6(a)	M(A), $S \times 1.5a = mga\cos\theta$	M1A1
	$S = \dfrac{2mg\cos\theta}{3}$ * **N.B.** Allow RHS in any equivalent form with the same terms in any order.	A1*
		(3)
6(b)	$V = mg - S\cos\theta$	M1A1
	$*V = \dfrac{mg}{3}(3 - 2\cos^2\theta)$	A1*
		(3)
6(c)	$\dfrac{4}{7}V$ seen or implied	B1
	Horizontal: $F = S\sin\theta$ Other possible equations: Perp to rod: $F\cos\theta + V\sin\theta = mg\sin\theta$ Parallel to rod: $F\sin\theta + mg\cos\theta = V\cos\theta + S$ M(B): $F \times 2a\sin\theta + mga\cos\theta = V \times 2a\cos\theta + S \times 0.5a$ M(C): $F \times 1.5a\sin\theta + mg \times 0.5a\cos\theta = V \times 1.5a\cos\theta$ M(G): $Fa\sin\theta + S \times 0.5a = Va\cos\theta$	M1A1
	e.g. $\dfrac{4}{7} \times \dfrac{mg}{3}(3 - 2\cos^2\theta) = \dfrac{2mg\cos\theta}{3} \times \sin\theta$	DM1
	Divide by $\cos^2\theta$ to produce an equation in $\tan\theta$	**DM**1
	$6\tan^2\theta - 7\tan\theta + 2 = 0$	A1
		(6)
		(12)
	Notes for question 6	
6(a)	M1 for moments about A equation, dimensionally correct, correct no. of terms, condone sin/cos confusion and sign errors **N.B.** M0 if a's missing	
	A1 for a correct equation (allow a different letter for S e.g. R_C provided it's clear that $R_C = S$)	
	A1* for given answer correctly obtained including "S = "but not necessarily in the final line of working..	
6(b)	M1 for resolving vertically, correct no. of terms, condone sin/cos confusion and sign errors	
	A1 for a correct equation (allow a different letter for V e.g. R_A provided it's clear that $R_A = V$)	
	A1* for obtaining the given answer from fully correct working including "V = .." but not necessarily in the final line of working. **N.B.** If S is never seen, can score max M1A1A0*	
6(c)	**N.B.** The first 3 marks below can be earned if the 'equations' appear in (a) or (b).	

	B1 $\frac{4}{7}V$ seen or implied	
	M1 for another equation: either resolving or taking moments, correct no. of terms, dimensionally correct, condone sin/cos confusion and sign errors	
	A1 for a correct equation	
	DM1, dependent on previous M, for substituting for V and S and using $F = \frac{4}{7}V$ to give an equation in θ and m or g or both only	
	DM1, dependent on previous M, for dividing by $\cos^2\theta$ and using $\sec^2\theta = 1 + \tan^2\theta$ to produce an equation in $\tan\theta$	
	A1 for answer, or an integer multiple of answer, correctly obtained **N.B.** Allow the terms in a different order.	