UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2613651556

PHYSICS **0625/52**

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.

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1	
2	
3	
4	
Total	

This document consists of **9** printed pages and **3** blank pages.

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1 In this experiment, you will investigate the principle of moments.

Carry out the following instructions referring to Fig. 1.1.

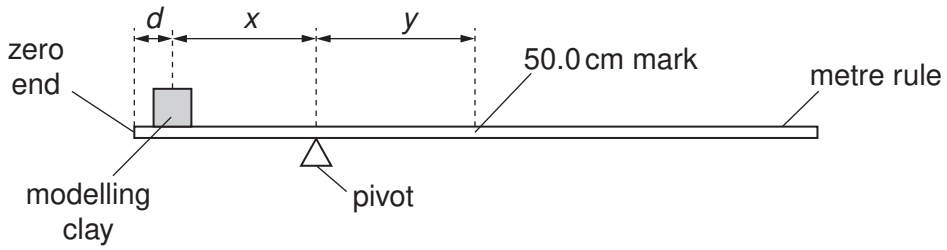

Fig. 1.1

You are provided with a piece of modelling clay.

(a) Mould the piece of modelling clay into a cube shape. Place the modelling clay on the rule so that its centre is at a distance $d = 10.0$ cm from the zero end of the rule as shown in Fig. 1.1.

Adjust the position of the rule so that it is as near as possible to being balanced, with the 50.0 cm mark to the right of the pivot.

(i) Measure the distance x from the centre of the modelling clay to the pivot.

$x =$ .....

(ii) Measure the distance y from the pivot to the 50.0 cm mark on the rule.

$y =$ .....

(iii) The mass M of the metre rule is provided for you on a card. Record this value.

$M =$ .....

(iv) Calculate the mass m_1 of the piece of modelling clay using the equation

$$m_1 = \frac{My}{x}.$$

$m_1 =$ .....
[3]

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(b) Divide the modelling clay into two pieces, with one piece approximately twice the size of the other piece.

(i) Using the larger piece of modelling clay, of mass m_2, repeat the steps in **(a)**.

x = ...

y = ...

m_2 = ...

(ii) Using the smaller piece of modelling clay, of mass m_3, repeat the steps in **(a)**.

x = ...

y = ...

m_3 = ...

(iii) Calculate $m_2 + m_3$.

$m_2 + m_3$ = ...
[4]

(c) Assuming that the experiment has been carried out with care, suggest two reasons why $m_2 + m_3$ may not be equal to m_1.

1. .....

.....

2. .....

.....[2]

(d) Explain briefly how you ensured that the centre of the cube of modelling clay was at the 10.0 cm mark on the metre rule. You may draw a diagram.

.....

.....

.....[1]

[Total: 10]

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[Turn over

2 In this experiment, you will investigate temperature changes when hot and cold water are mixed.

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

(a) (i) Pour 100 cm^3 of hot water into the beaker labelled **A**. Measure and record the temperature θ_h of the water in beaker **A**.

θ_h = ...

(ii) Measure and record the temperature θ_c of the cold water supplied.

θ_c = ...

(b) (i) Add 10 cm^3 of the cold water to the water in beaker **A**. Briefly stir the water in beaker **A**.

(ii) Measure and record in Table 2.1 the temperature θ_m of the water in beaker **A**. Also record the volume V of water added.

(iii) As soon as possible repeat step **(b)(i)** five times. Each time add 10 cm^3 of cold water to the water already in beaker **A** until a total of 60 cm^3 has been added. Each time record in the table the temperature θ_m of the water in beaker **A** and the total volume V of water added so far.

Table 2.1

V/ cm^3	θ_m/ °C

[3]

(c) Plot the graph of θ_m/°C (y-axis) against V/cm^3 (x-axis). Include on your graph the temperature θ_h at volume $V = 0$, as recorded in **(a)(i)**.

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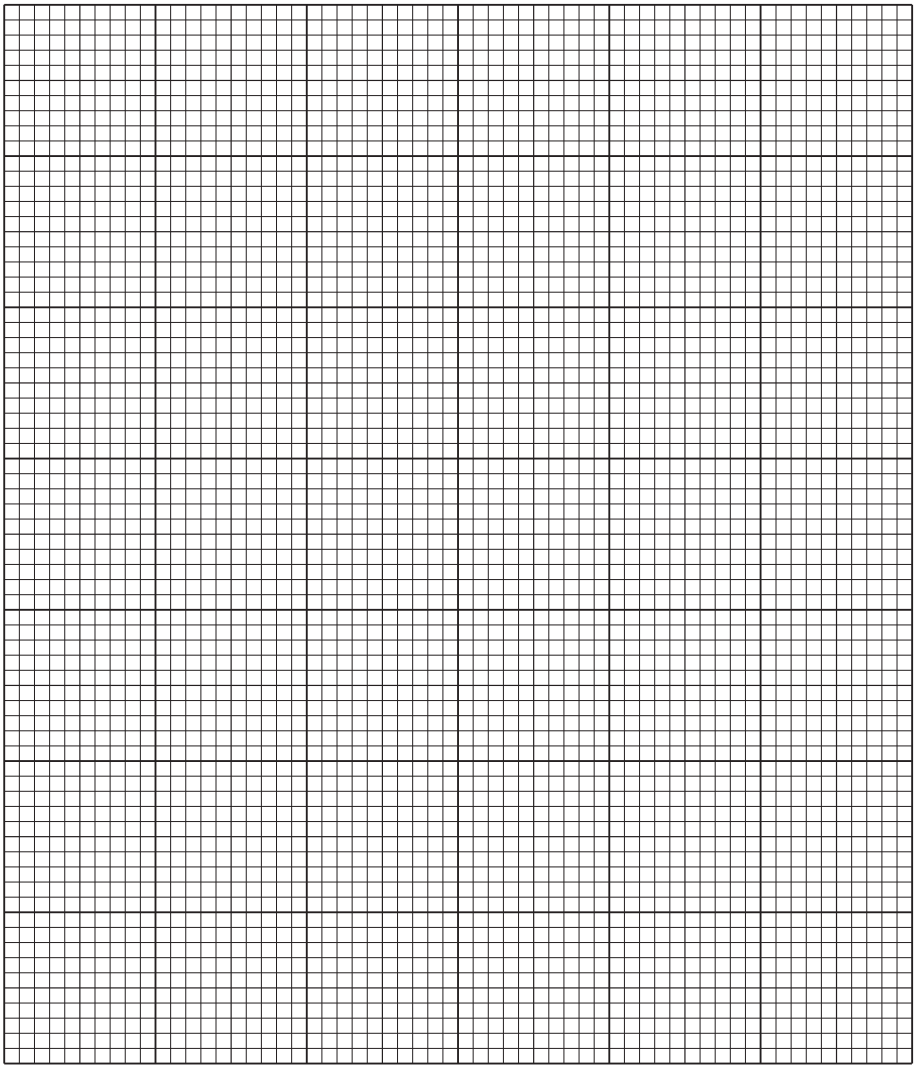

[4]

(d) If this experiment were to be repeated in order to check the results, it would be important to control the conditions. Suggest two such conditions that should be controlled.

1. .....

2. .....[2]

(e) Suggest a practical precaution that will enable readings in this experiment to be taken as accurately as possible.

.....

.....[1]

[Total: 10]

3 In this experiment, you will investigate the potential difference across resistors in a circuit.

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Carry out the following instructions referring to Fig. 3.1. The circuit is set up for you.

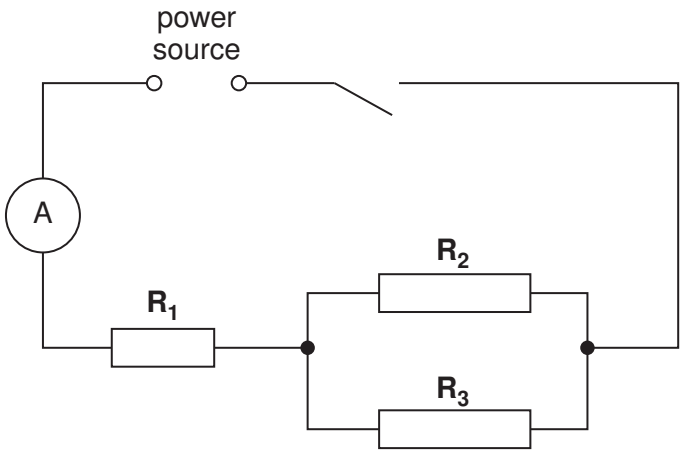

Fig. 3.1

(a) (i) Switch on. Use the voltmeter to measure the potential difference V_A across resistor $\mathbf{R_1}$.

V_A = ...

(ii) Measure the potential difference V_B across resistors $\mathbf{R_2}$ and $\mathbf{R_3}$.

V_B = ...

(iii) Measure the potential difference V_C across the combination of the three resistors.

V_C = ...
[4]

Switch off.

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(b) Theory suggests that $V_C = V_A + V_B$.

(i) Calculate $V_A + V_B$.

$V_A + V_B$ = ...

(ii) State whether your experimental results support the theory and justify your statement by reference to your results.

statement .....

justification .....

.....

.....[3]

(c) **(i)** Switch on. Record the current I indicated on the ammeter.

I = ...

Switch off.

(ii) Calculate the resistance R of the combination of the three resistors using the equation $R = \frac{V_C}{I}$.

R = ... [2]

(d) On Fig. 3.1 draw in the voltmeter connected as required in **(a)(iii)** using the standard symbol for a voltmeter. [1]

[Total: 10]

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

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Carry out the following instructions referring to Fig. 4.1.

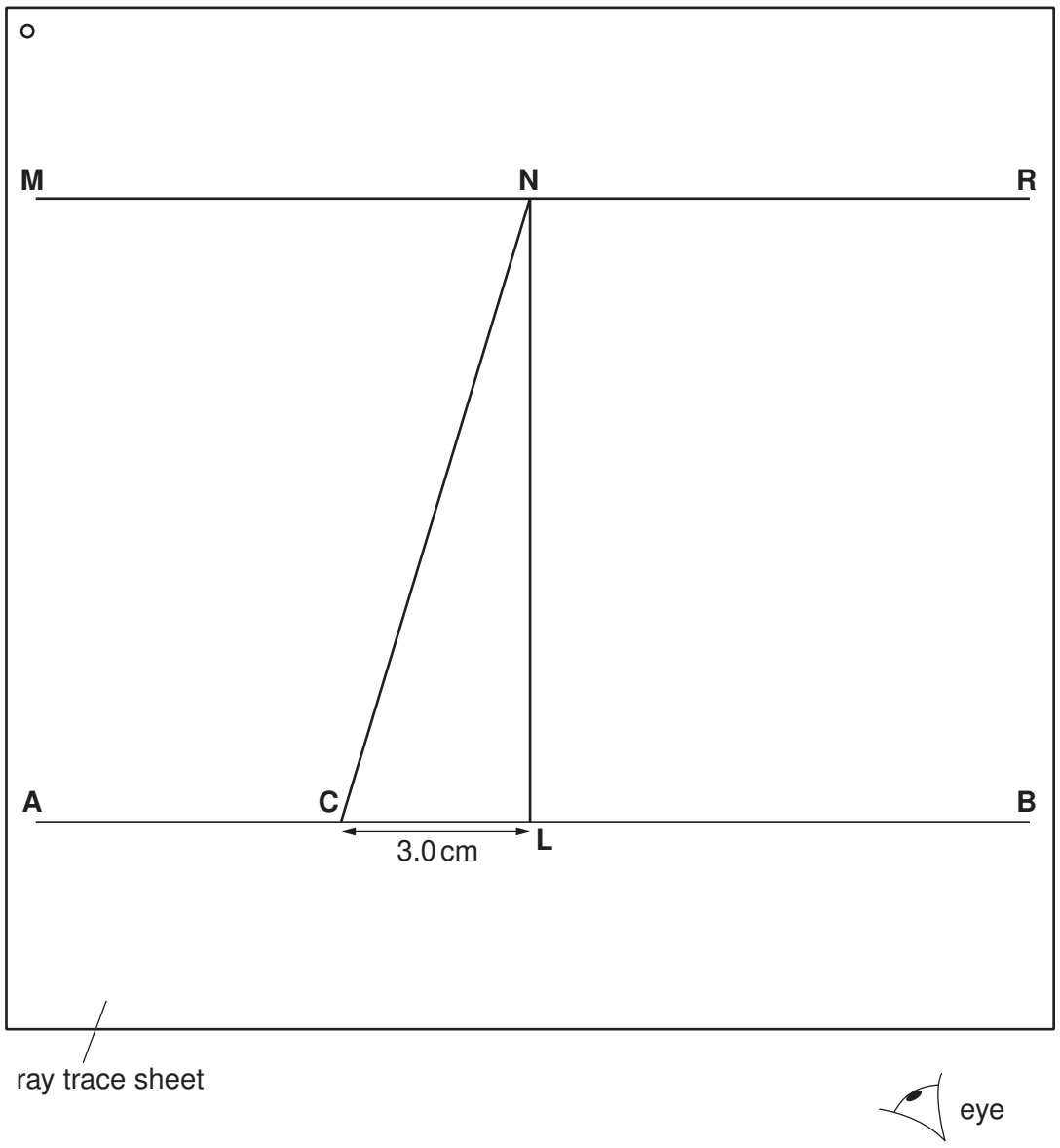

Fig. 4.1

(a) Draw a line 16 cm long near the top of the ray trace sheet. Label the line **MR**. Draw a normal to this line that passes through its centre. Label the point at which the normal crosses **MR** with the letter **N**.

(b) Draw a line 16 cm long parallel to and 10 cm below the line **MR**. Label this line **AB**. Label the point at which the normal crosses this line with the letter **L**.

(c) Place the mirror, with its reflecting face vertical, on the line **MR**. The mirror has a line drawn on it. One end of this line must be at point **N**.

(d) Place a pin P_1 on line **AB** at a point 3.0 cm to the left of the normal. Label this point **C**.

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(e) View the line on the mirror and the image of pin P_1 from the direction indicated by the eye in Fig. 4.1. Place two pins P_2 and P_3 some distance apart so that the image of P_1, the line on the mirror, and pins P_2 and P_3, all appear exactly one behind the other. Label the positions of P_2 and P_3.

(f) Remove the pins and the mirror and draw in the line joining the positions of P_2 and P_3. Continue the line until it meets the normal. Draw in the line joining point **C** and point **N**.

(g) Measure, and record in Table 4.1, the angle of incidence *i* between the normal and the line **CN**. Measure, and record in the table, the angle of reflection *r* between the normal and the line passing through P_2 and P_3.

(h) Repeat the steps **(d)** – **(g)** using a position of P_1 5.0 cm from the normal.

Table 4.1

i/°	*r*/°

[3]

(i) In spite of carrying out this experiment with reasonable care, it is possible that the values of the angle of reflection *r* will not be exactly the same as the values obtained from theory. Suggest two possible causes of this inaccuracy.

1. .....

.....

2. .....

.....[2]

Tie in your ray trace sheet between pages 10 and 11. [5]

[Total: 10]

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