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Code No. 6778 / CBCS / NON CBCS

FACULTY OF SCIENCE

M.Sc. II-Semester Examination, May / June 2017

Subject: Physics & Applied Electronics
Paper- III
Quantum Mechanics - II

Time : 3 Hours **Max. Marks: 80**

PART – A (8x4=32 Marks)
(Short Answer Type)

1 Deduce a relation between scattering amplitude and differential cross-section.
2. Explain the nature of phase shift in the case of repulsive and attractive potentials.
3. Outline the time-independent theory for the degenerate states.
4. State and explain WKB approximation.
5 What are Einstein coefficients? Explain.
6. Explain Fermi's golden rule.
7. Derive Klein-Gordon equation.
8. Write the properties of Diracmatrices.

PART – B (4x12=48 Marks)
(Essay Answer Type)

9.(a) What is Born's approximation? Explain.
(b) Obtain the scattering amplitude for the screened coulomb potential using Born approximation.

OR

(c) Discuss theory of the partial wave analysis in the scattering process.

10.(a) Deduce expression for the eigen values and eigen functions in the first order non-degenerate time-independent perturbation theory.

OR

(b) Describe the variation method for the eigen value problem and estimate the energy of ground state of Helium atom by this methods.

11.(a) Develop time-dependent perturbation theory and obtain an expression for transition probability.

OR

(b) Discuss harmonic perturbation in the time-dependent perturbation.

12.(a) Derive the solution of Dirac equation for free particle.
(b) Explain the significance of negative energy states.

OR

(c) Obtain an equation for a Dirac particle moving in a magnetic field.
(d) Deduce Dirac equation in covariant form.

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