UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

1552315196

PHYSICS **0625/51**

Paper 5 Practical Test **May/June 2013**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of the page.
Write in dark blue or black pen.
You may use a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
Total	

This document consists of **13** printed pages and **3** blank pages.

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1 The aim of this experiment is to investigate the stability of a block.

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Carry out the following instructions referring to Figs. 1.1, 1.2 and 1.3.

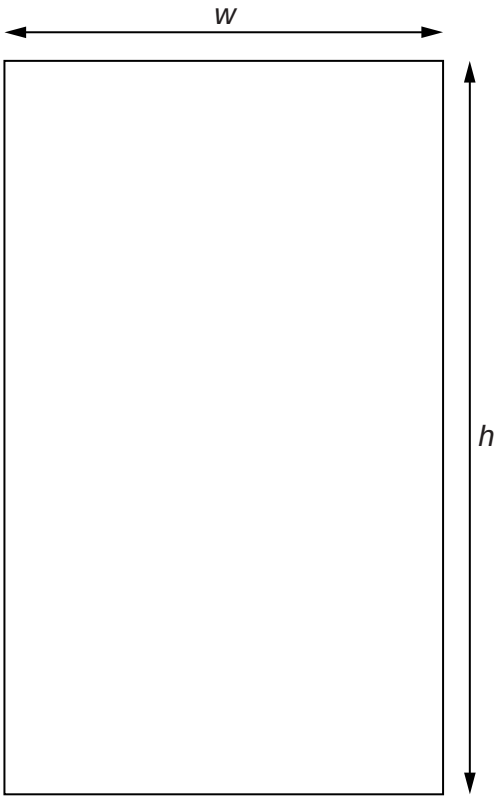


Fig. 1.1

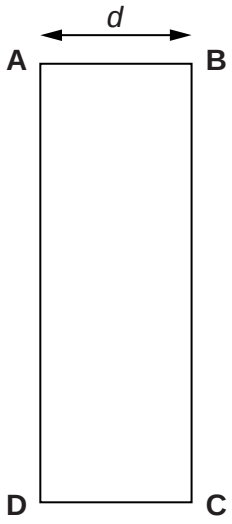


Fig. 1.2

(a) Measure and record the height *h*, width *w* and depth *d* of **your** transparent block.

h = ...

w = ...

d = ...

[2]

(b) Place the block in the space below with the **smallest** face in contact with the paper. Carefully draw round the outline, as shown in Fig. 1.2. Remove the block from the paper.

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(i) Label the corners of your outline **A**, **B**, **C** and **D**, as shown in Fig. 1.2.

(ii) On your diagram, draw a line **AC**.

(iii) Measure and record the angle α between lines **AD** and **AC**.

α = ...[1]

(c) Place the block on the paper towel at the edge of the bench, as shown in Fig. 1.3.

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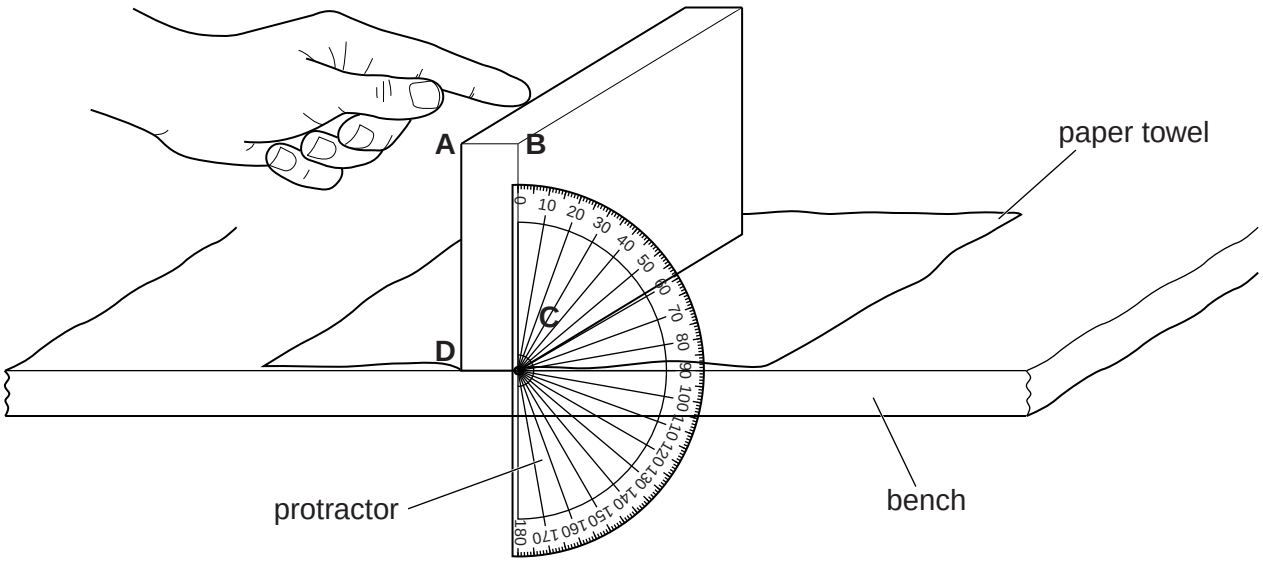


Fig. 1.3

(i) Hold the protractor next to face **ABCD** of the block as shown in Fig. 1.3. Gently push the top of the block (as indicated in Fig. 1.3) until the block tips over.

(ii) Record the angle θ, between side **BC** of the block and the vertical line on the protractor, when the block **just starts** to tip over.

θ = ...[1]

(iii) Repeat steps **(i)** and **(ii)** a suitable number of times for this experiment. Record the readings in the space below.

[2]

(iv) Calculate the average θ_{av} of all your values for θ. Show your working. Give your value of θ_{av} to a suitable number of significant figures for this experiment.

θ_{av} = ...[2]

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(d) A student suggests that θ_{av} should be equal to α.

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State whether your results support this suggestion. Justify your statement by reference to your results.

statement .....

justification .....

.....

.....
[2]

[Total: 10]

2 In this experiment, you will investigate the scale of a thermometer.

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Carry out the following instructions, referring to Figs. 2.1 and 2.2.

(a) Record the value of room temperature θ_R shown on the thermometer.

θ_R = ...[1]

(b) You are provided with a supply of hot water. Pour 200 cm^3 of hot water into the beaker. Place the thermometer into the beaker of hot water, as shown in Fig. 2.1.

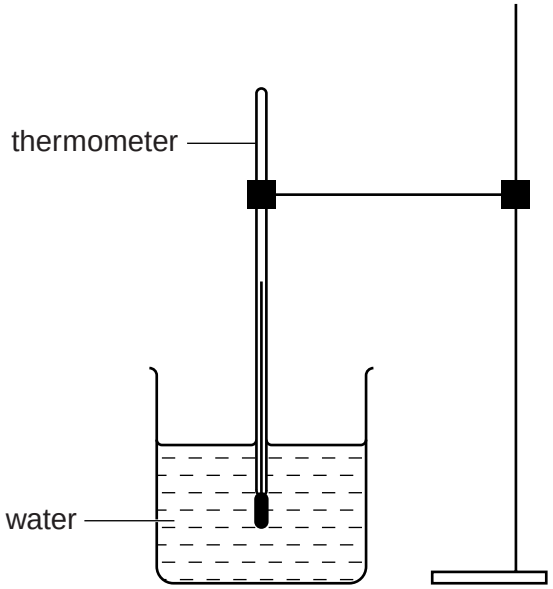


Fig. 2.1

(c) **(i)** When the thermometer reading stops rising, measure the temperature θ of the water in the beaker and immediately start the stopclock. Record θ in Table 2.1 at time t = 0 s.

(ii) Record in the table the time t and the temperature θ of the water every 30 s until you have a total of seven readings. [3]

Table 2.1

t/	θ/	d/

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(d) Remove the thermometer from the beaker and the clamp.

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(i) Measure and record in the table the distance *d* from the bottom end of your thermometer to the position of the first temperature reading in the table. Fig. 2.2 shows a measurement of *d* being made for a temperature of 81 °C. You must use your own temperature reading and thermometer.

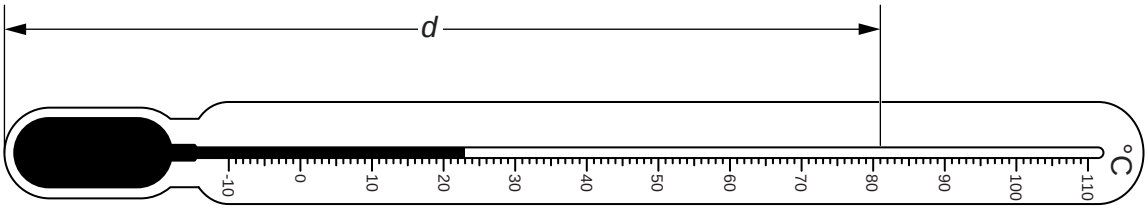


Fig. 2.2

(ii) Measure *d* for all the other temperature readings. Record your values in the table. [1]

(iii) Complete the column headings in the table. [1]

Question 2 continues on the next page.

(e) A student carried out this experiment and plotted a graph of θ against d. A sketch of the graph obtained is shown in Fig. 2.3.

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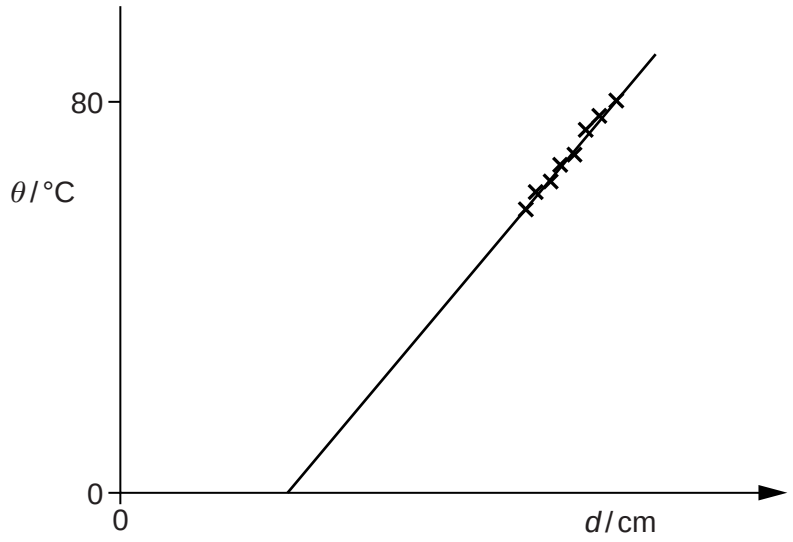


Fig. 2.3

(i) Explain how the graph line shows that θ is not directly proportional to d.

.....

.....

(ii) Suggest why, when $\theta = 0\,°C$, the value of d is not zero.

.....

.....

.....

.....

[2]

(iii) Describe briefly the method you would use to determine, as accurately as possible, the distance between the 1 °C marks on the thermometer.

.....

.....

.....

.....[2]

[Total: 10]

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3 In this experiment, you will investigate the resistance of a wire.

The circuit shown in Fig. 3.1 has been set up for you.

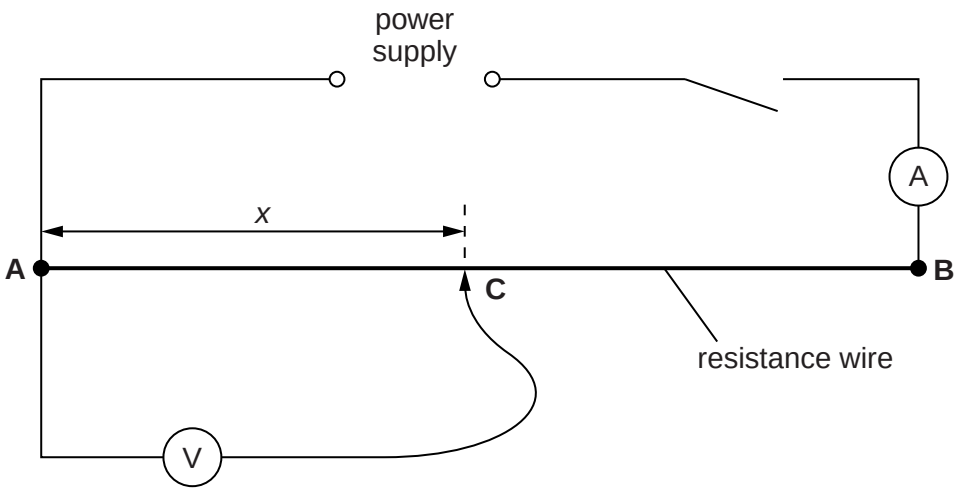


Fig. 3.1

(a) (i) Switch on. Measure, and record in Table 3.1, the current I in the circuit and the potential difference V across a length x = 10.0 cm of the wire **AB**. Switch off.

(ii) Calculate the resistance R of 10.0 cm of the wire **AB**, using the equation $R = \frac{V}{I}$. Record this value of R in the table.

(iii) Complete the column headings in the table.

(iv) Repeat steps **(i)** and **(ii)** with values of x equal to 30.0 cm, 50.0 cm, 70.0 cm and 90.0 cm.

Table 3.1

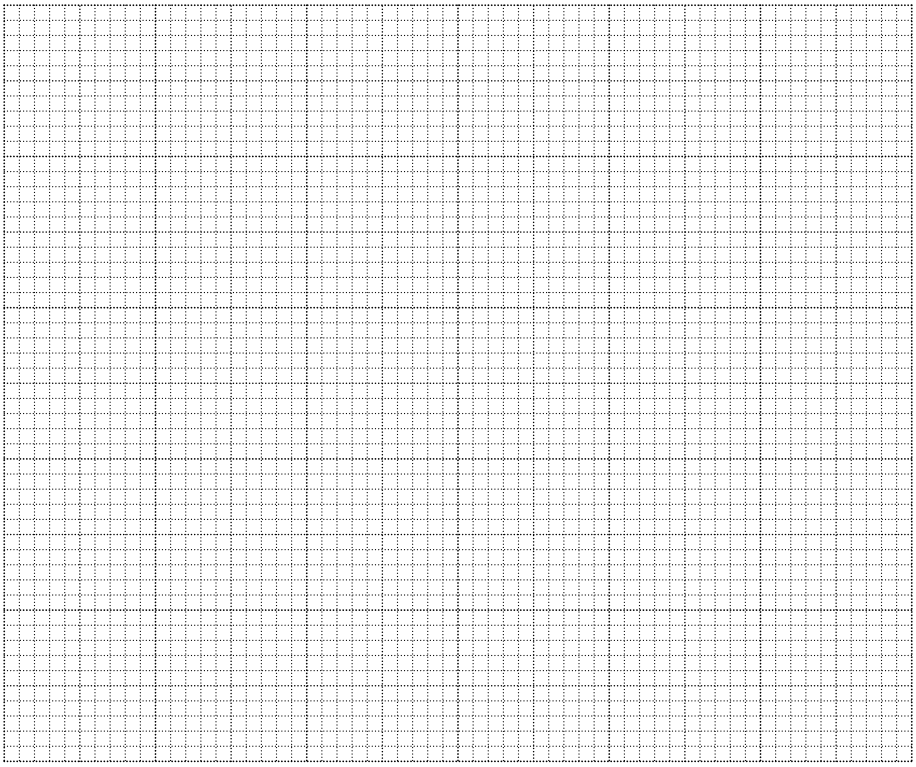
10.0			
30.0			
50.0			
70.0			
90.0			

[3]

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(b) Plot a graph of V/V (y-axis) against R/Ω (x-axis).

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[4]

(c) Determine the gradient G of the graph. Show clearly on the graph how you obtained the necessary information.

G = ...[3]

[Total: 10]

4 In this experiment, you will investigate the position of the image in a plane mirror.

Carry out the following instructions referring to Fig. 4.1.

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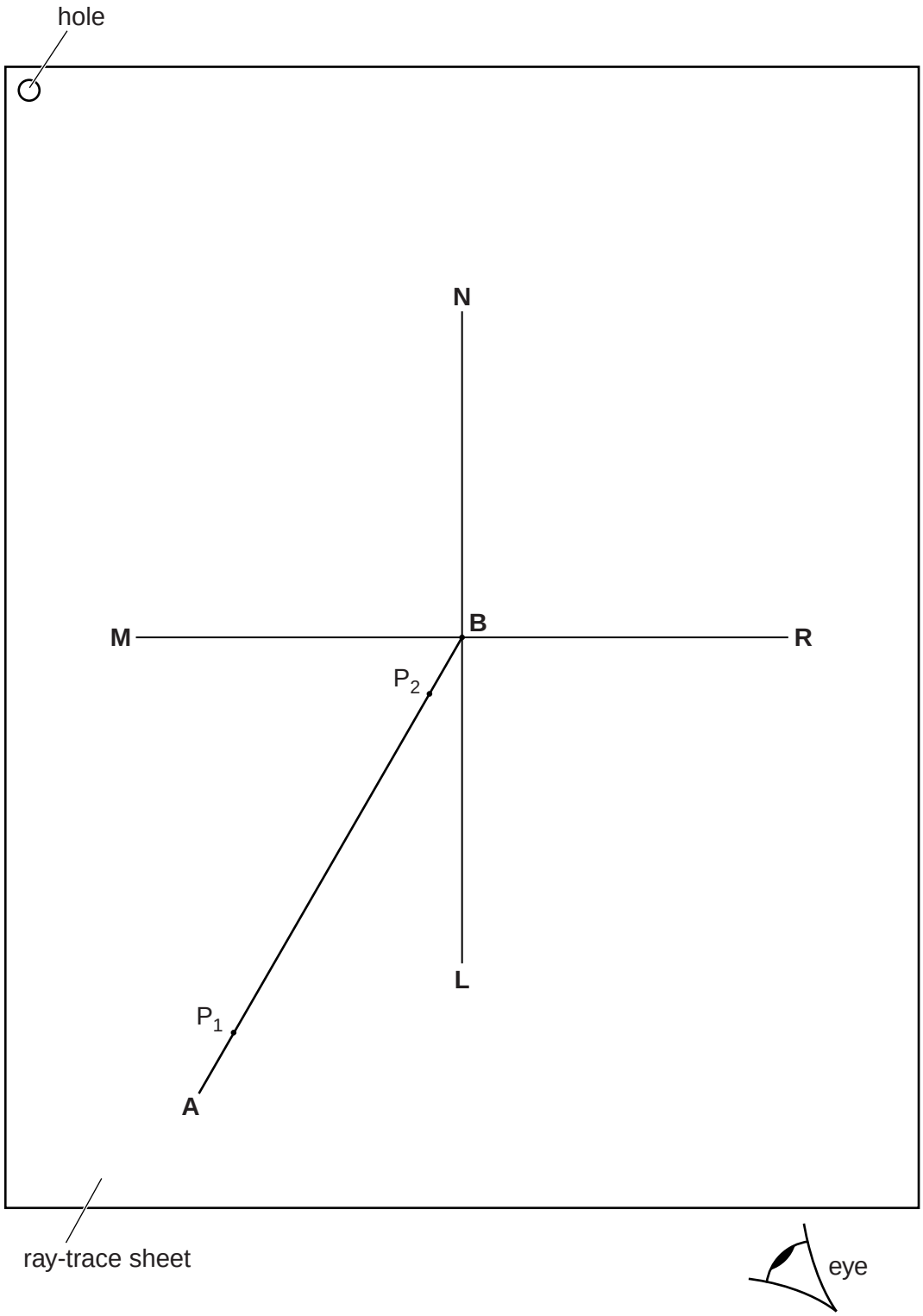


Fig. 4.1

For Examiner's Use

(a) Draw a line 10.0 cm long near the middle of the ray-trace sheet. Label the line **MR**. Draw a normal to this line that passes through its centre. Label the normal **NL**. Label the point at which **NL** crosses **MR** with the letter **B**.

(b) Draw a line 8.0 cm long from **B** at an angle of incidence $i = 30°$ to the normal below **MR** and to the left of the normal. Label the end of this line **A**.

(c) Place a pin P_1 on line **AB** at a distance 7.0 cm from **B**.

(d) Place a pin P_2 on line **AB** at a distance 1.0 cm from **B**.

(e) Place the reflecting face of the mirror vertically on the line **MR**.

(f) View the images of pins P_1 and P_2 from the direction indicated by the eye in Fig. 4.1. Place two pins P_3 and P_4 some distance apart so that pins P_3 and P_4, and the images of P_2 and P_1, all appear exactly one behind the other. Label the positions of P_3 and P_4.

(g) Remove the pins and the mirror and draw the line joining the positions of P_3 and P_4. Continue the line until it crosses **MR** and extends at least 8.0 cm beyond **MR**.

(h) Replace pin P_1 on line **AB** in the same position as in **(c)**, at a distance 7.0 cm from **B**.

(i) Place pin P_2 **1.0 cm to the right of its position** in part **(d)**.

(j) Repeat the steps in parts **(e)** to **(g)**.

(k) Label with a **Y** the point where the two lines beyond **MR** cross.

(l) **(i)** Draw a line from P_1 to **MR** that meets **MR** at a right angle. Measure and record the length *a* of this line.

a = ...

(ii) Draw a line from the point labelled **Y** to **MR** that meets **MR** at a right angle. Measure and record the length *b* of this line.

b = ...
[2]

(m) A student suggests that the length *a* should be equal to the length *b*.

State whether your results support this suggestion. Justify your statement by reference to your results.

statement .....

justification .....

.....

.....
[2]

(n) Suggest a precaution that you took, when placing the pins, in order to obtain reliable results.

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.....

..... [1]

Tie your ray-trace sheet into this Booklet between pages 12 and 13. [5]

[Total: 10]

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