Unit IV

8. What do you mean by Zeeman effect ? Describe an experimental set-up to study Zeeman effect. **8**

9. Explain Pachen-Back effect of a single valence electron system. **8**

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B.Sc. EXAMINATION, 2025

(Sixth Semester)

(Regular & Re-appear)

PHYSICS

Paper-XII

Atomic and Molecular Spectroscopy

Time : 3 *Hours*] [*Maximum Marks :* 40

Before answering the question-paper, candidates must ensure that they have been supplied with correct and complete question-paper. No complaint, in this regard will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

(Compulsory Question)

1. (a) Differentiate between emission and absorption spectra. **2**

(b) Discuss hydrogen fine spectra. **2**

(c) What is Pauli's exclusion principal ? **2**

(d) Explain anomalous Zeeman effect. **2**

Unit I

2. Explain the Bohr's model of one electron atom and discuss the various spectral series in Hydrogen atom. **8**

3. (a) Discuss the shortcomings of Bohr-Sommerfield theory. **4**

(b) The serious limit wavelength of Balmer series in hydrogen spectrum is 3646 Å. Calculate Rydberg constant for hydrogen atom. **4**

Unit II

4. Derive an expression for the Larmor processional frequency. What is its importance ? **8**

5. Describe the general features of spectra of alkali-like atoms. How are they explained ? **8**

Unit III

6. Outline the essential features of the spectra of alkaline-earth elements. How are they explained theoretically ? **8**

7. What is meant by hyperfine structure of spectral lines ? How could it be explained on the basis of nuclear spin ? **8**