Reg.No									

Prepared by Dr. TM

DEPARTMENT OF SCIENCES

3rd semester M Sc Physics-end sem examination

PHY 701- Atomic and Molecular Physics

Time : 3 Hours | 24 - 11 - 2016 | Max Marks : 50

Answer any **FIVE** of the following questions.

1. a) Explain space quantization of angular momentum. Show that it is in accordance with uncertainty principle.

   b) Give the quantum mechanical treatment of radiative transition of an electron.

   (5 + 5) marks

2. a) Explain the important processes associated with matter-radiation interaction in the various electro-magnetic regions.

   b) Explain the various aspects of a spectral transitions. **(5 + 5) marks**

3. a) The K and L energy levels of an element lie at 78 keV and 12 keV. Compute - i) wave length of K_α line, ii) The potential difference across the X ray tube to excite this line and iii) K absorption edge.

   b) Explain KL_IL_{II} Auger process. How Auger process is different from XRF?

   (5+ 5) marks

4. Explain the principle of NMR spectroscopy and its application in medicine. **10 marks**

5. a) Explain the spectra of an-harmonic oscillator and compare it with harmonic oscillator.

   b) Discuss qualitatively the effects of rotation on a vibrating molecule. **(5 +5) marks**

6. a) What is Raman scattering? Give the classical explanation of the effect.

   b) Discuss rotational Raman spectra of linear molecules. **(5 +5) marks**

* * * * * * * * *

TM