
PHYSICS

5054/42

Paper 4 Alternative to Practical

May/June 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)	bottom of ball drawn level with the zero mark on the ruler	B1
1(b)(i)	0.626 / 0.63 seen	C1
	0.63 s correct answer only	A1
1(b)(ii)	data to 2 d.p. / <u>large</u> variation in raw data	B1
1(c)(i)	5.04 (m / s ²) 2 / 3 s.f. only	B1
1(c)(ii)	longer time / sufficient time (to fall)	B1
	reduces percentage error in the time / reduces the <u>effect</u> of (human) reaction error	B1

Question	Answer	Marks
2(a)(i)	correct symbol and parallel connection with lamp P	B1
2(a)(ii)	2.4 (V) correct answer only	B1
2(b)(ii)	$I = 0.31$ (A) correct answer only	B1
2(b)(iii)	there is a current in the circuit / lamp P is lit	B1
2(b)(iv)	p.d. too small (to make it glow) / much less than working voltage / lamp P takes most of the voltage	B1

Question	Answer	Marks
3(a)	(hot) water in beaker, take temperature (at regular intervals) as it cools / take temperature after a fixed time / measure the time for a fixed temperature drop	B1
	repeat with different insulators	B1
3(b)	any one of constant room temperature same <u>starting</u> / initial temperatures same beaker same volume / mass / amount of hot water same times (of cooling) same temperature drop same thickness of insulator	B1
3(c)	2 / 3 sets of insulator, (change in) temperature / °C, time / s or minutes	B1
3(d)	compare temperature drops in <u>equal times</u> – largest drop is the poorest insulator (or reverse argument) / compare times for <u>equal temperature drops</u> – longest time is the best insulator (or reverse argument) / plot graphs to compare temperature drops in <u>equal times</u> / <u>compare gradients</u> – steepest graph is the poorest insulator (or reverse argument)	B1

Question	Answer	Marks
4(a)	2. <u>0</u> (cm) correct answer only	B1
4(b)(i)	2.3 (cm) correct answer only	B1
4(b)(ii)	(edges of) shadow curved / not distinct / (shadow of) ruler / hand / person gets in the way / shadow is of variable height	B1
4(c)	axes labelled quantity and unit and axes correct way round	B1
	x axis scale linear, not awkward, starts from (0,0)	B1
	points plotted accurately	B1
	smooth best fit curve drawn	B1
4(d)(i)	4(.0) \pm 0.2 (cm)	B1
4(d)(ii)	(d)(i) \div 2	B1
4(d)(iii)	expect YES <u>and</u> values very close / nearly the same / close enough / within limits of experimental error / < 10%	B1
4(e)(i)	correct value from sensible extrapolation	B1
4(e)(ii)	shadow becomes too big to fit on screen / becomes more blurred / off the scale of the graph	B1
4(f)	changing <i>D</i> changes the height of the shadow / to make it (a) fair (test) / a fair comparison	B1