C.1 Simple harmonic motion

Checklist

What you should know

After studying this subtopic, you should be able to:

- Identify examples of simple harmonic motion (SHM).
- Understand and use the terms: time period, T, frequency, f, angular frequency, ω, amplitude, equilibrium position and displacement.
- Define simple harmonic motion, and use the equation $a = -\omega^2 x$.
- Determine the time period of a simple pendulum using the equation:

$$T = 2\pi\sqrt{\left(\frac{l}{g}\right)}$$

- Determine the time period of a mass—spring system using the equation:

$$T = 2\pi\sqrt{\left(\frac{m}{k}\right)}$$

- Describe and graph the energy changes during SHM.

Higher level (HL)

- Determine the velocity and displacement of a SHM oscillator at any point in its cycle.
- Describe the position of an oscillator in its cycle based on its phase angle in radians.
- Determine the potential energy and kinetic energy of an oscillator at a given point in a SHM cycle.
- Describe quantitatively the energy transfers during SHM.