Question Number	Answer	Mark
8.	**N.B.** In parts (a) and (c), $g = 9.8$ could appear in the working but final answers must be using g. For any equation of motion, if they use an incorrect mass in the '*ma*' term, award M0 for the equation.	
8(a)	$R = 3mg\cos\alpha$	M1A1
	$F = \frac{1}{4}\times 3mg\times\frac{4}{5} = \frac{3mg}{5}$	A1 (3)
8(b)	$T = 2ma$	B1 (1)
8(c)	$3mg\sin\alpha - T - F = 3ma$ $\left(\frac{6mg}{5} - T = 3ma\right)$ **OR:** $3mg\sin\alpha - F = 5ma$	M1A1
	Solve their equations, both of which must have an 'mass x accln' term, for T in terms of mg	M1
	$(T =)\ \frac{12mg}{25}$ *	A1* (4)
8(d)	Same acceleration for both particles	B1 (1)
8(e)	Downwards at $\left(90^\circ - \frac{1}{2}\alpha\right)$ oe to the horizontal plane oe	B1 (1)
8(f)	$2T\sin\frac{1}{2}\alpha$ **OR** $\sqrt{2T^2 - 2T^2\cos\alpha}$ **OR** $\sqrt{(T - T\cos\alpha)^2 + (T\sin\alpha)^2}$	M1A1
	Put $T = \frac{12mg}{25}$ and substitute for trig. to give an answer in the form kmg	**dM**1
	$\frac{12mg\sqrt{10}}{125}$, Accept $0.3mg$, $0.30mg$ or better $(0.3035786\ldots.mg)$	A1 (4)
		(14)
	Notes	
8(a)	M1: Resolve perp to the plane, correct terms, condone cos/sin confusion and sign errors. Allow if they use $\cos(\frac{4}{5})$ or similar.	
	A1: Correct equation	
	A1: oe e.g. $0.6mg$	
8(b)	B1: cao.	
8(c)	M1: Equation of motion for A or whole system, correct terms, condone cos/sin confusion and sign errors. Allow if they use $\sin(\frac{3}{5})$ or similar.	
	A1: Correct equation	
	M1: Sub for trig and solve for T in terms of mg i.e. must be of the form kmg	
	A1*: Correct given answer correctly obtained	

8(d)	B1: cao B0 for acceleration throughout the string is constant B0 for the acceleration (each side) is the same B0 if any extra incorrect answers are included, e.g. mention of tension	
8(e)	B1: Accept a clear diagram with an arrow showing $\left(90^{\circ}-\frac{1}{2}\alpha\right)$ oe. B0 for any reference to a bearing or direction	
8(f)	M1A1: **Correct** expression in terms of T and α only. **N.B.** M1A0 is not possible.	
	dM1: Substitute for T and trig to give kmg, dependent on first M1	
	A1: Must be positive and in terms of mg.	