Question Number	Scheme	Marks
8(a)	$R = 4g\cos\alpha$	M1 A1
	$T - 0.5g = 0.5a$	M1 A1
	$4g\sin\alpha - T - F = 4a$	M1 A1
	(OR: $4g\sin\alpha - F - 0.5g = 4.5a$)	
	$F = \frac{1}{2}R$; $\sin\alpha = \frac{4}{5}$ or $\cos\alpha = \frac{3}{5}$	B1; B1
	Eliminating a or finding a	M1
	Solving for T (must have had an a)	M1
	$T = \frac{2g}{3}$ N or 6.5N or 6.53N	A1
		(11)
(b)	Magnitude $= 2T\cos\left(\frac{90-\alpha}{2}\right)$	M1 A1
	$= 2 \text{ x } \frac{2g}{3} \text{ x } \frac{3}{\sqrt{10}}$ (0.94868..)	**A1 ft on *T***
	$= 12N$ or $12.4N$ $\left(\frac{4g}{\sqrt{10}}\right)$	A1 (4)
		15
	Notes	
8(a)	First M1 for resolving perp to plane, with usual criteria First A1 for a correct equation Second M1 for resolving vertically, with usual criteria Second A1 for a correct equation, in terms of *a* and *T* Third M1 for resolving parallel to the slope, with usual criteria. Third A1 for a correct equation , in terms of *a*, *F* and *T* N.B. Their *a* could be UP the slope in which case all 4 marks for the 2 equations are available with $-a$ replacing *a*, provided they are consistent. If they are inconsistent, then assume the vertical resolution is the correct one and mark accordingly. Either of the above two equations can be replaced by the 'whole system' equation **N.B. If they use a = 0, in any of the above 3 equations, and they use the equation to find T, they lose both marks for that equation, and they lose the two M marks for eliminating and solving.** First B1 for $F = \frac{1}{2}R$ seen or implied; Second B1 for $\sin\alpha = 0.8$ or $\cos\alpha = 0.6$ seen or implied. Allow close approximations if $\alpha = 53.1^{\circ}\ldots$ used. Fourth M1 independent for eliminating *a* or finding *a*. Fifth M1 for solving for *T* but must have had an *a*. Fourth A1 for 2g/3, 6.5 or 6.53.	