

University of Information Technology & Sciences (UITS)

Faculty of Science & Engineering

Department of CSE

Mid Term Examination, Spring - 2024

Course Title: Engineering Physics

Course Code: PHY -0533111

Marks: 20

Time: 1 Hour

(Answer any *two* out of *three* questions)

1. a) What do you understand by Simple Harmonic Motion (SHM)? [2]
- b) Deduce the differential equation of SHM and solve it for the displacement of a particle. [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 metre, t in second and the phase angle in radian. Calculate the time period, frequency and epoch angle of the particle.
2. a) Define wave and oscillation, time period & frequency of a vibrating particle. [2]
- b) Derive an expression for total energy of a particle oscillating simple harmonically. [5]
- c) Discuss the change of potential energy (PE) and kinetic energy (KE) for an oscillating particle. When are the PE and KE maximum? [3]
3. a) What are meant by Lissajous Figures? [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 figures for $\alpha = \pi$ or 2π ; $\frac{\pi}{2}$; $\frac{\pi}{2}$ and $a = b$. [3]