Question			Answer	Marks	AO	Guidance	
12	(a)		19.6 (N)	**B1** **[1]**	**3.4**	cao oe ($2g$)	
12	(b)			**M1***	**3.3**	Attempt at N2L for either P or Q - correct number of terms	M0 if mass includes g
			$8g - T = 8a$ $T - 6g = 6a$	**A1**	**1.1**	Correct equations for the motion of P and Q	
			$a = \frac{1}{8}(8g - T) \Rightarrow T - 6g = \frac{3}{4}(8g - T)$ $(\Rightarrow 4T - 24g = 24g - 3T)$	**M1dep***	**3.4**	Eliminate a	Or if find a first then award this mark for an equation involving T only
			Magnitude of force exerted on pulley is $2T$	**B1**	**3.1b**	Either stated (anywhere in solution) or if 2(their T) seen	
			$T = \frac{48}{7}g \Rightarrow F = 134.4$ (N)	**A1** **[5]**	**1.1**	Awrt 134(N)	
12	(c)		$a = 1.4$	**B1**	**1.1**	Correct a	$a = \frac{1}{7}g$
			$v^2 = 2(1.4)(1.75)\left(\Rightarrow v^2 = 4.9\right)$	**M1***	**3.4**	Using $v^2 = u^2 + 2as$ with $u = 0$ to find speed of Q (or speed squared) after travelling 1.75	
			$0 = \left(\sqrt{4.9}\right)^2 + 2(-9.8)s \ (\Rightarrow s = 0.25)$	**M1dep***	**3.4**	Using $v^2 = u^2 + 2as$ with $v = 0$ and $a = \pm g$	
			Total distance travelled by Q is 0.25 + 1.75 = 2 (m)	**A1** **[4]**	**3.2a**	cao	Condone awrt 2.0
12	(d)		One factor could be the presence of air resistance	**B1** **[1]**	**3.5a**	Any correct factor **B0** for 'use a more accurate value of g' If **more** than one factor given then **B1** if all correct. **B0** if not.	Friction String is not light String is not inextensible P and Q are not particles Wind speed