



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.]

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|----|----|--|-----|--------|
| 1. | a. | Define with physical significant the terms Center of Mass and Moment of Inertia. | [2] | |
| | | | | CLO-1, |
| | b. | Draw and describe a graph that represents the relationship between force and friction. | [2] | C1 |
| | 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 50°. A body of mass 15 kg is placed on it. If the value of coefficient of friction μ_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] | |