

University of Information Technology & Sciences (UITS)

Faculty of Science & Engineering

Department of Computer Science and Engineering

Mid Term Examination, Spring – 2025

Course Title: Engineering Physics

Course Code: PHY -0533111

Marks: 20

Time: 1 (One) Hour

(Answer all questions)

1. (a) Define Simple Harmonic Motion (SHM) of a vibrating particle. [2]
- (b) Derive an expression for total energy of a particle oscillating simple harmonically. [5]
- (c) A particle performs SHM which is represented by the equation $x = 10 \sin \left(10t + \frac{\pi}{6} \right)$; [3]
where x is measured in metres, t in seconds and the phase angle in radians. Calculate (i) Time period, (ii) Displacement at $t = 1.5$ sec and (iii) Velocity at $t = 2$ sec.

OR

- (a) What are meant by restoring force and elastic force? [2]
 - (b) Derive an expression for composition of two Simple Harmonic Oscillations of equal time periods, different amplitudes and different phases acting at right angles. [5]
 - (c) Draw the Lissajous' Figures for $\alpha = \pi$; $\frac{\pi}{2}$; $\frac{\pi}{2}$ and $a = b$. [3]
2. (a) Define transverse wave and longitudinal wave. [2]
 - (b) Deduce the equation of stationary wave and hence explain the nodes and antinodes of the wave with figure. [5]
 - (c) A particle performs Simple Harmonic Wave which is represented by the equation $y = 20 \sin (100t + 10x)$; where y is measured in meter, t in second and the phase angle in radian. Calculate the time period, frequency and wavelength of the particle. [3]