VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.: 25BCC0154

SLOT: C1+TC1

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2025-2026

Programme Name & Branch	**: B.Tech. Computer Science and Engineering**
Course Code	**: BAPHY105**
Course Name	**: Engineering Physics**
Faculty Name(s)	**: Dr. Deepak Bhat(18901), Dr. Kuraganti Vasu(15985), Dr. Abhishek Kumar Singh(17958), Dr. Murali R(12528), Dr. Vishnudath K N (22477), Dr. Samuel P(19502), Dr. Bhaskar Sen Gupta(15852)**
Class Number(s)	**: 3665, 3661, 3663, 3655, 3658, 3659, 3666**
Date of Examination	**: 29 January 2026**
Exam Duration	**: 90 minutes** **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes
  CO 1: Identify limitations of classical physics through experimental observations.
  CO 2: Apply matrix algebra and Dirac notation for the understanding of quantum mechanical problems involving linear operators, eigenvalues and eigenvectors.

Q. No	Question	Module	Marks	CO	BL
1.	a) What is a blackbody? Draw the blackbody spectra for three different temperatures. b) What is ultraviolet catastrophe? Discuss how Planck resolved it.	1	5+5	1	2
2.	How did the double slit experiment with electrons illustrate the wave nature of particles? What happens if the electrons are replaced by macroscopic particles ? Explain with diagrams for both the cases.	1	10	1	2
3.	a) In Compton scattering, a photon of wavelength 0.01 nm is scattered by an electron. What is the maximum energy the recoiled electron can acquire from the photon? b) The wave function of a particle that is restricted to move between x = 0 and x = 1 is given by $\psi(x) = A(x + 3x^2)$. Determine A assuming it is a real, positive constant.	1	5+5	1	3
4.	Given two vectors belonging to the 2-d complex vector space, $\|\psi_1\rangle = (1+i)\|e_1\rangle - 3\|e_2\rangle$ and $\|\psi_2\rangle = 2\|e_1\rangle - 3(1-i)\|e_2\rangle$ where $\|e_1\rangle$ and $\|e_2\rangle$ form an orthonormal basis. Check if these two vectors are linearly independent. Also, calculate $\langle\psi_1\|\psi_2\rangle$ and from this, find out $\langle\psi_2\|\psi_1\rangle$ without explicit calculation.	2	10	2	3
5.	(a) What is a linear vector space? Does the set of all real polynomials whose value is 1 at x=0 form a vector space? Justify your answer. (b) Illustrate the idea of tensor product of vector spaces with an example.	2	5+5	2	2