

Roll No.
600 -/-/20/20

December 2013

M. Sc. IIIrd Semester Examination

PHYSICS

Fourth Paper : Atomic and Molecular Physics

Time 3 Hours

[Max. Marks : Regular 85 / Private 100 / ATKT 35

Note : This question paper is meant for all Regular, Private and ATKT students. Answer all five questions. All questions carry equal marks. The blind candidates will be given 60 minutes extra time.

1. Explain the interaction between Nuclear Spin and Magnetic Field.

15

OR

Explain the fundamentals of Nuclear magnetic spectroscopy. Give its applications.

2. Describe dissociation and pre-dissociation of molecules. Obtain expression for dissociation energy.

15

OR

Explain why bands are obtained in molecular spectra. Discuss formation of progressions and sequences.

3. What is Raman Effect ? How can it be explained on the basis of rotational and vibrational levels of molecules ? Discuss Raman Shift.

13

OR

Describe how molecular structure can be determined with the help of Infra red and Raman spectroscopy.

4. In Mössbauer Spectroscopy, explain why the resonant absorption is not at the same energy as emission. How Mossbauer spectra are obtained ?

16

OR

Discuss the effect of magnetic field on Mossbauer Spectrum.

5. Explain splitting of electron energy levels by a magnetic field.

13

OR

Explain Electron Spin Resonance (ESR) Spectroscopy. Discuss ESR spectra of an isotropic system.

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