
PHYSICS

5054/41

Paper 4 Alternative to Practical

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(a)	any one of: ball will roll about / zero error on balance/ball has too small a mass/top pan balance only measures to 1(.0) g	B1
1(b)	put beaker on top pan balance and tare (zero)	B1
	add 10 balls to the beaker and read mass	B1
	divide by 10 / number of balls	B1
	or	
	find the mass of the empty beaker,	B1
	find mass with balls and subtract	B1
	divide by 10 / number of balls	B1

Question	Answer	Marks
2(a)	ball correctly drawn with bottom of ball level with 60 cm mark.	B1
2(b)	to find the approximate position so as to know where to place the eye / measuring device owtte	B1
2(c)(i)	not possible to be accurate to more than nearest cm / difficult to measure to this precision owtte	B1
2(c)(ii)	40.2 cm	C1
	40 cm	A1
2(d)(i)	table completed (no mark)	
2(d)(ii)	he needs to use a tape measure / tape / join meter rules together / other valid method	B1
	needs the help of another student to drop the ball for him.	B1

Question	Answer	Marks
2(d)(iii)	axes labelled quantity and unit axes correct way round	B1
	scales linear, not awkward, start from (0,0)	B1
	points plotted accurately	B1
	smooth best fit curve drawn	B1
2(e)(i)	difficult to avoid (parallax) error so close to the floor owtte / bounces too quickly (to see) would have to lie down with head on floor.	B1
2(e)(ii)	correct reading from their graph	B1

Question	Answer	Marks
3(a)	correct thermistor symbol drawn between A and B.	B1
3(b)(i)	2.8 V cao	B1
3(b)(ii)	place the thermistor in (a beaker of melting) ice	B1
3(b)(iii)	$R_{\text{room temp}} = 790 \Omega$ and $R_0 = 1800 \Omega$ (1 mark if calculations correct but not 2 s.f.)	B2
3(b)(iv)	as temperature increases, resistance decreases or vice versa	B1

Question	Answer	Marks
4(a)	5(.0) cm (± 0.1 cm)	B1
4(b)(i)	line drawn from P to meet AB – parallel to ST by eye and point C labelled	B1
4(b)(ii)	distance from ST measured at least once (other than at P) to get the same answer / correct use of set squares / dividers / protractors	B1
4(c)	correct line drawn and point R labelled.	B1
4(d)	$\theta = 23^\circ \pm 1^\circ$	B1
4(e)	2.2 / sin (their value from d)	B1
4(f)	CF measured and sensible comment e.g. very close so they agree ecf their results.	B1