A1	**N.B.** They may find q (M1A1) and subtract from $5m$	
Question Number	**Scheme**	**Marks**
8(a)	Perpendicular to the plane: $R + 18\sin 40° = 2g\cos 30°$	M1 A1
	Equation of motion parallel to the plane: $18\cos 40° - F - 2g\sin 30° = 2a$ (or -2a)	M1 A1 A1
	$F = 0.3R$	B1
	$18\cos 40° - 0.3\left(2g\cos 30° - 18\sin 40°\right) - 2g\sin 30° = 2a$	dM1
	$a = 1.18$ or 1.2 $\left(\text{m s}^{-2}\right)$	A1 cao
		(8)
8(b)	$v^2 = 2^2 + 2\left('1.18'\right)5$	M1 A1**ft**
	$v = 3.98$ or 4.0 or 4 (m s^{-1})	A1 cao
	N.B. For (a) and (b), penalise over accurate answers ONCE only.	(3)
8(c)	$R = 2g\cos 30°\left(= g\sqrt{3}\right)$	B1
	Friction = $0.3\times 2g\cos 30°$ OR $0.3\times 2g\sin 30°$	M1
	Compares Friction with weight component parallel to plane Eg Consider: $2g\sin 30^o - 0.3\left(2g\cos 30^o\right)$ (= 2a) **OR** $0.3\left(2g\cos 30^o\right) - 2g\sin 30^o$ (= 2a)	dM1
	$(a) > 0$ **OR** $(a) < 0$ Concludes that P will not remain at rest oe	A1
		(4)
(15)		
NOTES		
(a) **M1** **A1** **M1** **A1** **A1** **B1** **dM1** **A1**	Correct number of terms, forces resolved *perp to the plane* where appropriate, condone sign errors and sin/cos confusion, forces and angles paired up correctly Correct unsimplified equation. Equation of motion parallel to the slope. Correct number of terms, forces resolved where appropriate, condone sign errors and sin/cos confusion, forces and angles paired up correctly Correct unsimplified equation with at most one error Fully correct unsimplified equation Use of $F = 0.3R$ Eliminate F and R to form an equation in a, dependent on two M's Correct value for a. Must be 2 or 3sf	

(b)		
M1	Complete method to form an equation in v or v^2	
A1ft	Correct unsimplified equation. Follow through on their value for a.	
A1	Cao. Must be positive. Note that $a = 1.2$ leads to $v = 4$.	
(c)		
B1	Correct expression or value for **new** R	
M1	Find the max friction. M0 if the previous R is used.	
dM1	Correct comparison between max friction value and weight component (force parallel to slope), dependent on previous M	
A1	Correct statement from fully correct working. Concludes that P will not remain at rest.	

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