

## Daffodil International University Faculty of Science & Information Technology Department of Computer Science and Engineering Mid Semester Examination, Spring-2024 Course Code: PHY-101 Course Title: Physics-I

Level: 1 Term: 1

**Exam Duration: 1.5 Hours** 

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	•	<b>a)</b>	Tell something about conservation of momentum.	[Marks] [1×5 = 5]	CO-1
		b)	Why Newton's 1st law of motion is called the law of inertia?		
		<i>c</i> )	Recall impulse of force.	-	
		<i>d</i> )	Define kinetic friction and its friction coefficient?		
		e)	State work energy theorem.		
	2.	<i>a</i> )	Prove that the momentum being conserved in two-body collision.	[Marks]	
		b)	Show that the moment of inertia of a thin uniform rod is $I = \frac{ml^2}{12}$	$[2.5 \times 4 = 10]$	CO-2
			when axis pass through the mid-point and normal to the length of the rod.		
		c)	Which of the following one is easier Push or Pull a box? Prove it mathematically.		
		d)	Derive the differential equation of simple harmonic motion.		
3	•	a)	An object is launched at an angle of 30 degrees to the horizontal	[Marks]	
			with an initial speed of 20 m/s. Calculate the height after 1.2 sec. of its launched.	$[2.5 \times 4 = 10]$	CO-3
		b)	If a 40 kg box is moving horizontally with a constant velocity on a		
			rough surface with a coefficient of sliding friction of 0.425, what		
			the box?		
		c)	A spring with a force constant of 400 N/m is compressed by 0.2		
			meters. Calculate the work done in compressing the spring.		
		d)	The displacement of a particle executing simple harmonic		
			vibration is expressed by $y = 3 \sin (31.416t + \phi)$ . If the		
			displacement at 0 sec is 6 mm. By solving the equation determine		
			the followings: (i) amplitude of motion (ii) the time period and (iii)		
			frequency of vibration.		