UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

1157465662

PHYSICS **0625/62**

Paper 6 Alternative to Practical **October/November 2010**

1 hour

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
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	
5	
Total	

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

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1 An IGCSE student is determining the density of the material of a metre rule.

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Fig. 1.1 shows the balancing experiment used to determine the mass of the rule.

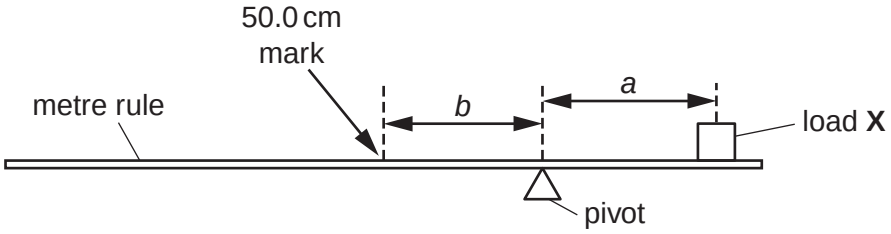


Fig. 1.1

(a) (i) On Fig. 1.1, measure the distance *a* from the centre of the load **X** to the pivot.

a = ... cm

(ii) On Fig. 1.1, measure the distance *b* from the pivot to the 50.0 cm mark on the rule.

b = ... cm
[1]

(b) The diagram is drawn one tenth of actual size.

(i) Calculate the actual distance *x* from the centre of the load **X** to the pivot.

x = ... cm

(ii) Calculate the actual distance *y* from the pivot to the 50.0 cm mark on the rule.

y = ... cm

(iii) Calculate the mass *m* of the metre rule using the equation

$$m = \frac{kx}{y}$$

where $k = 100$ g.

m = ...
[2]

(c) Figs. 1.2 and 1.3 show part of the metre rule drawn actual size.

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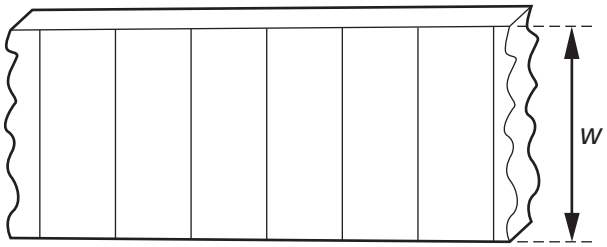


Fig. 1.2

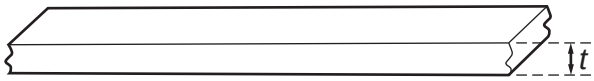


Fig. 1.3

(i) Take and record measurements from Fig. 1.2 to determine the average width *w* of the metre rule.

w = ... cm

(ii) Take and record measurements from Fig. 1.3 to determine the average thickness *t* of the metre rule.

t = ... cm

(iii) Calculate the volume *V* of the metre rule using the equation $V = lwt$ where *l* is the length of the metre rule (100.0 cm).

V = ...[3]

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

ρ = ...[3]

(d) State the assumption that the student has made about the position of the centre of mass of the metre rule.

.....[1]

[Total: 10]

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[Turn over

2 The IGCSE class is investigating the rate of cooling and the rate of heating of a thermometer bulb.

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The set-up is shown in Fig. 2.1 and Fig. 2.2.

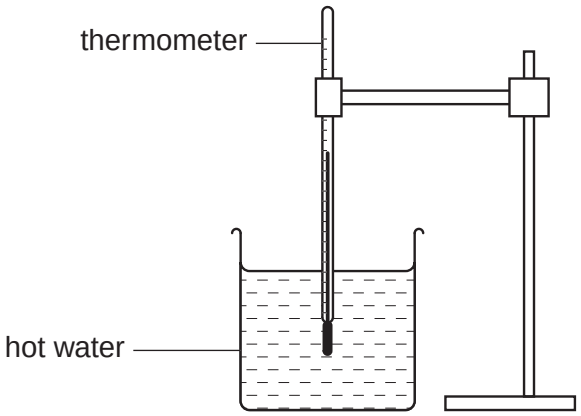


Fig. 2.1

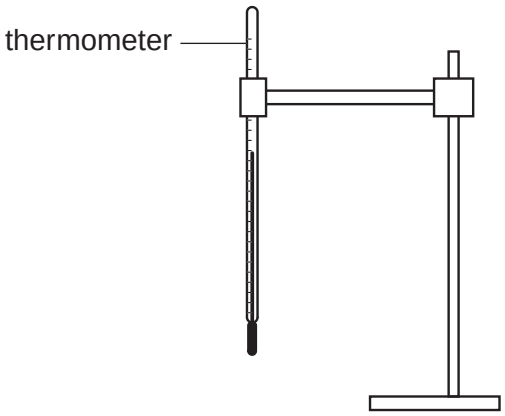


Fig. 2.2

A student places a thermometer in a beaker of hot water. When the reading on the thermometer is steady, she records the temperature reading θ in Table 2.1 at time $t = 0$.

She immediately removes the thermometer from the water and starts a stopclock. As the thermometer cools, she records the thermometer reading every 30 s, as shown in Table 2.1.

At time $t = 210$ s, she records the thermometer reading and immediately puts the thermometer back in the hot water. As the thermometer heats up, she records the time and thermometer reading every 30 s for 180 s, as shown in Table 2.2.

Table 2.1

t /	θ /
0	82
30	74
60	66
90	63
120	57
150	55
180	52

Table 2.2

t /	θ /
210	50
240	66
270	75
300	77
330	78
360	78
390	78

(a) Complete the column headings in both tables. [1]

(b) Calculate the change in the thermometer reading θ_c in the first 90 s whilst the thermometer cools.

θ_c = ...[1]

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(c) Suggest a conclusion about the initial rate of cooling of the thermometer bulb compared with the initial rate of heating. Justify your conclusion by reference to Tables 2.1 and 2.2.

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conclusion .....

justification .....

.....[2]

(d) When repeating this experiment in order to check the results, it is important to control the conditions. Suggest two such conditions that should be controlled.

1. .....

2. .....[2]

[Total: 6]

3 The IGCSE class is investigating the potential difference across a resistor.

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Fig. 3.1 shows the circuit used.

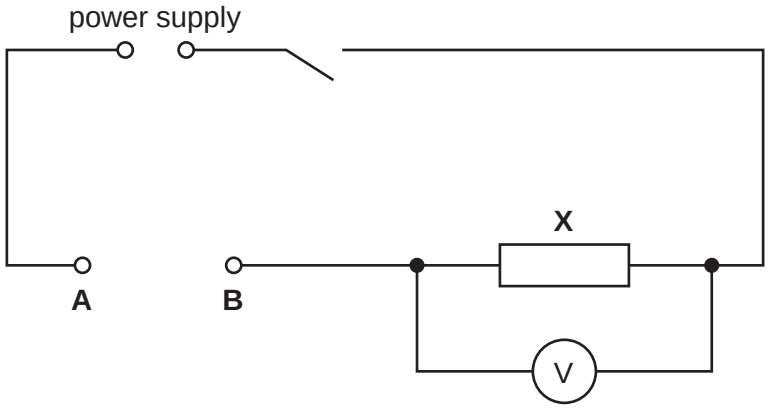


Fig. 3.1

The circuit contains a resistor **X**. There is a gap in the circuit between points **A** and **B** that is used for adding extra resistors to the circuit.

(a) A student connects points **A** and **B** together, switches on and measures the potential difference V_0 across resistor **X**. Fig. 3.2 shows the voltmeter scale.

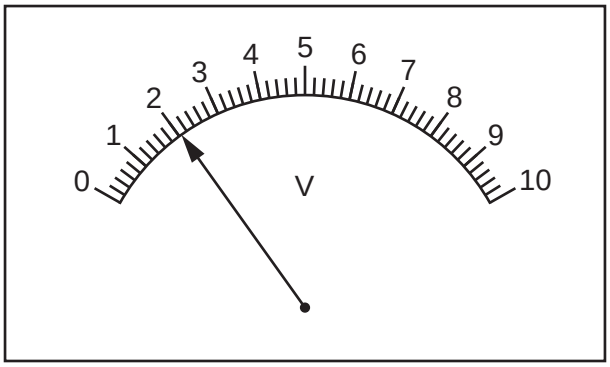


Fig. 3.2

Write down the value of potential difference V_0 shown on Fig. 3.2.

V_0 = ... [1]

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(b) The student does not change the position of the voltmeter in the circuit. She connects a 3.3 Ω resistor between points **A** and **B** and records in Table 3.1 the resistance *R* of the resistor. She switches on and records the potential difference *V* across the resistor **X**.

She repeats the procedure with each of two other resistors and finally with the 3.3 Ω and 6.8 Ω resistors connected in series with each other.

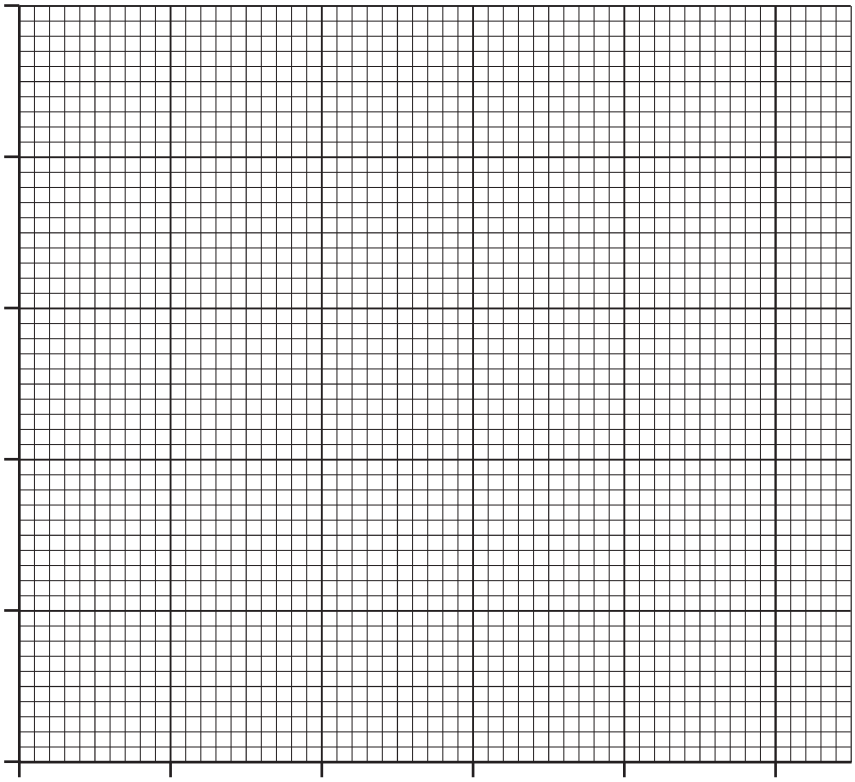
(i) Complete the column headings in the table.

Table 3.1

R /	*V* /
3.3	1.42
4.7	1.29
6.8	1.14
	0.95

(ii) In the space provided in Table 3.1, write the combined resistance of the 3.3 Ω and 6.8 Ω resistors connected in series with each other. [2]

(c) Plot the graph of *V* / V (*y*-axis) against *R* / Ω (*x*-axis). Begin both axes at 0.



[5]

(d) Use the graph to estimate the value of the potential difference *V* when *R* = 0 Ω. Show clearly on the graph how you obtained your result.

V = ...[2]

[Total: 10]

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4 An IGCSE student carries out a lens experiment to investigate the magnification of an image.

The apparatus is shown in Fig. 4.1.

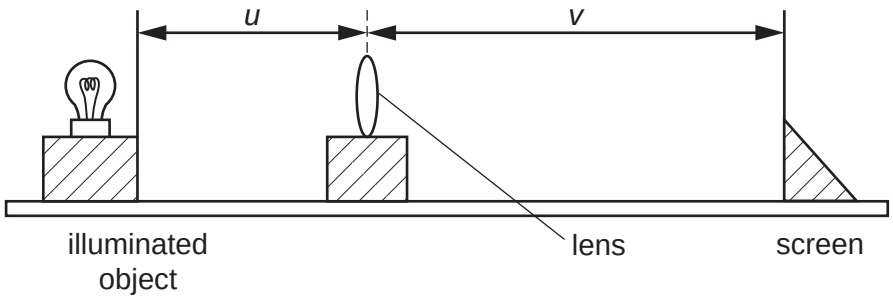


Fig. 4.1

The object is a rectangular hole in a piece of card. There is a thin wire across the hole. Fig. 4.2 shows the rectangular hole and the wire.

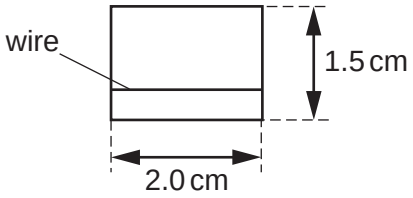


Fig. 4.2

The student sets the distance u at 32.0 cm and moves the screen to obtain a sharply focused image. The image distance v is 58.9 cm.

(a) (i) Calculate the magnification m using the equation $m = v/u$.

$m =$ .....[2]

(ii) Draw a diagram of the image, actual size, for a magnification $m = 2.0$.

[3]

(b) The object distance *u* is the distance from the object to the centre of the lens.

Explain briefly how you would position a metre rule to obtain an accurate value for *u*. You may draw a diagram.

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.....

.....

..... [1]

(c) Suggest two precautions that you would take in this experiment in order to obtain reliable readings.

1. .....

2. ..... [2]

[Total: 8]

5 The IGCSE class is investigating the rate at which salt dissolves in water.

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Each student is able to use
glass beakers,
a thermometer,
a stopclock,
a measuring cylinder,
an electronic balance,
a supply of salt,
a supply of cold water,
a stirrer,
a method of heating the water
and any other common laboratory apparatus that may be useful.

A student decides to investigate the effect of temperature on the rate at which salt dissolves in water by observing the time taken for small amounts of salt to dissolve in water at different temperatures.

(a) Suggest three possible variables that should be kept constant in this investigation.

1. .....

2. .....

3. ..... [3]

(b) In the table below, write the names of three items of apparatus that are necessary in order to take the readings in this investigation. In the second column of the table write the quantity that the item measures.

item of apparatus	quantity measured

[3]

[Total: 6]

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