



VIT

Vellore Institute of Technology
(Deemed to be University) - Vellore - Tamil Nadu - 690019

Continuous Assessment Test (CAT - II), December 2022

Programme	: B.Tech	Semester	: Fall 2022-2023
Course Title	: Engineering Physics	Course Code	: BPHY101L
School	: School of Advanced Sciences	Slot	: C2+TC2
Duration	: 90 mins	Max. Marks	: 50
Class No	: 5693, 5887, 5673, 5720, 5726, 5746, 5705, 5768, 5733		

Part - A (5 x 10 = 50)

Answer ALL Questions

Sl. No	Questions	Max Marks
1	<u>Define ultraviolet Catastrophe. Describe how Planck obtained the correct formula for the spectral distribution of radiation from a black body to solve this problem with the key assumptions that were considered.</u>	10
2	Elaborate on the <u>de Broglie concept of matter waves</u> and describe an experiment to establish the existence of matter waves.	10
3	(a) Arrive at the time-dependent Schrödinger wave equation and give the significance of the Hamiltonian operator. (b) X-rays of wavelength 10 pm are scattered from a target. Find the maximum kinetic energy of the recoil electron in eV.	5 5
4	Discuss quantum Tunneling and explain the working of an instrument developed based on the above principle.	10
5	(a) Prove that the energy levels of a particle confined in a one-dimensional box of infinite potential are discrete. (b) A particle is moving in a one-dimensional box of width 10 Å. Calculate the probability of finding the particle within an interval of 1 Å at the center of the box, when it is in its state of least energy.	5 5

