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. END SEMESTER EXAMINATIONS APRIL-2022
SEMESTER - VI
08UPHCT6014 **&** UPH/CT/6014 - **Relativity and Quantum Mechanics**

Total Duration : 3 Hrs.   **Total Marks : 60**

Section A

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

1. What is frame of reference? Mention the postulates of special theory of relativity.
2. Discuss about the phase velocity and group velocity and the relation between them.
3. Mention and explain the properties of wave function.
4. Outline the barrier penetration problem and mention its importance.
5. How is a two body problems reduced into one body problem?
6. Discuss the outcomes of Davisson and Germer's experiment.
7. What is a self-adjoint operator? Give example.
8. What is a rigid rotator? Mention its significance.

Section B

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

9. Explain Michelson-Morley experiment. Discuss its implications.
10. Describe the principle, construction and working of electron microscope.
11. (i) Explain the inadequacy of classical mechanics.
    (ii) Derive the Schrodinger's wave equation.
12. Discuss in details the linear harmonic oscillator with all its significance.
13. Discuss in details about the differential and total cross-section in scattering.

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