UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

9996717369

PHYSICS **0625/61**

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.

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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 position of the centre of mass of a triangular card.

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The apparatus is shown in Fig. 1.1.

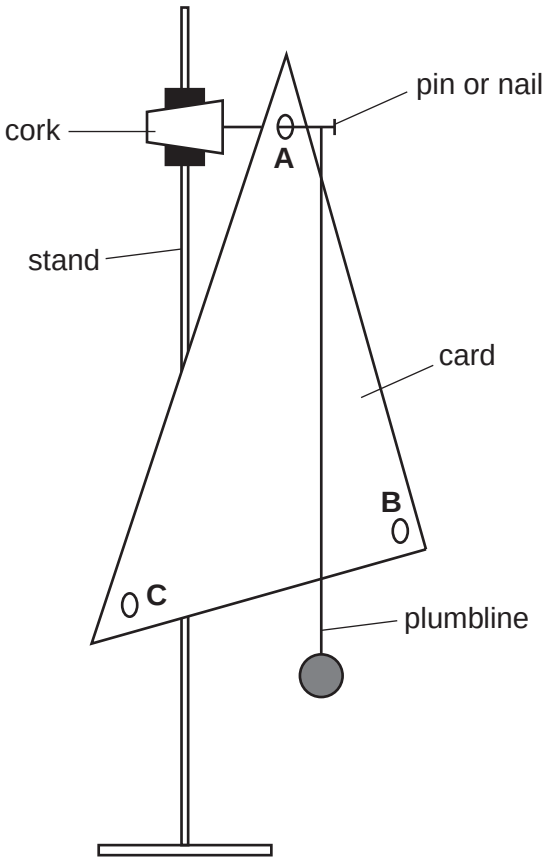


Fig. 1.1

(a) The student hangs the card on the nail through hole **A**. He checks that the card is able to swing freely and then hangs the plumbline from the nail so that it is close to, but not touching, the card. When the card and plumbline are still, he makes a small mark at the edge of the card where the plumbline crosses the edge. He removes the card and draws a line from the mark to hole **A**.

He repeats the procedure using holes **B** and **C**.

Fig.1.2 is a drawing of the card.

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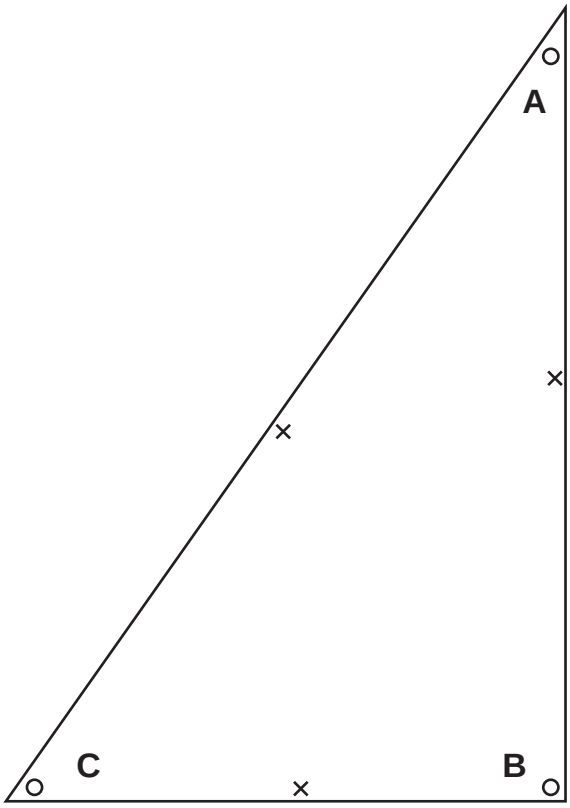


Fig.1.2

On Fig.1.2, the position of each of the marks the student makes is shown with a small cross. On Fig. 1.2, draw in the lines between the positions of the holes **A**, **B** and **C** and the corresponding crosses on the card. [2]

(b) If the experiment is completely accurate, the centre of mass of the card is at the position where the three lines meet. On Fig. 1.2, judge the best position for the centre of mass, marking it with a small cross. Draw a line from this position to the right-angled corner of the card and measure the distance *a* between the centre of mass and the right-angled corner of the card.

a = ...[3]

(c) In this experiment, it is important that the card is able to swing freely. For this reason, the plumbline should not touch the card but be a small distance from it. This could cause an inaccuracy in marking the card at the correct position. Describe how you would minimise this possible inaccuracy. You may draw a diagram.

.....

.....[1]

[Total: 6]

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

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The apparatus is shown in Fig. 2.1.

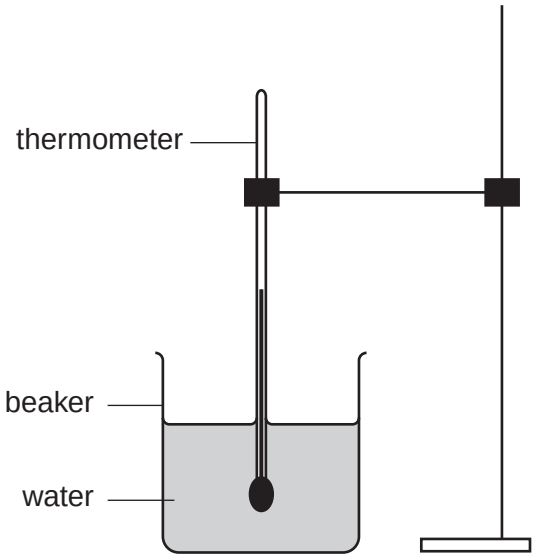


Fig. 2.1

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

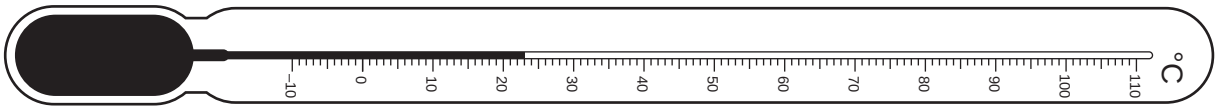


Fig. 2.2

θ_R = ...[1]

(b) The beaker contains 200 cm^3 of hot water. A student takes temperature readings as the water cools, as shown in Table 2.1.

Table 2.1

t /	θ /
0	79
30	65
60	58
90	55
120	53
150	52
180	51

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(i) Complete the column headings in Table 2.1.

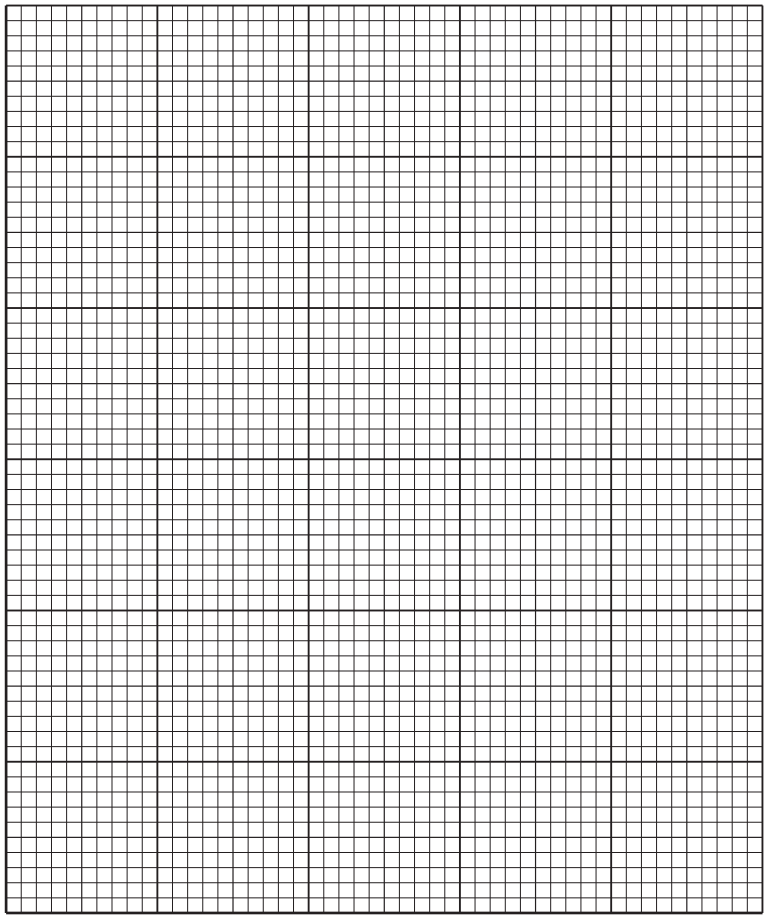
(ii) Calculate the temperature fall T_1 during the first 30 s of cooling.

T_1 = ...

(iii) Calculate the temperature fall T_2 during the final 30 s of cooling.

T_2 = ...[3]

(c) Plot the graph of temperature (*y*-axis) against time (*x*-axis).



[5]

(d) **(i)** State how the rate of cooling in the first 30 s differs from that in the final 30 s.

.....

.....

(ii) Explain how the graph line shows this difference.

.....

.....[2]

[Total: 11]

3 The IGCSE class is measuring the currents in lamps in different circuits.

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The first circuit is shown in Fig. 3.1.

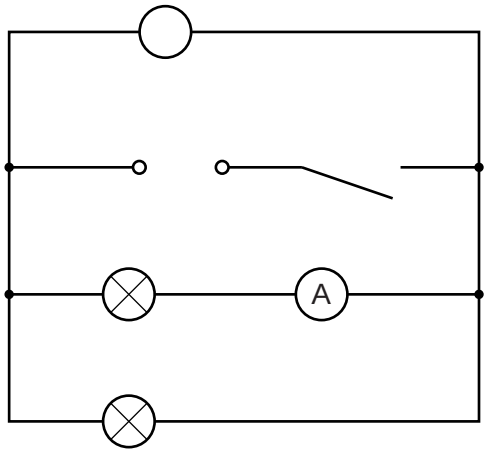


Fig. 3.1

(a) A student records the potential difference *V* across the lamps and the current I in lamp 1. She rearranges the circuit so that the ammeter is connected in series with lamp 2 and again records the potential difference *V* across the lamps and the current I in lamp 2.

The readings are shown in Table 3.1.

Table 3.1

	V /	I /	*R* /
lamp 1	1.9	0.35	
lamp 2	1.9	0.32	

(i) Calculate the resistance *R* of each lamp, using the equation $R = \frac{V}{I}$, and enter the results in the table.

(ii) Add together the two values of *R* to calculate R_S, the sum of the resistances of the two lamps.

R_S = ...

(iii) Complete the column headings in the table.

[3]

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(b) The student rearranges the circuit so that the lamps and the ammeter are in series. She does not change the position of the voltmeter.

She records the readings on the voltmeter and the ammeter.

voltmeter reading.....1.9 V

ammeter reading.....0.23 A

(i) Draw a circuit diagram of the rearranged circuit using conventional symbols.

(ii) Use the voltmeter and ammeter readings to calculate R_T, the combined resistance of the two lamps in series.

R_T = ...[3]

(c) A student suggests that the values of R_S and R_T should be equal. State whether the results support this suggestion and justify your statement by reference to the calculated values.

statement .....

justification .....

.....[2]

(d) State, without reference to the values of resistance that you have calculated, one piece of evidence that the student can observe during the experiment that shows that the temperature of the lamp filaments changes.

.....

.....[1]

[Total: 9]

4 The IGCSE class is investigating reflection of light using a plane mirror.

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A student has set up a ray trace sheet and this is shown in Fig. 4.1. The line **MR** shows the position of a plane mirror.

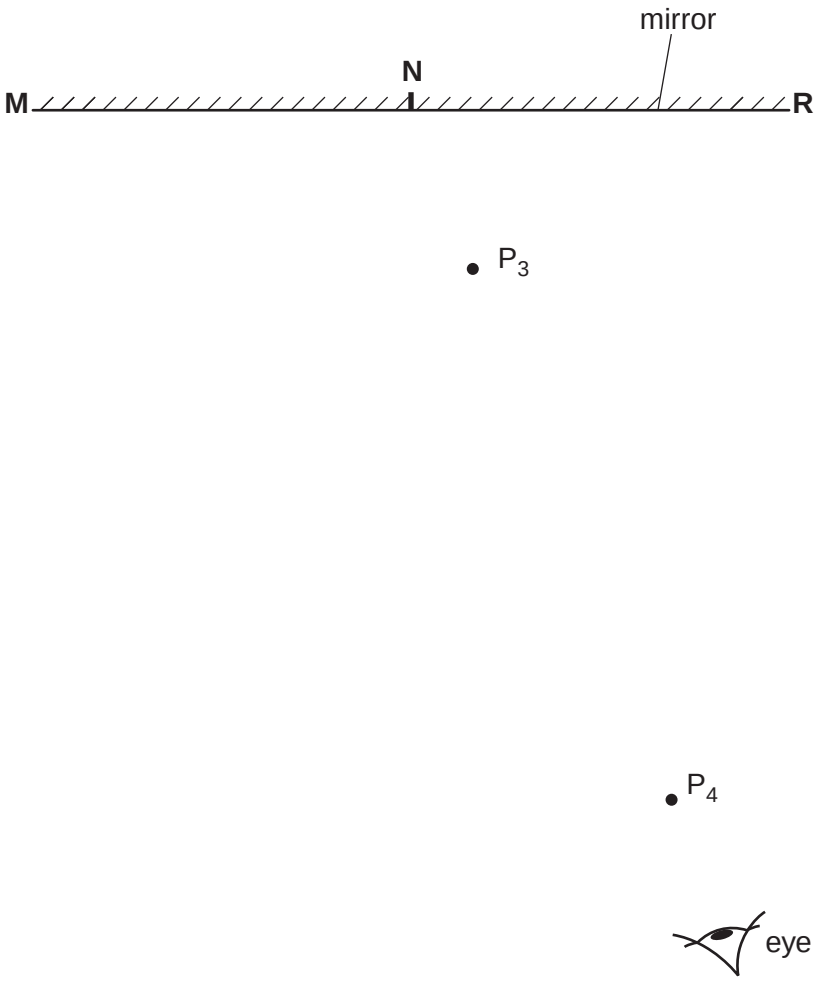


Fig. 4.1

(a) **(i)** Draw a normal to line **MR** at **N**.

(ii) Draw a line 10 cm long that is parallel to line **MR** and 12 cm below it. The ends of this line must be at the same distance from the edges of the page as the ends of line **MR**. Label this line **CD** with **C** directly below **M**. [3]

(b) The student places a pin P_1 so that it stands vertically at **C**. He places another pin P_2 as close as possible to the point **N**.

(i) Draw a line from **C** to **N**.

(ii) Measure and record the angle of incidence *i* between the line **CN** and the normal.

i = ...[2]

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(c) The student views the image in the mirror of the pin P_1 from the direction indicated by the eye in Fig. 4.1. He places two pins P_3 and P_4 some distance apart so that pins P_4, P_3, P_2 and the image of P_1 all appear exactly one behind the other. The positions of P_3 and P_4 are shown on Fig. 4.1.

(i) Draw in the line joining the positions of P_3 and P_4. Continue the line until it meets the normal.

(ii) Measure and record the angle of reflection *r* between the normal and line P_3P_4.

r = ...[2]

(d) Several students found that, in spite of carrying out this experiment with reasonable care, the measured value of the angle of reflection *r* was not exactly the same as the value obtained from theory.

Suggest two possible causes of this inaccuracy.

1. .....

.....

2. .....

.....[2]

[Total: 9]

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[Turn over

5 Table 5.1 shows some measurements taken by three IGCSE students. The second column shows the values recorded by the three students. For each quantity, underline the value most likely to be correct.

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The first one is done for you.

Table 5.1

quantity measured	recorded values
the mass of a wooden metre rule	<u>0.112 kg</u> 1.12 kg 11.2 kg
the diameter of a test tube	0.15 cm 1.5 cm 15 cm
the volume of a coffee cup	10 cm^3 100 cm^3 1000 cm^3
the area of a computer keyboard	0.07 m^2 0.70 m^2 7.0 m^2
the current in a 1.5 V torch lamp at normal brightness	0.12 A 12 A 120 A
the circumference of a 250 cm^3 beaker	2.3 cm 23 cm 230 cm

[5]

[Total: 5]

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