M.Sc. DEGREE EXAMINATION,APRIL 2020
I Year II Semester
Quantum Mechanics - II

Time : 3 Hours   **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. What is scattering amplitude?
2. Define differential cross section.
3. What are the transition probabilities?
4. State electromagnetic theory.
5. Define spin of an electron.
6. What is an antiparticle?
7. What are the properties of the gamma matrices?
8. State bilinear covariant.
9. What do you mean by quantization?
10. What do you understand by Klein-Gordon field?
11. State partial wave analysis.
12. Define Fermi Golden Rule.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Obtain the relation between angles in L-system and C-system.
14. What are the adiabatic approximation and sudden approximation?
15. Explain Klein-Garden equation.
16. Show that Dirac matrices must be even dimensional.
17. Explain creation an annihilation operators.
18. Derive Relativistic invariance of Dirac equation.
19. Give the properties of Gamma Materices.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Obtain an expression for the scattering cross section using Born approximation and discuss the condition for the validity of it.

21. Discuss the first order time dependent perturbation theory.

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

23. Derive the covariant form of Dirac equation.

24. Explain second quantization of an electromagnetic field.

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