Question	Scheme	Mark	Notes
4a	$4 - gT_1 = 0$ or $T_1 = \dfrac{\sqrt{32}\sin 45°}{g}$	M1	Complete method using *suvat*
	$T_1 = 0.408\,(0.41)$	A1	3 sf or 2 sf only. Not $\frac{20}{49}$
		[2]	
4b	Height of Q above P:	M1	Complete method using *suvat* and 7 and 4 for the initial vertical components
	$h = \left(7T_1 - \frac{1}{2}gT_1^2\right) - \left(4T_1 - \frac{1}{2}gT_1^2\right) \quad (= 3T_1)$	A1	Correct unsimplified expression in T_1 or their T_1 They do not need to have substituted for T_1 (2.0408… - 0.8163…)
	$h = 1.2$ (m)	A1ft	2 sf only $(3 \times \textit{their}\ T_1)$
		[3]	
4c	Correct time for P to reach B. ($\frac{40}{49}$, 0.816, or $\frac{8}{g}$ or better)	B1	Seen or implied.
	Vertical component of speed $= 7 - g \times 2T_1 \quad (= -1)$	M1	Complete method using *suvat* with $2T_1$ or their t for the time at B M0 if not using 7
	$\tan\alpha = \pm\dfrac{\textit{their}\ 1}{5}$	M1	Correct use of *their* 1 and 5 to find an equation in a relevant angle (e.g. 90 – α)
	$\alpha = 11$	A1	11 or better (e.g. 11.3)
	If they use T_1 in place of $2T_1$ can score B0M0M1A0		
		[4]	
4d	Form an equation in T_2 only	M1	Complete method using *suvat* and perpendicular gradients. e.g. $\begin{pmatrix}5\\7\end{pmatrix}\cdot\begin{pmatrix}5\\7-gT_2\end{pmatrix} = 0$ Condone sign errors (Vertical component of speed $= \pm\frac{25}{7}$) (perpendicular direction is downwards at 35.5° to the horizontal)
	$-\dfrac{25}{7} = 7 - gT_2$	A1	Correct unsimplified equation
	$T_2 = 1.08$ or $T_2 = 1.1$	A1	3 sf or 2 sf only
		[3]	
		(12)	