Question Number	Scheme	Marks
5(a)	Use of cosine rule on triangle *APB* **OR** trig. on 'half' of the triangle *APB* to find one relevant angle.	M1
	Given answers correctly obtained.*	A1*
		(2)
5(b)	$T_A \cos 30^o + T_B \cos 60^o = mg$	M1 A1
	$T_A \sin 30^o + T_B \sin 60^o = mr\omega^2$	M1A1A1
	$r = a\sin 60^o$ (or $r = a\sqrt{3}\cos 30$ or $r = a\frac{\sqrt{3}}{2}$)	B1
	Solve for T_A	dM1
	$T_A = \frac{1}{2}m\sqrt{3}(2g - a\omega^2)$ *	A1*
		(8)
5(c)	Attempt to obtain one inequality on ω^2	M1
	Correct inequality	A1
	Attempt to obtain another inequality on ω^2 and use both to obtain answer	M1
	$\frac{2g}{3a} < \omega^2 < \frac{2g}{a}$ *	A1 *
		(4)
		(14)

Notes	
(a)	
M1	Either complete method to obtain one relevant angle.
A1*	Correct GIVEN angles correctly obtained. Sufficient annotation/justification leading to both given answers eg Stating $\angle OBP = 2\times\angle OAP$ alone is not sufficient – additional annotation or justification is required. Use of triangles to verify is acceptable.
(b)	
M1	Resolve vertically, dimensionally correct equation with correct no. of terms, condone sign errors and sin/cos confusion.
A1	Correct equation
M1	Equation of motion horizontally: dimensionally correct equation with correct no. of terms, condone sign errors and sin/cos confusion.
A1	Correct equation, with at most one error. If $r\omega^2$ is never seen, this is an A error.
A1	Correct equation
B1	Cao If this is seen in (a) it must be used in (b) for this mark.
dM1	Solve for T_A in terms of *m*, *a*, *g* and ω
A1*	Given answer correctly obtained. Must see exactly.
(c)	
M1	Correct use of either $T_A > 0$ or their $T_B > 0$ oe to obtain one inequality on ω^2. Could be their expression for either Tension > 0.
A1	Correct inequality
M1	Use both $T_A > 0$ and their $T_B > 0$ to form inequalities in attempt to obtain answer. Could be their expression for either Tension > 0. Note: $T_B = \frac{3}{2}ma\omega^2 - mg$
A1*	Given answer correctly obtained