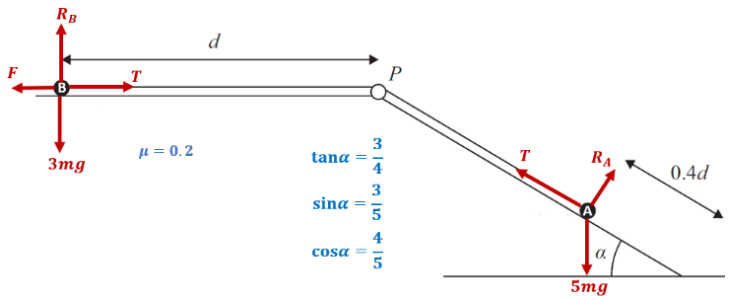
Question Number	Answer	Mark
		
8(a)	$(R =)\ 3mg$	B1
	$(F =) 0.6mg$	B1
		(2)
8(b)	N2L for B	M1
	$T - F = 3ma$	A1
	N2L for A	M1
	$5mg\sin\alpha - T = 5ma$	A1
	$a = 0.3g$ *	A1*
		(5)
8(c)	Correct statement with nothing incorrect and no extras • The acceleration of both particles is the same.	B1
		(1)
8(d)	Method to find speed with $u = 0$, $a = 0.3g$ and $s = 0.4d$ • *suvat* $V^2 = 2\times 0.3g\times 0.4d$ • energy $5mg(0.4d\sin\alpha) = \frac{1}{2}(5m)V^2$ $(V^2 = 0.24gd)$	M1
	Method to find new acceleration of B	M1
	e.g N2L $(-)0.6mg = 3ma_1$ $(a_1 = \pm 0.2g)$	A1
	Complete method • to find the speed at the pulley using $s = 0.6d$ and their calculated V and a_1 $W^2 = V^2 + 2\times a_1\times 0.6d$ • to find the distance to rest and their calculated v and a_1 $0 = V^2 + 2\times a_1\times s$	M1
	$W = 0$ and hence (just) reaches the pulley * **OR:** $s = 0.6d$ and hence (just) reaches the pulley *	A1 *
		(5)
		(13)
	Notes for Question 8	

8(a)		
B1	Seen or implied by correct expression for friction	
B1	Correct expression for friction	
8(b)		
M1	Equation of motion for *B* (look at the *ma* term). Dimensionally correct, correct no. of terms, condone sign errors. No need to replace friction. Condone consistent missing *m*'s for the method mark only.	
A1	Correct unsimplified equation of motion for *B*.	
M1	Equation of motion for *A* (look at the *ma* term). Dimensionally correct, correct no. of terms, condone sign errors and sin/cos confusion. Condone consistent missing *m*'s for the method mark only.	
A1	Correct unsimplified equation of motion for *A*	
A1*	Given answer obtained from complete and correct working. Must see an equation of motion for each particle, $\sin\alpha = \frac{3}{5}$ and at least one line of working following the equations of motion. **S.C.** • If equations of motion for each particle are implied max score is M1A1M1A1A0* e.g. $5mg\sin\alpha - 5ma = F + 3ma$ • If whole system equation is used, max score is M1A1M0A0A0* e.g. $5mg\sin\alpha - F = 8ma$	
8(c)		
B1	Correct statement. B0 if incorrect statement seen or irrelevant extras included. Qn: *state how you have used the fact that the string is inextensible in your working for part (b).* B1 Acceleration is the same for *A* and *B* Acceleration is the same in each particle B0 Acceleration each side is the same Acceleration is the same throughout the string Same acceleration on both sides Tension and acceleration are the same Any mention of tension.	
8(d)		

M1	Method to form an equation for V or V^2 when A hits the ground. Dimensionally correct equation, correct number of terms, condone sign errors. May use *suvat* or conservation of energy.	
M1	Method to find the new acceleration of B. May form an equation of motion for B, correct no. of terms, condone sign errors. May write down $a_1 = \pm 0.2g$ with no evidence of incorrect working.	
A1	Correct unsimplified equation. May be implied by use of $a_1 = \pm 0.2g$	
M1	Complete method to obtain given answer. M0 if $a = 0.3g$ or $a = g$ is used.	
A1*	Given answer correctly obtained and conclusion stated.	