

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.

M.Sc. - END SEMESTER EXAMINATIONS APRIL - 2022

SEMESTER - I

08PPHCT1003 - QUANTUM MECHANICS - I

Total Duration : 3 Hrs.

Total Marks : 60

Section A

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

1. Reproduce Schrodinger's time dependent and for matter waves.
2. Prepare a short note on Hilbert space.
3. Interpret the time-independent perturbation theory for non-degenerate levels.
4. Illustrate eigenvalue spectrum from angular momentum algebra.
5. Describe the problem of a particle in a rectangular barrier potential.
6. Relate time evolution in Schrodinger picture.
7. Apply variation method to estimate the ground state wave function.
8. Infer the concepts of spin and Pauli matrices shortly.

Section B

Part A

Answer any **TWO** questions ($2 \times 10 = 20$ Marks)

9. State and prove Ehrenfest's theorem in detail.
10. Solve the radial equation to obtain the energy values of the hydrogen atom.
11. Examine symmetries and conservation law in detail.
12. Deduce and describe WKB approximation method in detail.

Part B

Compulsory question ($1 \times 10 = 10$ Marks)

13. Compute and explain Clebsch - Gordan Coefficients in detail.
