

Question	Scheme		Marks	AOs
5(a)	Use $s = ut$ horizontally:		M1	3.3
	$10 = Ut \cos 45^\circ$		A1	1.1b
	Use $s = ut + \frac{1}{2}at^2$ vertically:		M1	3.4
	$5 = Ut \sin 45^\circ - \frac{1}{2}gt^2$		A1	1.1b
	Form an equation in U only: $5 = 10 \tan 45^\circ - \frac{1}{2}g\left(\frac{10}{U \cos 45^\circ}\right)^2$		M1	2.1
	$U = 14$		A1	1.1b
			(6)	
5(b)	Use $v^2 = u^2 + 2as$ vertically: $v_v^2 = (14 \sin 45^\circ)^2 - 2g \times 5$		M1	3.4
	$v_v = 0$		A1	1.1b
	speed = $14 \sin 45^\circ = 9.9$ or $9.90 \text{ (m s}^{-1}\text{)}$		A1	3.1b
			(3)	
5(c)	e.g. It ignores wind effects, it uses an inaccurate value for g , it ignores spin effects, it ignores the dimensions of the ball		B1	3.5b
			(1)	
5(d)	$V > U$ since air resistance would slow the ball down oe		B1	3.5a
			(1)	
(11 marks)				
Notes:				
5a	M1	Correct no. of terms and allow sin/cos confusion and sign errors.		
	A1	Correct unsimplified equation.		
	M1	Correct no. of terms and allow sin/cos confusion and sign errors.		
	A1	Correct unsimplified equation.		
	M1	Form an unsimplified equation in U only, g does not need to be substituted.		
	A1	cao		
5b	M1	Correct no. of terms and allow sin/cos confusion and sign errors.		
	A1	Correct unsimplified equation.		
	A1	2 sf or 3 sf only.		
5c	B1	Any appropriate answer		

5d	B1	cao
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