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.Physics - END SEMESTER EXAMINATIONS - NOV' 2024
SEMESTER - II

22PPHCT2005 - Quantum Mechanics - II

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

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

1. Discuss scattering amplitude, obtain an expression for scattering amplitude using Born's approximation.
2. Explain the Semi-classical treatment of an atom with electromagnetic radiation.
3. Outline the limitation of KG equation.
4. Derive the Dirac equation for a free particle.
5. Briefly explain relativistic field and KG field.
6. Discuss about the differential scattering cross section and total scattering cross section.
7. Explain briefly the constant and harmonic perturbations.
8. Elaborate on the spin orbit interaction, and Dirac field.

Section C

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

9. Explain the principle of partial wave analysis of scattering problem.
   Deduce the expression for the scattering amplitude and phase shift.
10. Deduce and discuss the validity of Klein - Gordon equation.
11. Elaborate the (i) covariant form of Dirac equation, and
    (ii) magnetic moment of the electron.
12. Discuss the quantization of the field and quantization of Schrodinger equation.

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

13. Explain the time dependent perturbation theory for adiabatic perturbation.

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