Exam. Code : 103204
Subject Code : 1304

B.A./B.Sc. 4th Semester

PHYSICS Paper-B

(Atomic and Molecular Spectra)

Time Allowed—2 Hours] [Maximum Marks—35

Note :— There are **eight** questions for equal marks. Candidate are required to attempt any **four** questions.

I. (a) What is Bohr's Correspondence principle ? Explain it.

(b) What is difference between emission and absorption spectra ?

II. (a) Describe how Frank and Hertz experiment confirms Bohr's Theory of Atom.

(b) Write two evidences in favor of Bohr's Theory of Atom?

III. (a) What is spin-orbit (L-S) coupling ? Write spectroscopic notation and selection rules for L-S Coupling.

(b) What are D_1, D_2 lines in Sodium atom spectra ?

IV. (a) Discuss splitting of spectral lines of an atom in Anomalous Zeeman effect.

(b) What is difference between fine structure and hyperfine structure of an atom ?

V. (a) What are symmetric and antisymmetric wave functions? What type of wave function describes identical particles with half integral spin ?

(b) Distinguish between identical and non-identical particles using Pauli Exculusion principle.

VI. (a) Explain with energy level diagram the spectra of alkaline earth atoms.

(b) Why singlet state is higher in energy than corresponding triplet state ?

VII. (a) Explain origin of characteristics x-rays.

(b) X-ray tube operated at 50 keV, find shortest wavelength of x-ray emitted.

VIII. (a) What is Raman Effect ? How this effect is used in Raman Spectroscopy?

(b) A molecule is excited at 4358 A^0 and Raman line is observed at 4567 A^0. Find its Raman shift.