Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

PHYSICS **0625/61**

Paper 6 Alternative to Practical **October/November 2014**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **12** printed pages.

DC (SJF/KN) 82881/3

CAMBRIDGE International Examinations

[Turn over

1 The IGCSE class is investigating the reflection of light by a plane mirror. Fig. 1.1 shows a student's ray-trace sheet.

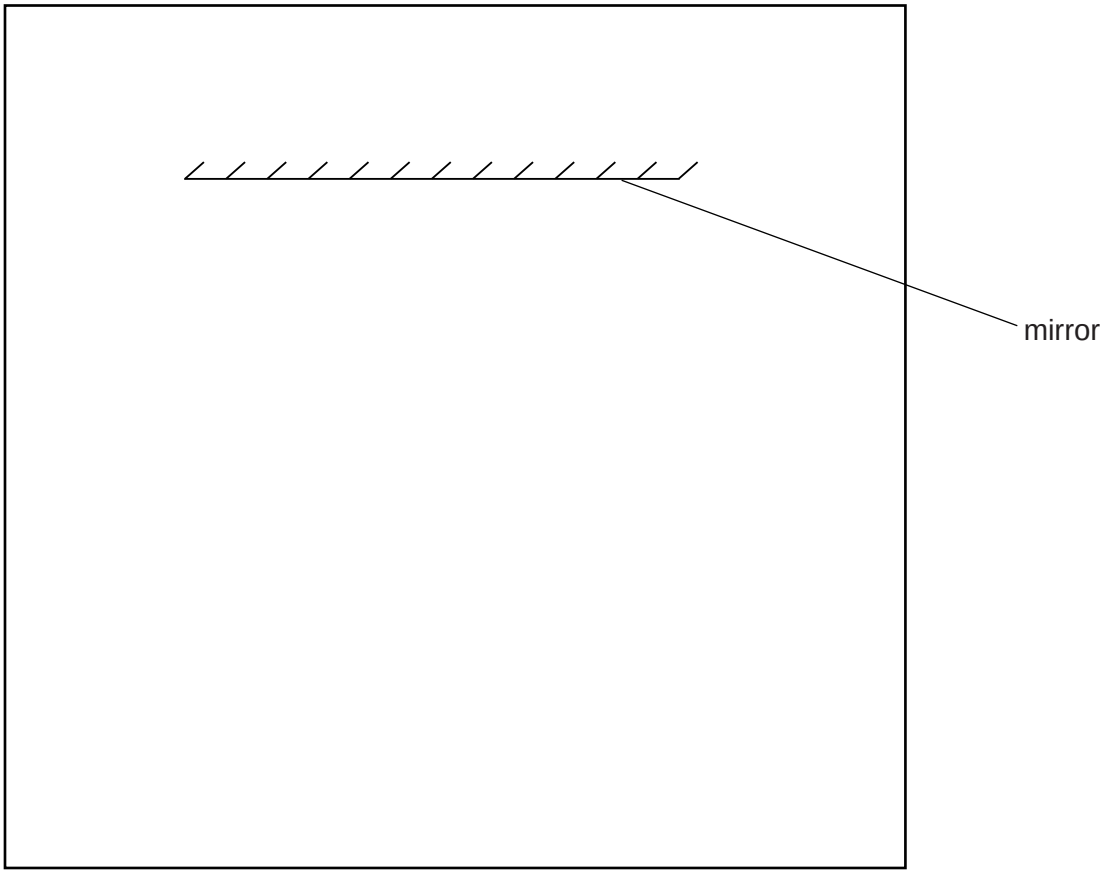


Fig. 1.1

(a) On Fig. 1.1, draw a normal to the centre of the mirror. [1]

(b) On Fig. 1.1, draw an incident ray at 30° to the normal and to the left of the normal. [1]

(c) Fig. 1.2 shows a diagram of a ray box.

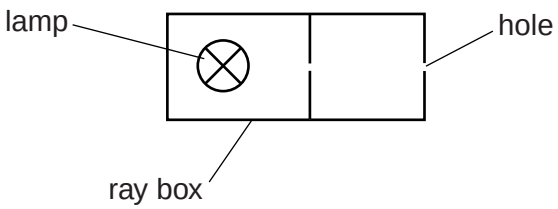


Fig. 1.2

On Fig. 1.1, draw the ray box in a suitable position to produce the incident ray that you have drawn. [1]

(d) On Fig. 1.1, draw a reflected ray in the position you would expect it to be using the incident ray that you have drawn. [1]

(e) State two precautions that you could take in this experiment to obtain reliable results.

1. .....

.....

2. .....

.....

[2]

[Total: 6]

2 The IGCSE class is investigating the cooling of hot water under different conditions.

Figs. 2.1 and 2.2 show the apparatus used.

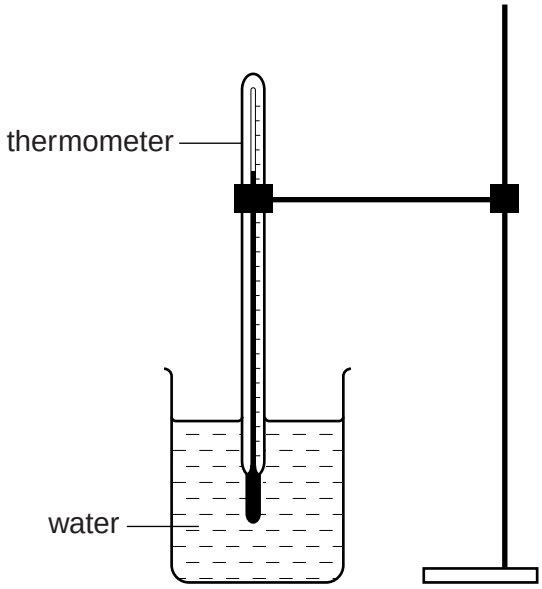


Fig. 2.1

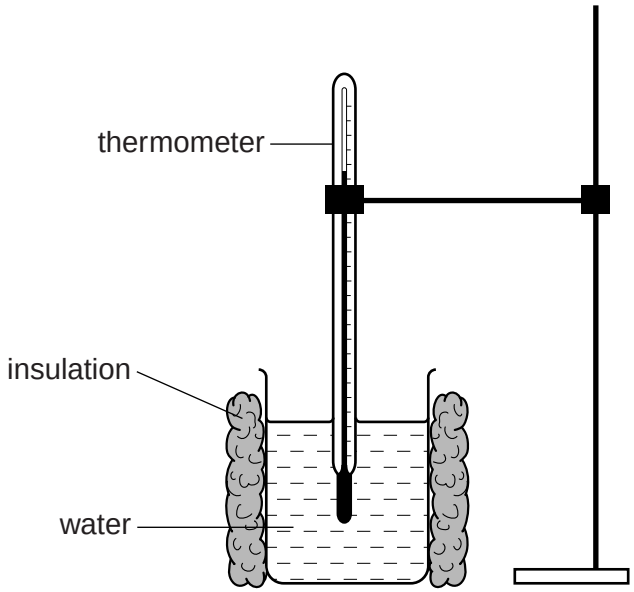


Fig. 2.2

(a) Record room temperature θ_R as shown on the thermometer in Fig. 2.3.

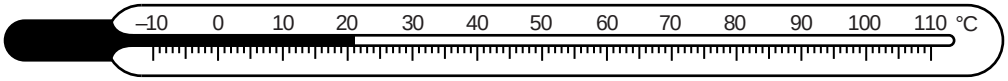


Fig. 2.3

θ_R = ... [1]

(b) A student pours hot water into the uninsulated beaker shown in Fig. 2.1 until it is about two-thirds full. She measures the temperature and immediately starts a stopclock. She records the temperature every 30 s. She repeats the procedure using the insulated beaker as shown in Fig. 2.2. The readings are shown in Table 2.1.

Table 2.1

	without insulation	with insulation
t/	*θ*/	*θ*/
0	80	79
30	77	76
60	74	73
90	72	71
120	70	70
150	69	69

Complete the column headings in the table. [1]

(c) State whether the cotton wool insulation increases, decreases, or has no significant effect on the rate of cooling of the water, compared with the rate of cooling with no insulation. Justify your answer by reference to the results.

statement .....

justification .....

.....

.....
[2]

(d) The student suggests that a significant cause of loss of thermal energy from the beakers is evaporation.

Suggest how you would reduce the evaporation in this experiment.

.....[1]

(e) Suggest one condition that should not be changed when this experiment is repeated.

.....[1]

[Total: 6]

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

The circuit used is shown in Fig. 3.1.

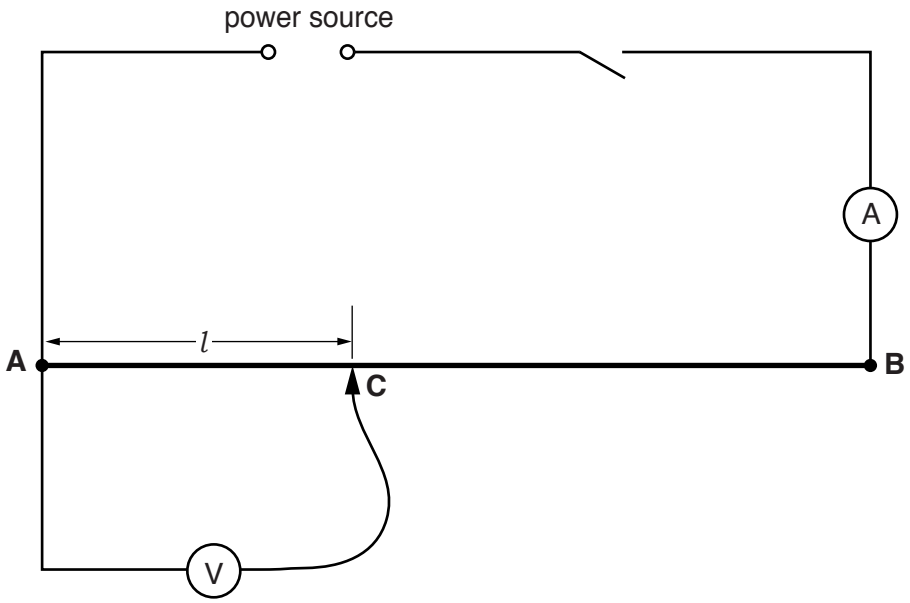


Fig. 3.1

(a) A student measures the potential difference V across different lengths l of the wire **AB** and the current I in the wire. The wire **AB** is 1.00 m long. The readings are shown in Table 3.1.

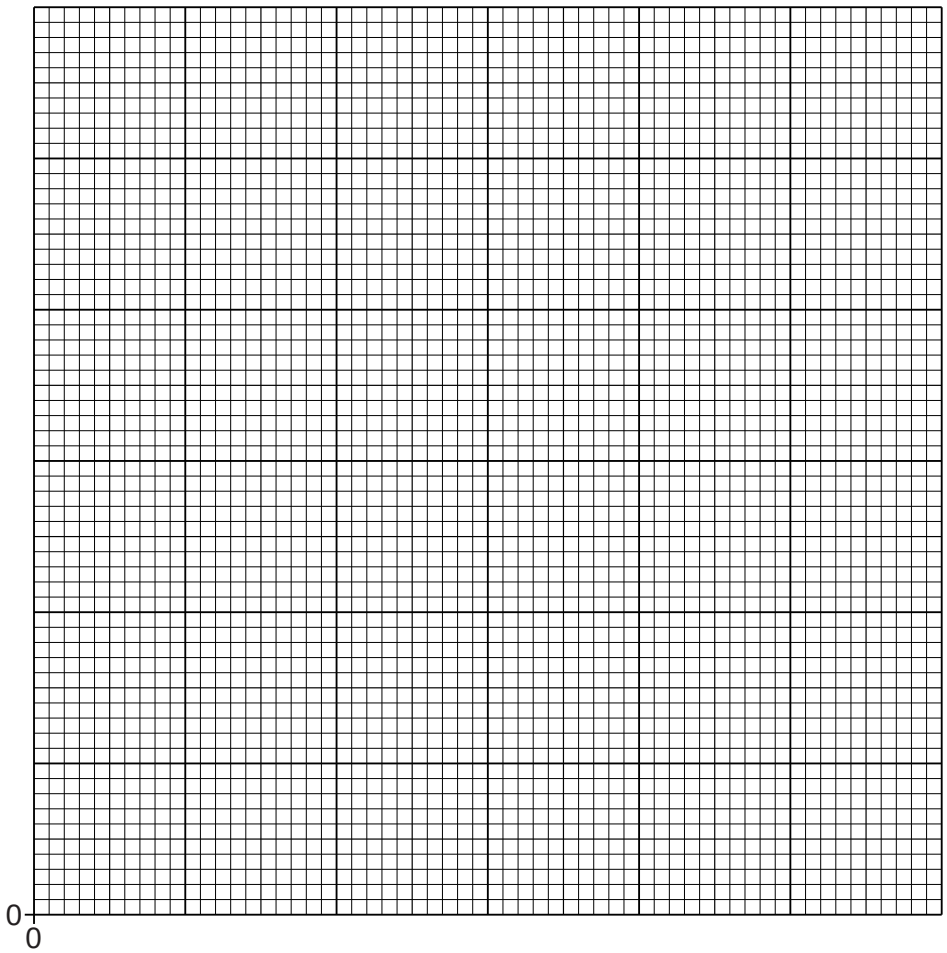
Calculate the resistance R of each length l of the wire **AB**, using the equation $R = \frac{V}{I}$. Record the values of R in the table.

Table 3.1

l/cm	V/V	I/A	R/Ω
10.0	0.36	0.73	
20.0	0.70	0.71	
30.0	1.10	0.73	
40.0	1.45	0.73	
50.0	1.80	0.72	

[2]

(b) Plot a graph of R/Ω (y-axis) against l/cm (x-axis). Start both axes at the origin (0,0).



[5]

(c) State whether your graph shows that the resistance R is proportional to the length l. Justify your answer by reference to the graph.

statement .....

justification .....

.....

[2]

(d) Suggest how you could further test your statement in **(c)**, using the same apparatus.

.....

.....[1]

[Total: 10]

4 The IGCSE class is determining the magnification of an image produced by a lens.

The apparatus is shown in Fig. 4.1.

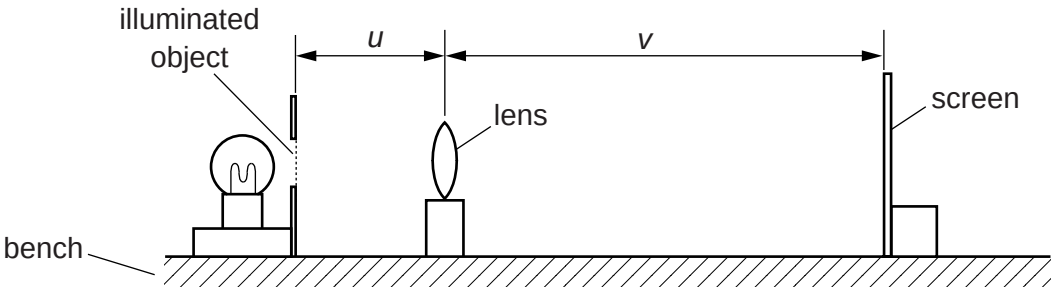


Fig. 4.1

(a) **(i)** On Fig. 4.1, measure and record in mm the distance *u* from the illuminated object to the centre of the lens.

u = ... mm

(ii) On Fig. 4.1, measure and record in mm the distance *v* from the centre of the lens to the screen.

v = ... mm
[1]

(b) Calculate the ratio $\frac{v}{u}$.

$\frac{v}{u}$ = ... [1]

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

(i) Calculate the actual distance *U* from the illuminated object to the centre of the lens.

U = ... mm

(ii) Calculate the actual distance *V* from the centre of the lens to the screen.

V = ... mm
[1]

(d) The student measures the height *h* from the top to the bottom of the image on the screen.

h = 4.5 ..... cm

(i) On Fig. 4.2, measure the height x of the illuminated object.

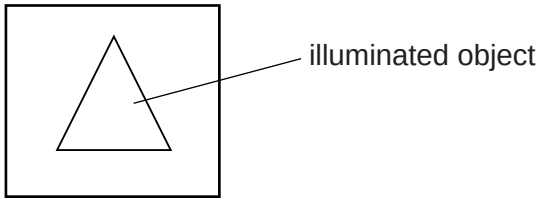


Fig. 4.2 (full size)

x = ...

(ii) Calculate $\frac{h}{x}$.

$\frac{h}{x}$ = ...
[1]

(e) The magnification m of the image is given by the equation $m = \frac{h}{x}$. The student suggests that the ratio $\frac{V}{U}$ also gives the magnification m. State whether the results support this suggestion and justify your answer by reference to the results.

statement .....

justification .....

.....
[2]

(f) State two precautions that you could take in this experiment to obtain reliable results.

1. .....

.....

2. .....

.....
[2]

(g) The image on the screen in this experiment is magnified and dimmer than the object.

State one other difference that you would expect to see between the image and the illuminated object.

.....[1]

(h) Suggest one precaution that you would take in this experiment in order to focus the image as clearly as possible.

.....

.....[1]

[Total: 10]

5 An IGCSE student is taking measurements of a drinks cup.

Carry out the following instructions, referring to Fig. 5.1.

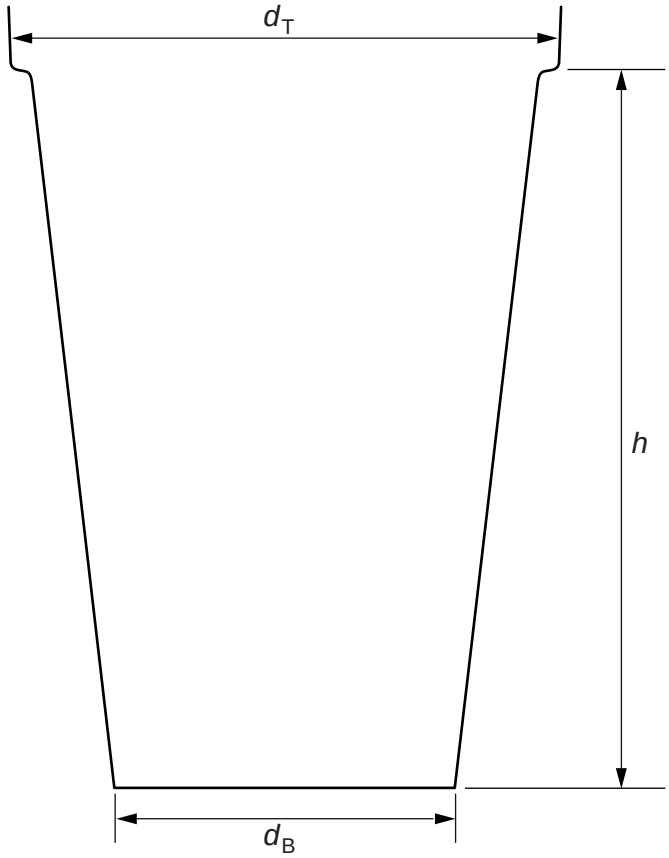


Fig. 5.1

(a) (i) On Fig. 5.1, measure the height h of the cup.

h = ... cm

(ii) On Fig. 5.1, measure the diameter d_T of the top of the cup.

d_T = ... cm

(iii) On Fig. 5.1, measure the diameter d_B of the bottom of the cup.

d_B = ... cm

(iv) Calculate the average diameter d_A, using the equation $d_A = \frac{d_T + d_B}{2}$.

d_A = ... cm

(v) Calculate an approximate value for the volume V of the cup, using the equation $V = \frac{\pi d_A^2 h}{4}$.

V = ...
[3]

(b) The student determines the average circumference of the cup, using a 50 cm length of string and a metre rule.

Fig. 5.2 shows how the student used the string to determine the average circumference.

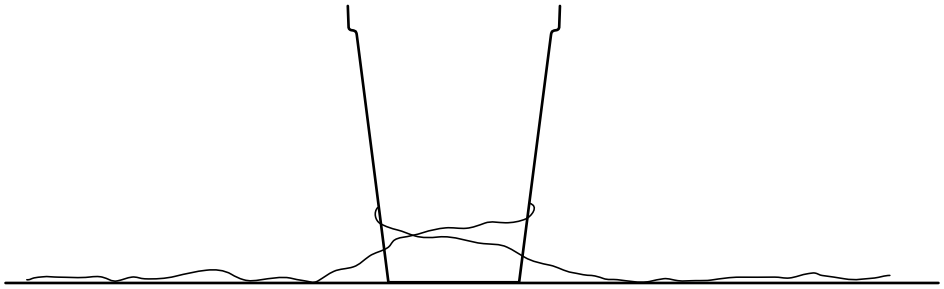


Fig. 5.2

Describe how you would use the string to obtain a more reliable value for the average circumference.

.....

.....

.....[2]

Question 5 continues on the next page.

(c) The student fills a measuring cylinder to the 500 cm^3 mark. He pours water from the measuring cylinder into the cup until the cup is full. Fig. 5.3 shows the water remaining in the measuring cylinder.

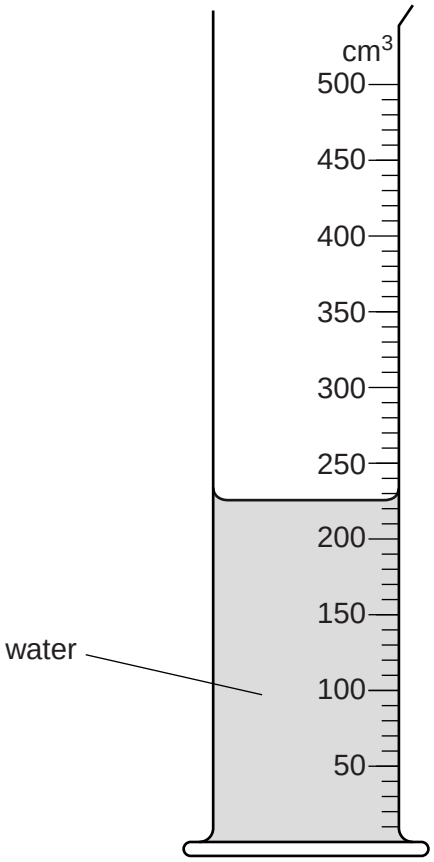


Fig. 5.3

(i) Record the volume of water V_R remaining in the measuring cylinder.

V_R = ...

(ii) Calculate the volume V_W of the water in the cup.

V_W = ...
[2]

(d) On Fig. 5.3, show clearly the line of sight required to take the reading of V_R. [1]

[Total: 8]