Further Mechanics Multiple Choice

1. Which one of the following statements is not true for a body vibrating in simple harmonic motion when damping is present?

A The damping force is always in the opposite direction to the velocity.

B The damping force is always in the opposite direction to the displacement.

C The presence of damping gradually reduces the maximum potential energy of the system.

D The presence of damping gradually reduces the maximum kinetic energy of the system.

(Total 1 mark)

2. The time period of a simple pendulum is doubled when the length of the pendulum is increased by 3.0 m. What is the original length of the pendulum?

A 1.0 m

B 1.5 m

C 3.0 m

D 6.0 m

(Total 1 mark)

3. A body moves with simple harmonic motion of amplitude 0.50 m and period 4π seconds. What is the speed of the body when the displacement of the body from the equilibrium position is 0.30 m?

A 0.10 m s^{-1}

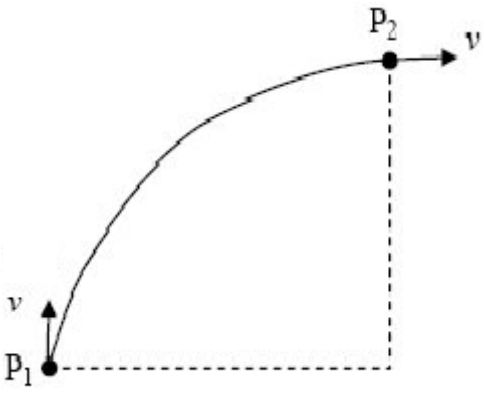
B 0.15 m s^{-1}

C 0.20 m s^{-1}

D 0.40 m s^{-1}

(Total 1 mark)

4. A particle of mass *m* moves horizontally at constant speed *v* along the arc of a circle from P_1 to P_2 under the action of a force. What is the work done on the particle by the force during this displacement?



A zero

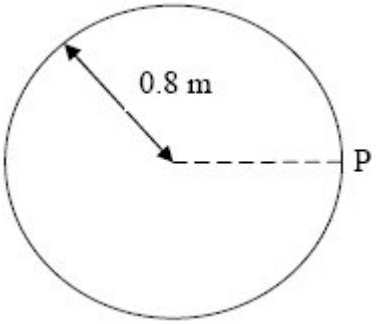
B $\frac{\pi mv^2}{2}$

C $mv^2\sqrt{2}$

D $2\,mv^2$

(Total 1 mark)

5.



A model car moves in a circular path of radius 0.8 m at an angular speed of $\frac{\pi}{2}$ rad s^{-1}. What is its displacement from point P, 6 s after passing P?

A zero

B 1.6 m

C 0.4 πm

D 1.6 πm

(Total 1 mark)

6. What is the value of the angular velocity of a point on the surface of the Earth?

A 1.2×10^{-5} rad s^{-1}

B 7.3×10^{-5} rad s^{-1}

C 2.6×10^{-1} rad s^{-1}

D 4.6×10^{2} rad s^{-1}

(Total 1 mark)

7. The rate of change of momentum of a body falling freely under gravity is equal to its

A weight.

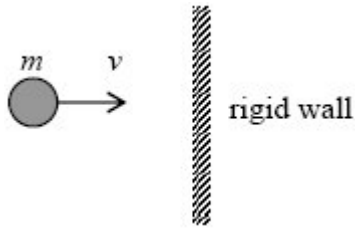
B power.

C kinetic energy.

D potential energy.

(Total 1 mark)

8. A particle of mass *m* strikes a rigid wall perpendicularly from the left with velocity *v*.



If the collision is perfectly elastic, the change in momentum of the particle which occurs as a result of the collision is

A 2*mv* to the right.

B 2*mv* to the left.

C *mv* to the left.

D zero.

(Total 1 mark)

1. B

[1]

2. A

[1]

3. C

[1]

4. A

[1]

5. B

[1]

6. B

[1]

7. A

[1]

8. B

[1]