

Question Number	Scheme	Marks
4.(a)	$V^2 = U^2 + 2g \times 2.5$	M1A1
	Eliminate V and solve for U	A1 (DM1)
	$7 = 0.2(10 - -V)$	M1A1
	$U = 24$	A1 (6)
4.(b)	$1 = 10t - 4.9t^2$ OR e.g. $v^2 = 10^2 - 2 \times 9.8 \times 1$ and $v = 10 - 9.8t$	
	$1 = 10t - 4.9t^2$ to give $\sqrt{80.4} = 10 - 9.8t$	M1 A1
	$t = \frac{10 \pm \sqrt{100 - 19.6}}{9.8}$ so $t = \frac{10 - \sqrt{10^2 - 2 \times 9.8 \times 1}}{9.8}$	DM1
	$t = 0.11 \text{ s or } 0.105 \text{ s}$	A1 (4)
4(c)	<p>The graph shows velocity v on the vertical axis and time t on the horizontal axis. Two straight lines are plotted. The first line starts at $(0, 24)$ and ends at approximately $(0.11, 25.4)$. The second line starts at approximately $(0.105, -10)$ and ends at approximately $(0.11, -9.8)$.</p>	B1 ft 1 st line B1 2 nd line B1 , -10 (3)
		(13)
	Notes for Qu 4	
	4(a) First M1 for complete method, using suvat, to find equation in U and V only First A1 for a correct equation Second A1 – treat as third DM1 , dependent on the other two M's, for eliminating V and solving for U Second M1 for using Impulse = Change in Momentum of ball (must have 0.2 in both terms and be using 10 as one of the velocities) (M0 if clearly adding momenta or if g is included) but condone sign errors. Third A1 for a correct equation, 7 and 10 must have the same sign but equation may have V instead of $-V$ Fourth A1 for $U = 24$ (must appear here) N.B. If they use U instead of V in the impulse-momentum equation, can score max M1A0/6 for part (a). N.B. If they go from $V^2 = U^2 + 49$ to $V = U + 7$, can score max 5/6	