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 APRIL - 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. Describe the differential Scattering Cross section and total cross section .

2. Explain in detail about the relation between the L-system and C-system using scattering theory.

3. Solve Klein-Gordon equation leads to positive and negative probability density values.

4. Show that Dirac's equation in the Covariant form.

5. Derive harmonic perturbation and define transition probability.

6. What do you understand by selection rule?

7. Describe Dirac's Equation for a free particle.

8. Define Scattering cross section,total scattering cross section and differential scattering cross section.Establish a relation between them.

Section C

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

9. Explain an expression for the scattering Cross section using Born Approximation and Discuss the condition for the Validity of it.

10. Solve an account of Fermi's golden rule and Sudden approximation.

11. Write down the Klein- Gordon equation which type of particle obeys this equation. Mention the drawback of the Klein- Gordon equation.

12. Evaluate how will you obtain the magnetic moment of the electron in Dirac's relativistic theory.

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

13. Describe the quantization of the electromagnetic field.

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