Course code: PHY 2456/ 2478　　　　　　　　　　**Time: 3 hours**
Course title: Quantum Mechanics & Relativity　　　**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.

∗∗∗∗∗∗∗∗∗∗∗∗