How do we find out the structural information from Raman and IR spectra? Give an example.
- 12 (a) Give the experimental details of NMR spectroscopy.  
**OR**  
(b) Explain the principle and working of an ESR spectrometer. Give important applications of ESR spectra.

\*\*\*\*\*