



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.	a)	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?		
	c)	Recall impulse of force.		
	d)	Define kinetic friction and its friction coefficient?		
	e)	State work energy theorem.		
2.	a)	Prove that the momentum being conserved in two-body collision.	[Marks] [2.5×4 = 10]	CO-2
	b)	Show that the moment of inertia of a thin uniform rod is $I = \frac{ml^2}{12}$ 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 with an initial speed of 20 m/s. Calculate the height after 1.2 sec. of its launched.	[Marks] [2.5×4 = 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 is the magnitude of the minimum horizontal force being applied to 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.		