

Roll.No.

20UMAAT2D02

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 - NOVEMBER 2025
SEMESTER - I

20UMAAT2D02 - Allied Physics - II

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

Section B

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

1. Explain the concept of angular dispersion and the dispersive power of a prism.
2. Describe the vector atom model and the quantum numbers associated with it.
3. Compute the difference between L-S coupling and j-j coupling with examples.
4. Determine the half-life of a radioactive isotope if its decay constant is $2 \times 10^{-5} \text{ s}^{-1}$
5. State and explain the semi-empirical mass formula and its significance.
6. Prepare a short note on Joule–Thomson effect and its application in the liquefaction of gases.
7. Illustrate the truth table of NAND and NOR gates and explain why they are called universal gates.
8. Examine the DeMorgan's theorem for two variables using truth tables.

Section C

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

9. Apply the condition for combination of two prisms to produce dispersion without deviation. And explain its practical significance.
10. Criticize the energy levels using vector atom model for an electron in p-orbital considering L-S coupling.
11. Infer the liquid drop model of the nucleus and discuss how it accounts for nuclear fission.
12. Explain Linde's method of liquefying air with neat diagram.
13. Illustrate a combinational logic circuit to implement a 2-input XOR gate using only NAND gates with a diagram and truth table.
