Question			Answer	Marks	AO	Guidance	
14	(a)		$T_{AB} - 2g\sin 30 = 2a$	M1*	3.3	N2L parallel to plane for A – correct number of terms, allow cos/sin confusion	Dimensionally consistent equations for **M** marks
			$4g\sin 60 - T_{BC} = 4a$	M1*	3.3	N2L parallel to plane for C – correct number of terms, allow cos/sin confusion	**M1M0M0** if T used in both equations
			$T_{BC} - T_{AB} - F_B = 3a$	M1*	3.3	N2L parallel to plane for B	
			$4g\sin 60 - 4a - 2g\sin 30 - 2a - F_B = 3a$	M1dep*	2.1	Eliminates both tensions	Allow in terms of F_B
			$9a = g\left(4\sin 60 - 2\sin 30 - 3\mu\right)$	A1	3.3	Use of $F_B = \mu(3g)$ to get a correct equation in a and μ	$9a = g(2\sqrt{3} - 1 - 3\mu)$
			$(\mu =)\frac{1}{3}\left(2\sqrt{3} - 1 - 9\frac{a}{g}\right) > 0$	M1	3.1b	Explicitly uses $\mu > 0$ to get a strict inequality in a and g only. If $a = \frac{1}{9}g(2\sqrt{3} - 1 - 3\mu)$ $\Rightarrow a < \frac{1}{9}g(2\sqrt{3} - 1)$ without justification is **M0**	**Dependent on all previous M marks**
			$a < \frac{1}{9}g\left(2\sqrt{3} - 1\right)$	A1 [7]	2.2a	**AG –** must follow from a correct equation involving μ, a and g	**SC** considering whole system with no friction **B2** only for deriving $9a = g(2\sqrt{3} - 1)$
14	(b)		$a = \frac{1}{9}g \Rightarrow \mu = \frac{2}{3}\left(\sqrt{3} - 1\right)$	B1	1.1	Correct value of μ (oe) using given a (soi)	$\mu = 0.488033...$
			$F_B = 2\left(\sqrt{3} - 1\right)g$	B1	3.4	Correct value for F_B	$F_B = 14.34819...$
			$\sqrt{(3g)^2 + \left(2\left(\sqrt{3} - 1\right)g\right)^2}$	M1	3.1a	$\sqrt{(3g)^2 + {F_B}^2}$ allow any value for F_B or even just the expression F_B	
			32.7 (N)	A1 [4]	2.2a	(For reference: 32.71438099…)	