Mark scheme

Practical skills

Physics 0625 · Questions from Paper 4 and Paper 6

Total marks

86

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
6	6	7	7	7	10	10	11	11	11	**86**

Question 1 [6]

1(a)	(use stop-watch to) time oscillations	B1
	(use of fiduciary) aid to determine a complete cycle	B1
	(use of) multiple oscillations **AND** division (to determine period)	B1
1(b)	<table><tr><td>quantity</td><td>device</td></tr><tr><td>volume of water in a glass</td><td>measuring cylinder</td></tr><tr><td>width of a small swimming pool</td><td>metre rule</td></tr><tr><td>thickness of a piece of aluminium foil</td><td>micrometer screw gauge</td></tr></table> 1 mark for each correct response	B3

Question 2 [6]

2 **(a)** $\theta_R = 24(°C)$ [1]

(b) **(i)** Table:
s, °C, °C [1]

(ii) About the same [1]
Justified with reference to numbers in table [1]

(c) Any two from:
Volumes of water
Room temperature/draughts
Same beaker
Initial water temperature [2]

[Total: 6]

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Question 3 [7]

3	**MP1**	Stopwatch (or equivalent) AND (metre) rule / ruler	1
	MP2	Measure time for 5 (+) oscillations	1
	MP3	Divide by number of oscillations to find period (*T*)	1
	MP4	Repeat for each bob	1
	MP5	Variable; one from: Initial amplitude / starting position Length of pendulum / thread Number of oscillations	1
	MP6	Table with column headings for *t*, or period (*T*), or both AND *d*, with correct units	1
	MP7	Conclusion: Plot graph(s) of *d* against period (*T*) or *t* (or vice versa) OR compare period (*T*) or *t* values for different diameters	1

Question 4 [7]

4	**MP1**	**circuit diagram:** correct voltmeter circuit symbol shown in parallel with all or part of wire	1
	MP2	**apparatus:** metre ruler	1
	MP3	**method:** measure / record length; measure p.d. and current; specific reference to repeating with different length	1
	MP4	**key / control variable:** constant diameter / radius / gauge of wire material of wire / same wire / same type of wire	1
	MP5	**table:** columns, with units, for length, p.d., current, resistance	1
	MP6	**analysis:** compare readings in the table to see <u>if</u> change in length produces change in resistance plot resistance-length or length-resistance graph	1
	MP7	**additional point** (one from)**:** at least 5 sets of data taken; repeat for each length <u>and</u> take average; 2nd control variable: diameter / material / temperature of wire; use of protective resistor	1

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Question 5 [7]

5	**MP1** (Metre) rule / tape measure	1
	MP2 Release ball to roll down track, measure how far it travels.	1
	MP3 Repeat for at least 2 more different angles of right-hand side of track	1
	MP4 Clear identification of the correct distance to be measured (e.g. from table leg or other point identified on floor to point of impact with track) OR clear explanation of how to identify point of impact (e.g. using a sand tray)	1
	MP5 Constant variable identified Release height for ball Or same ball every time / same weight / mass / size of ball	1
	MP6 Table consistent with their method (if method correct with columns for distance travelled and angle of track, with units)	1
	MP7 Analysis based on their table Graph of angle against distance travelled, or compare angle with distance travelled (or the equivalents for their method)	1

Question 6 [10]

6 **(a)** graph: axes labelled and scales suitable [1]
all plots correct to nearest ½ small square [2]
well judged best fit line [1]
thin best fit single line/no 'blobs' [1]

(b) statement matches line (expect YES) [1]
justification matches statement
(expect straight line through origin) [1]

(c) triangle method with more than half the line used [1]
clear how obtained – shown on graph [1]
m correct in kg, 2 or 3 significant figures [1]
1.39 – 1.45 kg - unit penalty

[Total: 10]

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Question 7 [10]

7(a)(i)	15	1
7(a)(ii)	Ring(s) do not extend (owtte)	1
7(b)	Use of set square to line up with scale OR perpendicular viewing	1
7(c)	Graph:	
	Axes correctly labelled and right way round	1
	Suitable scales	1
	All 6 plots correct to ½ small square	1
	Good line judgement, thin, single, continuous line	1
7(d)	(NO);line does not pass through origin	1
7(e)	*L* in range 6–8	1
	L in range 7.2–7.8	1
	Total:	**10**

Question 8 [11]

8(a)	θ_R = 21 (°C)	1
8(b)	read scale perpendicularly / or words to that effect (e.g. at eye level, at right angles)	1
8(c)	81.0 $>$ $\theta_{300} \geqslant$ 80.5 (°C)	1
8(d)(i)	x_1 = 0.067 **AND** x_2 = 0.044 **AND** x_3 = 0.022	1
8(d)(ii)	units °C / s	1
8(d)(iii)	consistent 2 or consistent 3 significant figures	1
8(e)(i)	description matching results e.g. 'cooling rate falls steadily as time goes on' **AND** reference to cooling rate values to show this	1
8(e)(ii)	θ_F near or equal to θ_R	1
8(f)(i)	cooling rates likely to be lower	1
	(e.g.) x_2 lower than x_1 and second 90 s has lower starting temperature	1
8(f)(ii)	any **one** suitable control variable from: • volume of water • size / material of beaker • room temperature / other valid environmental factor	1

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Question 9 [11]

9(a)	Clear use of horizontal aid OR bob touching rule	**1**
9(b)(i)	T = 1.41	**1**
9(b)(ii)	T^2 = 1.99 (to 2 decimal places only, correctly rounded)	**1**
9(c)	Axes of graph correctly labelled with quantity and unit and right way round	**1**
	Suitable scales	**1**
	All plots correct to ½ small square	**1**
	Good line judgement, thin, continuous line	**1**
9(d)	Triangle method clear on graph	**1**
	Triangle at least half the length of the line between extreme plots used	**1**
	G value in range 0.038 – 0.044	**1**
9(e)	Reaction time / human error a smaller part of time measured	**1**

Question 10 [11]

10(a)	S = 48.8 (cm)	**1**
10(b)	perpendicular viewing (of scale)	**1**
10(c)	1/N or N^{-1}	**1**
10(d)	axes correctly labelled with quantity and unit and correct way round	**1**
	suitable scales with a axis starting from 30	**1**
	all plots correct to ½ small square	**1**
	good line judgement with thin continuous line	**1**
10(e)	triangle method clearly shown on graph	**1**
	(triangle) covering at least ½ of candidate's line between the extreme plots	**1**
	G = 40.0 ± 1.0 (i.e. any answer between 39.0 and 41.0 inclusive)	**1**
10(f)	$d = G$ and given to 2 or 3 significant figures	**1**

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