

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.

B.Sc.Physics - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER - IV

22UPHCT4007 - Atomic Physics

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

Section B

Answer any **SIX** questions ($6 \times 5 = 30$ Marks)

1. Explain the various quantum numbers associated with the vector atom model.
2. Apply Thomson's parabola method to find mass of a positive ion.
3. Prepare the experimental verification for Compton effect.
4. Interpret the applications of lasers in communication & medicine.
5. State the selection rules and intensity rules.
6. In a Bain bridge mass spectrograph, singly ionised atoms of Ne^{20} pass into the deflection chamber with a velocity of $10^5 m/s$. If they are deflected by a magnetic field of flux density 0.08 T, calculate the radius of their path and where Ne^{22} ions would fall if they had the same initial velocity.
7. Describe the production of X-rays using Coolidge tube.
8. Distinguish between spontaneous emission & stimulated emission.

Section C

Answer any **THREE** questions ($3 \times 10 = 30$ Marks)

9. Describe the principle and procedure of Stern and Gerlach experiment and indicate the importance of the results obtained.
10. Derive an expression for the Zeeman shift.
11. Illustrate the construction of Aston's mass spectrograph with necessary theory.
12. Explain the Bragg X-ray spectrometer method of determining wavelength of X-rays.
13. Describe the construction and working of CO_2 laser.
