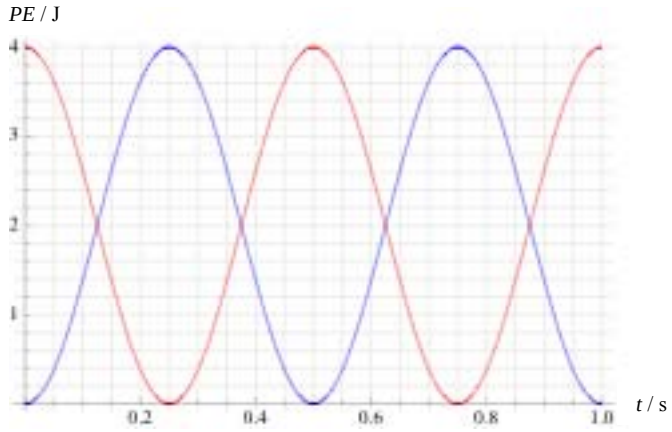
# Mark scheme for Support Worksheet – Topic 4, Worksheet 2

**1** **a** See curve in blue in following graph.




[2]

**b** The period is 1 s [1]

**2** The potential energy is given by $E_P = \frac{1}{2}m\omega^2 x_0^2$ and so $4 = \frac{1}{2} \times 0.50 \times \left(\frac{2\pi}{1.0}\right)^2 x_0^2$;

giving $x_0 = 0.64$ m [2]

**3** In a transverse wave the displacement is at right angles to the direction of energy transfer, in a longitudinal wave it is parallel to the direction of energy transfer. [1]

**4** **a** 2.0 cm [1]

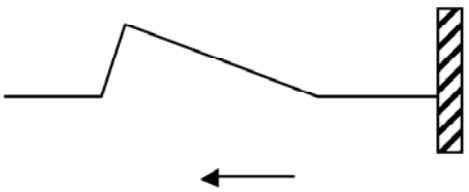
**b** 2.0 m [1]

**c** In 16 ms the wave moved a distance of 0.40 m; and so $v = \frac{0.40}{16 \times 10^{-3}} = 25\ \text{m s}^{-1}$ [2]

**d** From $v = f\lambda$, $25 = f \times 2.0$ and so $f = 12.5\,\text{Hz}$ [1]

**5** Rays are always at right angles to the wavefronts. [1]

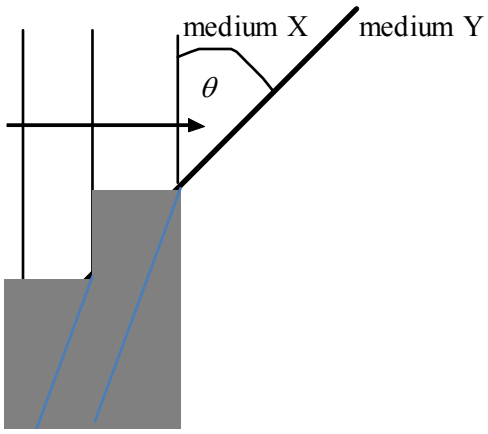
**6** See diagram below.



[2]

**7** **a** $\frac{\sin 45^\circ}{v} = \frac{\sin\theta}{v/2} \Rightarrow \sin\theta = \frac{\sqrt{2}}{4}$; hence $\theta = 21^\circ$ [2]

**b** See diagram.




[2]

**8** $\lambda \geq b$ [1]