Mark scheme

Measurements

Physics 0625 · Questions from Paper 3, Paper 4 and Paper 6

Total marks

65

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
3	7	6	7	8	8	5	6	6	9	**65**

Question 1 [3]

1 **(a)** 15 ±1 (cm^3) B1

(b) level shown at 40 ±1 cm^3 OR 25 + candidate's **(a)** ±1 cm^3 on magnified figure B1

(c) idea of goes up further OR more sensitive
OR idea of small variations causing larger height differences
OR larger divisions / more gradations B1

[Total: 3]

Question 2 [7]

2 **(a)** **(i)** 7 minutes 20 seconds B1

(ii) 440 (s) C1
division by 40 C1
11 (s) A1

(b) (speed =) distance/time in any form C1
75/15 C1
5 (m / s) A1
Note: 6.8 (m / s) gains 2 marks as correctly using time 11(s) from **(a)**

[Total: 7]

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Question 3 [6]

3 **(a)** any **two** from: B2
wire not starting at 0 cm
wire not straight
wire away from / not close to rule

(b) **(i)** 0.65 (cm) B1

(ii) candidate's **(b)(i)** / 8 C1
0.8125 OR 0.813 OR e.c.f. C1
0.81 A1

[Total: 6]

Question 4 [7]

4(a)(i)	4.3 (cm)	**A2**
	5.8 (– 1.5)	**C1**
4(a)(ii)	**(a)(i)** ÷ 8 correctly evaluated (0.54 (cm) if 4.3 cm used)	**A2**
	(a)(i) ÷ 8	(C1)
4(b)	7.8 (g / cm^3)	**A3**
	54 ÷ 6.9	(C2)
	$D = m \div v$ in any form	(C1)

Question 5 [8]

5(a)(i)	0.3(0) (cm^3)	**A3**
	(average volume of one drop) = 60 ÷ 200	**(C2)**
	total volume = number of drops × (average) volume of one drop	**(C1)**
5(a)(ii)	226.5 (s)	**A2**
	180 (+ 46.5 =)	**(C1)**
5(a)(iii)	1.1 (s)	**A2**
	time for one drop = total time ÷ no of intervals	**(C1)**
5(b)	84 (cm^3)	**B1**

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Question 6 [8]

6(a)(i)	*l* shown clearly from bottom of clamp to centre of bob	**1**
6(a)(ii)	Any 2 from: Metre rule close to pendulum Measurement from bottom of clamp Set-square used as a horizontal reference	**2**
6(b)(i)	1.01(1)	**1**
6(b)(ii)	Any 2 from: Idea of averaging Reaction time / judgement of when to stop / start (owtte) Reduces effect of error / spreads error over 20 swings (owtte)	**2**
6(c)	1.02(212) with 2, 3 or 4 significant figures	**1**
	unit s^2	**1**
	Total:	**8**

Question 7 [5]

7 **(a)** Period: 1.81 s OR 1.8 s as mean value
OR 1.8 s as most common reading / the mode B1

(b) Time a minimum of 2 (successive) oscillations B1
Divide result by the number of oscillations B1
OR
Count no. of oscillations in at least 20 s (B1)
Divide the time by the number of oscillations
OR Divide no. of oscillations by time and find reciprocal (B1)
2 of:
Repeat (several times) and find mean
Time with reference to fixed / fiducial point or top or bottom of oscillation
Check / set zero of stop-watch B2
Show knowledge of what is meant by one oscillation

[Total: 5]

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Question 8 [6]

8 **(a)** (parallelogram or triangle may have any orientation)
NOT a copy of Fig. 1.1
two sides at right angles, by eye B1
one side longer than the other B1
diagonal or completion of triangle drawn **and** labelled “resultant” OR R
Ignore numerical values. Condone arrows in wrong direction B1

(b) 98 N – 102 N B1
(accept value found by calculation)

(c) (vertically) up/opposite to W NOT North B1

(d) his **(b)** OR correct value calculated B1
ignore mass

[Total: 6]

Question 9 [6]

9(a)	speed = 4.3 m / s	speed = 4.3 m / s	**A2**
	correct vector triangle or rectangle drawn	use of Pythagoras' theorem e.g. $a^2 + b^2 = c^2$ OR (speed =) $\sqrt{(2.5^2 + 3.5^2)}$	(C1)
	direction = 54° or 55°	direction = 54° or 55°	**A2**
	resultant velocity vector (including arrow)	use of trigonometry to find angle e.g. tan Θ = 3.5 / 2.5	(C1)
9(b)	a scalar quantity distance, time, mass, energy, temperature		**B1**
	a vector quantity force, weight, acceleration, momentum, electric field strength, gravitational field strength		**B1**

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Question 10 **[9]**

10 **(a)** **(i)** any scalar quantity other than mass B1

(ii) any vector quantity other than force B1

(b) F = ma in any form OR (a =) F / m C1
50 000 / 290 000 OR 50 / 290 C1
a = 0.17 m / s^2 A1

(c) **(i)** 1 cm: 20 000 N / 20 kN B1

(ii) triangle completed B1
230 000 N OR 230 kN in range 220 000 N – 240 000 N / 220 kN – 240 kN B1

by calculation: 110°
OR by measurement: 108° – 112° B1

[Total: 9]

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