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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 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 $g=15ms^{-2}$).	[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]	