Question Number	Answer		Mark
17(a)	(The mass meets the conditions for simple harmonic motion as) There is a (resultant) <u>force</u> acting on the mass which is proportional to its displacement from its equilibrium position. The <u>force</u> is always directed towards the equilibrium position (An equation with symbols defined, and the negative sign justified, may be a valid response for both marks For equilibrium position accept: undisplaced point/position **or** fixed point/position **or** central point/position)	(1) (1)	**2**
17(b)(i)	Use of $\Delta F = k\Delta x$ k =26.2 (N m^{-1}) <u>Example of calculation</u> $k = \dfrac{0.2\text{ kg} \times 9.81\text{ N kg}^{-1}}{7.5 \times 10^{-2}\text{ m}} = 26.16\text{ N m}^{-1}$	(1) (1)	**2**
17(b)(ii)	Combine $T = 2\pi\sqrt{\frac{m}{k}}$ with $f = \frac{1}{T}$ to obtain $f^2 = \frac{k}{4\pi^2}m^{-1}$ Compare with $y = mx + c$ to identify gradient as $\frac{k}{4\pi^2}$ Gradient of graph calculated Large triangle used for gradient calculation k =26.7 N m^{-1} A conclusion consistent with the value calculated in (i) (accept comparison with "show that" value from (i)) <u>Example of calculation</u> $T^2 = \dfrac{4\pi^2 m}{k} \therefore f^2 = \dfrac{k}{4\pi^2}m$ So gradient $= \dfrac{k}{4\pi^2}$ Gradient= $\dfrac{(3.25 - 0.00)\text{ s}^{-2}}{(5.00 - 0.20)\text{ kg}^{-1}} = 0.677\text{ kg s}^{-2}$ $k = 4\pi^2 \times 0.677\text{ kg s}^{-2} = 26.7\text{ N m}^{-1}$	(1) (1) (1) (1) (1) (1)	**6**
	Total for question 17		**10**