Sr.No. 3219

Exam Code:103204

Subject Code: 7536

B.A/B.Sc. - 4th Sem (old sylb 2018-19)

(2721)

Paper: Physics Paper-B (Atomic Spectra & Lasers)

Time Allowed: 2 hrs. **Max. Marks: 35**

Note: There are EIGHT questions of equal marks. Candidates are required to attempt any FOUR questions.

I. What is spin magnetic moment and orbital magnetic moment of electron in an atom? Derive expression to show that they are quantized?

II. What is anomalous Zeeman effect? Derive expression for Zeeman Shift. Draw Zeeman Lines for D line of Sodium atom for $3\ ^2P_{1/2} \rightarrow 3\ ^2S_{1/2}$ transition.

III. Explain spectra of alkaline earth atoms. Draw energy level diagram for allowed transitions using selection rules.

IV. What are coupling schemes for orbital and spin angular momentum of electron? Discuss L-S coupling schemes for two electron system. What are selection rules for transitions in LS coupling?

Contd....P/2

V. Discuss concept of stimulated emission and population inversion in LASER. How they are achieved in a LASER.

VI. Derive Einstein relation for spontaneous emission and stimulated emission.

SECTION-E

VII. Explain with energy level diagram the working of He-Ne LASER. How population inversion is achieved in it.

VIII. What is Q-switching? What are different techniques for Q-switching in LASER?

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