
PHYSICS**5054/31**

Paper 3 Practical Test

October/November 2017

MARK SCHEME

Maximum Mark: 30

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Question	Answer	Marks
1(b)(i)	correct description of one oscillation in relation to the rod	B1
1(b)(ii)	T_1 in the range 9.0 to 16.0 s with at least one repeat measurement and average correctly calculated with correct unit	B1
1(b)(iii)	T_1 calculated correctly to 2 / 3 s.f. with unit seen somewhere for T or t	B1
1(c)	$T_2 < T_1$	M1
1(d)	ratio calculated correctly with no unit and in the range 0.67 to 0.75	A1
	for Q1 penalise incorrect notation for time once	
	apply unit penalty once in the question	

Question	Answer	Marks
2(a)	V_1 in the range 3.0 (V) to 4.5 (V) to 0.1 (V) or better, with unit	B1
2(b)	(i) $V_2 < V_1$ to 0.1 V or better with consistent correct unit seen here or in (a) or b(ii) and (ii) $V_3 < V_2$ to 0.1 V or better with consistent correct unit seen here or in (a) or (b)(i)	B1
2(c)(i)	correct plots and best fit line	B1
2(c)(ii)	correct trend in results: V reduces as the concentration of the solution increases	B1
	V reduces as the volume of blue liquid is increased / concentration of the solution increases wtte or ecf : statement relating volume and concentration consistent with the candidate's results	B1

Question	Answer	Marks
3(a)	vertical check by alignment with a vertical reference line or use of a set square between the rule and the bench	B1
3(b)(i)	x in the range 15.0 to 35.0 cm measured to the nearest mm with unit	B1
3(b)(ii)	height from the bottom of the ball to the ramp or height between two common points on the ball	B1
3(b)(iii)	lift the sphere / ball vertically / upwards out of the sand tray (without disturbing the sand)	B1
3(b)(iv)	x from at least two readings correctly averaged	B1

Question	Answer	Marks
4	<u>Preliminary results</u>	
4(a)	x_0 in the range 15.0 to 25.0 cm measured to nearest mm with unit	B1
4(c)	look down from vertically above the measuring cylinder and see that there is water all away around the clay cylinder or displace the clay cylinder vertically and see that it oscillates in the measuring cylinder	B1
4(d)	s in the range 6.0 cm to 10.0 cm measured to the nearest mm with unit	B1
4(e)	new s larger than value of s obtained for 4(d)	B1
	$x < x_0$ by about 2 cm measured to nearest mm with unit	B1

Table

4(f)	table with headings(quantities) and units and results from (a) , (d) and (e) included	B1
	range of x values , largest is x_0 and smallest ≤ 4.0 (but not zero)	B1
	at least 5 sets of results showing a general trend of s increasing as x decreases	B1
	approximately linear increase in s as x decreases	B1

Question	Answer	Marks
Graph		
4(d)	axes labelled with units and correct orientation	B1
	suitable scale, not based on 3, 6, 7 etc. with plotted data occupying \geq half the grid in both directions	B1
	points plotted correctly and all points plotted	B1
	best fit fine straight line	B1
Calculations		
4(e)	use of two points that are on the straight line	M0
	correct calculation of G <i>with the correct sign</i>	A1
	from a triangle that uses more than half the drawn line with answer to 2 / 3 s.f.	A1