Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0123456789

PHYSICS **0625/06**

Paper 6 Alternative to Practical **For Examination from 2016**

SPECIMEN PAPER

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, graphs or rough working.
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 accredited for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **11** printed pages and **3** blank pages.

CAMBRIDGE International Examinations

1 A student is determining the mass of a load using a balancing method.

Fig. 1.1 shows the apparatus.

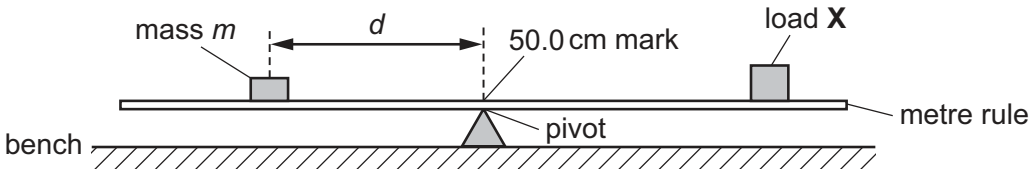

Fig. 1.1

The load **X** has been taped to the metre rule so that its centre is exactly over the 90.0 cm mark. It is not moved during the experiment.

A mass *m* of 40 g is placed on the rule and its position adjusted so that the rule is as near as possible to being balanced with the 50.0 cm mark exactly over the pivot. Fig. 1.2(a) shows part of the rule when it is balanced.

The procedure is repeated for a range of masses. Fig. 1.2(b)–(e) shows the rule when balanced for values of *m* of 50 g, 60 g, 70 g and 80 g.

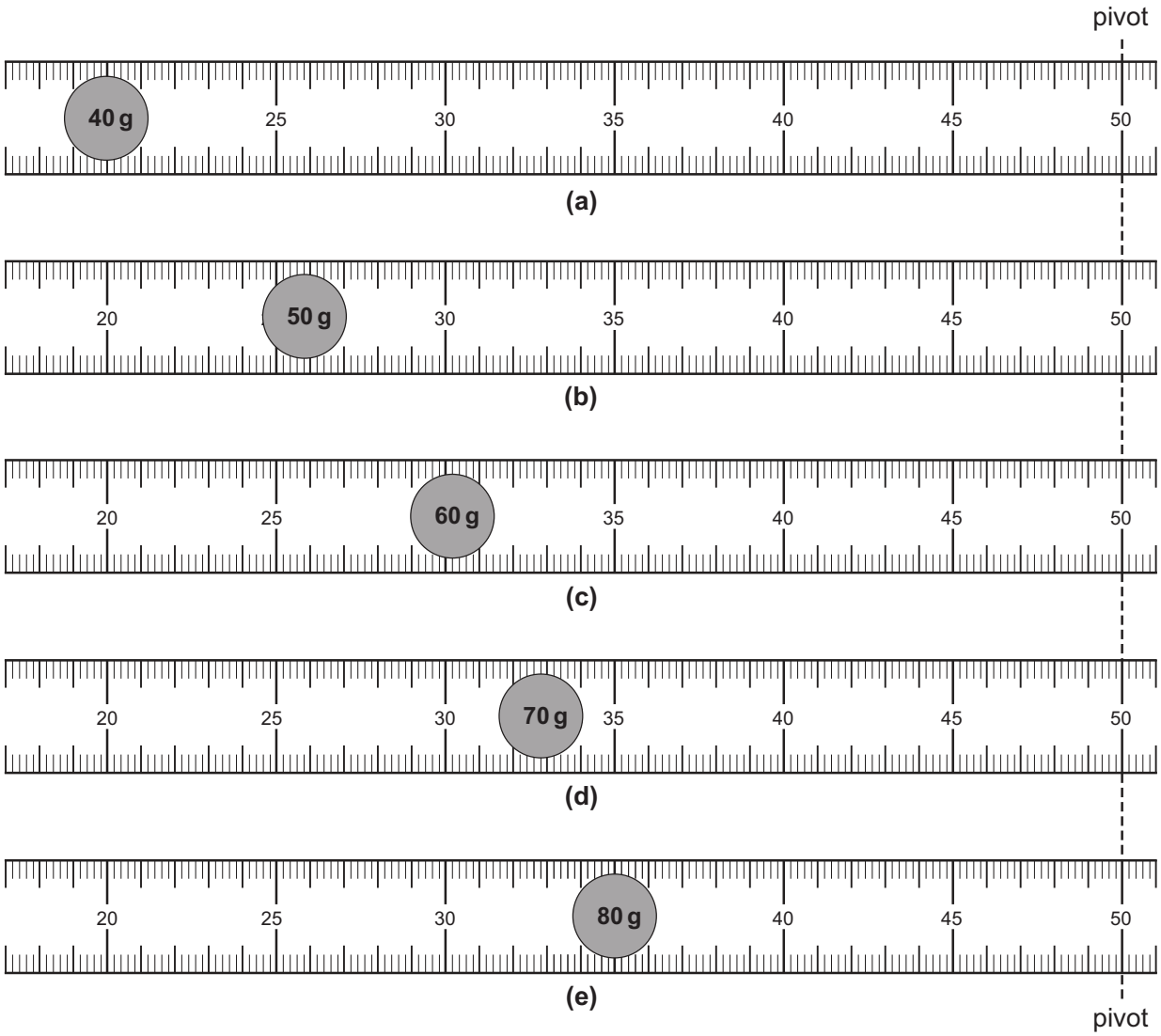

Fig. 1.2

(a) **(i)** Use Fig. 1.2 to determine d, the distance between the mass and the pivot at balance, for each value of m. Record your results in Table 1.1. [3]

Table 1.1

m/g	d/cm	$\frac{1}{d}\Big/\frac{1}{\text{cm}}$
40		
50		
60		
70		
80		

(ii) For each value of d, calculate $1/d$ and record it in the table. [1]

(b) Describe one difficulty the student might have when carrying out this experiment, and how he might overcome this difficulty.

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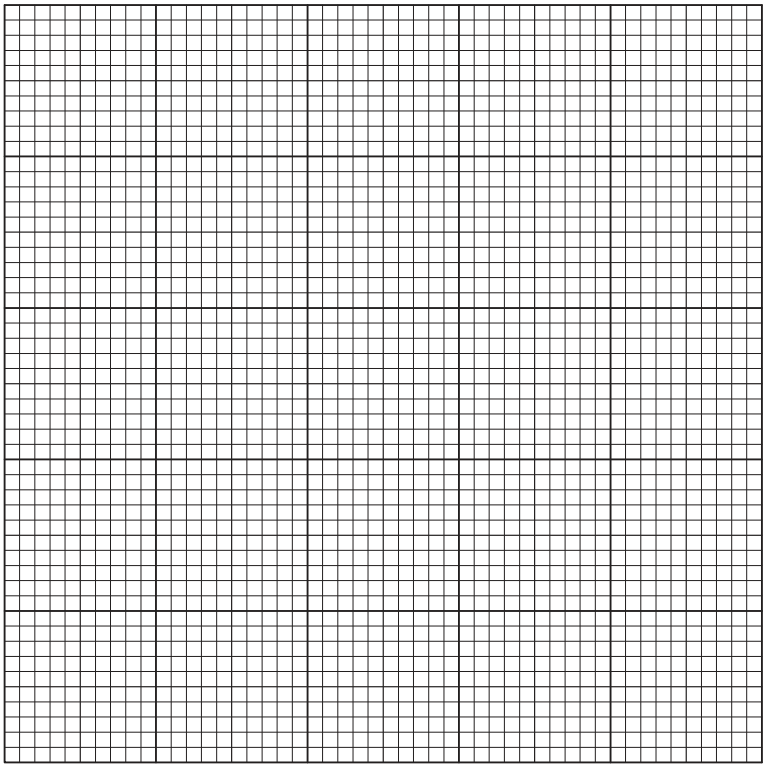
.....

..... [2]

(c) Plot a graph of m/g (y-axis) against $\frac{1}{d}\Big/\frac{1}{\text{cm}}$ (x-axis).



[4]

[Turn over

(d) Determine the gradient G of the graph. Show clearly on the graph how you obtained the necessary information.

G = ... [1]

(e) Determine the mass μ, in grams, of the load **X**. Use the equation $\mu = \frac{G}{40.0}$.

μ = ... g [1]

[Total: 12]

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2 A student is investigating the effect of a layer of cotton wool on the cooling of a test-tube of water.

Fig. 2.1 shows the apparatus.

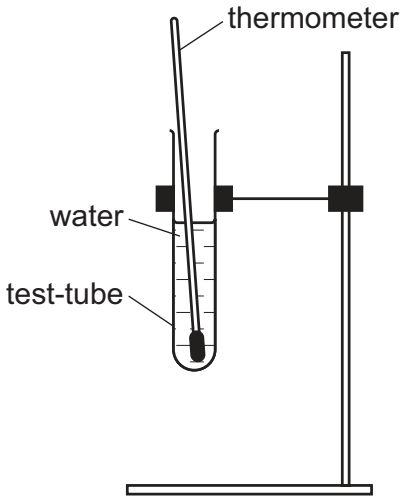

Fig. 2.1

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

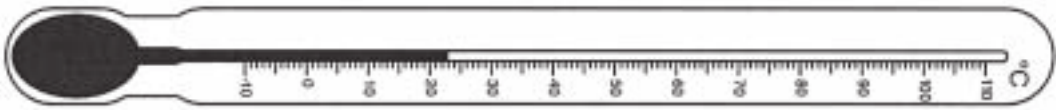

Fig. 2.2

θ_R = ... [1]

(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.

She measures the initial temperature θ of the hot water and immediately starts a stopclock.

Suggest one precaution the student takes to make sure that her temperature reading is as accurate as possible.

.....

..... [1]

(c) The student records in Table 2.1 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 around the test-tube and repeats the procedure.

Complete the time column and the column headings in Table 2.1.

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

[1]

(d) Write a conclusion to this investigation, stating in which experiment the cooling is more rapid. Explain your answer by reference to the readings and any relevant science.

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..... [3]

(e) Discuss the quality of the results, and suggest **two** improvements to the experiment which would allow a more certain conclusion to be drawn.

quality of results: .....

.....

improvements: .....

.....

.....

.....

[3]

(f) This experiment is being carried out by students in many different countries, using identical apparatus.

Suggest **two** differences in the conditions in the various laboratories that might lead to differences in their results.

1. .....

2. .....
[2]

(g) Estimate the volume of water that a test-tube can hold.

volume = ... [1]

[Total: 12]

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3 A student is investigating the effect of the length of resistance wire in a circuit on the potential difference across a lamp.

(a) Fig. 3.1 shows the circuit without a voltmeter.

Complete the circuit diagram to show a voltmeter connected in the circuit to measure the potential difference across the lamp. [2]

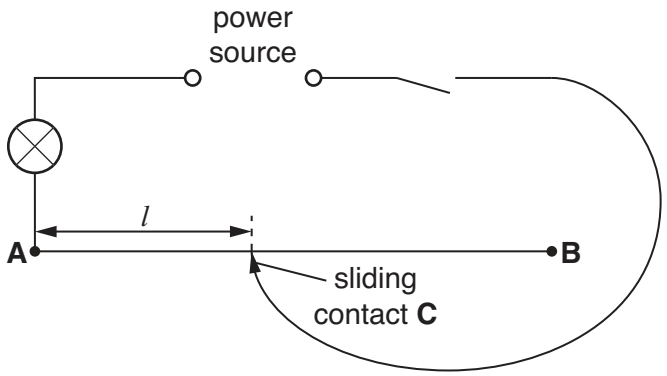

Fig. 3.1

(b) The student switches on and places the sliding contact **C** on the resistance wire at a distance l = 0.200 m from end **A**.

The voltmeter reading is shown in Fig. 3.2.

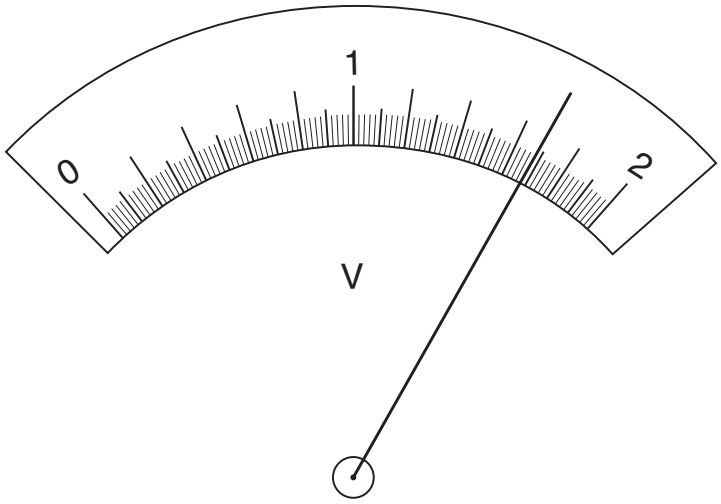

Fig. 3.2

Record the voltmeter reading in Table 3.1.

Table 3.1

l/m	V/V
0.200	
0.400	1.43
0.600	1.25
0.800	1.11
1.000	1.00

[1]

(c) The student repeats the procedure using a range of values of l. Table 3.1 shows the readings.

Use the results for the potential difference across the lamp to predict how increasing the length l affects the brightness of the lamp.

..... [1]

(d) The student suggests that the potential difference V across the lamp is directly proportional to the length l of resistance wire in the circuit.

State whether you agree with this suggestion. Justify your answer by reference to the results.

statement .....

justification .....

.....

.....

[2]

(e) The student repeats the experiment.

Suggest a practical reason why the repeat readings may be slightly different from those recorded in Table 3.1.

.....

..... [1]

(f) State one safety precaution that you would take when carrying out experiments like this with resistance wires.

..... [1]

[Total: 8]

4 A student's plastic bottle of water tips over in class.

Plan an experiment to investigate how the quantity of water in a plastic bottle affects its stability.

The plastic bottle holds up to 2000 cm^3 of water and has a height of 42 cm.

(a) Write a plan for the experiment, including:

- the apparatus needed
- instructions for carrying out the experiment
- the values you will use for the quantity of water
- how you will make sure your results are as accurate as possible
- the graph you will plot from your results

A diagram is not required, but you may add to Fig. 4.1, or draw your own diagram, if it helps to explain your plan.

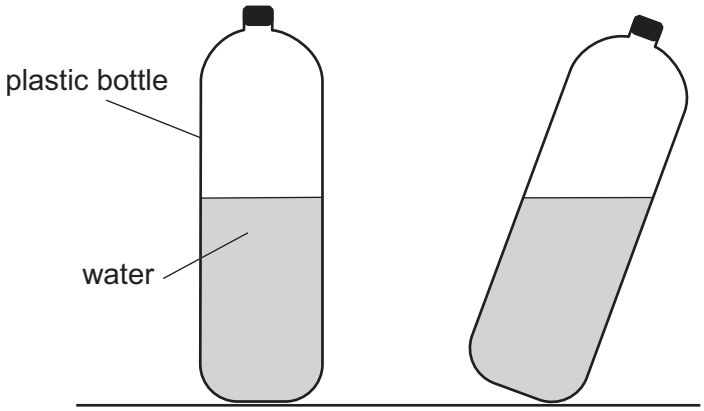

Fig. 4.1

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(b) On Fig. 4.1, measure the angle through which the bottle has been tilted.

angle = ... [1]

[Total: 8]

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