



QUESTION WORKBOOK

Simple harmonic motion

Periodic motion · Year 13

AQA 3.6.1.2 · CIE 17.1 · OCR A 5.3.1

10 questions · 30 marks

PRINT EDITION

SECTION A · Warm-up

A1 State the defining condition for simple harmonic motion. [2]

A2 A body oscillates with a frequency of 2.0 Hz. Calculate its angular frequency. [2]

A3 An oscillator has an angular frequency of 10 rad s^{-1} and an amplitude of 0.050 m. Calculate its maximum speed. [2]

SECTION B · Standard

B1 A body performs SHM at 3.0 Hz with an amplitude of 0.020 m. Calculate its maximum acceleration. [3]

- B2** An object in SHM has amplitude 0.10 m and angular frequency 8.0 rad s^{-1} . Calculate its speed when its displacement is 0.060 m. [4]

- B3** An oscillator moves as $x = A \cos \omega t$ with $A = 0.15 \text{ m}$ and $\omega = 4.0 \text{ rad s}^{-1}$. Calculate its displacement at $t = 0.20 \text{ s}$. [3]

- B4** An oscillator has an angular frequency of 6.28 rad s^{-1} . Calculate its frequency and its period. [3]

SECTION C · Stretch

- C1** A body performs SHM with amplitude 0.080 m and period 0.50 s. Calculate (a) its angular frequency, (b) its maximum speed and (c) its maximum acceleration.

[4]

- C2** An object performs SHM of amplitude 0.10 m. Calculate the displacement at which its speed is half of its maximum speed.

[4]

- C3** Describe the phase relationship between the displacement, velocity and acceleration in SHM.

[3]