45071

M.Sc. DEGREE EXAMINATION, APRIL 2018.

Physics

FOURTH SEMESTER

Paper I — QUANTUM MECHANICS — II

Time : Three hours Maximum : 75 marks

(No additional sheet will be supplied)

PART A — (5 × 3 = 15 marks)

Answer any FIVE questions.

Each question carries 3 marks.

Each answer should not exceed 1 page.

1. What are Identical particles? Explain.

2. Explain Pauli's Exclusion principle.

3. What are commutation rules for angular momentum?

4. Give a short note on spin angular momentum.

5. What is Klein - Gorden Equation?

6. Discuss about Negative Energy States.

7. Discuss N-representations.

8. What do you understand about second Quantization?

PART B — (4 × 15 = 60 marks)

Answer ALL questions.

Each question carries 15 marks.

Each answer should not exceed 6 pages.

9. Obtain expression for Hydrogen molecule. Also discuss about spin-orbit interaction and ortho and para hydrogen

Or

10. Derive symmetric and anti symmetric wave functions for two and three particle system.

www.kvrssgroup.com
www.upiqpbank.com

11. Obtain Eigen values and Eigen functions for L_z and L^2. Give a short note on addition of angular momenta.

Or

12. State Clebsh - Gorden coefficients. Derive Clebsh - Gorden coefficients for $J_1 = J_2 = 1/2$.

13. Explain klein - Gordon Equation. Obtain probability current density using klein - Gorden Equation.

Or

14. State and Explain Dirac's matrices. Derive Dirac's relativistic equation for free particle also discuss plane wave solution.

15. Discuss about Lagrangian and Hamilton formulation of field also discuss second Quantization.

Or

16. Explain following

    (a) Commutation and Anti commutation Relations.

    (b) System of Fermions acid Bosons.

    (c) Creation and Annihilation.

---

www.kvrssgroup.com
www.upiqpbank.com