Question Number		Mark	Note
7a	$F_{\max} = \frac{1}{3} \times 0.5g \times \frac{12}{13}$	M1	Use of $F = \mu R$. Allow $\cos\alpha$ Condone sine/cosine confusion
	Work done $= F_{\max} \times 5$	DM1	For their $F_{\max}$ Dependent on previous M1
	Work done = 7.5 (J)	A1	7.5(J) or 7.54 (J) or $\frac{10g}{13}$ Not $\frac{98}{13}$ (follows substitution for g).
		[3]	
7b	Work-energy equation	M1	Need all terms. Condone sign errors and sine/cosine confusion.
	$\frac{1}{4}U^2 = \frac{1}{4}.26^2 + \frac{1}{2}g.5\sin\alpha + their\ \text{WD}$	A1ft A1ft	Unsimplified equation with at most one error Correct unsimplified equation
	(U =) 27	A1	27 or 27.3 (2 sf or 3 sf)
		[4]	
7c	Use of $v = u + at$	M1	Complete method using *suvat*
	$-26\sin\alpha = 26\sin\alpha - gT \quad (20 = gT)$ **OR** $0 = 26\sin\alpha \times T - \frac{1}{2}gT^2$ **OR** $T = 2 \times \frac{26\sin\alpha}{g}$	A1	Correct unsimplified equation in T or t.
	(T =) 2.0	A1	2, 2.0 or 2.04 (2sf or 3sf)
		[3]	
7d	Use of $s = ut + \frac{1}{2}gt^2$	M1	Complete method for time to ground using *suvat*
	$-5\sin\alpha = 26\sin\alpha t - \frac{1}{2}gt^2$	A1	Unsimplified equation with at most one error

	$(t = 2.2177...)$	A1	Correct unsimplified equation
	ALT 1: time up + time down	M1	Complete method using *suvat*
	$\frac{26\sin\alpha}{g} + \frac{2}{g}\sqrt{\left(\frac{(26\sin\alpha)^2}{2g} + 5\sin\alpha\right)}$ =(1.0204 + 1.1973)	A1 A1	Unsimplified equation with at most one error Correct unsimplified equation
	Horizontal distance, $X = 26\cos\alpha \times t$ (53.22)	**D**M1	Use of $u\cos\alpha t$ or equivalent, dependent on M1.
	Total distance $= 5\cos\alpha + 26\cos\alpha \times t$	M1	Use of: their $X + 5\cos\alpha$
	$= 58\ (\text{m})$	A1	58 or 57.8 (2sf or 3sf)
		[6]	
		(16)	