

**SVS 328 B-2K12**  
**B.Sc. Vth Semester Degree Examination**  
**Physics Optional**  
**Atomic and Molecular Physics**  
**Paper - 5.1 (V)**

Time : 3 Hours

Maximum Marks : 80

**Instructions to Candidates.**

- 1) Answer **all** questions from section - A.
- 2) Answer any **five** question from Section - B.
- 3) Answer any **four** questions from Section - C.

**Section - A**

Answer **all** questions.

(15 × 1=15)

1. What is energy equivalent to a.m.u?
2. What is the value of  $\left(\frac{e}{m}\right)$  of electron?
3. Define Bohr radius.
4. Define excitation potential.
5. What is space Quantisation?
6. State Pauli's exclusion principle.
7. What is Bohr magneton?
8. State Mosely's law of X-ray.
9. What is Duane-Hunt limit?
10. Mention different types of molecular spectra.
11. What is cause for blue colour of the sky?
12. What are anti-stokes lines?
13. What is stimulated emission?
14. What is optical pumping?
15. What is holography.

**Section - B**

16. Describe briefly Dempster's mass spectrography. (5 × 5=25)
17. Write a note on sommerfield's atom model.
18. Write a note on L-S. Coupling.
19. Explain briefly continuous and characteristic X-ray spectra.
20. Explain stark effect.
21. Explain the theory of vibrational spectra.
22. Compare fluorescence and phosphorescence.

**Section - C**

(10 × 4=40)

23. a) Describe an experiment for determination of  $\left(\frac{e}{m}\right)$  of electron by J.J.Thomson method.
- b) A cathode ray beam is bent in a circular arc of radius 0.02 meter by a field of magnetic induction  $4.5 \times 10^{-3}$  weber/m<sup>2</sup>. Calculate the velocity of electron. Given that, electronic charge =  $1.6 \times 10^{-19}$  Coulomb. and electronic mass =  $9.1 \times 10^{-31}$  Kg. (8+2=10)
24. a) State Bohr's postulates.
- b) Obtain an expression for energy of electron of Hydrogen atom.
- c) Calculate the wavelength of 1st member of Balmer series. (2+6+2=10)
25. a) Describe stern's Gerlach experiment.
- b) Discuss the importance of the results obtained from stern-Gerlach experiment. (7+3=10)
26. a) What is Zeeman effect?
- b) Describe the experimental study of normal zeeman effect.
- c) Calculate the Zeeman shift of line of wavelength 6000A° when a magnetic induction of 1 web/m<sup>2</sup> is applied in Normal zeeman effect. (1+7+2=10)
27. a) What is Raman effect.
- b) Explain the Raman effect on the basis of quantum theory.
- c) Mention different types of scattering of light. (1+7+2=10)
28. a) Explain principle, construction and working of He-Ne laser.
- b) Write uses of Laser. (8+2=10)