



THE AMERICAN COLLEGE, MADURAI
(An Autonomous Institution Affiliated to Madurai Kamaraj University)
Re-accredited (2nd Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale
Backlog Arrear Examination, March 2021

Course code: PHY 2456/ 2478

Course title: Quantum Mechanics & Relativity

Time: 3 hours

Max.: 75 marks

Answer any FIVE of the following questions

5x15=75

1. State the postulates of special theory of relativity. Derive Lorentz transformation equations.
2. Describe the phenomena of Compton scattering and derive the formula for Compton shift.
3. Construct the time-dependent Schrodinger equation. Hence derive the time-independent Schrodinger equation of a particle in a potential $V(x)$.
4. Evaluate the energy eigen values and energy eigen functions of a free particle.
5. Explain the postulates of quantum mechanics .
6. Construct the Schrodinger equation of a stream particle incident on a potential barrier with height V_0 , hence derive the energy eigenfunctions of the particle in different regions in the case of $E > V_0$.
7. Discuss in detail the linear harmonic oscillator problem by Schrodinger method.
