Question Number	Answer		Mark
2(a)(i)	Substitution using $T = \frac{2\pi}{\omega}$	(1)	
	Clear algebra leading to relationship	(1)	2
	<u>Example of derivation</u> $T = \frac{2\pi}{\omega} \Rightarrow \omega = \frac{2\pi}{T} \Rightarrow \omega^2 = \frac{4\pi^2}{T^2}$ $Mg = mx\omega^2 = mx\frac{4\pi^2}{T^2}$ $\therefore T^2 = \frac{4\pi^2 mx}{Mg}$		
2(a)(ii)	1 Use a timing marker (to mark the start and end of a rotation)	(1)	
	2 Start timing after a few rotations	(1)	
	3 Time a number of rotations and divide by the number of rotations **Or** Repeat the measurement of T and calculate a mean	(1)	
	4 (Vary M to) obtain at least 5 sets of measurements	(1)	
	5 Keep x constant (for each value of M)	(1)	
	6 Plot a graph of T^2 against $\frac{1}{M}$ to check it is a straight line **Or** Plot a graph of T^2 against $\frac{1}{M}$ to check the gradient is constant	(1)	6
	Accept alternative graphs: T against $\sqrt{\frac{1}{M}}$ or log T against log M or variations with correct use of constants		
2(b)	Any **TWO** from		
	The video recording will help to judge when a rotation is complete	(1)	
	The video recording can be used to view the motion more slowly	(1)	
	The time for a rotation will be long so any improvement will be small	(1)	2
	Total for question 2		**10**