Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

PHYSICS **0625/52**

Paper 5 Practical Test **October/November 2014**

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, graphs or rough working.
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 **11** printed pages and **1** blank page.

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1 In this experiment, you will take measurements of a sample of modelling clay.

Carry out the following instructions referring to Fig. 1.1.

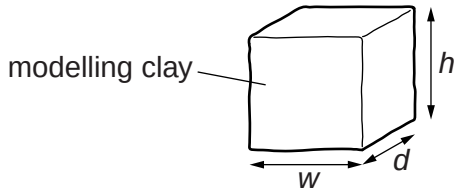


Fig. 1.1

(a) You are provided with a piece of modelling clay. The shape of the piece of modelling clay is approximately a cube.

(i) Measure the height h, width w and depth d of the piece of modelling clay.

h = ... cm

w = ... cm

d = ... cm

(ii) Calculate the volume V_A of the modelling clay, using the equation $V_A = hwd$.

V_A = ... cm^3

(iii) Measure the mass m of the modelling clay, using the balance provided.

m = ... g

(iv) Calculate the density ρ of the modelling clay, using the equation $\rho = \frac{m}{V_A}$.

ρ = ...
[4]

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(b) (i) Mould the piece of modelling clay into an approximate sphere. Use the rule and the blocks of wood to measure the diameter *d* of the sphere of modelling clay.

d = ... [1]

(ii) Draw a diagram to show how you used the blocks of wood and the rule to measure the diameter of the sphere of modelling clay.

[1]

(c) (i) Pour approximately 100 cm^3 of water into the measuring cylinder. Record the volume of water V_1 in the measuring cylinder.

V_1 = ...

(ii) Mould the modelling clay into a shape that will fit into the measuring cylinder.

Tie the thread round the modelling clay and lower it into the measuring cylinder until it is completely covered with water. Record the new volume V_2.

V_2 = ...

(iii) Calculate the volume V_B of the modelling clay using the equation $V_B = (V_2 - V_1)$.

V_B = ...
[2]

(d) A student suggests that the volume of the modelling clay should not change when the shape is changed.

Assuming that the experiment has been carried out with care, suggest two reasons why the values V_A and V_B may not be the same.

1. .....

.....

2. .....

.....
[2]

[Total: 10]

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[Turn over

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2 In this experiment, you will investigate the cooling of hot water as cold water is added.

You are provided with a supply of hot water and a supply of cold water. Carry out the following instructions, referring to Figs. 2.1 and 2.2.

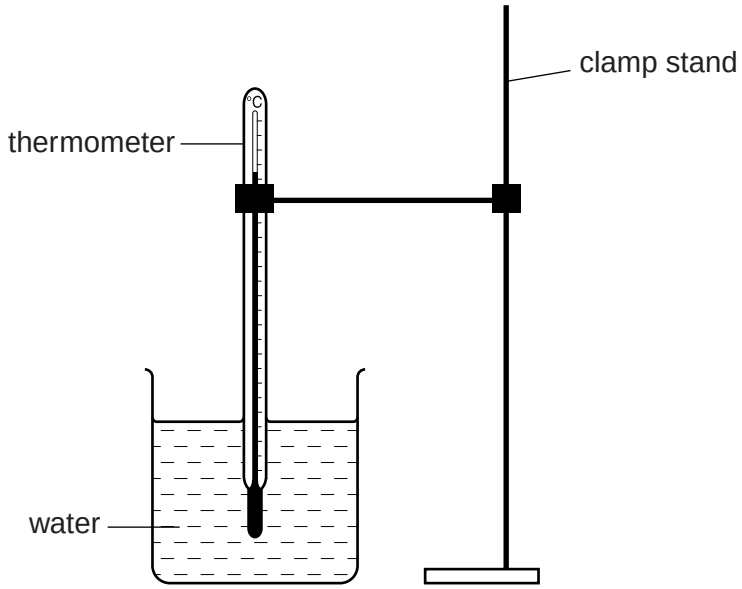


Fig. 2.1

(a) Measure and record the temperature θ_C of the cold water supplied.

θ_C = ... [1]

(b) (i) Pour approximately 150 cm^3 of the hot water supplied into the empty beaker. Without adding any cold water, place the thermometer in the beaker of hot water. When the thermometer reading stops rising, measure the temperature θ of the water in the beaker. In Table 2.1, record θ at $V = 0\,cm^3$. V is the total volume of cold water added.

(ii) Add 10 cm^3 of the cold water to the hot water in the beaker. Stir briefly. Measure, and record in the table, the temperature θ of the water in the beaker and the total volume V of cold water added.

(iii) Repeat step **(ii)** until you have added a total of 50 cm^3 of cold water. Record the readings in the table.

Table 2.1

V / cm^3	θ / °C
0	

[3]

(c) You are provided with a drinks cup held above a measuring cylinder, as shown in Fig. 2.2. The cup has a small hole in its base.

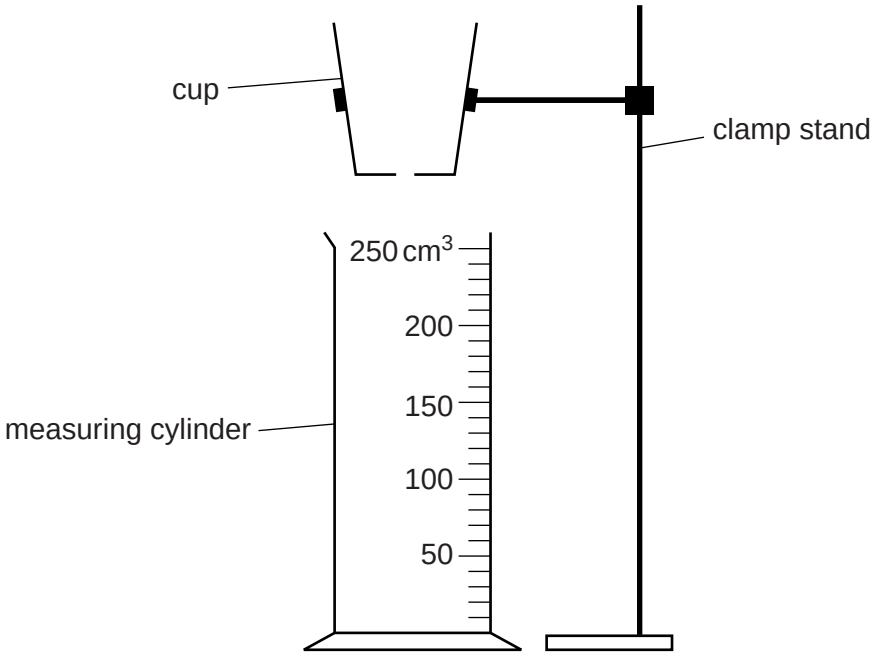


Fig. 2.2

(i) Place a finger over the hole in the cup, to prevent water coming out of the cup.

(ii) Pour approximately 150 cm^3 of cold water into the cup.

(iii) Check that the measuring cylinder is directly under the cup. Remove your finger from the hole and immediately start the stopclock.

Measure and record the time t_1 taken for 50 cm^3 of water to fall into the measuring cylinder and immediately stop the flow of water with your finger.

t_1 = ...

(iv) Return the stopclock to its zero reading. Remove your finger from the hole and immediately start the stopclock.

Measure and record the time t_2 taken for the next 50 cm^3 of water to fall into the measuring cylinder.

t_2 = ...

(v) Allow the cup to empty into the measuring cylinder without taking any further measurements.

(vi) Calculate the average rate of flow of water R_1 for the first 50 cm^3, using the equation $R_1 = \frac{k}{t_1}$, where k = 50 cm^3.

R_1 = ...

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(vii) Calculate the average rate of flow of water R_2 for the next 50 cm^3, using the equation $R_2 = \frac{k}{t_2}$, where $k = 50\,cm^3$.

R_2 = ...
[3]

(d) A student suggests that the experiment described in parts **(a)** and **(b)** would be improved by having a steady flow of cold water added to the hot water by the method described in part **(c)**.

Suggest one possible disadvantage of using the method described in part **(c)** to produce such a flow of water.

.....

..... [1]

(e) The experiment described in parts **(a)** and **(b)** could be repeated to check the results.

Suggest two conditions that should be kept constant in order to provide a reliable check.

1. .....

2. .....
[2]

[Total: 10]

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[Turn over

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

Carry out the following instructions, referring to Fig. 3.1.

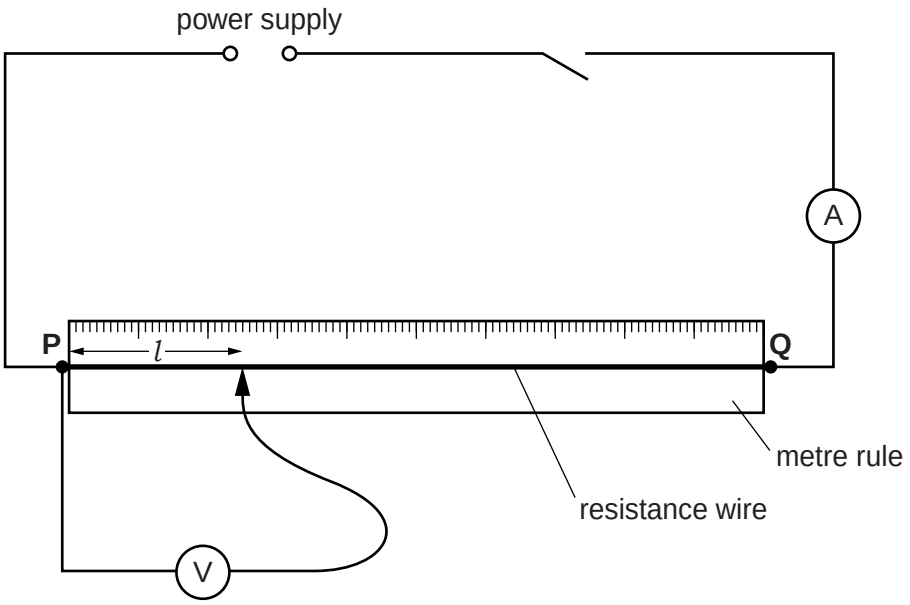


Fig. 3.1

(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 $l = 0.250\,\text{m}$ of the resistance wire connected between **P** and **Q**, as shown in Fig. 3.1. Switch off.

(ii) Calculate the resistance R of the length $l = 0.250\,\text{m}$ of wire using the equation $R = \frac{V}{I}$.

Record this value of R in the table.

(iii) Repeat steps **(i)** and **(ii)** using l values of 0.350 m, 0.450 m, 0.550 m, 0.650 m and 0.750 m.

(iv) Complete the heading for each column of the table.

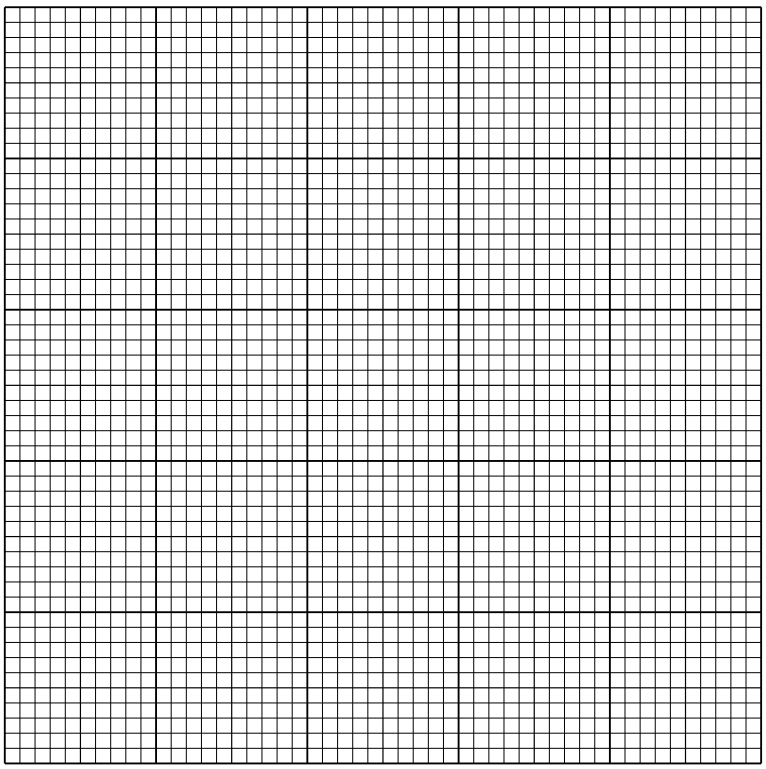
Table 3.1

l/	*V*/	*I*/	*R*/
0.250			
0.350			
0.450			
0.550			
0.650			
0.750			

[2]

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



[4]

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

G = ... [2]

(d) Predict the value of the resistance R_1 of 1.00 m of the resistance wire connected between **P** and **Q**. Give your answer to a number of significant figures that is suitable for this experiment.

R_1 = ... [2]

[Total: 10]

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

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

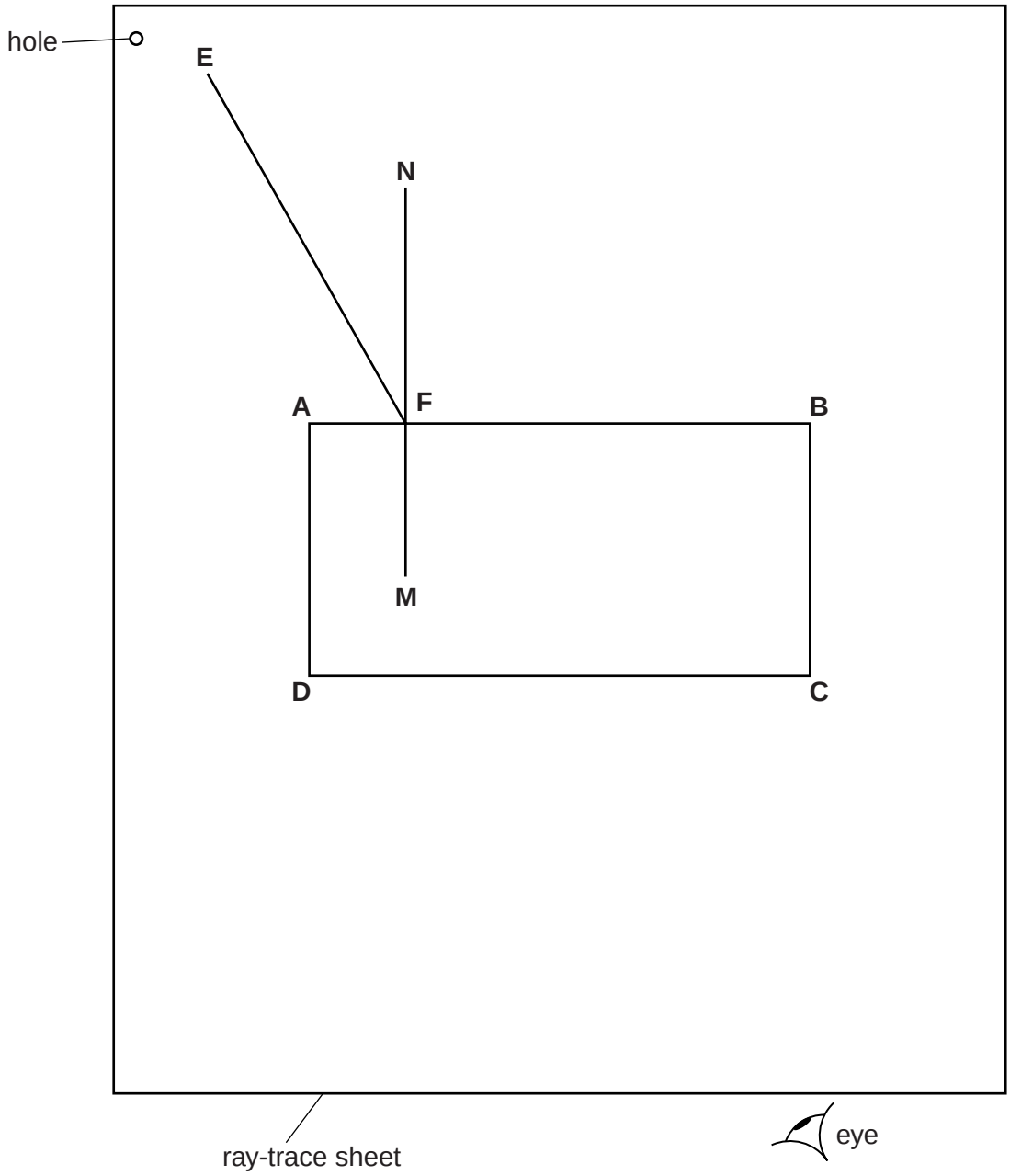


Fig. 4.1

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

(b) Remove the block and draw the normal **NM** to side **AB** so that the normal is 2.0 cm from **A**. Label the point **F** where **NM** crosses **AB**.

(c) Draw the line **EF** at an angle $i = 30°$ to the normal as shown in Fig. 4.1.

(d) Place the paper on the pin board.

(e) Place two pins P_1 and P_2 on line **EF** at a suitable distance apart for this experiment.

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(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, 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_1, P_2, P_3 and P_4. Remove the block and the pins.

(g) Draw a line joining the positions of P_3 and P_4. Continue the line until it meets side **CD** of the block. Label the point **G** where the line meets side **CD**. Draw the line **FG**.

(h) Measure and record the angle *r* between the normal and line **FG**.

r = ... [1]

(i) Turn the ray-trace sheet over. Place the transparent block, largest face down, on the ray-trace sheet but at right angles to the previous position. Label the outline **ABCD** as shown in Fig. 4.2.

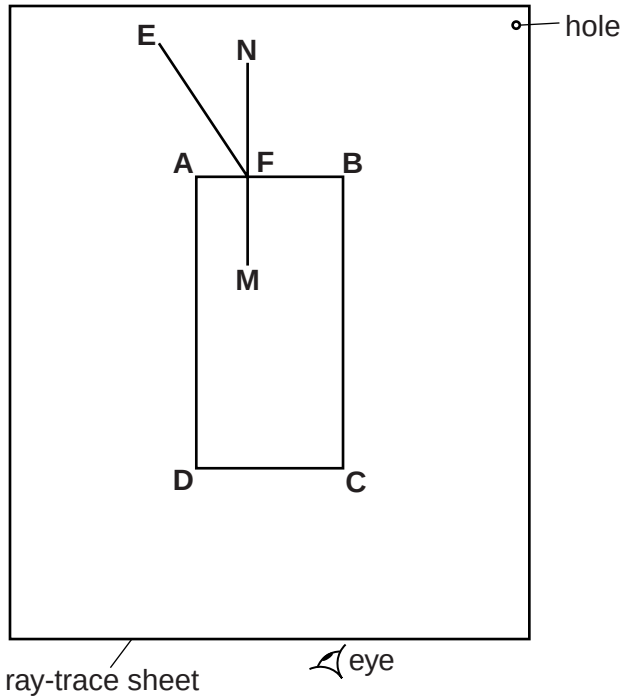


Fig. 4.2

(j) Repeat steps **(b)** to **(h)**.

r = ... [1]

(k) A student suggests that the value of *r* should be the same in both experiments because the material of the block has not changed.

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

statement .....

justification .....

.....

[1]

(l) State two precautions that you should take in this experiment to obtain reliable results.

1. .....

.....

2. .....

.....

[2]

Tie your ray-trace sheet into this Booklet between pages 10 and 11. [5]

[Total: 10]

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