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# Daffodil International University

**Faculty of Science & Information Technology**
**Department of Computer Science and Engineering**
**Mid Term Examination, Fall-2024**
**Course Code: PHY101 Course Title: Physics I**
**Level: 1 Term: 1 Batch: 67**

**Time: 1.5 Hour** **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) | Express the significance of frame of reference? | 1 | CO1 |
| | b) | Give the definition of linear and angular momentum to present their association. | 1 | |
| | c) | Define instantaneous velocity and instantaneous acceleration. | 1 | |
| | d) | Review the classification of mechanical wave with example. | 1 | |
| | e) | Explain the damped oscillation in simple harmonic motion? | 1 | |
| 2. | a) | Derive the time to reach maximum vertical distance and correlate that it is double to time to reach landing point of a projectile. | 3 | CO2 |
| | b) | Solve the general solution of simple harmonic oscillation equation and interpret that as $X=A\sin(\omega t + \delta)$ where symbols have their usual meaning. | 3 | |
| | c) | Describe the moment of inertia and radius of gyration of a solid cylinder rotating about its own axis. | 4 | |
| 3. | a) | A ball is kicked at an angle of $45^0$ with the horizontal and with the velocity of 20 m/s. Figure out the horizontal and vertical position of the ball after 1.5 sec of throwing it. | 2.5 | CO3 |
| | b) | A simple harmonic vibration equation is defined by $Y = 10 \sin(62.832t + \phi)$. The displacement at 0 sec is 5cm. Evaluate (i) the epoch (ii) the frequency and (iii) the maximum velocity. | 2.5 | |
| | c) | A 1300 kg car is stick to another car of mass of 900 kg by colliding with it a velocity of 3 cm/sec. Identify the velocity of the cars just after their interaction between them. | 2.5 | |
| | d) | A cyclist starts from the rest and accelerates uniformly to a speed of 10 cm/sec over a distance of 400 cm. Determine the acceleration of the cyclist and the total time it takes for the cyclist to reach the final speed. | 2.5 | |