5(a)(i)	amplitude = 0.60 m
5(a)(ii)	oscillations are simple harmonic
5(b)	*Any three points from:* • mean / equilibrium position is at h = 1.4 m • total energy of oscillations = 9.0 J • angular frequency of oscillations = 1.2 rad s^{-1} **or** period of oscillations = 5.1 s **or** frequency of oscillation = 0.19 Hz • maximum speed of block = 0.73 m s^{-1} • mass of block = 33 kg
5(c)	U-shaped curve resting on h axis (with minimum at $E_P = 0$)
	curve from h = 0.8 m to h = 2.0 m, with minimum E_P shown at h = 1.4 m
	both end-points of curve shown at E_P = 9.0 J

4(a)	$\omega = 2\pi / T$
	$= 2\pi / (0.15 \times 10^{-6}) = 4.2 \times 10^{7}$ rad s^{-1}
4(b)	$a_0 = \omega^2 x_0$
	$= (4.2 \times 10^{7})^2 \times 40 \times 10^{-6}$ $= 7.1 \times 10^{10}$ m s^{-2}
4(c)	$E = \frac{1}{2} m \omega^2 x_0^2$
	$= \frac{1}{2} \times 2.4 \times 10^{-4} \times (4.2 \times 10^{7})^2 \times (40 \times 10^{-6})^2$
	= 340 J
4(d)(i)	apply alternating p.d. (to / across crystal)
	applying p.d. to / across crystal causes it to distort
4(d)(ii)	$Z = \rho c$ $Z_m = 1100 \times 1600$ (= 1.76×10^6) $Z_b = 1900 \times 4100$ (= 7.79×10^6)
	intensity reflection co-efficient= $[(7.79 - 1.76) / (7.79 + 1.76)]^2$ = 0.40 or 40%
	percentage transmitted = 60%

4(a)(i)	$\omega = 2\pi f$
	$f = 9.7 / 2\pi$ $= 1.5$ Hz
4(a)(ii)	amplitude = $\sqrt{(11.6)} = 3.4$ cm
4(a)(iii)	$a_0 = \omega^2 x_0$
	$= 9.7^2 \times 3.4 \times 10^{-2}$ $= 3.2$ m s^{-2}
4(b)	sketch: straight line through the origin with negative gradient
	line with negative gradient passing through (+3.4, $-a_0$) and (–3.4, $+a_0$)
	line with ends at $x = \pm 3.4$ cm and $a = \pm a_0$
4(c)	sum of potential energy and kinetic energy is constant
	at maximum displacement, kinetic energy is zero **or** at maximum displacement, potential energy is maximum
	at zero displacement, kinetic energy is maximum **or** at zero displacement, potential energy is minimum