

Question		Scheme	Marks	AOs
4(a)		Equation of motion for A	M1	3.3
		$T - \frac{1}{2}mg = 2ma$	A1	1.1b
			(2)	
4(b)		Equation of motion for B OR whole system equation	M1	3.4
		$3mg - T = 3ma$ OR $3mg - \frac{1}{2}mg = 5ma$	A1	1.1b
		Solve equations for a	DM1	1.1b
		$a = \frac{1}{2}g$	A1	1.1b
		$V = \sqrt{2 \times \frac{1}{2}g \times h}$ or $V^2 = 2 \times \frac{1}{2}g \times h$	M1	3.1a
		$V = \sqrt{gh}$	A1	1.1b
			(6)	
4(c)		V is greater than W , since air resistance will reduce the size of a	B1	3.5a
			(1)	
4(d)		e.g. include the weight or extensibility of the string	B1	3.5c
			(1)	
(10 marks)				
Notes:				
4a	M1	Translate situation into the model and set up the equation of motion for A , with usual rules		
	A1	Correct equation		
4b	M1	Translate situation into the model and set up the equation of motion for B , with usual rules or use the whole system equation		
	A1	Correct equation		
	DM1	Solve for a , dependent on previous M mark		
	A1	Allow $4.9 \text{ (m s}^{-2}\text{)}$ at this stage		
	M1	Complete method to produce an expression for v or v^2 in terms of g and h		
	A1	cao		
4c	B1	Any equivalent statement		
4d	B1	The inclusion of any incorrect statements scores B0		