UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

9126505672

PHYSICS **0625/53**

Paper 5 Practical Test **October/November 2011**

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.

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 **10** printed pages and **2** blank pages.

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[Turn over

For Examiner's Use

1 In this experiment, you will determine the density of modelling clay by two methods.

(a) Method 1.

Carry out the following instructions referring to Fig. 1.1. You are provided with a piece of modelling clay.

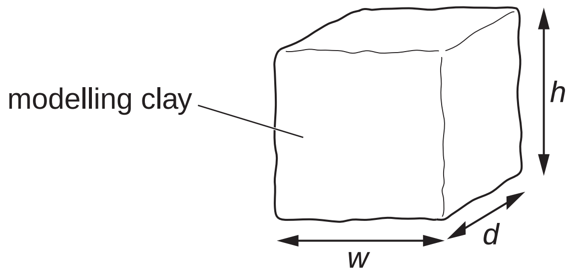

Fig. 1.1

(i) Mould the piece of modelling clay into a shape that is approximately a cube. 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 of the piece of modelling clay using the equation $V = hwd$.

V = ... cm^3

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

m = ... g

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

ρ = ... [3]

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(b) Method 2.

Carry out the following instructions referring to Fig. 1.2. You are provided with a beaker containing water at room temperature.

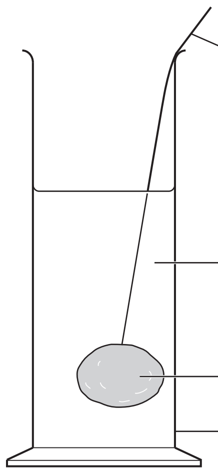

Fig. 1.2

Break the piece of modelling clay into two pieces with one piece approximately twice the size of the other piece.

(i) Using the **smaller** piece of modelling clay, measure its mass m_s.

m_s = ...

(ii) Pour approximately 50 cm^3 of water into the measuring cylinder. Record the volume of water V_1 in the measuring cylinder.

V_1 = ...

(iii) Tie the thread around the smaller piece of modelling clay and lower it into the measuring cylinder until it is completely covered with water. Record the new volume V_2.

V_2 = ...

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

V_s = ...

(v) Calculate the density ρ of the modelling clay using the equation $\rho = \frac{m_s}{V_s}$.

ρ = ...[5]

(c) Assuming that the experiment has been carried out with reasonable care, suggest two reasons why the two values obtained for the density of the modelling clay may not be the same.

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1. ....

....

2. ....

....[2]

[Total: 10]

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2 In this experiment, you will investigate the energy changes that occur when hot and cold water are mixed.

You are provided with a supply of hot water and a supply of cold (room temperature) water.

(a) (i) Pour 50 cm^3 of cold water into the beaker labelled **A**. Measure and record the temperature θ_c of this water.

θ_c = ...

(ii) Pour 50 cm^3 of hot water into the beaker labelled **B**. Measure and record the temperature θ_h of this water.

θ_h = ...

(iii) As soon as you have taken the temperature, pour the 50 cm^3 of water from beaker **A** into beaker **B**. Briefly stir the mixture then measure and record the temperature θ_m of the mixture.

θ_m = ...
[3]

(b) (i) Calculate the gain in thermal energy E_c of the cold water using the equation

$$E_c = k(\theta_m - \theta_c)$$

where k = 210 J / °C.

E_c = ...

(ii) Calculate the loss in thermal energy E_h of the hot water using the equation

$$E_h = k(\theta_h - \theta_m)$$

where k = 210 J / °C.

E_h = ...
[2]

(c) A student suggests that all the thermal energy lost by the hot water is gained by the cold water. E_c and E_h should therefore be equal.

(i) State whether your experimental results support this suggestion and justify your statement by reference to your results.

statement ....

justification ....

....[2]

(ii) Suggest a practical reason in this experiment why E_c might be different from E_h.

....

....[1]

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(d) Another student was asked to suggest quantities that should be kept constant if this experiment is repeated in order to check the readings. Table 2.1 shows the suggestions. Place a tick (✓) in the second column of the table next to each correctly suggested quantity.

Table 2.1

suggestion	
avoid parallax errors when taking readings	
number of stirs	
room temperature	
starting temperature of cold water	
starting temperature of hot water	
use only two or three significant figures for the final answers	

[2]

[Total: 10]

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

You will use the circuit shown in Fig. 3.1.

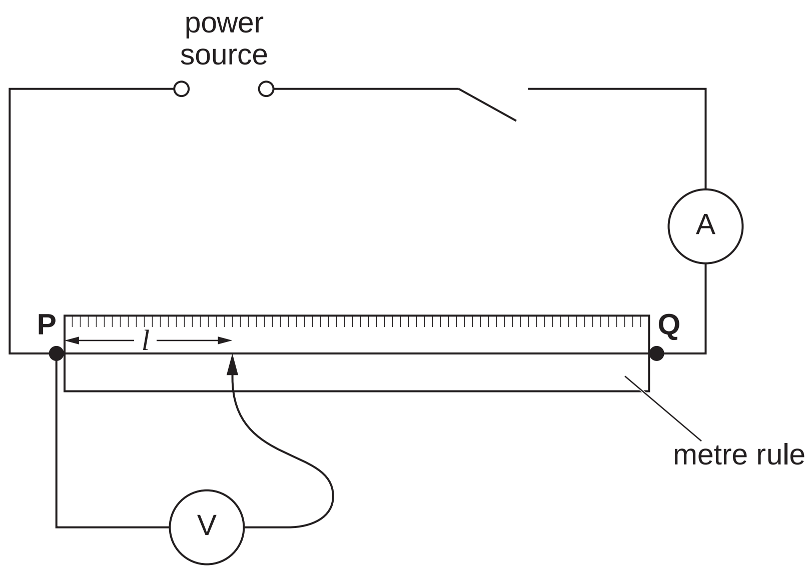

Fig. 3.1

(a) (i) Switch on. Measure and record in Table 3.1 the current I in the circuit and the p.d. V across a length l = 0.250 m of the wire **PQ** as shown in Fig. 3.1. Switch off.

(ii) Calculate the resistance R of the length l = 0.250 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 0.500 m and 0.750 m.

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

Table 3.1

l /	V /	I /	R /
0.250			
0.500			
0.750			

[5]

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(b) Use data from the table to suggest and justify a relationship between the length l of the wire and its resistance R. Show your working.

relationship ....

....

justification ....

....

....[3]

(c) Use your results to predict the resistance of a 1.500 m length of the same wire. Show your working.

prediction = ... [2]

[Total: 10]

For Examiner's Use

4 In this experiment, you will investigate the formation of images by a converging lens.

Carry out the following instructions referring to Fig 4.1.

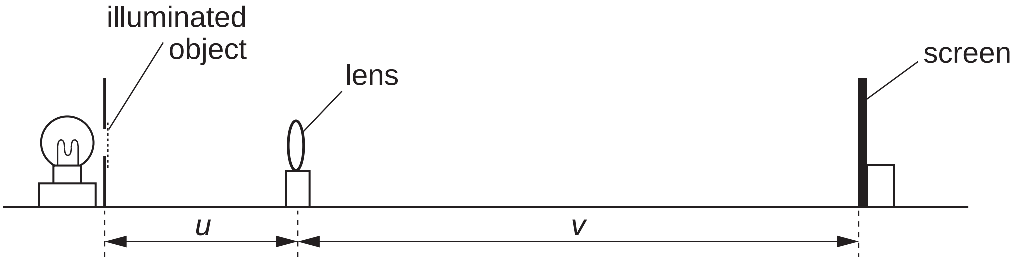


Fig. 4.1

(a) (i) Place the screen about 1.0 m from the illuminated object.

(ii) Place the lens between the object and the screen so that the centre of the lens is at a distance u = 0.200 m from the object. Adjust the position of the screen until a clearly focused image is formed on the screen.

(iii) Measure (in metres) the distance v between the centre of the lens and the screen.

(iv) Record the values of u and v in Table 4.1.

(v) Repeat the steps in **(i)** – **(iv)** using values for u of 0.250 m, 0.300 m, 0.350 m and 0.400 m.

Table 4.1

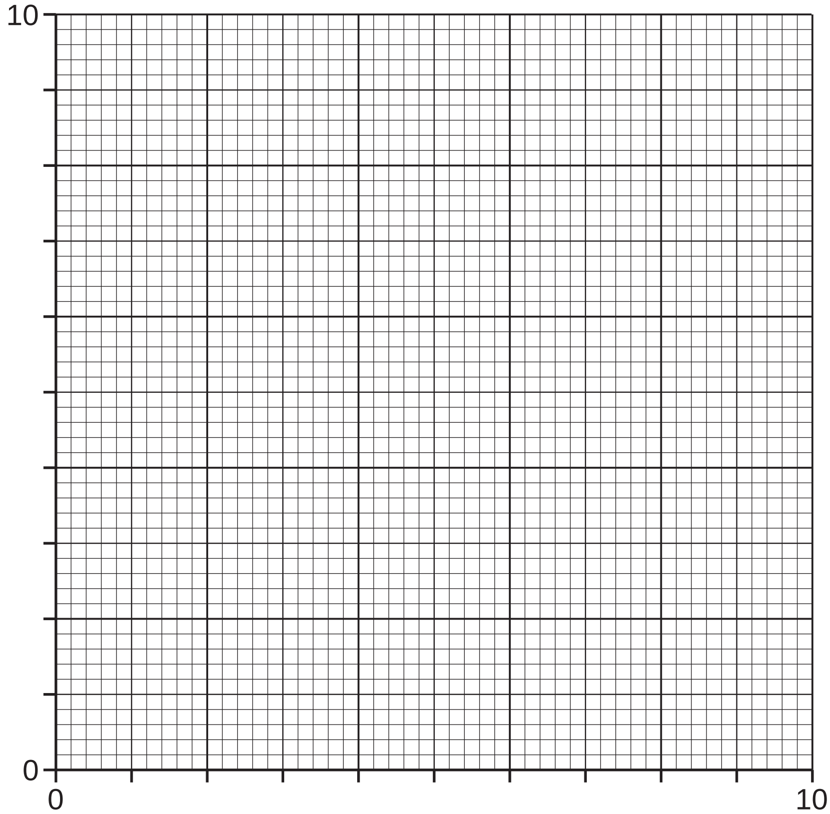
u / m	v / m	$\frac{1}{u} \Big/ \frac{1}{\text{m}}$	$\frac{1}{v} \Big/ \frac{1}{\text{m}}$

(vi) Calculate the values of $\frac{1}{u}$ and $\frac{1}{v}$ and enter them in the table.

[3]

For Examiner's Use

(b) Plot the graph of $\frac{1}{v} \Big/ \frac{1}{\text{m}}$ (y-axis) against $\frac{1}{u} \Big/ \frac{1}{\text{m}}$ (x-axis).



[4]

(c) **(i)** Use the graph to find the intercept on the y-axis.

intercept on the y-axis = ...

(ii) Use the graph to find the intercept on the x-axis.

intercept on the x-axis = ...

[2]

(d) State and briefly explain one precaution you took in order to obtain reliable measurements.

precaution ....

....

explanation ....

....[1]

[Total: 10]

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