UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

PHYSICS **0625/53**

Paper 5 Practical Test **October/November 2012**

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 **11** printed pages and **1** blank page.

For Examiner's Use

1 In this experiment, you will determine the mass of an object.

(a) Carry out the following instructions, referring to Figs. 1.1 and 1.2.

The spring has already been set up for you.

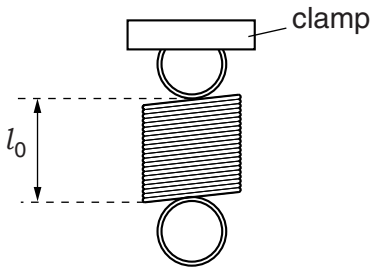


Fig. 1.1

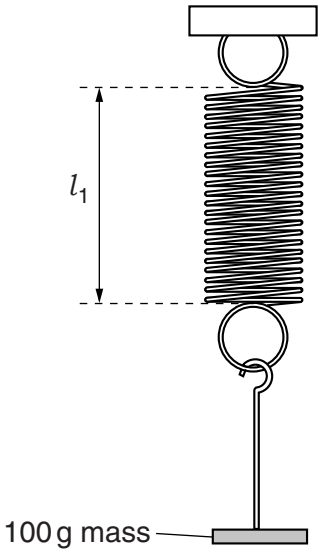


Fig. 1.2

(i) Measure and record the length l_0 of the spring without any load.

l_0 = ...

(ii) Suspend the 100 g mass from the spring.

Measure and record the stretched length l_1 of the spring.

l_1 = ...[1]

(iii) Calculate the extension e_1 of the spring using the equation $e_1 = (l_1 - l_0)$.

e_1 = ...[1]

(iv) Determine a value for k using the equation $k = \frac{m}{e_1}$, where m = 100 g.

k = ... unit .....[2]

(b) Set up the apparatus as shown in Fig. 1.3.

For Examiner's Use

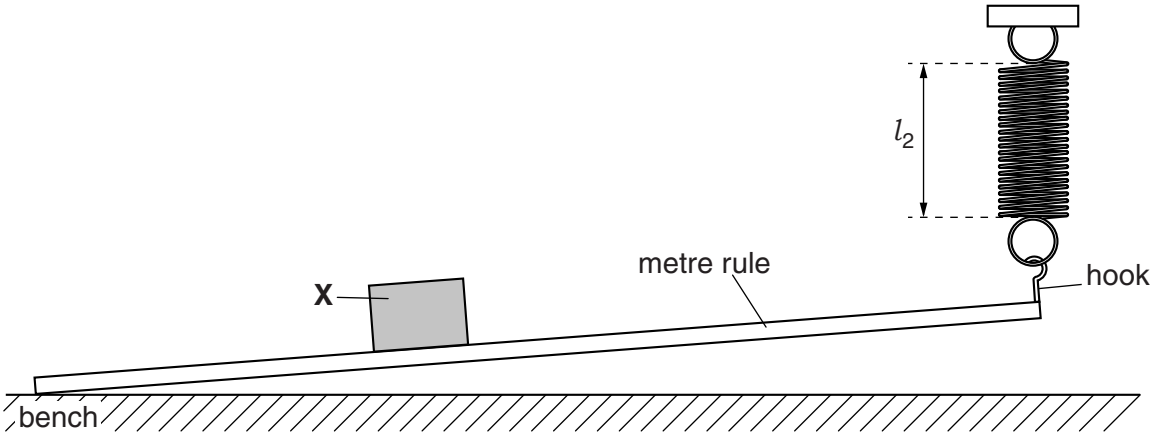


Fig. 1.3

(i) Place the object **X** with its centre at the mark on the metre rule that is 40.0 cm from the end resting on the bench.

Explain briefly how you made sure that the object was in the correct position. You may wish to use a diagram.

.....

.....

.....[1]

(ii) Measure and record the length l_2 of the spring.

l_2 = ...

(iii) Remove the object **X**. Measure and record the new length l_3 of the spring.

l_3 = ...

(iv) Determine the change in the extension e_2 for the mass at 40.0 cm, where $e_2 = (l_2 - l_3)$.

e_2 = ...

(v) Calculate the mass M of the object **X** using your answer to **(a)(iv)** and **(b)(iv)** and the equation $M = k\left(\frac{e_2}{0.40}\right)$.

M = ...[3]

(c) Suggest two practical causes of inaccuracy in this experiment.

For Examiner's Use

1. .....

.....

2. .....

.....

[2]

[Total: 10]

BLANK PAGE

2 In this experiment, you will investigate how different surfaces absorb thermal radiation.

For Examiner's Use

Carry out the following instructions, referring to Fig. 2.1. The apparatus is set up for you.

A screen is provided to the side of the lamp in order to shield your eyes from direct glare. Do not place it between the lamp and the thermometer.

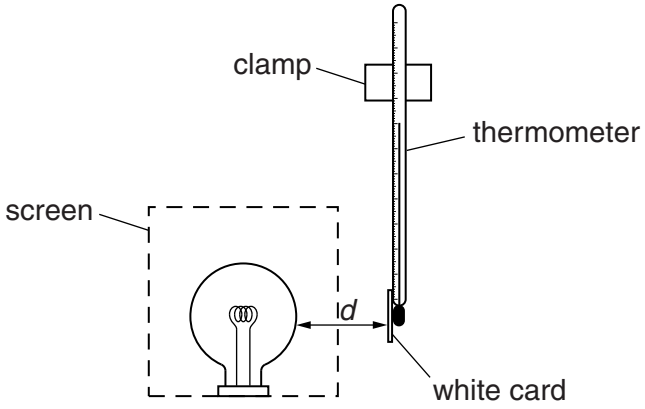


Fig. 2.1

(a) (i) Adjust the distance d between the lamp and the thermometer so that it is approximately 1 cm. You are provided with a spacer to do this.

(ii) In Table 2.1, record the initial temperature θ (with the lamp switched off).

(iii) Switch on the lamp.
In Table 2.1, record the temperature θ at 60 s intervals until you have a total of 5 values up to $t = 240$ s.
Switch off the lamp.

(iv) Replace the white card with the piece of black card, making sure that it makes good contact with the thermometer bulb.

(v) Repeat step **(i)**.

(vi) When the thermometer has cooled down, repeat steps **(ii)** and **(iii)**.

(vii) Complete the column headings in the table.

Table 2.1

	white card	black card
t /	θ /	θ /

[4]

(b) (i) Calculate the overall temperature change for each card after 240 s.

For Examiner's Use

white card: temperature change = ...

black card: temperature change = ...

[1]

(ii) Determine which surface, white or black, absorbs thermal radiation more efficiently. State the experimental evidence for your choice.

surface.....

evidence .....

.....

.....

[1]

(iii) A student suggests that the rate of temperature rise will be greater at the beginning of the experiment than towards the end.

Do your results support this? Justify your answer with reference to your data for black card.

statement .....

justification .....

.....

.....

[2]

(c) Another IGCSE student wants to repeat your experiment.

Suggest one precaution with the apparatus which she should take to make the comparison between white and black surfaces a fair one. Explain why not taking this precaution might cause the test to be unfair.

precaution .....

.....

explanation .....

.....

.....

.....

.....

[2]

[Total: 10]

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

For Examiner's Use

The apparatus has been set out for you as shown in Fig. 3.1.

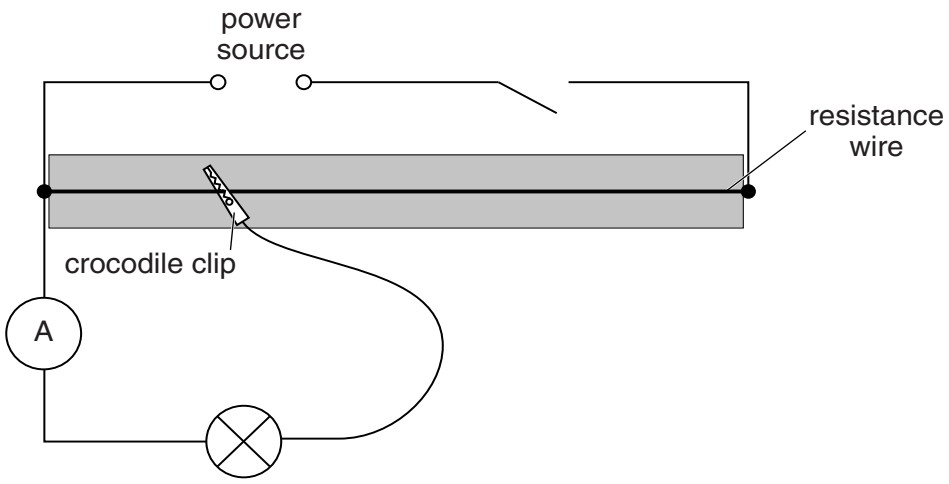


Fig. 3.1

(a) (i) On Fig. 3.1, draw the symbol for a voltmeter correctly connected to measure the potential difference across the lamp.

(ii) Connect the voltmeter as described in **(i)**.

[2]

(b) Switch on.

(i) Adjust the position of the crocodile clip on the resistance wire to give a voltmeter reading of 1.0 V.

(ii) Measure, and record in Table 3.1, the potential difference V and the current I.

(iii) Repeat **(i)** and **(ii)** for 3 more positions of the crocodile clip giving larger values of potential difference. Include the maximum length of wire.

Switch off.

(c) (i) Complete the column headings in Table 3.1.

(ii) Calculate, and record in Table 3.1, the resistance R of the lamp at each potential difference using the equation $R = \frac{V}{I}$.

Table 3.1

For Examiner's Use

V/	I/	R/

[5]

(d) An IGCSE student suggests that the resistance of a lamp stays the same whatever its temperature.

State whether your findings support this suggestion. Justify your answer, using your results and your observations during the experiment.

statement .....

.....

justification .....

.....

.....

.....

[3]

[Total: 10]

4 In this experiment, you will determine the focal length of a converging lens.

For Examiner's Use

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

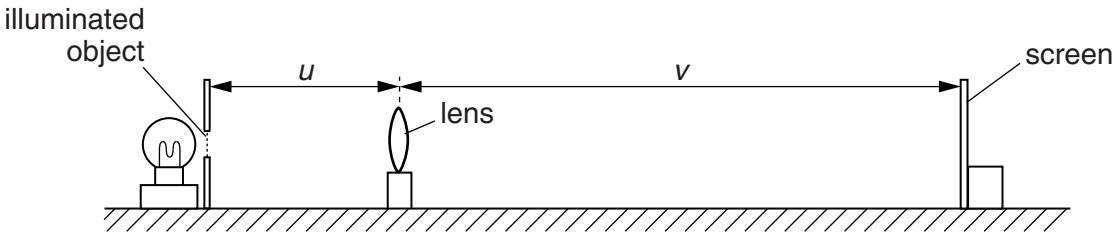


Fig. 4.1

(a) (i) Set the object distance u to 0.200 m.

(ii) Place the screen near the lens. Move the screen until a sharp image of the object is seen on the screen.

(iii) Carefully measure, and record in Table 4.1, the image distance v in metres.

(iv) Repeat steps **(ii)** and **(iii)** for object distances u of 0.250 m, 0.350 m, 0.450 m and 0.600 m.

(b) Calculate the values of $\frac{1}{v}$ and record them in the table.

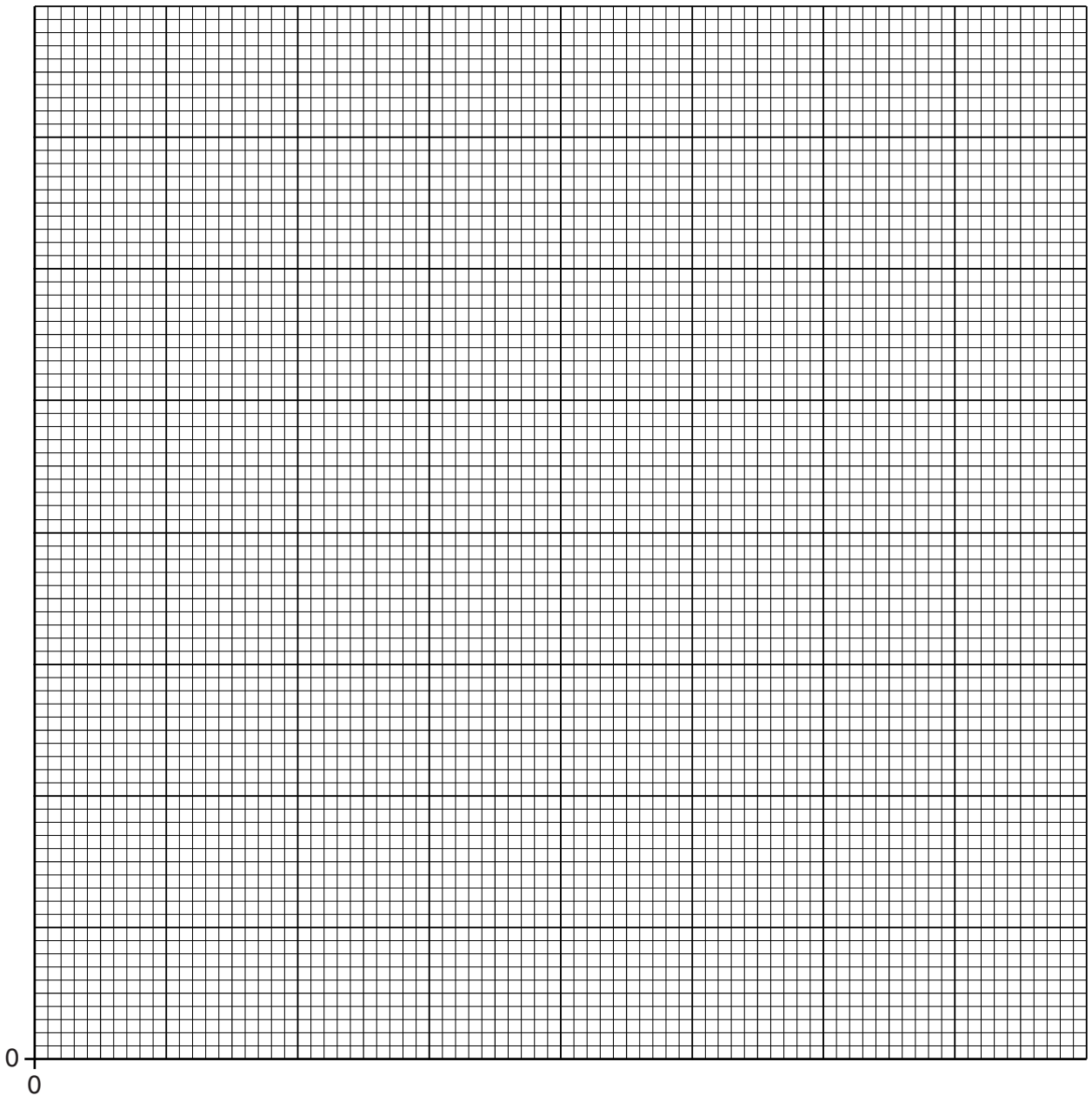
Table 4.1

u / m	$\frac{1}{u} \Big/ \frac{1}{\text{m}}$	v / m	$\frac{1}{v} \Big/ \frac{1}{\text{m}}$
0.200	5.00		
0.250	4.00		
0.350	2.86		
0.450	2.22		
0.600	1.67		

[3]

(c) Plot a graph of $\frac{1}{v}\Big/\frac{1}{\text{m}}$ (y-axis) against $\frac{1}{u}\Big/\frac{1}{\text{m}}$ (x-axis). Begin both axes at the origin (0,0). The scale must allow the best-fit line, when extended beyond the range of the data, to cross both axes.

For Examiner's Use



[4]

(d) (i) From the graph, determine the value p of $\frac{1}{u}$ when $\frac{1}{v}$ is zero (the x-intercept).

$p =$ .....

(ii) From the graph, determine the value q of $\frac{1}{v}$ when $\frac{1}{u}$ is zero (the y-intercept).

$q =$ .....[1]

(e) (i) Calculate z, where z is the average of p and q.

For Examiner's Use

$z =$ .....

(ii) Calculate the focal length f of the lens where $f = \frac{1}{z}$.

$f =$ .....
[2]

[Total: 10]