Karunya University
(Karunya Institute of Technology and Sciences)
(Declared as Deemed to be University under Sec.3 of the UGC Act, 1965)

End Semester Examinations - 2015-16 Even Semester - May 2016

15PH3009 Atomic and Molecular Spectroscopy

Set A

Time : 3 hrs
Total Marks: 100

1. a. Define spectrocopy. (3 marks)

   b. Give the applications of different types of spectroscopy (7 marks)

   c. Classify molecules base on moment of inertia (10 marks)

OR

2. Derive the rotational energy level (E_J) and rotational constant (B) of a rigid diatomic molecule with a neat sketch. (20 marks)

3. a. Give the difference between emission and absorption epectra (3 marks)

   b. Discuss the vibrating diatomic molecue as a simple harmonic oscillator (17 marks)

OR

4. a. What is meant by Molecular Polarizability (3 marks)

   b. Explain Raman Spectra based on classical theory (17 marks)

5. Explain the diatomic vibrating rotator (20 marks)

OR

6. a. Discuss the fundamental vibrations of a CO_2 molecule (10 marks)

   b. Discuss the fundamental vibrations of a H_2O molecule (10 marks)

7. a. Give an example of atom which has atomic spectra similar to hydrogen atom (2 marks)

   b. With a neat energy level diagram explain the atomic spectra of hydrogen atom (18 marks)

OR

8. a. What is J-J coupling (3 marks)

   b. Explain Zeeman effect in detail with a neat sketch (17 marks)

9. Explain the working principle, construction, and applications of XPS. (20 marks)

Wishing you All the Best