VIT

Vellore Institute of Technology

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

SCHOOL OF ADVANCED SCIENCES

Fall Semester 2023-2024

Continuous Assessment Test – I

Programme Name & Branch : Intergrated M. Tech

Slot: E2

Course Name & code: Engineering Physics, IPHY101L

Class Number (s): 6073, 5840, 5834, 5896, 7943

Faculty Name (s) (Murali R, Anusha P T, Tulsi Anna, Atul Thakare, Laxmi Narayan Tripathi

Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s):

Q.No.	Question	Max Marks
1.	Derive wave equation on metallic string when constant tension , T is acting on the string. Show that the velocity of the wave is directly promotional to the square root of T through dimensional analysis.	10
2.	(a)Discuss the consequence of infinite impedance at the boundary in wave propagation. (5 Marks) (b) With what tension must a rope of length 5.00 m and mass 0.160 kg be stretched for transverse waves of frequency 60.0 Hz to have a wavelength of 0.800 m? (5 Marks) 73.728	10
3.	Derive the expression for the standing waves formed on a stretched string fixed on both ends. Further, obtain the fundamental frequency of it and sketch the first three standing wave modes with a neat diagram.	10
4.	(a) Explain the physical significance of Maxwell's equations? Elaborate the contribution by Maxwell to Ampere's law. (5 Marks) (b) If $A = xz^3\,\mathbf{i} - 2x^2yz\,\mathbf{j} + 2yz^4\,\mathbf{k}$, find $\nabla \times A$ (curl of A) at the point (1, -1, 1). (5 Marks) $-8\hat{i} + 9\hat{j} - \hat{k}$	10
5.	Derive the expression for wave equations for E, and B fields in a vacuum using Maxwell equations. State the assumptions used for the derivations	10