

If they use $g = 9.81$ or 10 in this question, penalise once for whole question.

Question		Scheme	Marks	AOs
2(a)		Attempt to find the displacement after 10 s	M1	3.1b
		$39.2 \times 10 - \frac{1}{2} g \times 10^2$ OR $-39.2 \times 10 + \frac{1}{2} g \times 10^2$	A1	1.1b
		98 (m) (must be positive)	A1	1.1b
			(3)	
2(b)		Complete method to find either half the time or the full time	M1	3.1b
		Correct equation e.g. $0 = 24.5 - gt$ OR $-24.5 = 24.5 - gt$	A1	1.1b
		5 (s)	A1	1.1b
			(3)	
2(c)		e.g. (include) air resistance	B1	3.5c
			(1)	
(7 marks)				
Notes: Penalise explicit use of $g = 9.81$ or 10 once for the whole question the first time it occurs.				
2a	M1	Complete method, using $s = ut + \frac{1}{2} at^2$ or possibly $s = vt - \frac{1}{2} at^2$ with the motion reversed, or an 'up and down' method i.e an appropriate equation for the motion from O to the top AND an appropriate equation from the top down to the ground AND combining to give the total distance		
	A1	Correct expression (s) N.B. If using an 'up and down method', this mark is for all the intermediate values: Distance up = 78.4, Time up = 4, time down = 6, distance down = 176.4 AND combining correctly i.e. (176.4 – 78.4) or (78.4 –176.4) These are the values for $g = 9.8$		
	A1	cao		
2b	M1	Complete method to find half the time or the full time. Allow inequalities. e.g. for half the time, they may find $t = 4$ and $t = 1.5$ and subtract e.g. for the full time, they may find $t = 6.5$ and $t = 1.5$ and subtract		
	A1	Correct equation or equations if they are using more than one.		
	A1	cao		
2c	B1	e.g. (use) a more accurate value of g , (include) spin of the stone, (include)shape of the stone, (include) size of the stone, (include) wind effects , rotation B0 if any incorrect extras are included e.g. the mass or weight of the stone DO NOT ALLOW NEGATIVES OF THESE e.g there is no air resistance		