Question Number	Answer		Mark
2 (a)	Use of $T = 2\pi\sqrt{(l/g)}$ shown	(1)	
	Addition of (half) the time period for long and short pendulum shown	(1)	
	$T = 1.9$ s Accept 2 or 3 sig figs	(1)	**3**
	Bald answer can score MP3 only		
	<u>Example of calculation</u>		
	Long pendulum $T_l = 2\pi\sqrt{(1.00 \text{ m} / 9.81 \text{ m s}^{-2})} = 2.01$ s		
	Short pendulum $T_s = 2\pi\sqrt{((1.00 \text{ m} - 0.25 \text{ m}) / 9.81 \text{ m s}^{-2})} = 1.74$ s		
	$T = 0.5(T_l + T_s) = 0.5(2.01 + 1.74 \text{ s}) = 1.88 \text{ s} = 1.9$ s		
2 (b)	Measure the distance h using a metre rule	(1)	
	Any THREE from:		
	Place a (timing) marker at the centre of the oscillation	(1)	
	Use a small initial angle	(1)	
	Time a number of oscillations and divide by the number	(1)	
	Repeat (measurement of time period) **and** calculate the mean	(1)	
	Start timing after several oscillations	(1)	
	Repeat the method for at least 5 values of h	(1)	
	Plot a graph of T^2 against h to check it is a straight line	(1)	**6**
	Accept valid alternative graph		
2 (c)	Using a light gate would eliminate reaction time	(1)	
	Either		
	Light gates remove parallax error	(1)	
	As the light gate is in fixed position	(1)	
	Or		
	There would be uncertainty in the time period from the light gate	(1)	
	As the light gate would time from edge of the bob rather than centre of mass	(1)	**3**
	Total for question		**12**