UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

* 9 0 8 8 9 6 5 7 7 6 *

PHYSICS **0625/63**

Paper 6 Alternative to Practical **May/June 2011**

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.

For Examiner's Use	
1	
2	
3	
4	
5	
Total	

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

DC (SLM) 43665
© UCLES 2011

1 The IGCSE class is investigating the loading of a metre rule.

For Examiner's Use

Fig. 1.1 shows the apparatus.

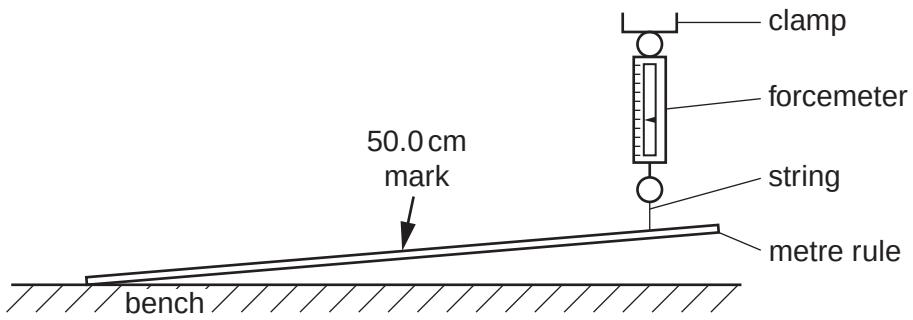


Fig. 1.1

(a) A metre rule is attached at one end to the bench. The other end is supported by a forcemeter.

A student records in Table 1.1 the reading *F* on the forcemeter.

He places a 100 g mass on the rule at the 50.0 cm mark and records in the table the value of the reading *F* on the forcemeter. He repeats the procedure using masses of 200 g, 300 g, 400 g and 500 g. The forcemeter readings are shown in the table.

Write the mass values in the table.

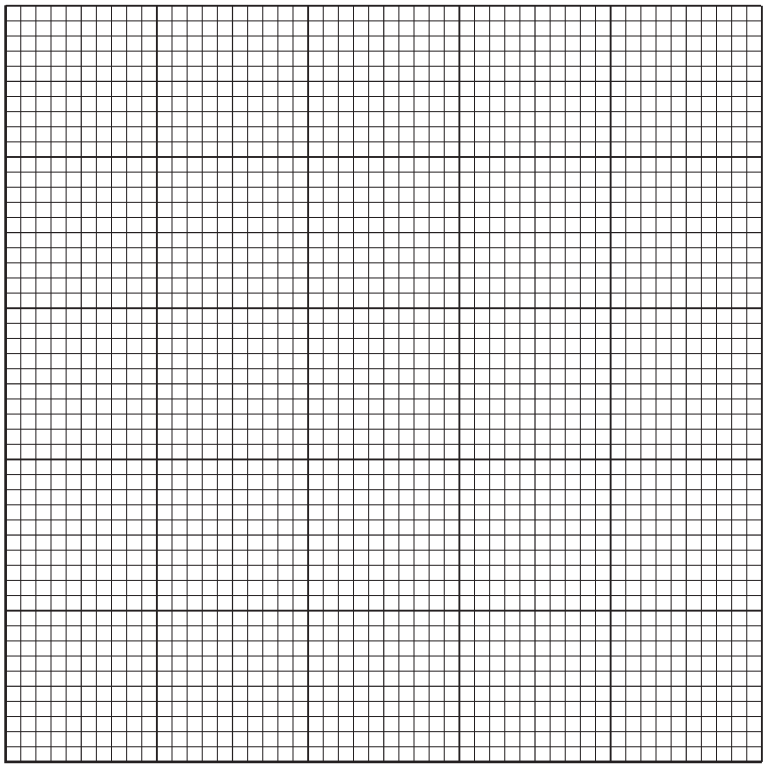
Table 1.1

m/g	*F*/N
0	1.10
	1.85
	2.20
	2.95
	3.50
	4.20

[1]

(b) Plot a graph of F/N (y-axis) against m/g (x-axis).

For Examiner's Use



[5]

(c) Use the graph to find the value of F when m = 375 g. Show clearly on the graph how you obtained the result.

F = ...[2]

(d) The forcemeter shows a reading when no mass has been added to the metre rule. Assuming that the forcemeter has no zero error, suggest a reason for the reading.

.....

.....[1]

[Total: 9]

© UCLES 2011

[Turn over

2 The IGCSE class is investigating the rate of cooling of water.

For Examiner's Use

Fig. 2.1 shows the apparatus.

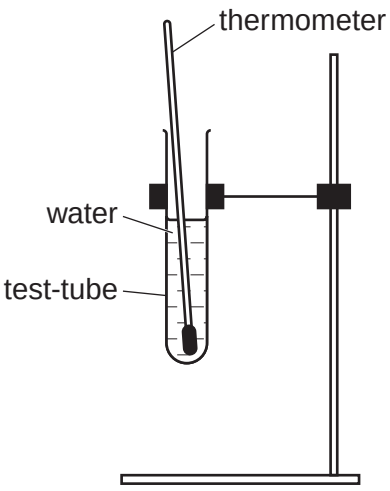


Fig. 2.1

(a) Record room temperature θ_R as shown on the thermometer in Fig. 2.2.

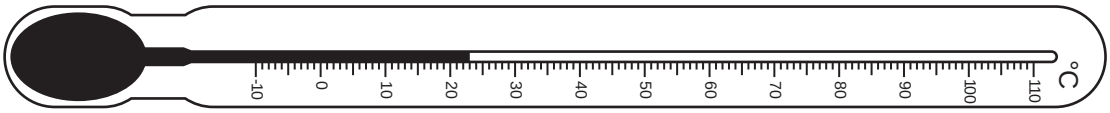


Fig. 2.2

θ_R = ...[1]

For Examiner's Use

(b) A student pours hot water into the test-tube until it is about two thirds full of water and places the thermometer in the water. When the thermometer reading stops rising, she measures the temperature θ of the water and records θ in Table 2.1 at time t = 0. She starts a stopclock and records in the table the time t and the temperature θ of the water every 30 s. She removes the thermometer and pours away the water from the test-tube. She then wraps cotton wool insulation round the test-tube and repeats the procedure.

(i) Complete the time and temperature column headings in the table.

(ii) Complete the time column in the table.

Table 2.1

t /	tube without cotton wool θ /	tube with cotton wool θ /
0	79	80
	65	67
	58	60
	55	57
	53	56
	52	55
	51	54

[2]

(c) State in which experiment the cooling is more rapid. Justify your answer by reference to the readings.

experiment .....

justification .....

.....[2]

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

1. .....

2. .....[2]

(e) Suggest two alternative insulating materials that could be used in place of cotton wool.

1. .....

2. .....[2]

[Total: 9]

© UCLES 2011

[Turn over

3 The IGCSE class is investigating the resistance of a wire.

For Examiner's Use

Fig. 3.1 shows the circuit.

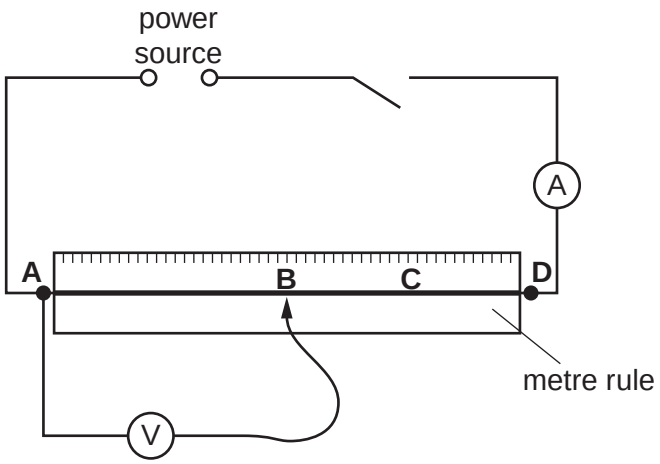


Fig. 3.1

(a) A student measures the current I in the circuit and the p.d. V across the section of wire **AB**. He records the length l of the wire **AB**. He repeats the procedure with the voltmeter connected across section **AC** of the wire and then with the voltmeter connected across section **AD** of the wire. The readings are shown in Table 3.1.

Table 3.1

voltmeter connected across	l /	I /	V /	R /
AB	50	0.21	0.9	
AC	75	0.22	1.4	
AD	100	0.20	1.7	

(i) Calculate the values of resistance R for each length of wire using the equation $R = \frac{V}{I}$. Enter the values in the table.

(ii) Complete the column headings in the table. [3]

(b) It is suggested that the resistance across **AB** should be half the resistance across **AD**. State whether the results support this suggestion and justify your answer with reference to the results.

statement .....

justification .....

.....[2]

(c) It is known that changes in temperature affect the resistance of the wire. State how you can limit the temperature changes when carrying out this experiment.

.....

.....[1]

© UCLES 2011

(d) The student wishes to use a lower current so he adds a variable resistor to the circuit.

For Examiner's Use

(i) Draw the standard circuit symbol for a variable resistor.

(ii) On Fig. 3.1, mark with an X a suitable position in the circuit for the variable resistor. [2]

[Total: 8]

© UCLES 2011

[Turn over

4 The IGCSE class is investigating the refraction of light through a transparent block.

For Examiner's Use

Fig. 4.1 shows a student's ray trace sheet. It is not drawn full size.

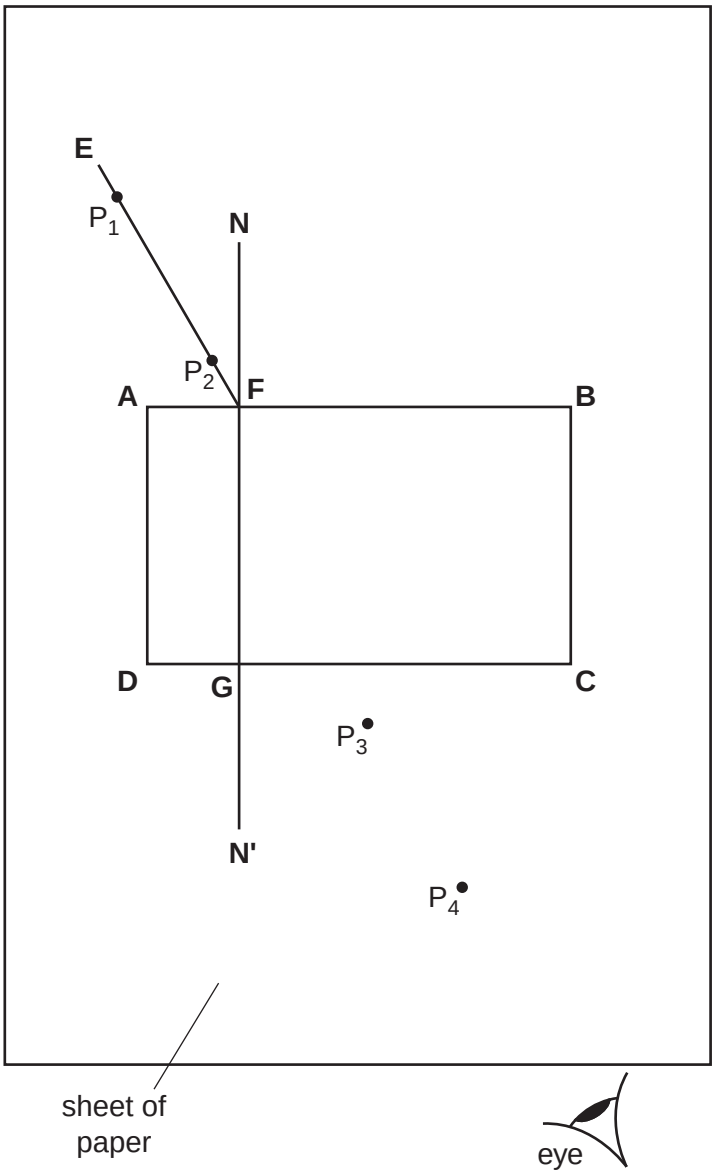


Fig. 4.1

(a) The student places a transparent block, largest face down, on a sheet of plain paper and draws the outline **ABCD** of the block. She removes the block and draws the normal **NN'** to side **AB**. She then draws the line **EF** at an angle of incidence *i*.

On Fig. 4.1, measure the angle of incidence *i*.

i = ...[1]

For Examiner's Use

(b) She places two pins P_1 and P_2 on line **EF**, as shown in Fig. 4.1, and replaces the block. She observes 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. She places two pins P_3 and P_4 between her 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.

(i) On Fig. 4.1, draw a line joining the positions of P_3 and P_4. Continue the line until it meets **CD**. Label this point **H**.

(ii) Measure and record the length *a* of the line **GH**.

a = ...

(iii) Draw the line **HF**.

(iv) Measure and record the length *b* of the line **HF**.

b = ...

(v) Calculate the refractive index *n* of the material of the block using the equation $n = \frac{b}{2a}$.

n = ...
[5]

(c) **(i)** Suggest how far apart you would place the pins P_3 and P_4 if you were carrying out this experiment using a ray trace sheet the same size as this page.

suggested distance = ...

(ii) Give a reason for your answer to **(i)**.

reason .....
[2]

(d) This experiment may be carried out using a ray of light, produced by a ray box, instead of by using optical pins. A student suggests that the ray box method will be more accurate. Assuming that the experiment is carried out with care, suggest one possible cause of inaccuracy using the optical pin method and one using the ray box method.

optical pin method .....

.....

ray box method .....

.....[2]

[Total: 10]

For Examiner's Use

5 **(a)** An IGCSE student is investigating the relationship between the extension of a metal wire of unstretched length 3.000 m, and the load hung on the wire. He has a set of 10 N weights.

Consider the readings that the student should take and write appropriate column headings, with units, in Table 5.1.

Table 5.1

0	3.000	0
20	3.001	0.001
40	3.002	0.002
60	3.003	0.003
80	3.010	0.010

[2]

(b) The student decides to repeat the experiment using a wire made of a different metal in order to study how the extension may be affected by the metal from which the wire is made. To make a fair comparison, other variables must be kept constant. Suggest two variables that the student should keep constant.

1. .....

2. .....[2]

[Total: 4]

© UCLES 2011

BLANK PAGE

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

© UCLES 2011