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: PHS 2464 **Time: 3 Hours**

Course Title: Classical and Quantum Mechanics **Max. Mark: 75**

PART – A

Answer Any FIVE Questions **(5x 15 = 75)**

1. Using Hamilton's principle, obtain the Lagrange's equation of motion of conservative system.
2. Obtain the differential equation for a particle undergoing a central force motion and use it to verify Kepler's laws of planetary motion.
3. Derive the energy density radiation formula in terms of frequency and hence deduce Wien's law and Rayleigh-Jeans law.
4. Starting from the wave equation and introducing energy and momentum of the particle obtain an expression for Schrodinger's time independent form
5. From the solution of classical wave equation, show that $i\hbar \frac{\partial \psi}{\partial t} = \frac{-\hbar^2}{2m}\nabla^2\psi + V\,\psi$
6. Solve the Schrodinger's wave equation for a particle in a box. Solve it to obtain its Eigen function and Eigen values
7. Determine the energy levels of a linear harmonic oscillator on the basis of the Schrodinger's equation

****