Topical Past Paper Workbook

IGCSE Physics (0625) Paper 3 [Core]

May 2012 - May 2021

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Introduction

Each topical past paper book consists of hundreds of questions and their answer schemes, in the form of worksheets. Questions are assigned to each chapter according to their corresponding topic. Topics, in turn, are based on the items of the latest Cambridge IGCSE or AS/A level syllabus content. This book's specifications are as follows:

Title: IGCSE Physics (0625) Paper 3 Topical Past Paper Workbook
Subtitle: Exam Practice Worksheets With Answer Scheme
Examination board: Cambridge Assessment International Education (CAIE)
Subject code: 0625
Years covered: May 2012 - May 2021
Paper: 3 (Structured Questions)
Number of pages: 1137
Number of questions: 687

Contents

Chapter 1

General physics

1.1 Length and time

1. 0625_m20_qp_32 Q: 1

(a) A student places 8 similar coins in a pile, as shown in Fig. 1.1.

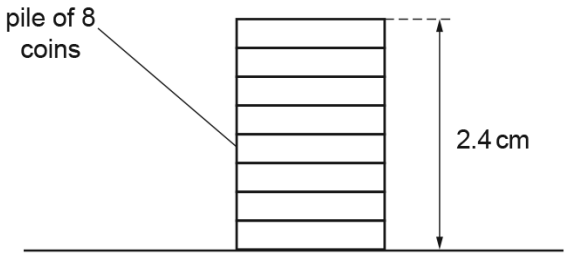

Fig. 1.1 (not to scale)

The height of the pile of coins is 2.4 cm.

Calculate the average thickness of one coin.

average thickness = ... cm [2]

(b) Fig. 1.2 shows the pile of coins, a measuring cylinder and a beaker containing some water.

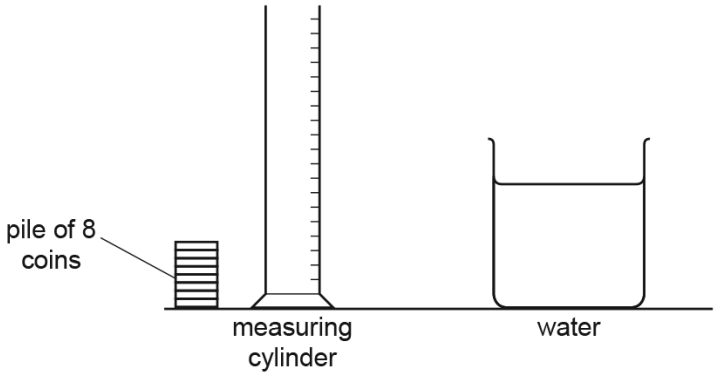

Fig. 1.2 (not to scale)

Describe how the student can measure the volume of **one** of the coins using the set-up shown in Fig. 1.2.

.....

.....

.....

..... [4]

[Total: 6]

2. 0625_s19_qp_31 Q: 3

A teacher investigates the reaction time of five students. A 0.50 m ruler is held above the hand of a student before being allowed to fall. The arrangement is shown in Fig. 3.1.

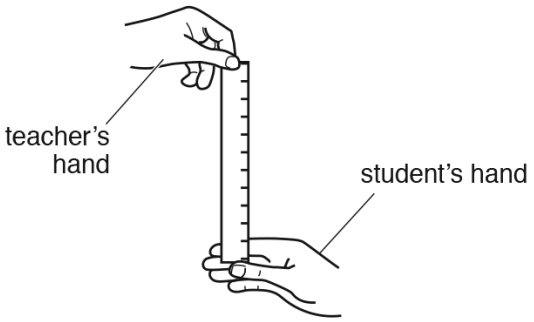

Fig. 3.1

As soon as the ruler falls the student closes their hand, catching the ruler. The further the ruler falls, the greater the reaction time of the student. The results obtained are shown in Fig. 3.2.

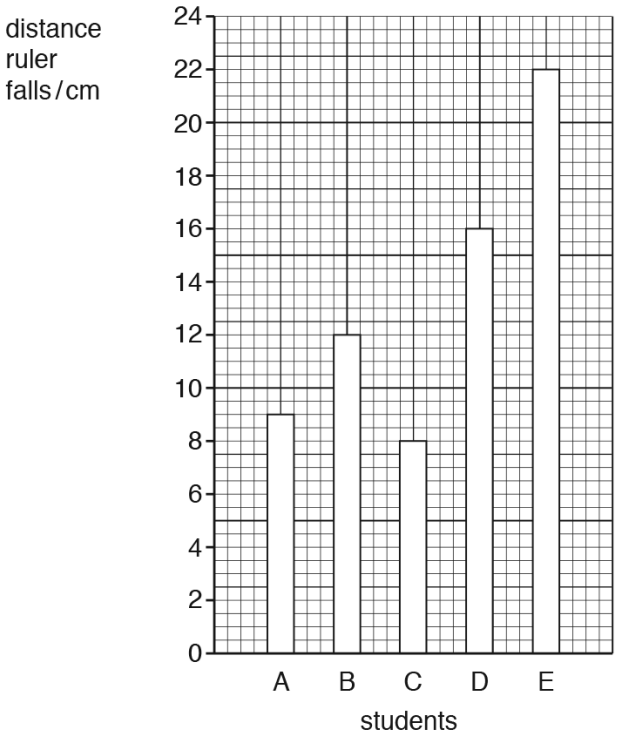

Fig. 3.2

(a) Using the results shown in Fig. 3.2, calculate the average distance that the ruler drops.

average distance = ... cm [2]

(b) List the students in order of their reaction times, with the shortest reaction time at the top of the table. One has been done for you.

order	student
1st	
2nd	
3rd	B
4th	
5th	

[2]

(c) In a similar investigation, a ruler drops a distance of 11.0 cm and has an average speed of 16 cm/s.

Calculate the reaction time.

reaction time = ... s [3]

[Total: 7]

3. 0625_w19_qp_31 Q: 2

Four students P, Q, R and S each attempt to measure the time period (the time for one complete oscillation) of a pendulum. The arrows in Fig. 2.1 show the movements of the pendulum that each student times.

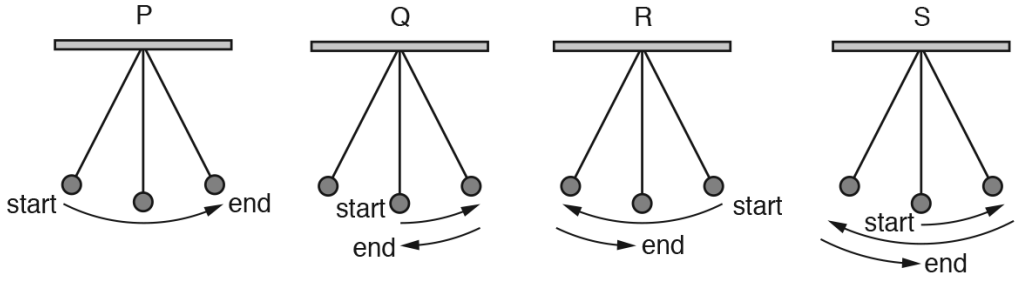

Fig. 2.1

(a) State the student who has chosen the correct movement for one period of a pendulum.

student ..... [1]

(b) Another student uses a stopwatch to measure the time taken for 50 periods of a pendulum. Fig. 2.2 shows the time taken on the stopwatch.

Fig. 2.2

Calculate the time for one period of the pendulum. Give your answer to 3 significant figures.

time for one period = ... s [3]

(c) The student measures the displacement of the pendulum bob from its rest position. The displacement is 16.5 cm, as shown in Fig. 2.3.

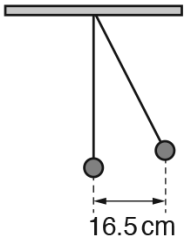

Fig. 2.3

State the displacement in millimetres.

displacement = ... mm [1]

[Total: 5]

4. 0625_w19_qp_33 Q: 1

(a) A student uses a stopwatch in a timing experiment.

Fig. 1.1 shows the stopwatch readings.

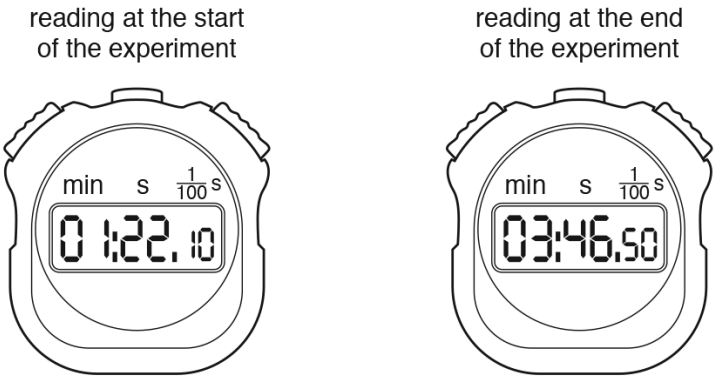

Fig. 1.1

Calculate the time interval between the two readings.

time interval = ... s [2]

(b) A device has a light-emitting diode (LED) that flashes briefly at regular intervals.

Describe how to determine accurately the average time for each interval, using a stopwatch.

.....

.....

.....

.....

.....

..... [4]

[Total: 6]

5. 0625_s17_qp_31 Q: 1

A pipe drips water into an empty glass jar. A student takes measurements to find how fast the water is rising up the jar. Fig. 1.1 shows the arrangement.

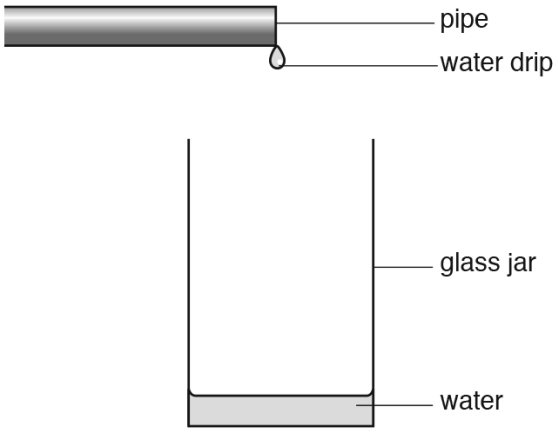

Fig. 1.1

(a) The student measures the depth of the water every minute.

State the **two** pieces of equipment that she uses.

1. .....

2. .....

[2]

(b) The student records her observations in a table. She then plots a graph using the axes shown in Fig. 1.2.

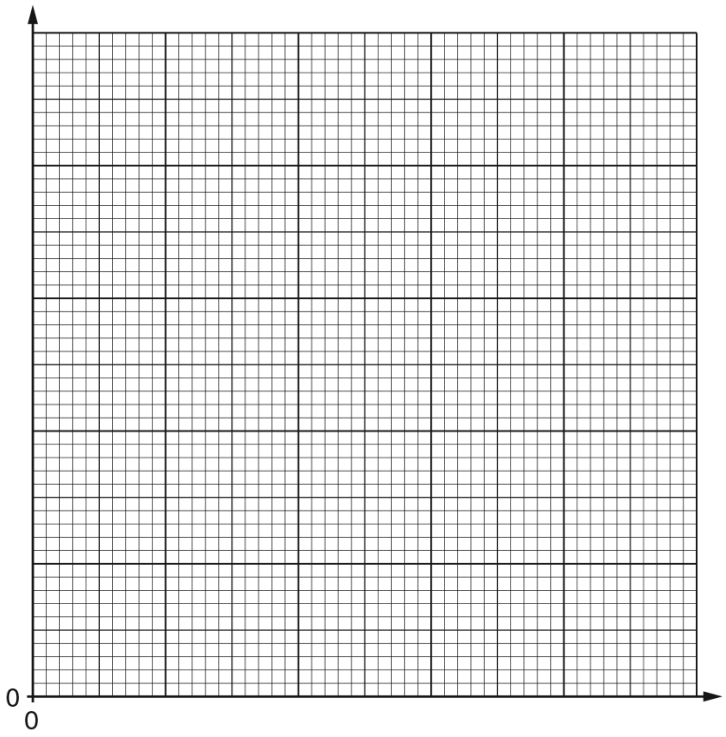

Fig. 1.2

(i) On Fig. 1.2, label both axes with title and unit. [2]

(ii) The water rises up the jar at a constant rate.

Draw a line on Fig. 1.2 to show the student's graph. Start the line from the time when the jar is empty. [2]

(c) A puddle of water forms on the ground. The average depth of the water is 2.5 mm.

Determine the average depth of the water in m.

depth = ... m [2]

[Total: 8]

6. 0625_w17_qp_31 Q: 1

A student clamps a metre rule to the end of a bench, as shown in Fig. 1.1. He attaches a mass to the end of the rule.

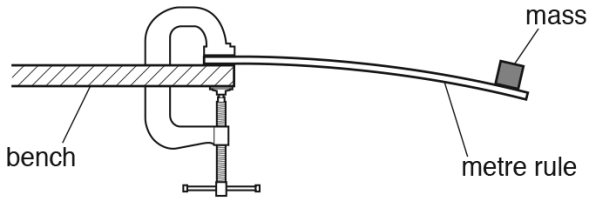

Fig. 1.1

The student displaces the end of the rule by a small distance. The rule oscillates up and down. The student measures the time for ten complete oscillations.

(a) State the name of a measuring device for timing the oscillations.

..... [1]

(b) State a reason why the student measures the time for ten oscillations, rather than for one.

..... [1]

(c) The student repeats the procedure. His results are shown in the table.

results	time for ten complete oscillations / seconds
1st	3.93
2nd	4.07
3rd	3.55
4th	3.99

(i) One of the results is incorrect. On the table, draw a ring around the incorrect result. [1]

(ii) Calculate the average value for the time for ten complete oscillations.

average time = ... s [2]

(iii) Determine the time for one complete oscillation. State your answer to two significant figures.

time = ... s [1]

[Total: 6]

7. 0625_s16_qp_32 Q: 1

A student investigates water dripping from a tap (faucet).

Fig. 1.1 shows the dripping tap and a rule next to a container collecting the drops of water.

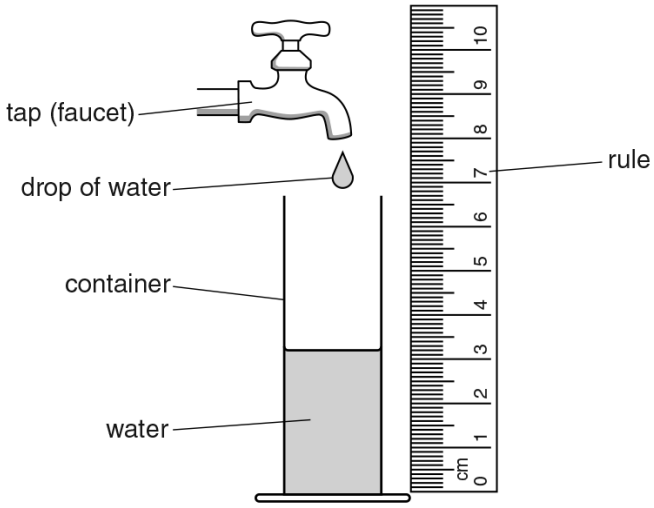

Fig. 1.1

(a) Name the quantity that the student is measuring with the rule.

..... [1]

(b) The student uses a digital stopwatch to measure the time between the drops of water. She repeats her measurement.

Fig. 1.2 shows the reading on the stopwatch for all her measurements.

time = ... s time = ... s time = ... s

Fig. 1.2

(i) On the line below each stopwatch, record the time, in seconds, measured by the student. [1]

(ii) Calculate the average time between drops of water. Show your working.

average time between drops = ...s [2]

(c) The student collects drops of water for 15.5 minutes.

Calculate how many drops leave the tap in 15.5 minutes. Use your answer to part **b(ii)**.

number of drops = ... [3]

[Total: 7]

8. 0625_s15_qp_21 Q: 1

A student has a stack of 20 identical coins.

Fig. 1.1 shows the student measuring the height of the stack using a ruler.

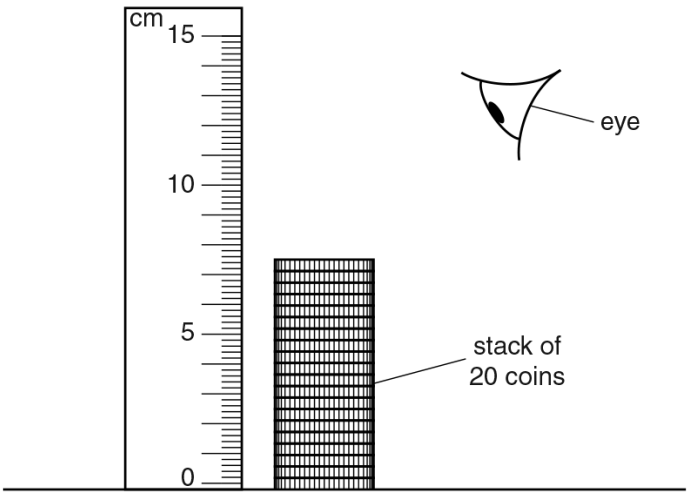

Fig. 1.1

(a) With his eye at the position shown, the student's measurement of the height of the stack is 6.8 cm.

Suggest two reasons why the student's measurement is inaccurate.

1. .....

.....

2. .....

.....

[2]

(b) Another student correctly determines the height of the stack as 7.7 cm.

Calculate the average thickness of one coin.

thickness = ... cm [2]

(c) The mass of a single coin is 12 g.

State this mass in kg.

mass = ... kg [1]

[Total: 5]

9. 0625_s15_qp_23 Q: 1

In the past, burning candles were used as timers.

A boy carries out an experiment to make his own timer using a burning candle.

Fig. 1.1 shows the length of the candle, and the clock he used, at the start of the experiment and at the end of the experiment.

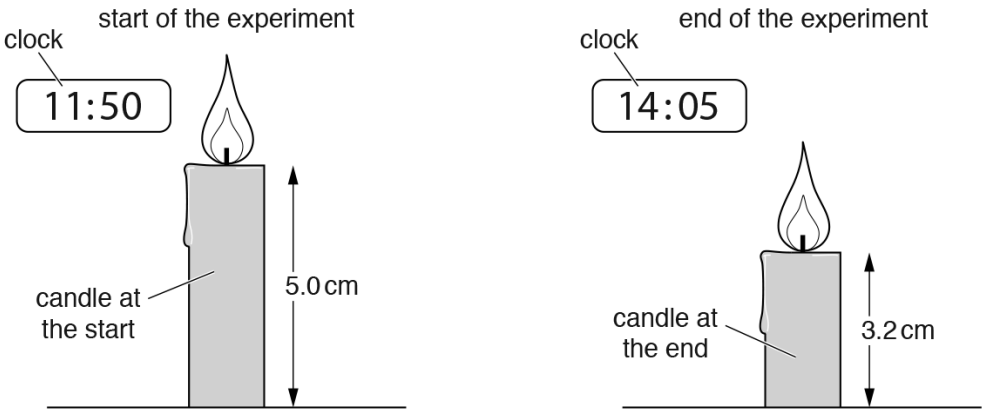

Fig. 1.1 (not to scale)

(a) The candle has a cross-sectional area of 1.6 cm^2.

Calculate the volume of candle at the start of the experiment.

volume = ... cm^3 [2]

(b) Use Fig. 1.1 to complete the table.

time at start of the experiment	
time at end of the experiment	
time for which the candle was burning	..... hours .....minutes = ... hours

[2]

(c) The difference in the length of the candle from the start to the end of the experiment was 1.8 cm.

Calculate the rate, in cm / hour, at which the candle burns.

rate = ... cm / hour [2]

(d) The boy estimates that he would need a candle about 24 cm long, of the same material and diameter, to make a candle timer that would last at least one day.

State whether the boy's estimate is correct. Give a reason for your answer.

.....

.....

.....[2]

[Total: 8]

10. 0625_w15_qp_22 Q: 1

A student uses a rule to measure a thin piece of wire as shown in Fig. 1.1.

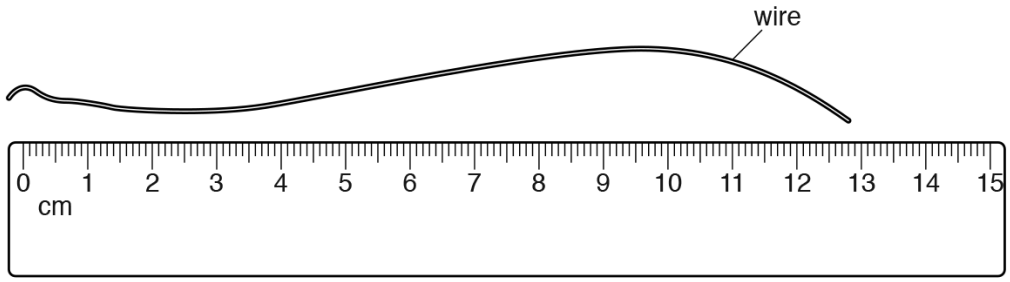

Fig. 1.1

The student records the length of the wire as 12.8 cm.

(a) State two errors in the student's measurement of the length of wire.

1. .....

.....

2. .....

.....

[2]

(b) The student is asked to measure the thickness of the wire using the same ruler. The student does this by bending a short length of the wire and measuring distance *x* as shown in Fig. 1.2.

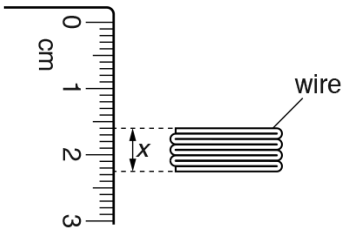

Fig. 1.2

(i) Use the ruler in Fig. 1.2 to determine the distance *x*.

distance *x* = ... cm [1]

(ii) Calculate the average thickness of the wire, **in mm**. Give your answer correct to two significant figures.

average thickness of wire = ... mm [3]

[Total: 6]

11. 0625_s13_qp_21 Q: 1

Some liquid is poured into the measuring cylinder shown in Fig. 1.1.

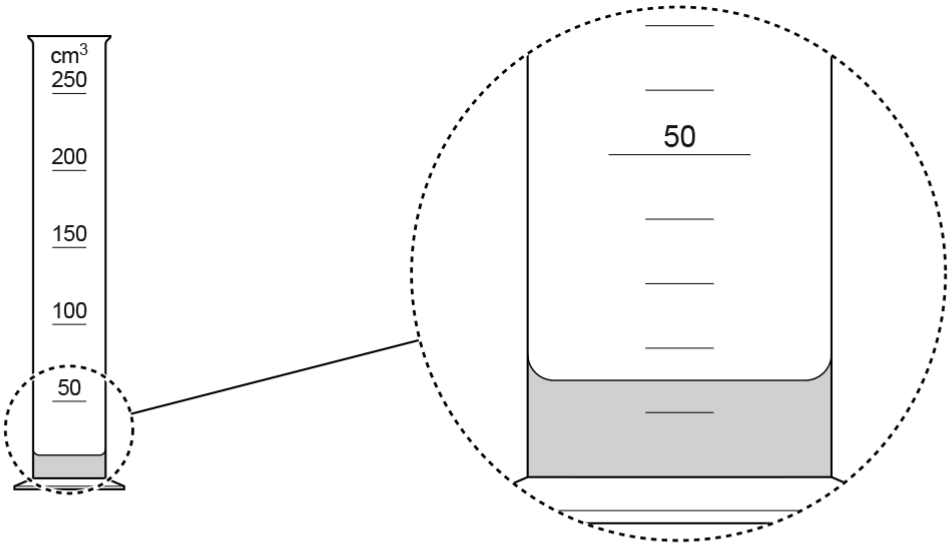

Fig. 1.1

(a) Use Fig. 1.1 to estimate the volume of the liquid.

volume = ... cm^3 [1]

(b) **On the enlarged part of Fig. 1.1**, draw the liquid level when another 25 cm^3 of liquid has been added to the measuring cylinder. [1]

(c) Explain why it would be more accurate to use a narrower measuring cylinder to measure liquid volumes like that in Fig. 1.1.

.....

.....

.....[1]

[Total: 3]

12. 0625_s13_qp_23 Q: 1

Small drops of water fall at regular intervals from a leaking tap (faucet).

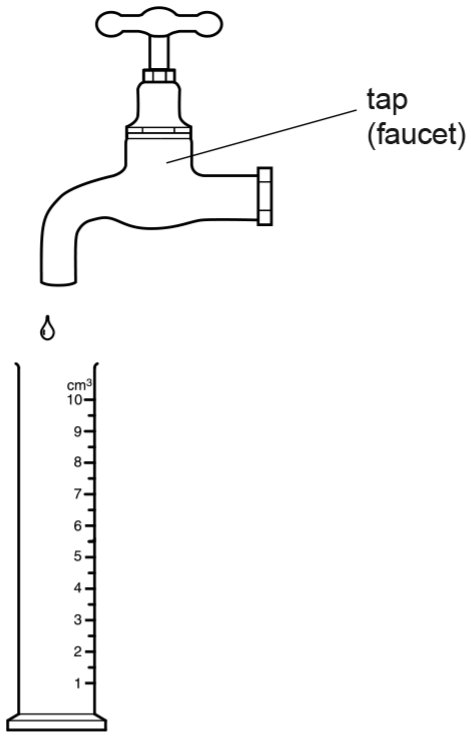

Fig. 1.1

Immediately after a drop has fallen, a student puts an empty measuring cylinder under the tap, to catch the drops.

At the same time, her friend starts a stopwatch.

After 50 drops have fallen, she stops the stopwatch.

Fig. 1.2 shows the reading on the stopwatch at the start and finish of this experiment.

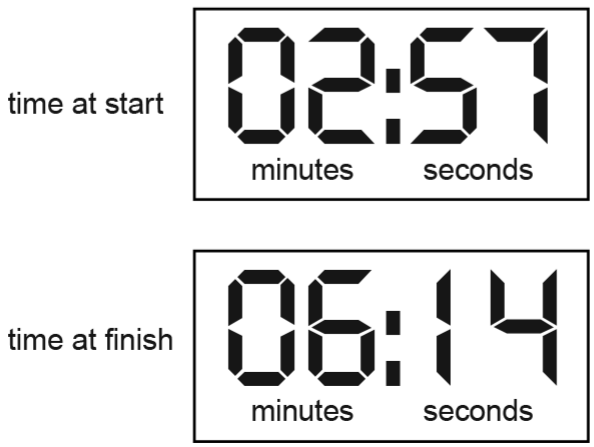

Fig. 1.2

Fig. 1.3 shows the measuring cylinder at the finish.

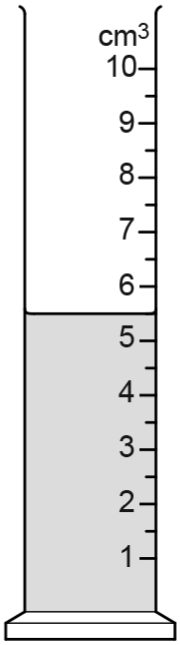

Fig. 1.3

(a) (i) For how many seconds did the girl catch drops from the tap?

number of seconds = ...[3]

(ii) Calculate the time interval between one drop and the next.

time interval = ... s [2]

(b) (i) What is the total volume of the 50 drops?

volume = ... cm^3

(ii) Calculate the volume of one drop.

volume = ... cm^3
[2]

[Total: 7]

13. 0625_w13_qp_23 Q: 1

A ruler is used to measure the length of a piece of cotton, as shown in Fig. 1.1.

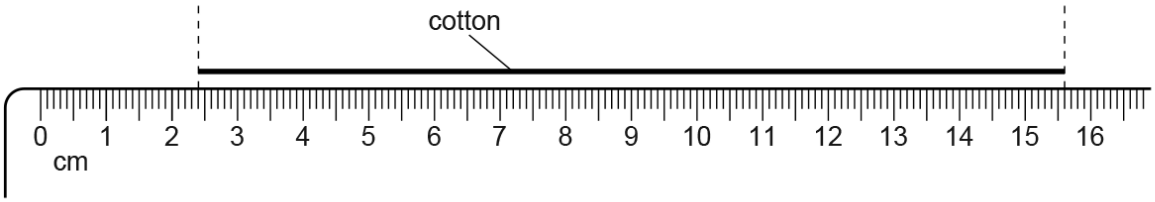

Fig. 1.1 (not actual size)

(a) Use the ruler in Fig. 1.1 to find the length of the piece of cotton.

length = ... cm [2]

(b) The left-hand end of the cotton is moved to the 1.0 cm mark on the ruler.

On Fig. 1.1, mark clearly and carefully, with an arrow, where the **right-hand** end will reach on the ruler. [1]

(c) The piece of cotton is wound around a wooden rod.

The rod has a square cross-section. The cotton goes around the rod exactly 3 times, as shown in Fig. 1.2.

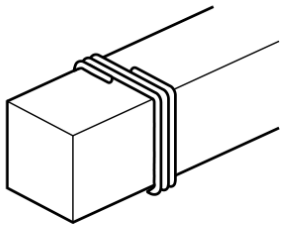

Fig. 1.2

Calculate the thickness of the square wooden rod.

thickness = ... cm [3]

[Total: 6]

1.2 Motion

14. 0625_s21_qp_31 Q: 1

Fig. 1.1 shows a speed–time graph for a car.

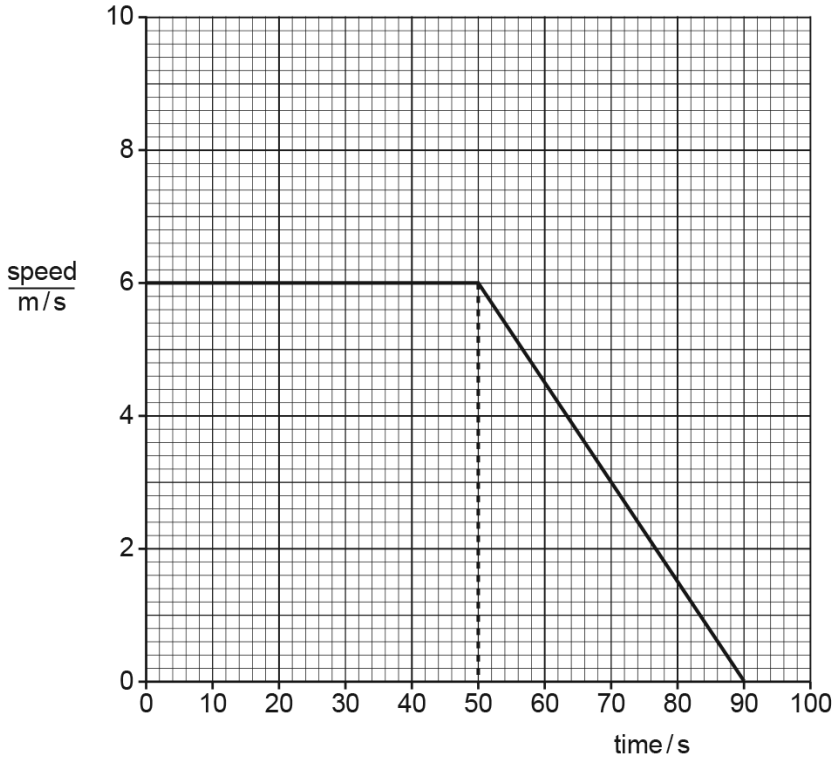

Fig. 1.1

(a) (i) Describe the motion of the car from 0 to 50 s, as shown in Fig. 1.1.

..... [1]

(ii) Describe the motion of the car from 50 s to 90 s, as shown in Fig. 1.1.

.....

..... [1]

(iii) Calculate the distance travelled by the car between 50 s and 90 s.

distance travelled = ... m [3]

(b) A motorcycle travels at a constant speed.

(i) The motorcycle travels 710 m in 87 s.

Calculate the speed of the motorcycle and show that it is close to 8 m / s.

[3]

(ii) The motorcycle in part **(b)(i)** travels at a constant speed for 87 s.

On Fig. 1.1, draw the speed–time graph for the motorcycle. [2]

[Total: 10]

Appendix A

Answers

1. 0625_m20_ms_32 Q: 1

(a)	(average thickness =) 2.4 ÷ 8	**C1**
	(average thickness =) 0.3 (cm)	**A1**
(b)	any **four** from: measuring cylinder partially filled with water / displacement can filled with water volume of water recorded / empty measuring cylinder under spout coin(s) in water OR water covers all coin(s) new volume noted / displaced water collected in measuring cylinder (average) volume of a coin = increase in volume OR increase in volume ÷ number of coins	**B4**

2. 0625_s19_ms_31 Q: 3

(a)	67 (cm)	**C1**
	(67 ÷ 5 =) 13.4 (cm)	**A1**
(b)	C 1st ; A 2nd;	**B1**
	D 4th; E 5th	**B1**
(c)	speed = distance ÷ time in any form OR (t =) distance ÷ speed	**C1**
	11 ÷ 16	**C1**
	0.69 (s)	**A1**

3. 0625_w19_ms_31 Q: 2

(a)	(student) S	**B1**
(b)	83.37 (s) seen	**C1**
	83.37 ÷ 50	**C1**
	1.67 (s) cao	**A1**
(c)	165 (mm)	**B1**

4. 0625_w19_ms_33 Q: 1

(a)	226.50 – 82.10 **OR** 3:46.5(0) – 1:22.1(0) **OR** 2 min 24.4 (s) 144.4(0) (s)	**C1** **A1**
(b)	start stopwatch as LED lights owtte count large number of flashes i.e. > = 10 stop stopwatch on nth lighting of LED AND n > = 1 divide time on stopwatch by n	**B4**

5. 0625_s17_ms_31 Q: 1

(a)	rule(r)	**B1**
	(stop) watch/clock	**B1**
(b)(i)	x–axis labelled time/t with minutes	**B1**
	y-axis clearly labelled depth/distance/height with mm/cm/m	**B1**
(b)(ii)	line drawn from the origin	**B1**
	single straight diagonal line	**B1**
(c)	1000 mm = 1 m **OR** 2.5 ÷ 1000	**C1**
	0.0025 (m) **OR** 2.5×10^{-3}	**A1**
	Total:	**8**

6. 0625_w17_ms_31 Q: 1

(a)	stopwatch or stopclock	**B1**
(b)	improved accuracy	**B1**
(c)(i)	circle around 3rd OR 3.55	**B1**
(c)(ii)	3.93 + 4.07 + 3.99 = 11.99	**C1**
	(11.99 ÷ 3 =) 4.0 (s)	**A1**
(c)(iii)	0.40 (s) OR **(c)(ii)** ÷ 10	**B1**

7. 0625_s16_ms_32 Q: 1

(a)	height (of water / liquid)	**B1**
(b)(i)	3.10 (s) and 3.04 (s) and 3.16 (s)	**B1**
(b)(ii)	correct sum (9.3) correct average (3.1)	**C1** **A1**
(c)	15.5 × 60 or 930 930 ÷ 3.1 300 (drops)	**C1** **C1** **A1**
		Total: 7

8. 0625_s15_ms_21 Q: 1

(a) any two from: B2
- gap between ruler and stack
- eye not perpendicular/ level with top of stack
- zero error of ruler

(b) 7.7 ÷ 20 C1
0.385 (cm) **OR** 0.39 (cm) A1

(c) 0.012 (kg) c.a.o. B1

[Total: 5]

9. 0625_s15_ms_23 Q: 1

(a)	volume = length × cross-sectional area words, symbols or numbers	C1
	8.0 accept 8 (cm^3)	A1
(b)	time of burning: 2 hours 15 minutes	B1
	2.25 hours, accept 2¼ hours	B1
(c)	(speed =) distance ÷ time in any form: symbols, words, numbers, ecf from **(b)**	C1
	0.8(0) cm / hour, ecf from **(b)**	A1
(d)	correct deduction from candidate's **(c)**	B1
	correct reasoning from candidate's **(c)** e.g. 24 cm candle would burn for 30 h **OR** 19.2 cm will burn in 24 h	B1
		[Total: 8]

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10. 0625_w15_ms_22 Q: 1

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

---

11. 0625_s13_ms_21 Q: 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]

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12. 0625_s13_ms_23 Q: 1

(a)	**(i)**	use of 2 min 57 s / 177 s AND 6 min 14 s / 374 s	C1
		attempt at subtracting one time from another / 3 min 17 s	C1
		197 s	A1
	(ii)	division by 50	C1
		3.94(s) OR 3.9(s) OR 4(s) OR 4.0(s) e.c.f. **(a)(i)**	A1
(b)	**(i)**	5.5 (cm^3)	B1
	(ii)	0.11 (cm^3) (5.5 ÷ 50)	B1
			[Total: 7]

13. 0625_w13_ms_23 Q: 1

(a)	2.4 and 15.6 used	C1
	13.2 (cm)	A1
(b)	R.H. end at {candidate's **(a)** + 1.0 (cm)}	B1
(c)	4.4 (cm) OR candidate's **(a)** / 3 correctly evaluated	C1
	division by 4	C1
	1.1 (cm) e.c.f.	A1
		[Total: 6]

14. 0625_s21_ms_31 Q: 1

	Answer	Mark
(a)(i)	constant speed/velocity OR (moving at) 6 m / s	**B1**
(a)(ii)	(constant) deceleration/decelerating OR (then) slows OR decreasing speed	**B1**
(a)(iii)	(distance =) area under graph OR ½ × b × h	**C1**
	40 × 6 × 0.5	**C1**
	120 (m)	**A1**
(b)(i)	(speed =) distance ÷ time	**C1**
	710 ÷ 87	**C1**
	8.2 (m / s)	**A1**
(b)(ii)	horizontal line on Fig. 1.1	**M1**
	horizontal line only at 8.2 m / s OR 8.0 m / s (by eye) to at least 80 s	**A1**