

<b>A1</b>	N.B. They may find $q$ (M1A1) and subtract from $5m$	
<b>Question Number</b>	<b>Scheme</b>	<b>Marks</b>
<b>8(a)</b>	Perpendicular to the plane: $R + 18 \sin 40^\circ = 2g \cos 30^\circ$	M1 A1
	Equation of motion parallel to the plane: $18 \cos 40^\circ - F - 2g \sin 30^\circ = 2a \text{ (or } -2a\text{)}$	M1 A1 A1
	$F = 0.3R$	B1
	$18 \cos 40^\circ - 0.3(2g \cos 30^\circ - 18 \sin 40^\circ) - 2g \sin 30^\circ = 2a$	dM1
	$a = 1.18 \text{ or } 1.2 \text{ (m s}^{-2}\text{)}$	A1 cao
		(8)
<b>8(b)</b>	$v^2 = 2^2 + 2(1.18)5$	M1 A1ft
	$v = 3.98 \text{ or } 4.0 \text{ or } 4 \text{ (m s}^{-1}\text{)}$	A1 cao
	N.B. For (a) and (b), penalise over accurate answers ONCE only.	(3)
<b>8(c)</b>	$R = 2g \cos 30^\circ (= g\sqrt{3})$	B1
	Friction = $0.3 \times 2g \cos 30^\circ$ OR $0.3 \times 2g \sin 30^\circ$	M1
	Compares Friction with weight component parallel to plane Eg Consider: $2g \sin 30^\circ - 0.3(2g \cos 30^\circ) (= 2a)$	dM1
	<b>OR</b> $0.3(2g \cos 30^\circ) - 2g \sin 30^\circ (= 2a)$	
	$(a) > 0 \text{ OR } (a) < 0$ Concludes that $P$ will not remain at rest oe	A1
		(4)
<b>(15)</b>		
<b>NOTES</b>		
<b>(a)</b> <b>M1</b>	Correct number of terms, forces resolved <i>perp to the plane</i> where appropriate, condone sign errors and sin/cos confusion, forces and angles paired up correctly	
<b>A1</b>	Correct unsimplified equation.	
<b>M1</b>	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	
<b>A1</b>	Correct unsimplified equation with at most one error	
<b>A1</b>	Fully correct unsimplified equation	
<b>B1</b>	Use of $F = 0.3R$	
<b>dM1</b>	Eliminate $F$ and $R$ to form an equation in $a$ , dependent on two M's	
<b>A1</b>	Correct value for $a$ . Must be 2 or 3sf	