VIT
Vellore Institute of Technology
CHENNAI

Reg. Number:	25BCE1996

Continuous Assessment Test (CAT) – I - AUGUST 2025

Programme	:	B.Tech	Semester	:	Fall Semester 2025-26
Course Code & Course Title	:	BAPHY105, Engineering Physics	Slot	:	D1+TD1
Faculty	:	Prof. Rajasekarakumar Vadapoo, Prof. Sanjit Das, Prof. Jitendra Narayan Dash, Prof. Shalini MG, Prof. G Vinitha, Prof. Dayasindhu Dey, Prof. Rajesh Goswami, Prof. L J Kennedy, Prof. Ranjani Seshadri, Prof. N. Punithavelan Prof. Gopinath Mudhana Mr. M Daniel Ranjan	Class Number	:	CH2025260103706, CH2025260103698, CH2025260103710, CH2025260103696, CH2025260103910, CH2025260103690, CH2025260103712, CH2025260103662, CH2025260103692, CH2025260103708, CH2025260103686, CH2025260103704
Duration	:	90 Mins	Max. Mark		50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information
- Only non-programmable calculator without storage is permitted

Useful Constants: $m_e = 9.11 \times 10^{-31}$ kg, $m_p = 1.67 \times 10^{-27}$ kg, $h = 6.626 \times 10^{-34}$ J·s, $k_B = 1.38 \times 10^{-23}$ J/K, 1 eV = 1.602×10^{-19} J, $e = 1.602 \times 10^{-19}$ C.

Answer all the questions

Section A (2 x 10 = 20 marks)

Q. No	Sub Sec.	Description	Marks	CO	BT Level
1	a	What is a Black Body radiation? How does it help in understanding the quantum nature of radiation.	5	1	K1
	b	Define a wave function and write down their five distinct properties.	5	1	K1
2	a	What is an observable in quantum mechanics?	2	2	K1
	b	In one dimension, the momentum operator is $\hat{p} = -i\hbar d/dx$, Find $\hat{p}$ [sinkx].	3	2	K3
	c	Describe how measurement of an observable affects the quantum state of a system.	5	2	K1
Section B (2 x 15 = 30 marks)					
3	a	Write two differences between wave nature and particle nature.	2	1	K1
	b	In Young's experiment, the distance between the two images of the sources is 0.5mm, and the distance between the source and the screen is	5	1	K3

		1.4m. Given that the overall separation between 20 fringes on the screen is 3 cm, calculate the wavelength of light used			
	c	Describe the construction and working principle and outcome of the Stern Gerlach experiment.	8	1	K1
4		Using assumptions, derive Schrodinger time independent and time dependent wave equation.	15	2	K2

**********All the best************

Faculty Signature