

Question	Scheme		Marks	AOs
5(a)	Use vertical motion:		M1	3.3
	$0 = 7t - \frac{1}{2}gt^2$ OR $-7 = 7 - gt$ OR $0 = 7 - g \times \frac{1}{2}t$		A1	1.1b
	Use horizontal Motion: $OA = 14t$		M1	3.4
	$OA = 20$ (m)		A1	1.1b
			(4)	
5(b)	Vertical component = $7 - 0.5g = 2.1$		M1	3.3
	$V = \sqrt{14^2 + 2.1^2}$		M1	3.1b
	$V = 14$ or 14.2 (m s ⁻¹)		A1	2.2a
			(3)	
5(c)	V is greater		B1	3.5a
	Air resistance will slow the stone down		B1	1.1b
			(2)	
5(d)	e.g. it does not include: spin of the stone, wind effects, dimensions of the stone		B1	3.5b
			(1)	
(10 marks)				
Notes:				
(a)	M1	Complete method, using vertical motion, to produce an equation in t only, condone sign errors		
	A1	Correct equation		
	M1	Complete method, using horizontal motion, to produce an equation in t only, condone sign errors		
	A1	cao		
(b)	M1	Complete method to find the vertical component at $t = 0.5$ seconds		
	M1	Use of Pythagoras with their vertical component and 14, with square root		
	A1	These are the only acceptable answers after use of $g = 9.8$		
(c)	B1	cao		
	B1	Any equivalent statement		
(d)	B1	B0 if an incorrect extra is included		