JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

B.Tech-I Semester (CSE/IT/ECE/CE)

COURSE CODE (CREDITS): 18B11PH211 (3) MAX. MARKS: 15

COURSE NAME: Engineering Physics-II

COURSE INSTRUCTORS: PBB, SKK, VSA, SKT, HAZ, SBD, HSR MAX. TIME: 1 Hour

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Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

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Q.No	Question	CO	Marks
Q1	Derive the normalized wave function for a particle in a box of length α. Plot the wavefunction, probability and energy eigenvalues. Also, discuss the zero-point energy in this context.	1	3
Q2	What is Compton effect? Derive an expression for the Compton shift Δλ.	1	3
Q3	Find the change in wavelength of an X-ray photon when it is scattered by an electron through an angle (a) 90 degrees, (b) 60 degrees, and (c) 45 degrees.	2	3
Q4	Applying the uncertainty principle, explain the non-existence of electrons in the atomic nucleus.	2	3
Q5	Obtain the Schrodinger time-independent wave equation. Also, state the properties of wave functions.	1	3

$m_e=9.1\times10^{-31}$ kg; $h=6.626\times10^{-34}$ Js; $c=3\times10^{8}$ m/s;