



Daffodil International University  
Department of Software Engineering  
Faculty of Science & Information Technology  
Midterm Examination, Summer 2025

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

Level: 1 Term: 2 Section: A-L

Instructor: SH(A-D), AEE(E-H,L), MAM(I,J), JB(K)

Duration: 1:30 Hrs

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 Center of Mass and Moment of Inertia. [2] CLO-1, C1
- b. Draw and describe a graph that represents the relationship between force and friction. [2]
- c. Compare the distinctions between damping and resonance in their application to wave. [1]
2. a. Explain mathematically why the trajectory of a projectile launched at an angle follows a parabolic path. Consider the forces acting on the projectile and how they influence its motion. [4] CLO-2, C2
- b. Describe using mathematical equation that the total energy of a particle engaged in Simple Harmonic Motion (SHM) remains constant at any given moment. [3]
- c. Estimate mathematical expression for a standing wave. [3]
3. a. 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: a) The time and range it takes for the projectile to hit the ground. b) velocity of the ball when it reaches the ground. [3] CLO-3, C3
- b. The plane surface is inclined at an angle of 500. A body of mass 15 kg is placed on it. If the value of coefficient of friction  $\mu_k$ , between the body and the inclined surface is 0.2, calculate the downward acceleration of the body, along the inclined plane surface. (Take  $g=15\text{ms}^{-2}$ ). [3]
- c. A simple harmonic vibration equation is defined by  $Y = 5 \sin (60.832t + \phi)$ . The displacement at 0 sec is 2cm. Find (i) the epoch (ii) the frequency and (iii) the maximum velocity. [4]