QUESTION NUMBER	SCHEME	MARKS
7(a)(i)	For A: $\frac{4mg}{3} - mg\sin\alpha - F = ma$	M1A1
	$R = mg\cos\alpha$	M1 A1
	Use of $F = \frac{1}{3}R$ in an equation.	M1
	$a = \frac{11g}{15}$ or $0.73g$ or better	A1
(ii)	For B: $kmg - \frac{4mg}{3} = kma$	M1 A1
	$k = 5$	A1
	N.B. Either equation of motion could be replaced by a whole system equation: $kmg - mg\sin\alpha - F = (k+1)ma$	
		(9)
7(b)	Complete method to find resultant force $2T\cos\left(\frac{90° - \alpha}{2}\right)$	M1 A1
	Substitute $T = \frac{4mg}{3}$ and trig $\frac{32mg}{15}$ or $2.1mg$ or better.	**d**M1 A1
ALT 1	Use of cosine rule: $\sqrt{T^2 + T^2 - 2(T)(T)\cos(90+\alpha)}$	M1 A1
ALT 2	Use of vert and horiz components to find the resultant: $\sqrt{(T\cos\alpha)^2 + (T + T\sin\alpha)^2}$	M1 A1
		(4)
		(13)
	Notes for question 7	
(a) M1	For A use $F=ma$ parallel to the plane. Must be dimensionally correct and have correct no of terms. Condone sin/cos confusion. **N.B.** If they use T in this equation and never replace it, allow M1.	
A1	Correct unsimplified equation. **N.B**. a could be replaced by $-a$	
M1	Resolve perpendicular to the plane Must be dimensionally correct and have correct no of terms. Condone sin/cos confusion.	
A1	Correct equation	
M1	Use of $F = \frac{1}{3}R$	
A1	Correct answer	
M1	For B use $F=ma$ vertically. Must be dimensionally correct and have correct no of terms. Condone sin/cos confusion. **N.B**. Must have km on *both* sides for this mark. **N.B.** If they use T in this equation and never replace it, allow M1.	
A1	Correct unsimplified equation **N.B**. a could be replaced by $-a$, but must be consistent with the equation for A.	
A1	correct answer	

(b) M1	Complete method to find resultant force on pulley , allow sin/cos confusion
A1	Correct expression
dM1	Substitute $T = \frac{4mg}{3}$ and trig, dependent on previous M mark
A1	Correct answer.
(b) ALT1	
M1	Complete method – must involve α or its numerical value
A1	Correct expression
dM1	Substitute $T = \frac{4mg}{3}$ and trig, dependent on previous M mark
A1	Correct answer. Allow $\sqrt{\frac{1024m^2g^2}{225}}$ or similar.
(b) ALT2	
M1	Complete method, allow sin/cos confusion
A1	Correct expression
dM1	Substitute $T = \frac{4mg}{3}$ and trig, dependent on previous M mark
A1	Correct answer. Allow $\sqrt{\frac{1024m^2g^2}{225}}$ or similar.

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