



Daffodil International University

Department of Software Engineering

Faculty of Science & Information Technology

Midterm Examination, Fall 2025

Course Code: PHY 101 ; Course Title: Physics-I

Sections & Teachers: (A-D), (E-H,M), (I-L) & (SH, MI, RH)

Time: 1 Hour 30 Mins

Marks: 25

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1. a. Define with physical significant the terms Momentum and Moment of Inertia. [1.5] CO-1, CI
- b. Draw and describe a graph that represents the relationship between force and friction. [2]
- c. Retrieve how a resonance is different from damping. [1.5]
2. a. Compute the expression for total energy of a particle executing SHM. [3] CO-2, C2
- b. Estimate mathematical expression for a standing wave. [3]
- c. Approximate the expressions for different parameters (trajectory, range, maximum height) involved in a projectile motion. [4]
3. a. A SHM is represented by the equation $y = 10 \sin[10t - (\pi/6)]$. Calculate (i) time period (ii) maximum displacement (iii) maximum velocity and maximum acceleration (iv) displacement, velocity and acceleration at time $t = 1$ sec. [4] CO-3, C3
- b. A projectile is launched with an initial speed of 20 m/s at an angle of 30 degrees above the horizontal from a height of 40 meters. Compute: (i) The time and range it takes for the projectile to hit the ground. (ii) velocity of the ball when it reaches the ground [3]
- c. A particle moves in a circle of radius 6m. Its linear speed is given by $v = t^2 + 2t$. (i) Compute the centripetal and tangential acceleration at 3s (ii) Calculate the angle between the resultant acceleration and the radius vector. [3]