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Daffodil International University
Department of Software Engineering
Faculty of Science & Information Technology
Mid Term Examination, Fall 2024
Course Code: PHY 101; Course Title: Physics-I: General Mechanics, Waves and Oscillations, Optics and Atomic and Modern Physics
Sections & Teachers: (A-K) & (SH, SAR)

Time: 1 Hour 30 Mins **Marks: 30**

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.	List the key concepts related to moment of inertia.	[1.5]	CLO-1
	b.	Draw and describe a graph that represents the relationship between force and friction.	[2]	
	c.	Retrieve how a transverse wave is different from longitudinal waves.	[1.5]	
2.	a.	Compute the expression for differential equation of a particle executing SHM	[3]	CLO-2
	b.	Estimate mathematical expression for a standing wave.	[3]	
	c.	Approximate the mathematical 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=1sec.	[4]	CLO-3
	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 10 m. Its linear speed is given by $v = t^2+2t$ (i) Compute the centripetal and tangential acceleration at t = 3s (ii) Calculate the angle between the resultant acceleration and the radius vector.	[3]	