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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

Mid Examination, Summer 2025

Course Code: PHY101, Course Title: Physics I

Level: 1 Term: 2 Batch: 68

Time: 1.5 Hours (90 Min.) **Marks: 25**

Answer ALL Questions [Optional]

[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)*	Recall the concept of the radius of gyration.	1	CO1
	b)	State Newton's 2nd law.	1	
	c)	Explain the Work-Energy theorem.	1	
	d)	Write down the mathematical equation for Hooke's Law with significance.	1	
	e)	Define damped vibration.	1	
2.	*a)*	Compute the moment of inertia of a thin uniform rod is , when the axis passes through the midpoint and is normal to the length of the rod.	3	CO2
	b)	Demonstrate that the path of a projectile follows the parabolic form.	3	
	c)	Interpret the solution of the differential equation of simple harmonic motion.	4	
3.	*a)*	A car with a mass of 1200 kg was moving at a velocity of 20 ms^{-1}. While moving it collided with a car with a mass of 800 kg at rest. After the collision the cars combined and moved 50 m ahead and stopped. What was the magnitude of the resisting force.	2.5	CO3
	b)	An archer launches an arrow with a speed of 25.0 m/s at an angle of 40 degrees above the horizontal. (a) How long is the arrow in the air? (b) How far away does it land? (c) What is the maximum height it reaches?	2.5	
	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. [Use CGS unit.]	2.5	
	d)	A skater of mass 4 kg is initially at rest. A constant force of 12 N acts on the skater for 3 seconds. After that, the force is removed. How far does the skater travel in 7 seconds from the start?	2.5	