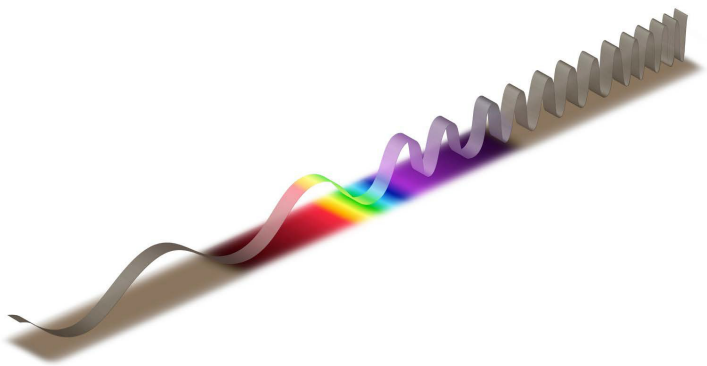
Cambridge Assessment International Education

Specimen Paper Answers – Paper 6

Cambridge IGCSE™ / IGCSE (9–1)

Physics 0625 / 0972

For examination from 2023



Version 1

Cambridge Pathway

In order to help us develop the highest quality resources, we are undertaking a continuous programme of review; not only to measure the success of our resources but also to highlight areas for improvement and to identify new development needs.

We invite you to complete our survey by visiting the website below. Your comments on the quality and relevance of our resources are very important to us.

www.surveymonkey.co.uk/r/GL6ZNJB

Would you like to become a Cambridge consultant and help us develop support materials?

Please follow the link below to register your interest.

www.cambridgeinternational.org/cambridge-for/teachers/teacherconsultants/

Contents

Introduction

The main aim of this booklet is to exemplify standards for those teaching Cambridge IGCSE / IGCSE (9-1) Physics 0625 / 0972, and to show different examples of answers within an overall good performance.

In this booklet, we have provided answers for all questions with examiner comments where relevant. This paper requires candidates to answer short-answer and structured questions and candidates are awarded maximum of 40 marks for this paper and the mark scheme provides the answers required to gain the marks.

In some cases, the question and answer is followed by an examiner comment on the candidates answer. Additionally, the examiner has set out a number of common mistakes that occur when candidates answer the questions. In this way, it is possible to understand what candidates have done to gain their marks and how they could improve their answers and avoid errors.

The mark schemes for the Specimen Papers are available to download from the School Support Hub at www.cambridgeinternational.org/support

2023 Specimen Paper 6 Mark Scheme

Past exam resources and other teaching and learning resources are available on the School Support Hub www.cambridgeinternational.org/support

Assessment at a glance

The syllabus for Cambridge IGCSE Physics 0625 is available at www.cambridgeinternational.org

All candidates take three papers. Candidates who have studied the Core syllabus content, or who are expected to achieve a grade D or below, should be entered for Paper 1, Paper 3 and either Paper 5 or Paper 6. These candidates will be eligible for grades C to G.

Candidates who have studied the Extended syllabus content (Core and Supplement), and who are expected to achieve a grade C or above, should be entered for Paper 2, Paper 4 and either Paper 5 or Paper 6. These candidates will be eligible for grades A* to G.

Core assessment

Core candidates take Paper 1 and Paper 3. The questions are based on the Core subject content only:

Paper 1: Multiple Choice (Core)	
45 minutes	
40 marks	30%
40 four-option multiple-choice questions	
Externally assessed	

Paper 3: Theory (Core)	
1 hour 15 minutes	
80 marks	50%
Short-answer and structured questions	
Externally assessed	

Extended assessment

Extended candidates take Paper 2 and Paper 4. The questions are based on the Core and Supplement subject content:

Paper 2: Multiple Choice (Extended)	
45 minutes	
40 marks	30%
40 four-option multiple-choice questions	
Externally assessed	

Paper 4: Theory (Extended)	
1 hour 15 minutes	
80 marks	50%
Short-answer and structured questions	
Externally assessed	

Practical assessment

All candidates take one practical paper from a choice of two:

Paper 5: Practical Test	
1 hour 15 minutes	
40 marks	20%
Questions will be based on the experimental skills in Section 4	
Externally assessed	

Paper 6: Alternative to Practical	
1 hour	
40 marks	20%
Questions will be based on the experimental skills in Section 4	
Externally assessed	

Question 1

Question 1(a)

1 A student investigates how partly covering the top of a beaker of water affects the rate at which the water cools.

The apparatus used is shown in Fig. 1.1.

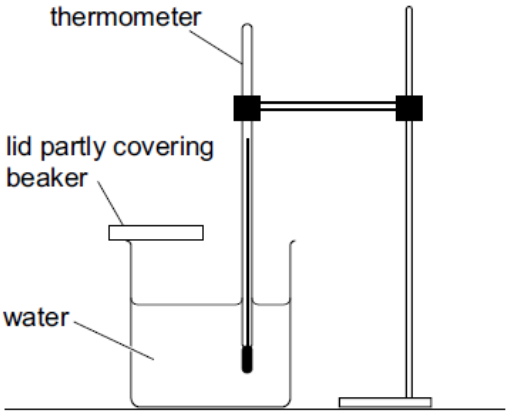


Fig. 1.1

(a)

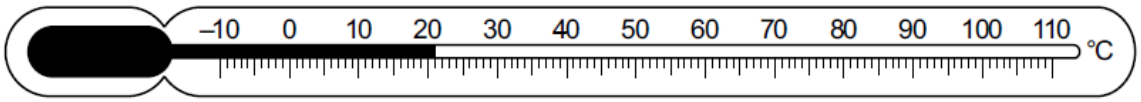


Fig. 1.2

Read and record the room temperature θ_R, shown on the thermometer in Fig. 1.2.

θ_R = ...20.1 °C..... [1]

Mark awarded = 0 out of 1

Examiner comment

Should be 21 °C.

Common mistakes

This is a common mistake.

Question 1(b)

(b) The student pours 100 cm^3 of hot water into a beaker. She places lid **A** on the beaker. This leaves half of the top of the beaker uncovered, as shown in Fig. 1.3.

She records the temperature of the water in the beaker and immediately starts a stopwatch. She records the temperature θ of the water every 30 s. Her readings are shown in Table 1.1.

She repeats the procedure using lid **B**. This leaves a quarter of the top of the beaker uncovered, as shown in Fig. 1.4.

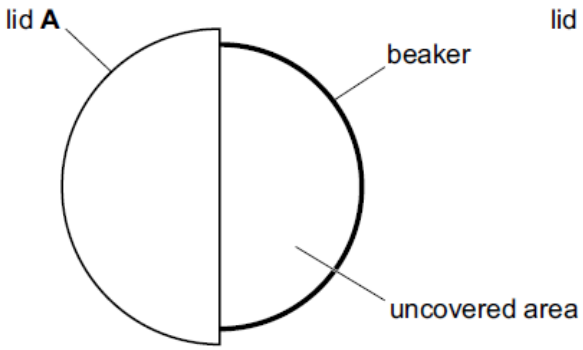


Fig. 1.3

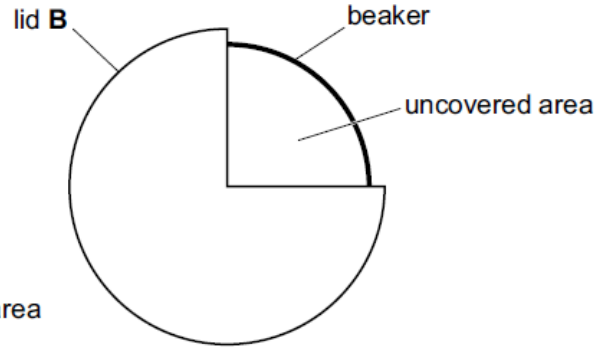


Fig. 1.4

Complete the headings row in Table 1.1.
Complete the time *t* column in Table 1.1.

Table 1.1

	beaker with lid **A**	beaker with lid **B**
t / s	θ / °C	θ / °C
0	80.0	81.0
30	77.0	79.0
60	74.5	77.5
90	72.5	76.0
120	70.5	75.0
150	69.0	74.0
180	68.0	73.5

[2]

Mark awarded = 2 out of 2

Examiner comment

All correct.

Common mistakes

sec in place of s; C or C° in place of °C.

Question 1(c)

(c) Describe a precaution that should be taken to ensure that the temperature readings are as accurate as possible in the experiment.

View the thermometer at right angles.

..... [1]

Mark awarded = 1 out of 1

Examiner comment

One of several possible correct answers.

Common mistakes

Vague reference to parallax, e.g. 'look vertically'.

Question 1(d)(i)

(d) (i) Write a conclusion to this experiment, stating for which lid the rate of cooling is greater. Justify your answer with reference to the results.

.....

Beaker with Lid A.

Lid A temperature falls by 12°C in 180s.

Lid B temperature falls by 7.5°C in 180s. [2]

Mark awarded = 2 out of 2

Examiner comment

Conclusion is correct with full explanation that refers correctly to the results.

Common mistakes

Candidates' justifications are too vague and do not include reference to the equal time interval.

Question 1(d)(ii)

(ii) Suggest a change to the **apparatus** that produces a greater difference between the rates of cooling for lid **A** and lid **B**. Explain why the change produces a greater difference.

change *Insulate sides of beaker*

.....

explanation *Loss of thermal energy is then only from the water surface.*

.....

[2]

Mark awarded = 2 out of 2

Examiner comment

Clearly stated change with a well-expressed explanation.

Common mistakes

Candidates will not read the question with sufficient care and miss the emphasis on a change in the **apparatus**. They will then suggest something that does not answer the question, for example 'use a longer time'.

Question 1(e)

(e) Another student thinks that the cooling rate is directly proportional to the percentage of the surface area uncovered. He draws a graph of cooling rate against the percentage of uncovered area to investigate this.

Describe how his graph line shows whether the rate of cooling and the percentage of uncovered surface area are directly proportional.

.....

Straight line through the origin

..... [2]

Mark awarded = 2 out of 2

Examiner comment

Concise and complete answer.

Common mistakes

A common error would be to miss out the second point 'through the origin'.

Question 1(f)

(f) Students in other countries are doing the same experiment.

State **one** factor they must keep the same to obtain similar readings.

.....

Use same volume of water ..... [1]

Mark awarded = 1 out of 1

Examiner comment

One of a number of acceptable suggestions.

Total mark awarded = 10 out of 11

Question 2

Question 2(a)(i)

2 A student is investigating a resistance wire. She uses the circuit shown in Fig. 2.1.

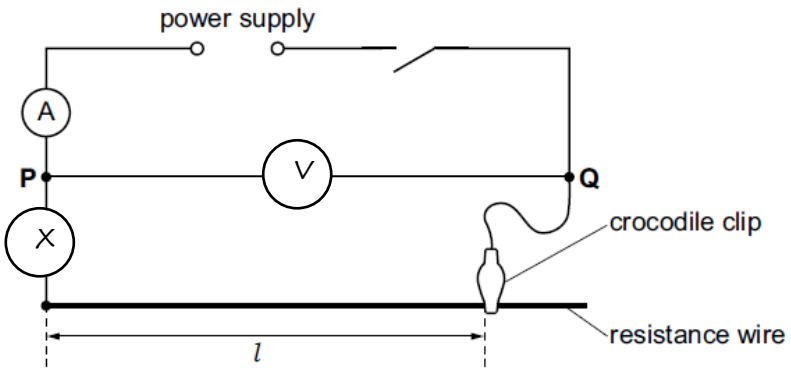


Fig. 2.1

(a) (i) On Fig. 2.1, draw a voltmeter connected to measure the potential difference (p.d.) V across terminals **P** and **Q**. [1]

Mark awarded = 1 out of 1

Examiner comment

Correct.

Common mistakes

Placing the voltmeter in series.

Question 2(a)(ii)

(ii) The student connects the crocodile clip to a length l = 90.0 cm of the resistance wire and measures the potential difference V across terminals **P** and **Q** and the current I in the circuit.

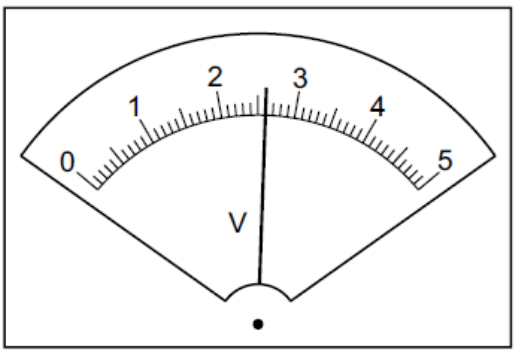


Fig. 2.2

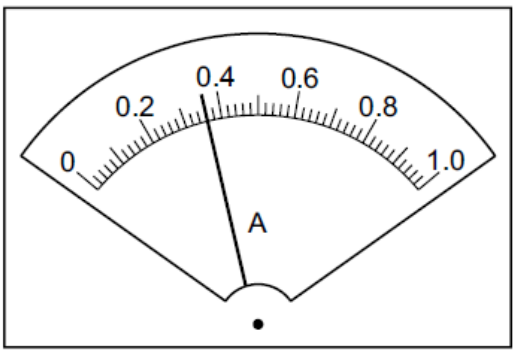


Fig. 2.3

Read, and record in Table 2.1, the values of V and I shown on the meters in Fig. 2.2 and Fig. 2.3. [2]

Mark awarded = 2 out of 2

Examiner comment

Both are correct.

Common mistakes

Misreading of the scales. For example, I = 0.28

Question 2(b)

(b) The student then connects the crocodile clip to lengths l = 60.0 cm and l = 40.0 cm of the resistance wire. She measures the potential difference V across terminals **P** and **Q** and the current I in the circuit. Her readings are shown in Table 2.1.

Complete the column headings in Table 2.1.

Table 2.1

l / cm	V / V	I / A	R / Ω	$\frac{R}{l}$ / $\frac{\Omega}{\text{cm}}$
90.0	2.6	0.36	7.2	0.080
60.0	2.5	0.49	5.1	0.085
40.0	2.3	0.74	3.1	0.078

[1]

Mark awarded = 1 out of 1

Examiner comment

Units are correct.

Common mistakes

Failure to fill in the column headings.

Question 2(c)(i)

(c) **(i)** Calculate, and record in Table 2.1, the resistance R of each length l of the wire.
Use the readings from the table and the equation $R = \frac{V}{I}$.

[2]

Mark awarded = 2 out of 2

Examiner comment

Correct calculations.

Common mistakes

Inconsistent significant figures or a rounding error.

Question 2(c)(ii)

(ii) Calculate, and record in Table 2.1, the value of $\frac{R}{l}$ for each length l of the wire.

[1]

Mark awarded = 1 out of 1

Examiner comment

All correct.

Question 2(d)

(d) Another student suggests that the values of $\frac{R}{l}$ for each length of wire should be the same.

State whether the results support this suggestion.

Justify your statement with reference to values from the results.

statement ...The results support the suggestion.....

justification ...The results are very close to each other.....

.....

.....

[1]

Mark awarded = 1 out of 1

Examiner comment

Correct statement with explanation that shows the candidate understands the concept of 'within the limits of experimental accuracy'.

Common mistakes

A contradictory answer, probably due to the candidate trying to memorise answers from mark schemes of past papers (e.g. 'results are nearly the same; beyond the limits'.)

Question 2(e)

(e) Suggest **one** difficulty which explains why different students, doing the experiment carefully with the same equipment, may **not** obtain identical results.

.....

It is not possible to tell which bit of the crocodile clip is making contact

with the wire. ..... [1]

Mark awarded = 1 out of 1

Examiner comment

A thoughtful observation that is practically based and shows that the candidate is familiar with practical work.

Common mistakes

A vague answer not specific to the experiment, for example ‘parallax error’.

Question 2(f)(i)

(f) A student finds that during the experiment, the wire becomes hot because there is a high current.

He decides to use a variable resistor to prevent this.

(i) Draw an **X** on the circuit in Fig. 2.1 to show where a variable resistor is connected for this purpose in the experiment.

[1]

Mark awarded = 0 out of 1

Examiner comment

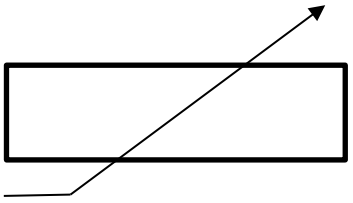
An incorrect position.

Common mistakes

Variable resistor placed below the voltmeter.

Question 2(f)(ii)

(ii) In the space below, sketch the circuit symbol for a variable resistor.



[1]

Mark awarded = 0 out of 1

Examiner comment

An incorrect symbol.

Common mistakes

A thermistor symbol or a symbol that has the strike-through with an arrowhead at one end and a thermistor ‘tail’ at the other.

Total mark awarded = 9 out of 11

Question 3

Question 3(a)

3 A student investigates the magnification produced by a converging lens.

He is using the apparatus shown in Fig. 3.1.

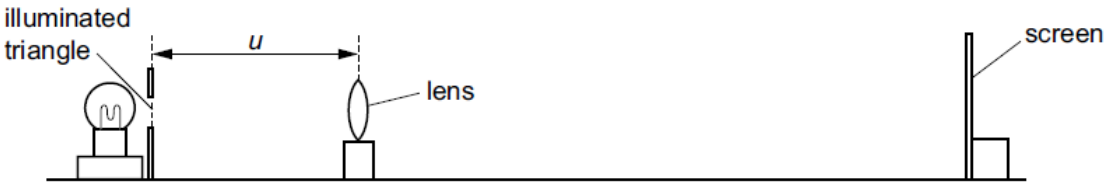


Fig. 3.1

(a) The illuminated object consists of a triangular-shaped hole in a piece of card. Fig. 3.2 shows, full size, the illuminated object.

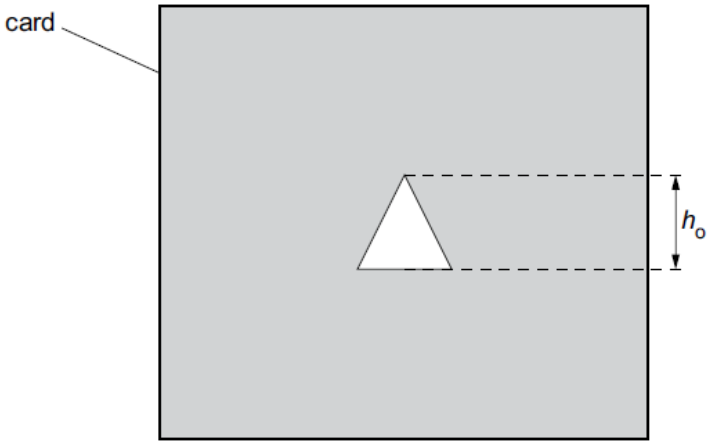


Fig. 3.2

Measure and record the height h_O of the triangular-shaped hole.

h_O = 1.4 cm [1]

Mark awarded = 1 out of 1

Examiner comment

Correct

Question 3(b)

(b) The distance between the illuminated object and the centre of the lens is set to u = 20.0 cm. The screen is moved until a focused image of the illuminated object is seen, as shown in Fig. 3.3.

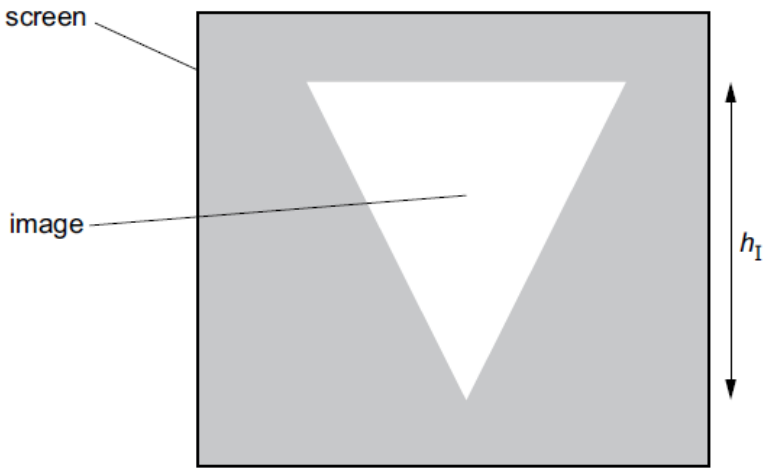


Fig. 3.3

The student repeats the procedure for u = 30.0 cm, u = 40.0 cm, u = 50.0 cm and u = 60.0 cm. His results are shown in Table 3.1.

Measure, and record in the first row of Table 3.1, the height h_I of the image.

Using your results from **(a)** and the equation $M = \frac{h_O}{h_I}$, calculate a value M and record this value in Table 3.1.

Table 3.1

u / cm	h_I / cm	M
20.0	4.5	0.31
30.0	1.5	0.93
40.0	0.9	1.6
50.0	0.6	2.3
60.0	0.5	2.8

[2]

Mark awarded = 2 out of 2

Examiner comment

Both correct.

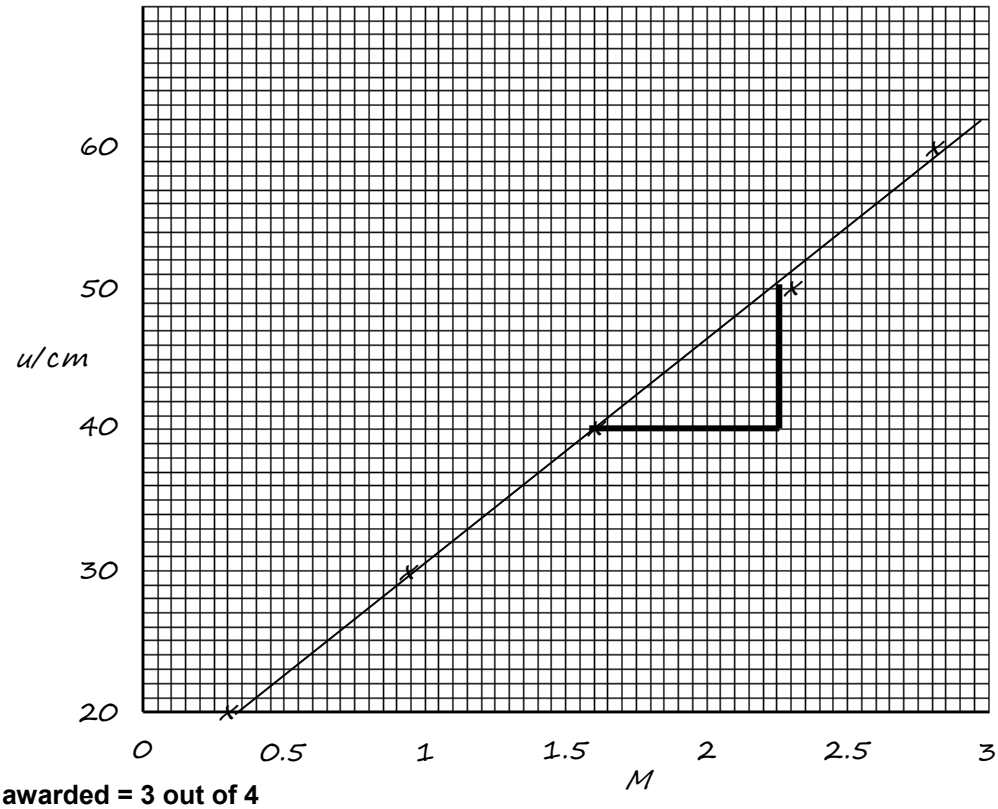
Common mistakes

Calculation error or rounding error.

Question 3(c)

(c) Plot a graph of u / cm (y-axis) against M (x-axis).

You do **not** have to start your axes at the origin (0, 0).



[4]

Mark awarded = 3 out of 4

Examiner comment

The graph has axes labelled, a good choice of scale, a well-judged straight line but plots that are too large. The candidate should have used neat crosses or circled dots.

Common mistakes

A poor choice of scale that results in the plots occupying less than half the graph grid in one or both directions.

Question 3(d)

(d) Determine the gradient G of the graph.

Show clearly on the graph how you obtained the necessary information.

$10 \div 0.65$

$G =$ 15.38 [2]

Mark awarded = 1 out of 2

Examiner comment

G is in range. The triangle is too small. It uses less than half of the line.

Common mistakes

Drawing a triangle that uses less than half of the line or failing to show the triangle clearly on the graph.

Question 3(e)

(e) Describe **one** difficulty that might be experienced when measuring the height of the image h_I.

Suggest an improvement to the **apparatus** to reduce this difficulty.

difficulty *difficult to view the correct height*

.....

improvement *Use a translucent screen and view it from behind*

.....

[2]

Mark awarded = 2 out of 2

Examiner comment

A clear and thoughtful answer showing a good appreciation of practical difficulties.

Common mistakes

An answer that does not address the question, possibly learned from the mark scheme of a past paper (e.g. 'It is difficult to line up the pins. View the bases of the pins.')

Total mark awarded = 9 out of 11

Question 4

4 A student is investigating the factors that affect the size of the crater (hole) a ball makes when it is dropped into sand.

Plan an experiment to investigate **one** factor that affects the size of the crater.

The apparatus available includes:

metal balls of different sizes
a tray of dry sand.

Write a plan for the experiment.

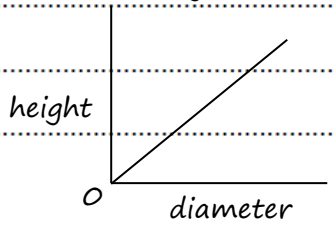
In your plan, you should:

- state which factor is being investigated
- state a key variable to keep constant
- list any additional apparatus needed
- explain briefly how to do the experiment, including what is measured and how this is done
- state how to obtain reliable results for this experiment
- suggest a suitable graph to be drawn from the results.

You may draw a diagram if it helps to explain your plan.

The student should investigate how far a ball drops on to the sand. This is the factor that will affect the size of the crater. He will need a meter rule and a clamp and stand and a tray of dry sand and a metal ball. He must use the same metal ball all the time so that is the constant variable. He will throw the ball down from a certain place and measure the height. Then he will measure the size of the crater. He will repeat the experiment lots of times and take the average. It is important to look at the ruler at right angles to avoid a parallax error. He must be careful not to drop the ball on his foot. He must not spill the sand out of the tray.

Room temperature should be kept constant and the fans must be switched off. He should make sure the sand is flat after an experiment and measure the diameter in two places. Plot a graph with the height on the y-axis and the diameter of the crater on the x-axis.



[7]

Mark awarded = 5 out of 7

Examiner comment

The candidate starts well, specifying the factor to be investigated (effectively the height from which the ball is dropped). The list of apparatus contains the additional apparatus required but unnecessarily also includes apparatus already specified in the question. The key variable (mass of metal ball) is made clear.

Marking point 4 is not scored as the ball is 'thrown' rather than being dropped from a starting position. There is mention of repeats but this appears to be repeating the same thing several times rather than using different dropping heights. Marking point 5 is not scored.

There follows a list of precautions that are irrelevant or not specific to this investigation. This is ignored rather than being penalised as there is nothing that would invalidate the experiment. Fortunately, a valid precaution follows. Finally, a suitable graph is suggested.

Common mistakes

Candidates often write too much. They begin by repeating much of the introduction to the question including the list of apparatus provided. Having spent time on this they then write an account without, apparently, referring to the bullet points which are there to help them to structure their answer. This results in a rambling account which often misses vital elements such as the measurements that must be taken. In this type of investigation question (but not in this particular case) candidates often offer a prediction (which is not asked for) and then do not offer an explanation of how to reach a conclusion which is required.

General precautions that apply to most experiments, e.g. how to avoid parallax errors, are not required but candidates should offer precautions that are specific to the investigation. For example, in this investigation, flattening the surface of the sand before each trial.

Total mark awarded = 5 out of 7

Cambridge Assessment International Education
The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA, United Kingdom
t: +44 1223 553554
e: info@cambridgeinternational.org www.cambridgeinternational.org