Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

5163115603

PHYSICS **0625/51**

Paper 5 Practical Test **May/June 2015**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, 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	

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **10** printed pages and **2** blank pages.

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1 In this experiment, you will determine the weight of a metre rule using a balancing method.

Carry out the following instructions, referring to Fig. 1.1.

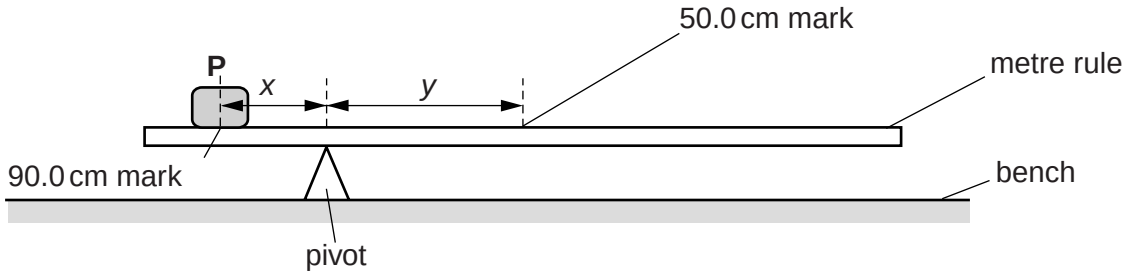


Fig. 1.1

(a) Place the metre rule on the pivot. Place the load **P** on the metre rule at the 90.0 cm mark.

Keeping **P** at the 90.0 cm mark, adjust the position of the metre rule on the pivot so that the metre rule is as near as possible to being balanced.

(i) Write down the reading on the metre rule at the position of the pivot.

The pivot is at the ..... cm mark of the metre rule.

(ii) Record the distance *x* from the 90.0 cm mark to the pivot.

x = ...[1]

(iii) Record the distance *y* from the pivot to the 50.0 cm mark.

y = ...[1]

(iv) Determine the weight *W* of the metre rule using the equation $W = \frac{Px}{y}$, where *P* = 2.0 N. *P* is the weight of load **P**.

W = ...[1]

(b) Keep the pivot at the same position, as recorded in **(a)(i)**.

Move load **P** to the 95.0 cm mark. Place the load **Q** on the metre rule and adjust its position so that the rule balances.

(i) On Fig. 1.2 mark, with a letter X, the approximate position of **Q**. [1]

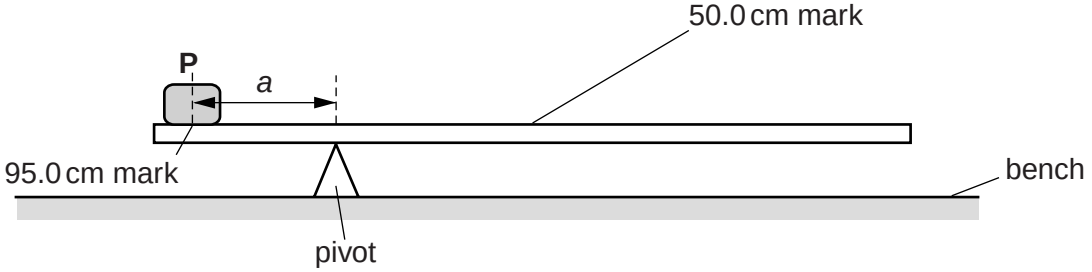


Fig. 1.2

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(ii) Record the distance *a* from the 95.0 cm mark to the pivot.

a = ...

(iii) Record the distance *b* from **Q** to the pivot.

b = ...

(iv) Record the distance *c* from the 50.0 cm mark to the pivot.

c = ...
[1]

(v) Calculate the product *aP*, where *P* = 2.0 N. Include the unit.

aP = ...

(vi) Calculate the product *bQ*, where *Q* = 1.0 N. *Q* is the weight of load **Q**.

bQ = ...

(vii) Calculate the product *cW*, using the value of *W* determined in part **(a)(iv)**.

cW = ...
[2]

(c) A student suggests that *aP* should be equal to *bQ* + *cW*.

State whether your results support the suggestion. Justify your answer by reference to the results.

statement .....

justification .....

.....
[2]

(d) Suggest one practical reason why it is difficult to obtain exact results with this experiment.

.....

.....[1]

[Total: 10]

2 In this experiment, you will investigate the cooling of water.

Carry out the following instructions referring to Fig. 2.1. You are provided with a beaker containing hot water and a thermometer.

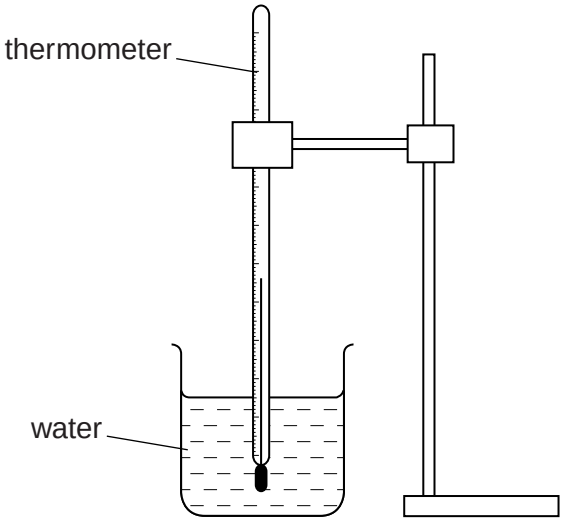


Fig. 2.1

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

(ii) In Table 2.1, record the temperature of the water at 30 s intervals until you have a total of six values up to time t = 150 s.

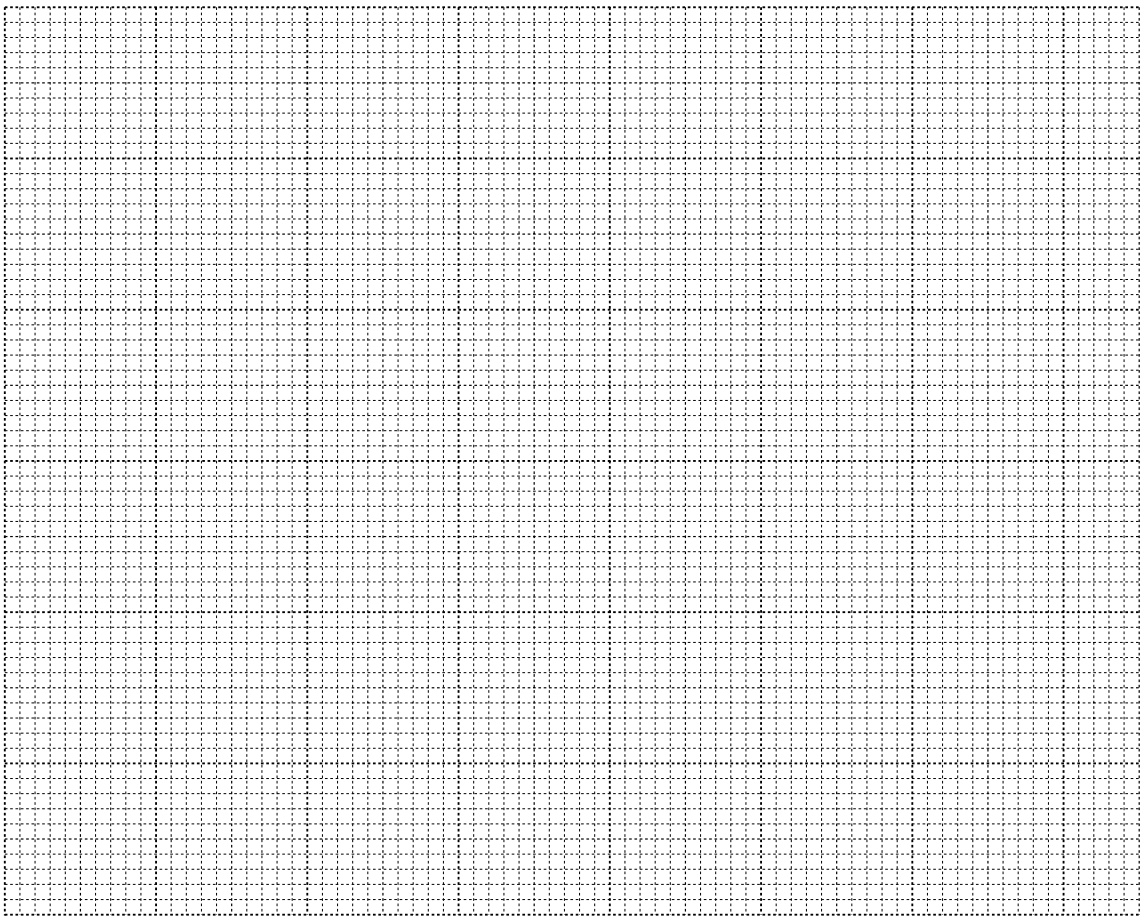
Table 2.1

t / s	θ / °C
0	
30	
60	
90	
120	
150	

[3]

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(b) Plot a graph of θ/°C (y-axis) against t/s (x-axis).



[5]

(c) **(i)** State whether the rate of cooling of the water in the beaker increases, decreases or stays approximately constant during the period of cooling.

The rate of cooling of the water .....[1]

(ii) Justify your statement by reference to the graph.

.....

.....

.....[1]

[Total: 10]

3 In this experiment, you will investigate the resistance of lamp filaments in series and parallel circuits.

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

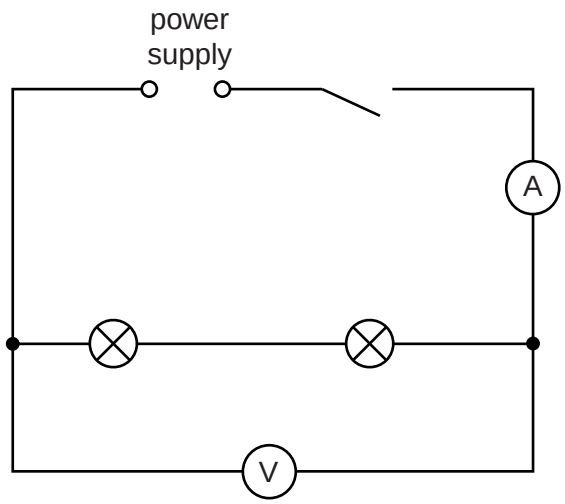


Fig. 3.1

(a) (i) Switch on. Measure and record the potential difference V_S across the lamps and the current I_S in the circuit. Switch off.

V_S = ...

I_S = ...
[2]

(ii) Calculate the resistance R_S of the lamp filaments using the equation $R_S = \frac{V_S}{I_S}$.

R_S = ...[1]

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(b) The circuit is to be rearranged so that
- the lamps are in parallel
- the ammeter will measure the total current in the circuit
- the voltmeter will measure the potential difference across the lamps.

Draw a diagram of this circuit using standard circuit symbols.

[2]

(c) Rearrange the circuit as described in **(b)**.

(i) Switch on. Measure and record the potential difference V_P across the lamps and the current I_P in the circuit. Switch off.

V_P = ...

I_P = ...

[1]

(ii) Calculate the resistance R_P of the lamp filaments using the equation $R_P = \frac{V_P}{I_P}$.

R_P = ...

(iii) Calculate the ratio $\frac{R_S}{R_P}$.

$\frac{R_S}{R_P}$ = ...

[2]

(d) A student wishes to investigate whether the ratio $\frac{R_S}{R_P}$ for the two lamps is the same under all conditions.

(i) Suggest a variable that you could change in order to obtain further sets of readings. You are not asked to take any further readings.

.....

(ii) Explain briefly how you would change this variable.

.....

.....

[2]

[Total: 10]

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4 In this experiment, you will investigate the refraction of light passing through a transparent block.

Carry out the following instructions, referring to Fig. 4.1.

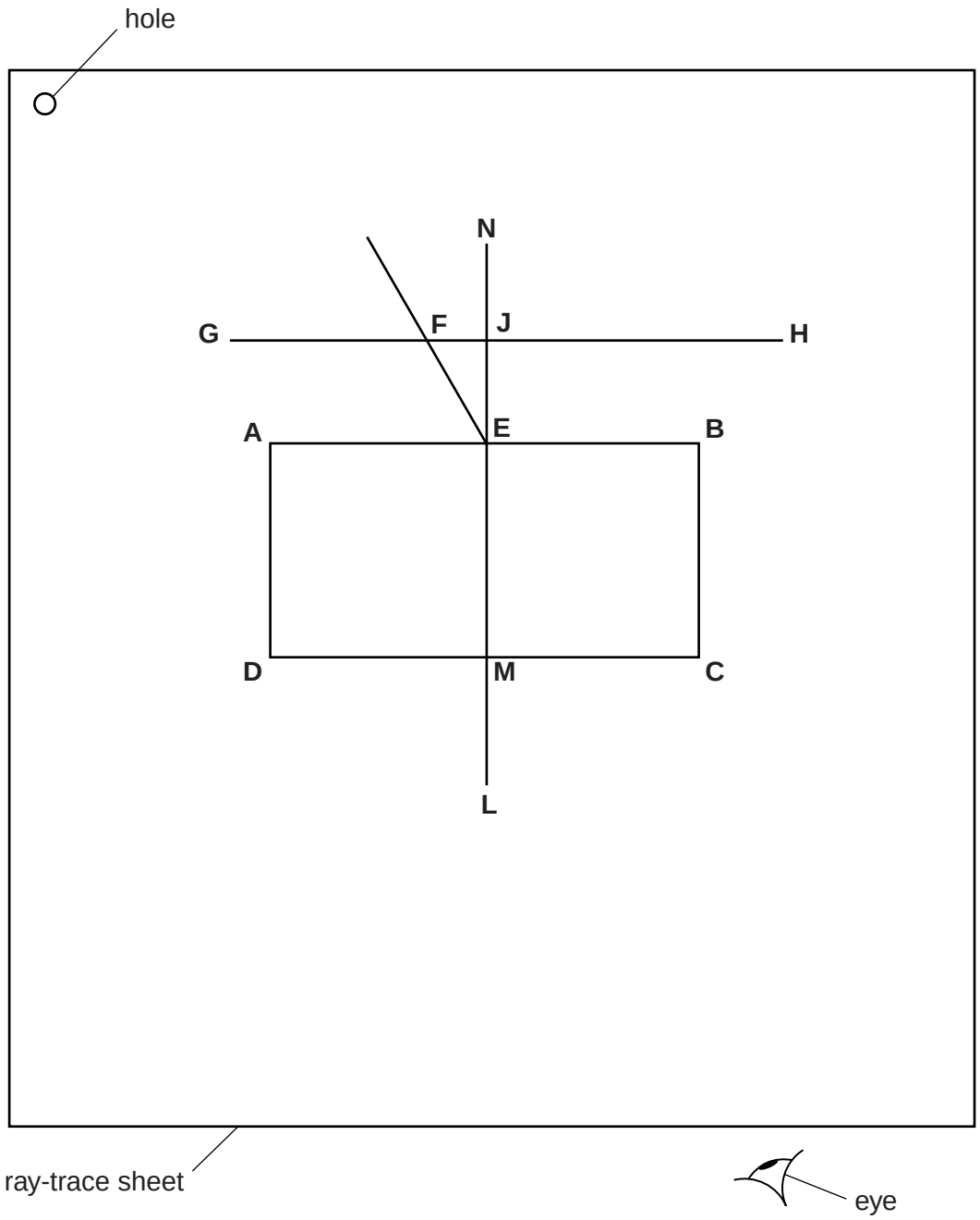


Fig. 4.1

(a) Place the transparent block, largest face down, on the ray-trace sheet supplied. The block should be approximately in the middle of the paper. Draw the outline of the block **ABCD**.

(b) Remove the block and draw a normal **NL** at the centre of side **AB**. Label the point **E** where the normal crosses **AB**. Label the point **M** where the normal crosses **CD**.

(c) Draw a line **GH**, parallel to **AB** and 6.0 cm above **AB**. Label the point **J** where the normal crosses **GH**.

(d) Draw a line, starting at **E**, to the left of the normal and at an angle of incidence $i = 30°$ to the normal as shown in Fig. 4.1. Label the point **F** where the line meets **GH**.

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(e) Place two pins P_1 and P_2 on the line **FE**, placing one pin close to **E**. Label the positions of P_1 and P_2.

(f) Replace the block and observe the images of P_1 and P_2 through side **CD** of the block so that the images of P_1 and P_2 appear one behind the other. Place two pins P_3 and P_4 between your eye and the block so that P_3 and P_4, and the images of P_1 and P_2 seen through the block, appear one behind the other. Label the positions of P_3 and P_4. Remove the block.

(g) Draw a line joining the positions of P_3 and P_4. Continue the line until it meets **CD** and label this point **K**. Draw the line **KE**.

(h) **(i)** Measure and record the length *a* between points **F** and **J**.

a = ...

(ii) Measure and record the length *b* between points **F** and **E**.

b = ...

(iii) Measure and record the length *c* between points **E** and **K**.

c = ...

(iv) Measure and record the length *d* between points **M** and **K**.

d = ...
[2]

(i) Calculate *n*, the refractive index of the material of the block, using the equation $n = \frac{ac}{bd}$.

n = ... [1]

(j) Repeat steps **(d)**–**(h)** but with the angle of incidence $i = 50°$.

a = ...

b = ...

c = ...

d = ...

n = ...
[2]

(k) Suggest one precaution that you should take with this experiment to obtain reliable results.

.....

.....

.....[1]

Tie your ray-trace sheet into this Booklet between pages 10 and 11. [4]

[Total: 10]

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