

January 2015

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. Discuss nuclear magnetic resonance spectroscopy in detail.

OR

What do you know about population of energy level and discuss relaxation process.

2. What do you know about electronic spectra of diatomic molecules and discuss Frank Condon principles related to it ?

OR

What do you know about dissociation and pre-dissociation ? Discuss in detail.

3. Define Raman effect and write its explanation by quantum theory.

OR

Discuss in detail Raman and Infrared Spectroscopy in the structural determination.

4. Define Mossbauer effect and discuss principles of Mossbauer spectroscopy.

OR

Discuss application of Mossbauer spectroscopy for Isomer shift and Quadra pole splitting.

5. Write principle of ESR and discuss in detail ESR spectrometer.

OR

Discuss ESR spectra of free radicals in solution.