M.Sc. DEGREE EXAMINATION,NOVEMBER 2018
I Year II Semester
Core Major
QUANTUM MECHANICS-II

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

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

Answer any **TEN** questions

1. Define laboratory frame of reference .
2. What do you understand by scattering cross section?
3. What is called perturbation?
4. What is meant by magnetic resonance?
5. Write the energy value in a Coulomb potential.
6. Explain Covariance form.
7. What is a trace?
8. Give the elementary idea of Feynman's theory of positron.
9. Explain the concept of field.
10. What are commutation relations?
11. Define spin of electron.
12. Explain Scattering amplitude.

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

Answer any **FIVE** questions

13. Explain the effective range theory for S wave.

14. Discuss about the time dependent perturbation theory.

15. Explain the interpretation of negative energy state.

16. Discuss the properties of gamma matrices.

17. Write down the creation and annihilation operators.

18. Discuss about the magnetic moment of an electron.

19. Explain about Sudden approximation.

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

Answer any **THREE** questions

20. Explain Born approximation and discuss the condition for the validity of Born approximation.

21. Apply time dependent perturbation theory to semi classical theory of radiation.

22. Derive the Dirac equation for a free particle and find its solution in relative quantum mechanics.

23. Obtain the Dirac equation in Covariance form.

24. Explain in detail the second quantization of Klein- Gordon field.

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