Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

PHYSICS **0625/63**

Paper 6 Alternative to Practical **May/June 2016**

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.

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1 Some students are comparing the rates of cooling of two thermometer bulbs under wet and dry conditions.

They are using the apparatus shown in Fig. 1.1.

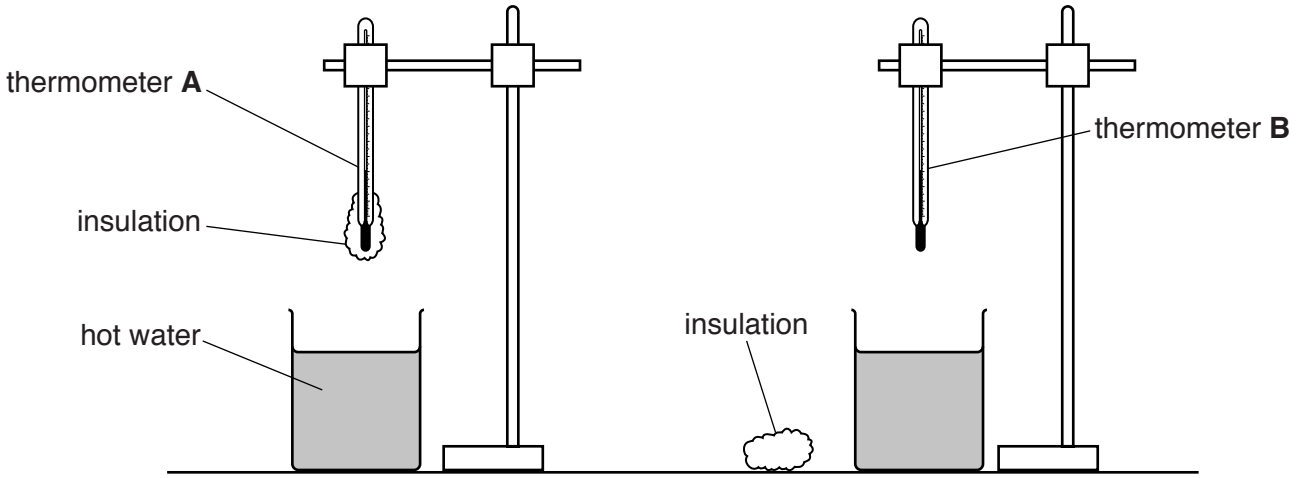

Fig. 1.1

Thermometer **A** has a layer of cotton wool insulation fixed around the bulb.

(a) Record the room temperature θ_R, as shown on the thermometer in Fig. 1.2.

View solution

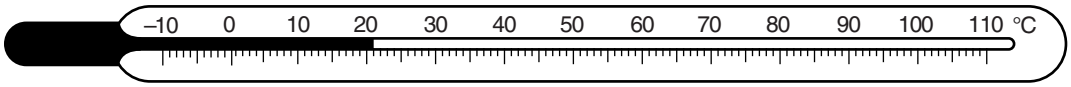

Fig. 1.2

θ_R = ...[1]

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(b) • Thermometer **A** is placed into hot water, at 81.0 °C, for two minutes and then removed.

• A student records, in Table 1.1, the temperature θ of the thermometer bulb every 30 s.

View solution

• Thermometer **B** is placed into hot water, also at 81.0 °C, for two minutes.

• The student removes thermometer **B** from the water and quickly wraps a layer of dry cotton wool insulation around the bulb.

• He then records the temperature θ of the thermometer bulb every 30 s.

Complete the column headings and time column in Table 1.1.

Table 1.1

	thermometer **A** with wet insulation	thermometer **B** with dry insulation
time /	θ /	θ /
0	80.0	77.5
	75.0	70.5
	67.0	64.0
	59.5	59.0
	53.5	54.5
	48.0	50.5
	43.0	47.5

[2]

(c) (i) Write a conclusion to this experiment, stating for which thermometer the cooling is faster. Explain your answer by reference to the results.

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.....[2]

(ii) Describe what is unusual about the pattern of cooling for thermometer **A**.

View solution

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.....[1]

(d) The student first wrapped dry insulation around the bulb of thermometer **B** before starting the timing.

View solution

(i) Suggest why he did this.

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.....[1]

(ii) Suggest what problem this delay in starting the timing might have caused with the procedure.

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.....

.....[1]

(e) Suggest two factors which should be kept constant to ensure that the comparison is fair.

View solution

1. .....

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2. .....

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[2]

[Total: 10]

2 A student is using a forcemeter and a set of different loads to determine the weight of a metre rule.

She is using the apparatus shown in Fig. 2.1.

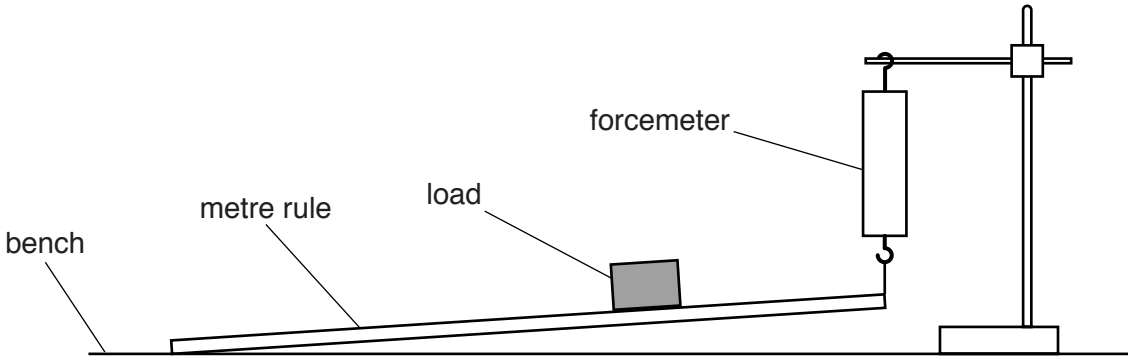

Fig. 2.1

(a) Fig. 2.2 shows the position of the load on the metre rule. The load is always at this position on the rule.

View solution

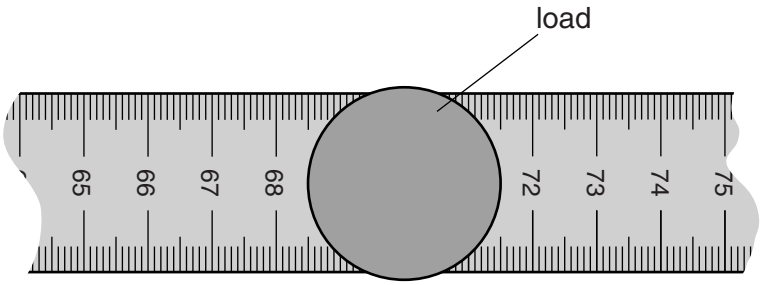

Fig. 2.2 (not full size)

Determine the scale reading on the metre rule at which the centre of the load is located. Show your working.

scale reading = ...cm [2]

(b) The student measures the force F indicated by the forcemeter for different loads placed on the rule.

Figs. 2.3 (a)–(e) show the scale of the forcemeter for values of load L = 1.00 N, 2.00 N, 3.00 N, 4.00 N and 5.00 N.

View solution

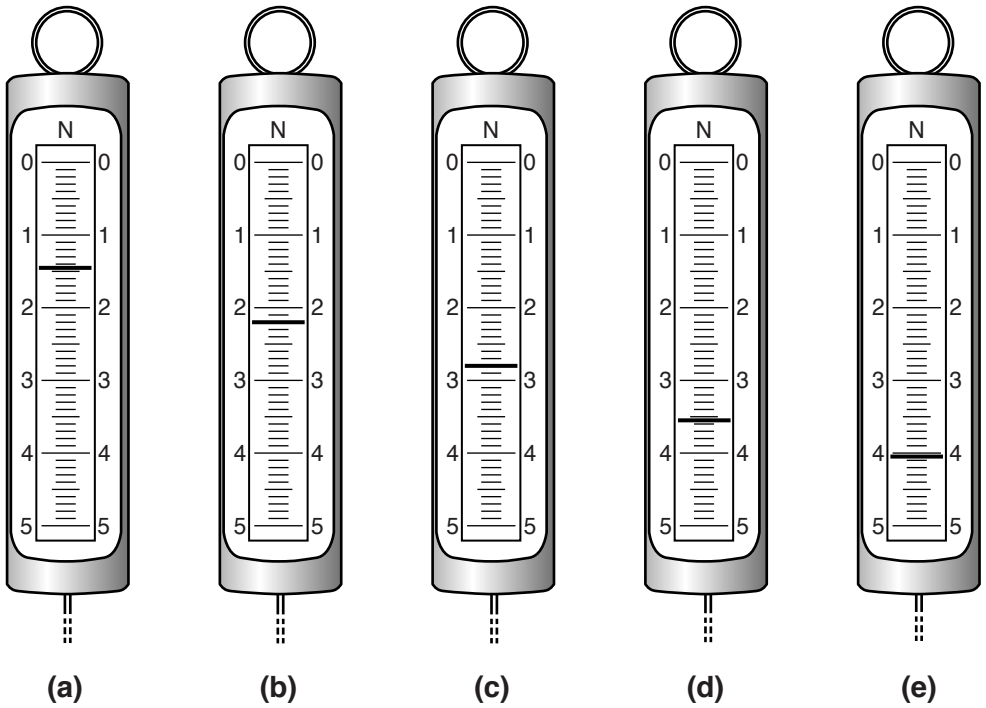

Fig. 2.3

In Table 2.1, record the value of F for each load.

Table 2.1

L/N	F/N
1.00	
2.00	
3.00	
4.00	
5.00	

[2]

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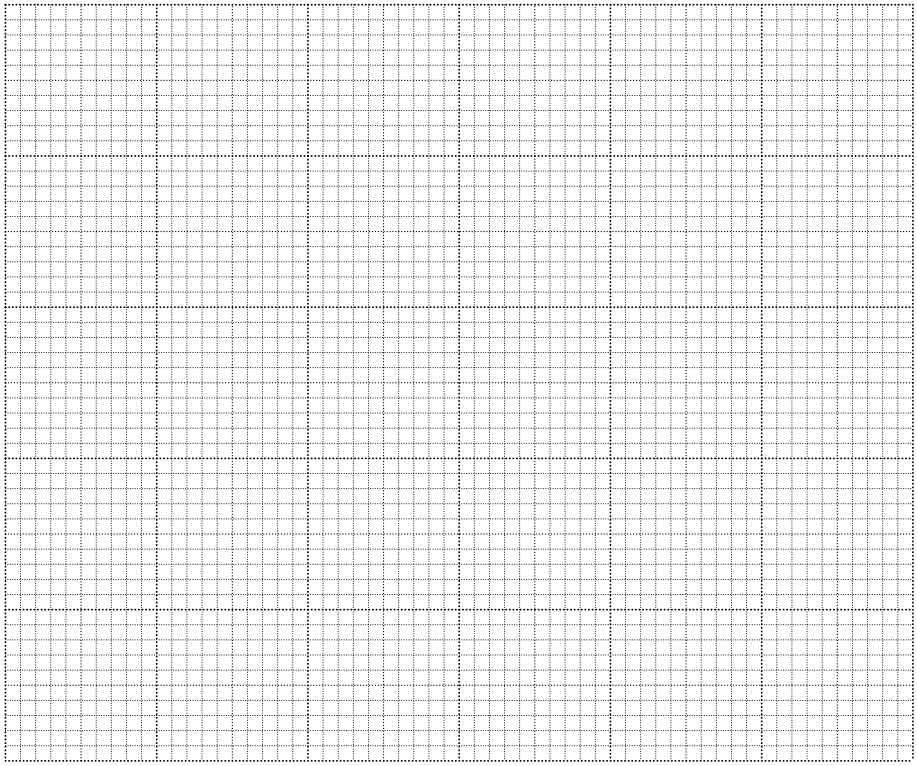
(c) Plot a graph of F/N (y-axis) against L/N (x-axis). Start your graph at the origin (0,0).

View solution



[4]

(d) **(i)** Determine the value y of the intercept of the line on the F axis.

View solution

y = ...[1]

(ii) The weight W of the metre rule is numerically equal to $2y$.

View solution

Write down a value for W to a suitable number of significant figures for this experiment.

W = ...[2]

(e) Assuming that the procedure is carried out carefully, suggest a possible source of inaccuracy in this experiment.

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.....[1]

[Total: 12]

View solution

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3 A student notices that the size of the image produced by a converging lens changes when the lens is moved further away from an object.

Plan an experiment to investigate how the size of the image varies with the object distance for a converging lens suitable for school experiments.


View solution

Write a plan for the experiment, including:

- a labelled diagram of the apparatus needed
- instructions for carrying out the experiment
- the factors that will limit the range of object distances
- the graph you will plot
- one precaution you will take to ensure reliable results, explaining what might be the effect of not taking this precaution.

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.....[7]

[Total: 7]

4 The class is investigating a circuit containing two lamps in series.

They are using the circuit shown in Fig. 4.1.

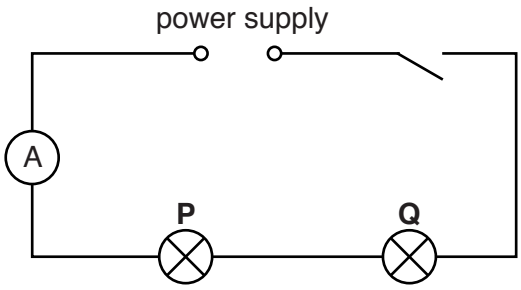


Fig. 4.1

View solution

(a) On Fig. 4.1, use the standard symbol to show a voltmeter connected to measure the potential difference (p.d.) across lamp **P**. [1]

(b) Record the current I in the circuit, as shown on the ammeter in Fig. 4.2.

View solution

I = ...[2]

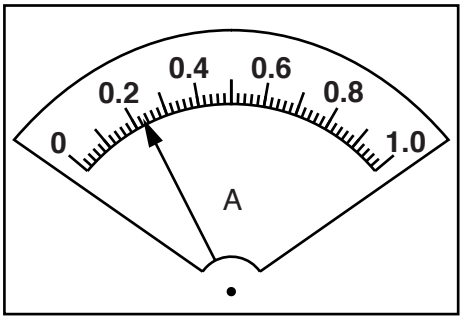
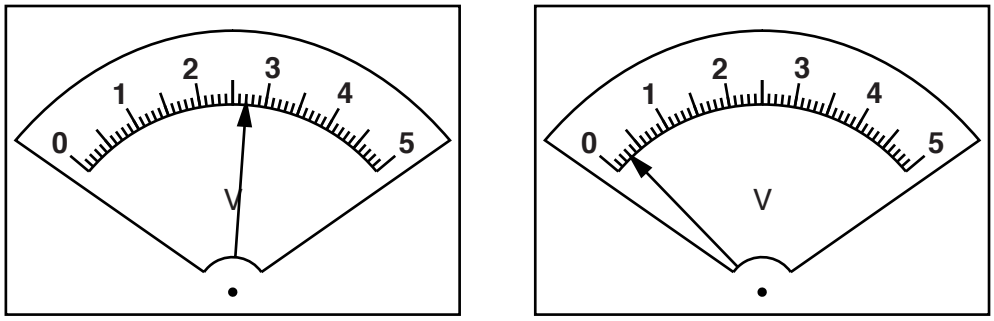


Fig. 4.2

(c) Fig. 4.3 shows the readings on voltmeters connected to measure the potential difference across each lamp.

View solution



lamp **P** lamp **Q**

Fig. 4.3

In Table 4.1, record the potential difference V_P across lamp **P** and the potential difference V_Q across lamp **Q**.

Table 4.1

lamp	potential difference / V	observation of brightness
P	V_P = ...	very bright
Q	V_Q = ...	not glowing

[1]

(d) Table 4.1 also shows the brightness of each lamp.

View solution

(i) A student thinks that, as lamp **Q** is not glowing, its filament must have broken.

State one piece of evidence from the results in **(b)** and **(c)** that shows this cannot be the case.

.....

.....[1]

(ii) The working potential difference for each lamp to be at its full brightness is 2.5V.

Suggest how the results for V_P and V_Q might help to explain the observations of the brightness of the lamps.

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.....[2]

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(e) Calculate the total resistance R of the lamps in the circuit, using the equation $R = \frac{(V_P + V_Q)}{I}$.

View solution

$R =$ .....[2]

(f) A student measures the potential difference V_S across the power supply.

View solution

$V_S =$ 3.1 V

He suggests that V_S should be equal to $V_P + V_Q$.

State whether the measurements support this suggestion. Justify your statement by reference to the results.

statement .....

justification .....

.....

[2]

[Total: 11]

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