A Level · OCR · Physics

5 mins 5 questions

Multiple Choice Questions

Simple Harmonic Oscillations

Describing Oscillations / Angular Frequency / Conditions for Simple Harmonic Motion / Time Period & Frequency / Acceleration & Displacement / Velocity / SHM Graphs

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Total Marks /5

1 A simple harmonic oscillator has maximum speed 24 ms^{-1} and amplitude 5.6 cm.

What is its angular frequency?

A. 0.23 $rads^{-1}$

B. 21 $rads^{-1}$

C. 68 $rads^{-1}$

D. 430 $rads^{-1}$

(1 mark)

2 For a simple harmonic oscillator, the maximum speed is v_{max} when the amplitude is A. The frequency of the oscillations is f.

Which expression is correct for this oscillator?

A. $v_{max} = fA$

B. $v_{max} = 2\pi fA$

C. $v_{max} = f^2A$

D. $v_{max} = 4\pi^2f^2A$

(1 mark)

3 The acceleration a of a simple harmonic oscillator is related to its displacement x by the equation

$$a = -25x.$$

What is the frequency of the oscillator?

A. 0.80 Hz

B. 1.3 Hz

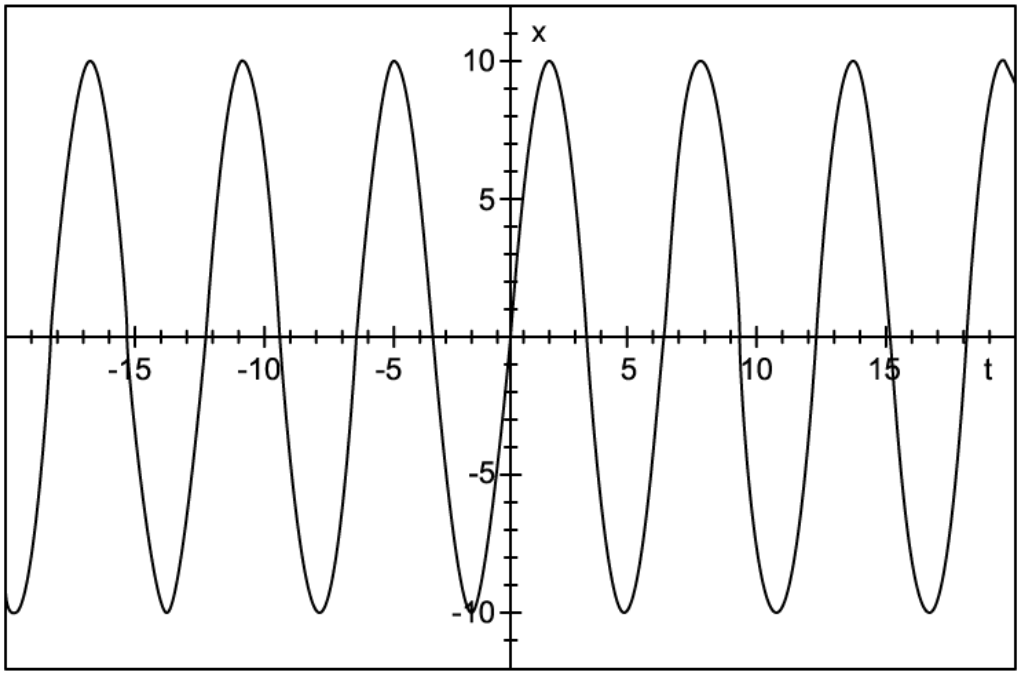
C. 4.0 Hz

D. 5.0 Hz

(1 mark)

4 The graph describes the displacement x of a simple harmonic oscillator with time. Which

of the equations **most closely** describes the oscillations?



A. $x = 5\sin(2\pi t)$

B. $x = 10\sin\left(\frac{2\pi}{6}t\right)$

C. $x = 10\cos(12\pi t)$

D. $x = 10\cos\left(\frac{\pi}{3}t\right)$

(1 mark)

5 A weight on the end of a spring moving with simple harmonic motion completes 2 full oscillations per second. If its maximum acceleration is 50 ms^{-2} then calculate the amplitude, *A*.

A. 0.32 m

B. 1.2 m

C. 1.25 m

D. 2.5 m

(1 mark)