Question Number	Scheme	Marks
7(a)	For B, $S = 3mg\cos\alpha$ For B, $3mg\sin\alpha - T - F_1 = 3ma$ For A, $R = mg$ For A, $T - F_2 = ma$ $F_1 = \frac{1}{3}S$; $F_2 = \frac{1}{5}R$ Solving for T $T = \frac{3mg}{5}$ or $5.88m$	M1 A1 M1 A2 B1 M1 A1 M1 **DM**1 A1 (11)
(b)	Constant tension throughout the string.	B1 (1)
(c)	$R = 2T\cos\frac{(180^o - \alpha)}{2}$ $(= 2T\sin\frac{1}{2}\alpha)$ $(2T\cos 63.4^o)$ $= 2\times\frac{3mg}{5}\times\frac{\sqrt{5}}{5}$ $= \frac{6mg\sqrt{5}}{25}$ $(5.3m$ or $5.26m)$ **OR:** $R = \sqrt{(T - T\cos\alpha)^2 + (T\sin\alpha)^2}$ or $R = \sqrt{(T^2 + T^2 - 2T^2\cos\alpha}$ Substitute their expression for T (MUST be in terms of m) and a correct value of α $= \frac{6mg\sqrt{5}}{25}$ $(5.3m$ or $5.26m)$	M1 A1 DM1 A1 (4) **16** M1A1 DM1 A1
	Notes	
	N.B. Use of sin(4/5) or similar, treat as an A error but allow recovery	
7(a)	First M1 for resolving perp to the plane , with usual rules	
	First A1 for a correct equation	
	Second M1 for equation of motion parallel to the inclined plane, with usual rules	
	Second and Third A1's for a correct equation -1 each error	
	B1 cao	
	Third M1 for equation of motion horizontally, with usual rules	
	Fourth A1 for a correct equation	
	Fourth M1 for using '$F = \mu R$' correctly twice	
	Fifth DM1, dependent on all M marks, for solving for T in terms of *m only*	
	Fifth A1 cao	
	N.B. Either equation of motion can be replaced by the whole system equation: $3mg\sin\alpha - F_1 - F_2 = 4ma$ (M1A2 or M1A1 as appropriate)	
(b)	Penalise extra wrong answers	
(c)	First M1 for attempt at correct expression for R in terms of T and α with usual rules i.e. condone cos/sin confusion but must be using the correct angle (can be in terms of α)	