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SSP

Daffodil International University
Faculty of Science & Information Technology
Department of Software Engineering
Midterm Examination, Spring 2026
Course Code: PHY 101; Course Title: Physics-I
Sections & Teachers: (A-D, E-H, I-L, M-P) & (SH, SKS, RH, MHB)

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** centripetal acceleration and tangential acceleration with a figure. [1.5]

b. **Draw** and **describe** a graph that represents the relationship between applied and frictional force. [2] CLO-1, Level- C1

c. **Compare** a wave and an oscillation. [1.5]

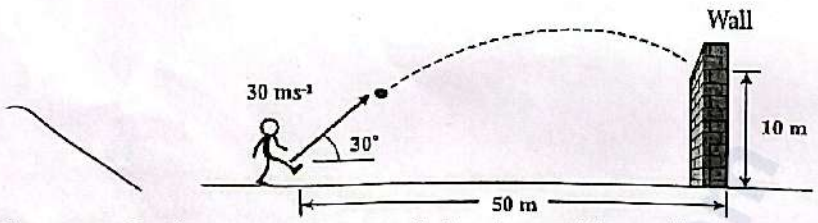
2. a. **Construct** the second-order differential equation of SHM of a particle executing circular motion. [3]

b. **Estimate** the mathematical expression for a standing wave. [3] CLO-2, Level-C2

c. **Explain** and **express** the projectile-motion parameters: trajectory equation, range, and maximum height and describe what each parameter means in the context of projectile motion. [4]

3. a. A 4 kg block slides down an inclined surface with an angle of 30° to the horizontal. Starting from rest, it covers 8m in the first two seconds. [5]
(i) Calculate the coefficient of kinetic friction.
(ii) If the block is pushed down with an additional force of 4N, **compute** the distance after 2 seconds? CLO-3, Level-C3

b. [5]



(i) Compute the time required to reach the plane of the wall.

(ii) Determine (using projectile-motion equations) whether the ball will pass the wall. **Show** the calculation of the ball's height at the wall's position and compare it with 10 m.

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