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PHYSICS**0625/52**

Paper 5 Practical Test

October/November 2025**1 hour 15 minutes**

You must answer on the question paper.

You will need: The materials and apparatus listed in the confidential instructions

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [].

For Examiner's Use

1	
2	
3	
4	
Total	

This document has **16** pages. Any blank pages are indicated.

- 1 In this experiment, you will investigate the reflection of light by a plane mirror.

Use the separate ray-trace sheet provided. You may refer to Fig. 1.1 for guidance.

- (a)
- Draw a line **LN** 12 cm long across the ray-trace sheet supplied, near to the top of the sheet.
 - Label the mid-point of the line with the letter **M**.
 - Draw a line **PR** parallel to line **LN** at a distance 12.0 cm below it across the full width of the page.
 - Draw a normal to **LN** at the point **M**.
 - Extend the normal downwards to the bottom of the page and label the end of the line **S**.
 - Label the point where the normal line crosses **PR** with the letter **Q**. [1]
- (b)
- Draw a line from point **M** at an angle $\theta = 10^\circ$, as shown in Fig. 1.1.

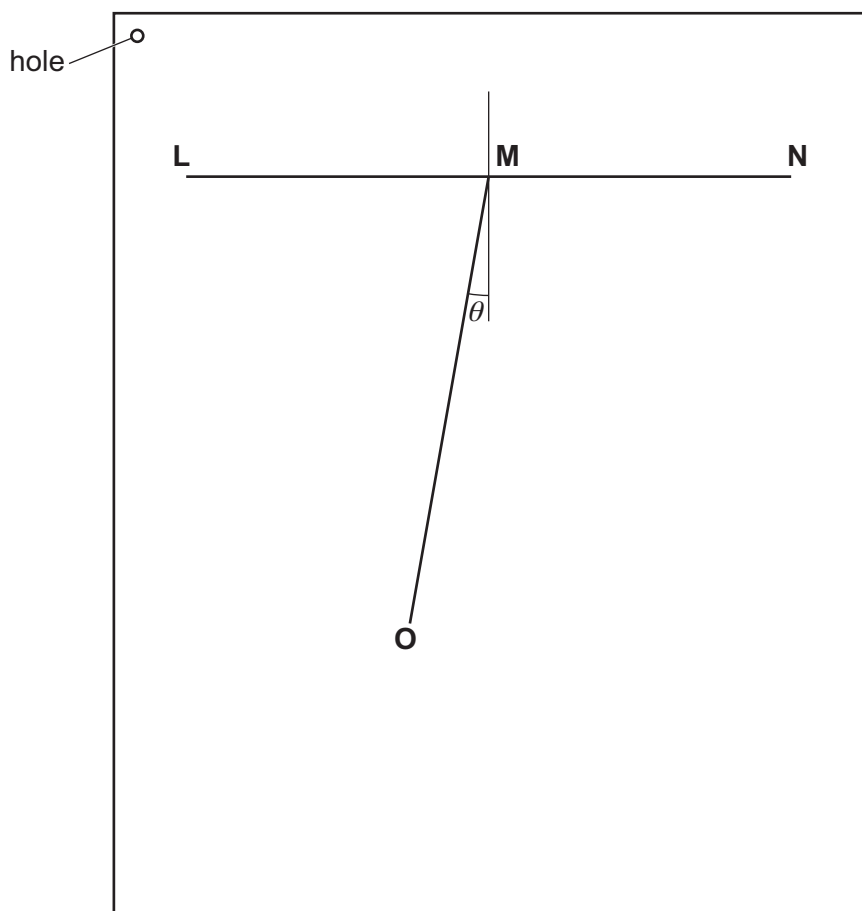


Fig. 1.1

- Extend the line downwards towards the bottom of the page and label the end of the line **O**. [1]



- (c) • Place the reflecting surface of the mirror along the line **LN**, facing the bottom of the page, and with the centre of the mirror at **M**.
- Position the light source and slit so that a ray of light passes along the line **OM** towards **M**.
- Mark two small crosses (x), a suitable distance apart on the ray reflected from the mirror.
- Remove the mirror and the illuminated slit. [1]
- (d) • Draw a line through the crosses and continue the line back to the mirror.
- Extend the line until it crosses line **PR**.
- Label the point at which the line meets **PR** with the letter **T**.
- (i) Measure the length *a* of the line **QT** in centimetres to the nearest millimetre and the length *b* of the line **MT** in centimetres to the nearest millimetre. Record your measurements below and in Table 1.1.

a = cm

b = cm [1]

- (ii) Calculate the ratio $r = \frac{a}{b}$. Record your answer in Table 1.1.

Give your answer to 2 significant figures.

Table 1.1

$\theta/^\circ$	<i>a</i> /cm	<i>b</i> /cm	$r = \frac{a}{b}$
10			
20			
30			

[2]

- (e) Repeat (b), (c) and (d) for values of $\theta = 20^\circ$ and $\theta = 30^\circ$.

Record your results in Table 1.1.

[1]



- (f) A student says that r is directly proportional to θ .

State if you agree with the student's statement.

Use values from Table 1.1 to justify your answer.

statement

justification

.....

.....

[2]

- (g) Suggest what you can do to have more confidence in your answer to part (f).

.....

.....

..... [1]

- (h) Suggest **one** source of inaccuracy in this experiment, even if it is carried out very carefully.

.....

..... [1]

[Total: 11]

Write your name, centre number and candidate number on your ray-trace sheet.
Tie your ray-trace sheet into this Booklet between pages 2 and 3.





- 2 In this experiment, you will investigate an electric circuit and find the resistance of an unknown resistor Z .

The incomplete circuit shown in Fig. 2.1 has been set up for you. There is a gap between the points labelled X and Y.

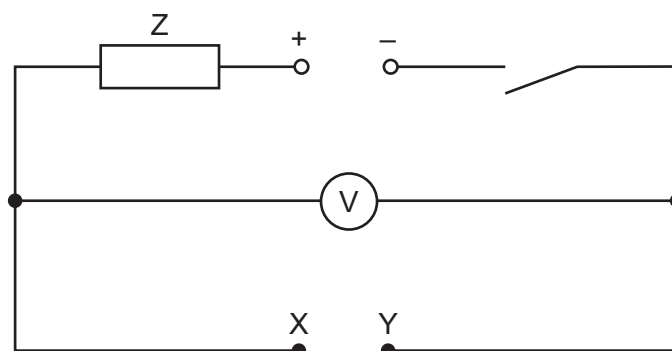


Fig. 2.1

- (a)
- Close the switch.
 - Without making any changes to the circuit, record the voltmeter reading V_0 .
 - Open the switch.

$V_0 = \dots\dots\dots$ V [1]

- (b)
- Connect the $10\ \Omega$ resistor between points X and Y.
 - Close the switch.
 - Record, in Table 2.1, the reading V on the voltmeter.
 - Open the switch.

Table 2.1

resistance R/Ω	voltmeter reading V/V	current I/A
10		
22		
39		
47		
68		

[1]



- (c) Remove the $10\ \Omega$ resistor from the circuit.

Repeat part (b), by replacing the $10\ \Omega$ resistor with resistors of $22\ \Omega$, $39\ \Omega$, $47\ \Omega$ and $68\ \Omega$ in turn. [2]

- (d) For each pair of values of R and V in Table 2.1, calculate the current I in the circuit. Use the equation:

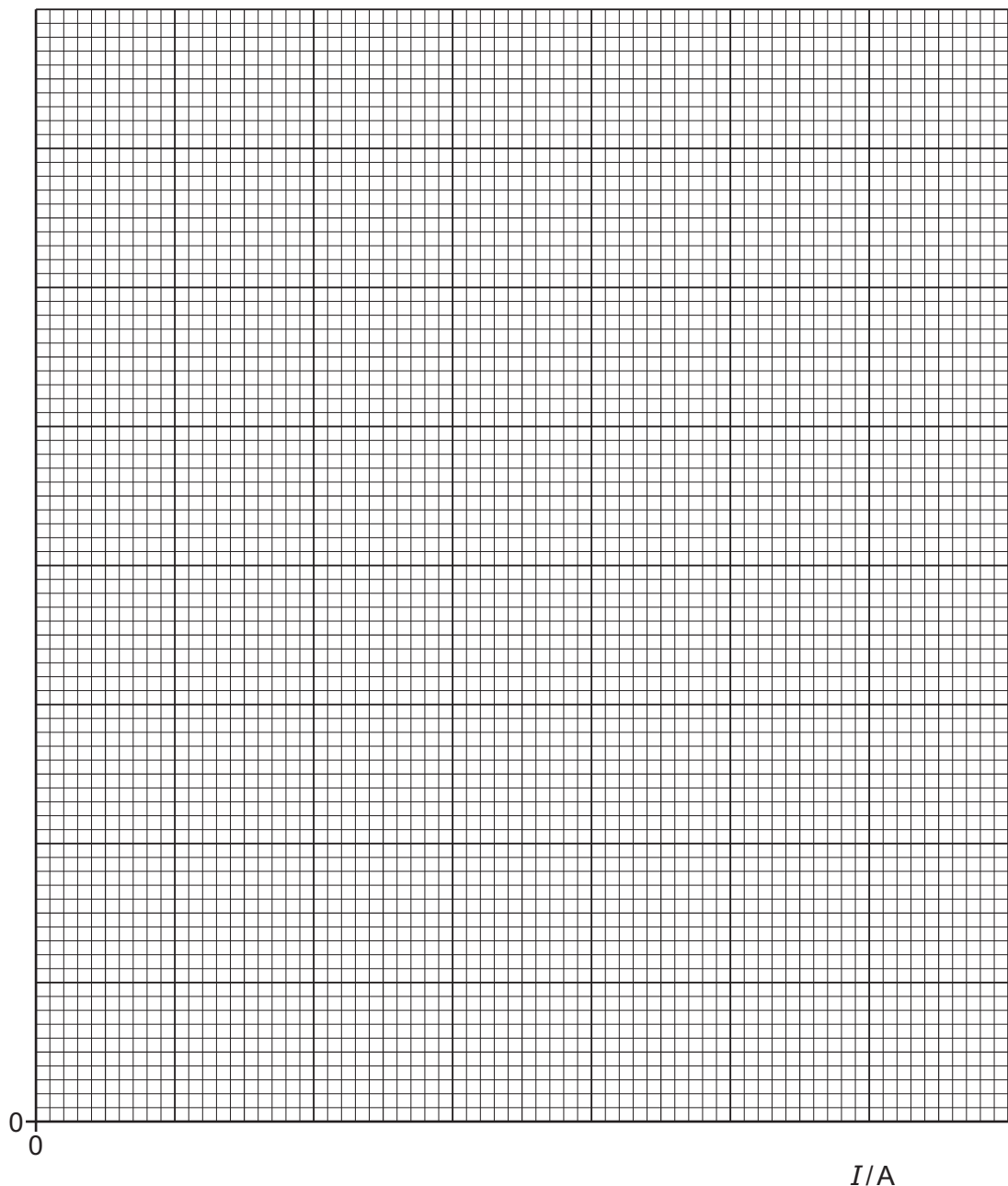
$$I = \frac{V}{R}$$

Record your values of I in Table 2.1 to 2 significant figures. [2]

- (e) Plot a graph of V/V (y-axis) against I/A (x-axis). Start your axes at the origin (0, 0).

Draw a best-fit straight line.

V/V



I/A





- (f) Determine the gradient G of your line. Show all working and indicate on the graph the values you use.

$$G = \dots\dots\dots [1]$$

- (g) The gradient of your line is numerically equal to the resistance R_Z of the unknown resistor Z .

Write down the value of the resistance R_Z .

Record your answer to the nearest ohm.

$$R_Z = \dots\dots\dots \Omega [1]$$

[Total: 11]





- 3 In this experiment, you will investigate the cooling of water.
The apparatus shown in Fig. 3.1 has been assembled for you.

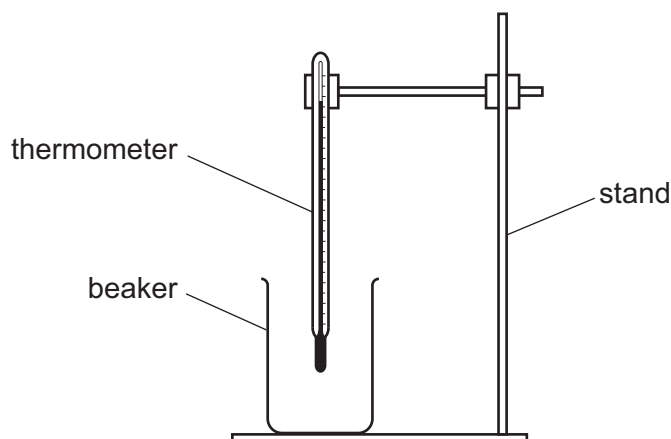


Fig. 3.1

- (a) Measure and record the room temperature θ_R to the nearest 0.5°C .

$\theta_R = \dots\dots\dots^\circ\text{C}$ [1]

- (b) (i) • Pour approximately 60 cm^3 of hot water into the beaker.
• Wait for 30 s.
• Measure and record in Table 3.1, the temperature θ of the water at time $t = 0$.
• Immediately start the stop-watch and measure the temperature of the water at one-minute intervals for 5 minutes.

Record in Table 3.1 the temperatures to the nearest 1°C .

Table 3.1

time t / min	temperature θ / $^\circ\text{C}$
0	
1	
2	
3	
4	
5	

[2]



- (ii) Suggest why you wait for 30 s before measuring the initial temperature of the hot water.

.....
 [1]

- (iii) State how you ensure that the temperature readings are as accurate as possible.

.....
 [1]

- (c) (i) Calculate the decrease in temperature $\Delta\theta$ of the hot water during the **first two** minutes of cooling.

$$\Delta\theta = \text{.....}^{\circ}\text{C} \quad [1]$$

- (ii) Calculate the average rate of cooling R_1 of the hot water during the **first two** minutes of cooling.

Use the equation:

$$R_1 = \frac{\text{decrease in temperature}}{\text{time}}$$

$$R_1 = \text{.....}^{\circ}\text{C}/\text{min} \quad [1]$$

- (iii) Calculate the average rate of cooling R_2 of the hot water during the **final two** minutes of cooling.

$$R_2 = \text{.....}^{\circ}\text{C}/\text{min} \quad [1]$$

- (d) Use your answers to (c)(ii) and (c)(iii) to write a conclusion about the way in which hot water in a beaker cools.

.....
 [1]

- (e) The water in the beaker is left to continue cooling.

- (i) Estimate the temperature of the water θ_5 after a further 5 minutes of cooling.

$$\theta_5 = \text{.....}^{\circ}\text{C} \quad [1]$$

- (ii) Estimate the temperature of the water θ_{50} after a further 50 minutes of cooling.

$$\theta_{50} = \text{.....}^{\circ}\text{C} \quad [1]$$

[Total: 11]



- 4 A student sets up a flexible track on the laboratory bench.

The student investigates the motion of a metal ball as it rolls from rest down the track. The metal ball rolls down the track, up the other side of the track, and comes momentarily to rest at a height h above the bench before rolling back down again.

Plan an experiment to investigate how **one** variable affects the size of this height h .

The apparatus available includes:

- flexible track
- two clamps, bosses and stands to support the track
- selection of metal balls.

Fig. 4.1 shows how the flexible track is supported.

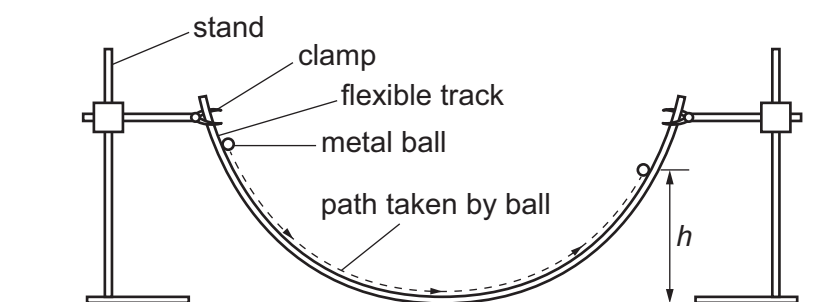


Fig. 4.1

You are **not** required to do the investigation.

In your plan:

- state the **one** variable you have chosen to investigate
- list any additional apparatus needed
- explain how to do the experiment
- state the key variables to be kept constant
- draw a table, with column headings, to show how to display the readings (you are **not** required to enter any readings in the table)
- explain how to use the readings to reach a conclusion.





..... [7]









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