



VIT[®]

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

Re Continuous Assessment Test (CAT - II), May 2022

Programme	: B.Tech	Semester	: Winter 2021-22
Course Title	: Engineering Physics	Course Code	: BPHY101L
School	: School of Advanced Sciences	Slot	: A2
Duration	: 90 mins	Max. Marks	: 50
Class No	:		

Part – A (5 x 10 = 50)

Answer ALL Questions

Sl. No	Questions	Max Marks	CO	BL
1	Explain the following: Both photoelectric effect and Compton effect arise due to the action of photons on loosely bound electrons, but the two effects are not the same. Does the concept of Bohr's orbit violate the uncertainty principle?	10	CO2	L1, L2
2	Introduce the wave mechanical concept and obtain Schrodinger equation when the potential is dependent on time. Write a note on Hamiltonian operator H.	10	CO2	L3, L5
3	i. Explain why wave particle duality is not apparent in our daily life? 5M ii. Which of the functions $\sin 3x$, $6 \cos 4x$, $5x^3$, $1/x$, $3 e^{-5x}$ are eigen functions of operator d^2/dx^2 ? For each eigen function find the eigen value. 5M.	10	CO2	L3, L4
4	Explain quantum confinement. Sketch the variation of density of states in 1D, 2D and 3D nano materials. 6M For the one dimensional well, show that $\lim_{n \rightarrow \infty} \frac{E_{n+1} - E_n}{E_n} = 0$	10	CO2	L4
5	For a particle in a box, apply Schrodinger equation to evaluate the eigen values, eigen functions, probability of locating the particle in different energy states with necessary diagrams.	10	CO2	L3, L5