UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	

5429162966

PHYSICS **0625/61**

Paper 6 Alternative to Practical **May/June 2010**

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 **11** printed pages and **1** blank page.

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International Examinations

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1 An IGCSE student is investigating the stretching of springs.

Fig. 1.1 shows the apparatus used for the first part of the experiment.

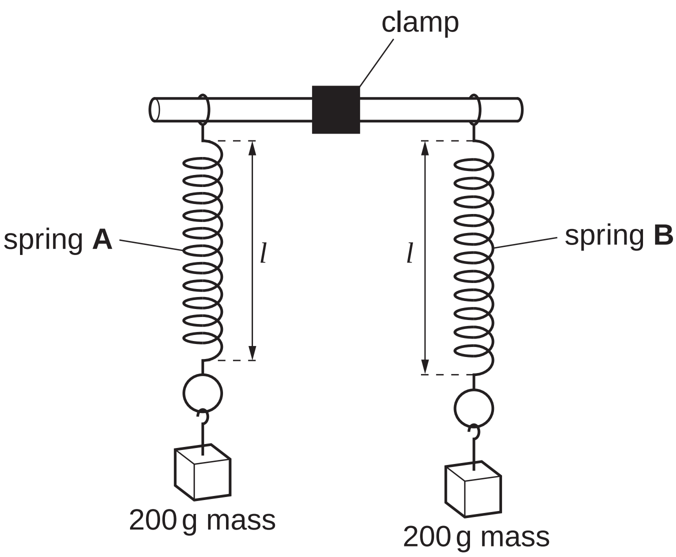

Fig. 1.1

The unstretched length l_A of spring **A** is 15 mm.

The unstretched length l_B of spring **B** is 16 mm.

(a) The student hangs a 200 g mass on each spring, as shown in Fig. 1.1.

(i) On Fig. 1.1 measure the new length l of spring **A**.

l = ... mm

(ii) Calculate the extension e_A of the spring using the equation $e_A = (l - l_A)$.

e_A = ... mm

(iii) On Fig. 1.1 measure the new length l of spring **B**.

l = ... mm

(iv) Calculate the extension e_B of the spring using the equation $e_B = (l - l_B)$.

e_B = ... mm

[2]

(b) The student then sets up the apparatus as shown in Fig. 1.2.

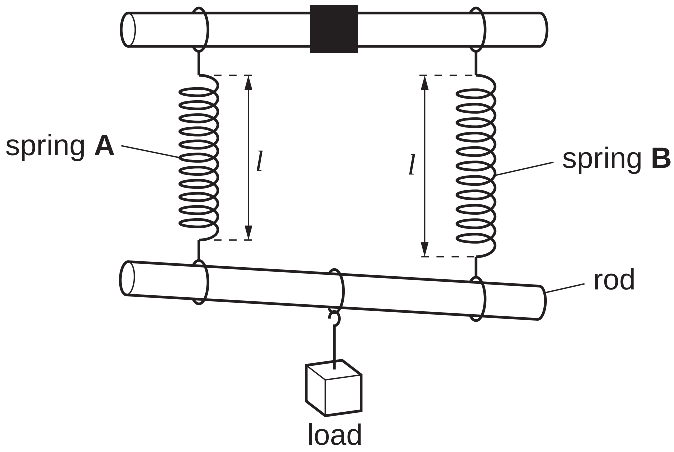

Fig. 1.2

(i) On Fig. 1.2 measure the new length of each of the springs.

spring **A**: l = ... mm

spring **B**: l = ... mm

(ii) Calculate the extension of each spring using the appropriate equation from part **(a)**.

spring **A**: e = ... mm

spring **B**: e = ... mm

(iii) Calculate the average of these two extensions e_{av}. Show your working.

e_{av} = ...mm [3]

(c) It is suggested that $(e_{\mathbf{A}} + e_{\mathbf{B}})/4 = e_{av}$.

State whether your results support this theory and justify your answer with reference to the results.

Statement ....

Justification ....

.... [2]

(d) Describe briefly one precaution that you would take to obtain accurate length measurements.

....

....

.... [1]

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2 The IGCSE class is investigating the cooling of water.

Fig. 2.1. shows the apparatus used.

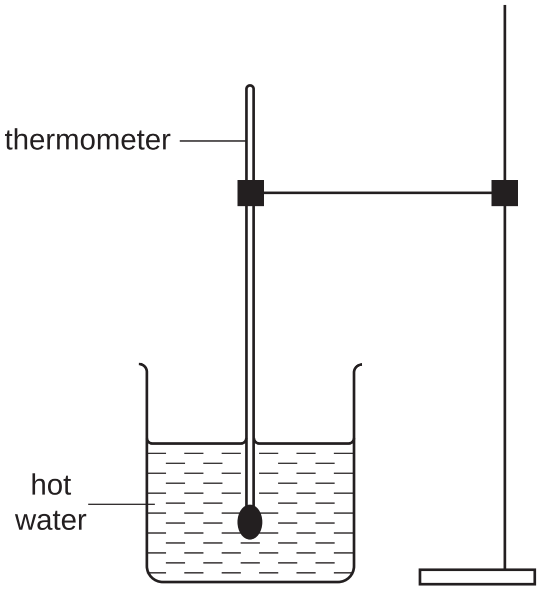

Fig. 2.1

Hot water is poured into the beaker and temperature readings are taken as the water cools.

Table 2.1 shows the readings taken by one student.

Table 2.1

t / s	θ / °C
0	85
30	78
60	74
90	71
120	69
150	67
300	63

(a) **(i)** Using the information in the table, calculate the temperature change T_1 of the water in the first 150 s.

T_1 = ...

(ii) Using the information in the table, calculate the temperature change T_2 of the water in the final 150 s.

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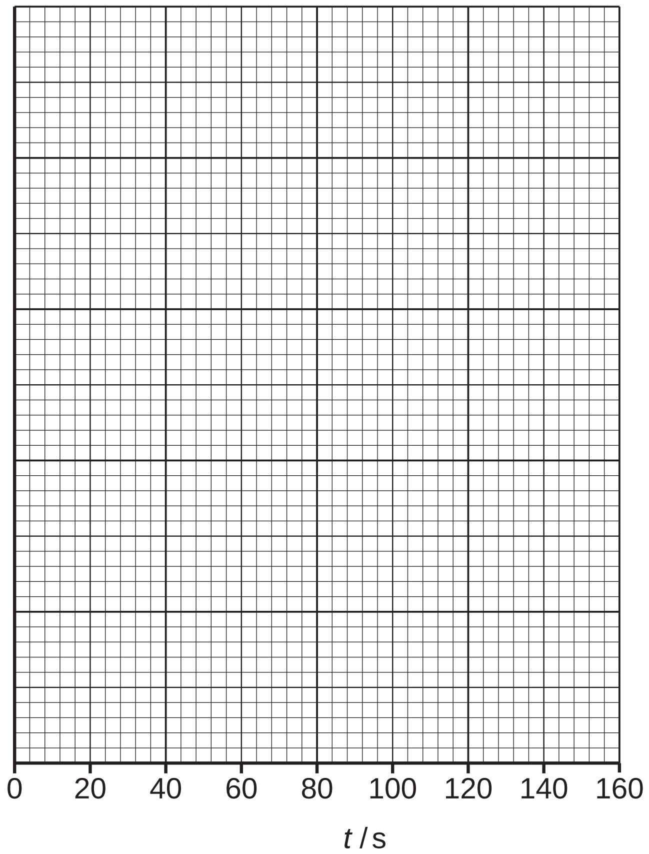
T_2 = ...

[3]

(b) Plot a graph of θ / °C (*y*-axis) against *t* / s (*x*-axis) for the first 150 s. [5]



(c) During the experiment the rate of temperature change decreases.

(i) Describe briefly how the results that you have calculated in part **(a)** show this trend.

....

....

(ii) Describe briefly how the graph line shows this trend.

....

....

[2]

3 The IGCSE class is investigating the effect of the length of resistance wire in a circuit on the potential difference across a lamp.

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(a) Fig. 3.1 shows the circuit without the voltmeter. Complete the circuit diagram to show the voltmeter connected in the circuit to measure the potential difference across the lamp.

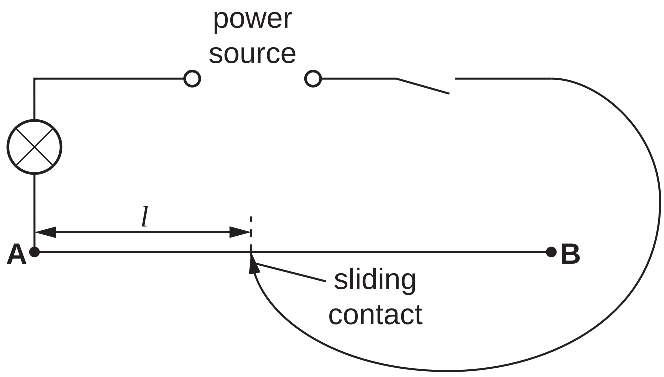

Fig. 3.1

[2]

(b) A student switches on and places the sliding contact on the resistance wire at a distance l = 0.200 m from end **A**. He records the value of l and the potential difference V across the lamp.
He then repeats the procedure using a range of values of l. Table 3.1 shows the readings.

Table 3.1

l / m	V / V	$\frac{V}{l}$ /
0.200	1.67	
0.400	1.43	
0.600	1.25	
0.800	1.11	
1.00	1.00	

(i) For each pair of readings in the table calculate and record in the table the value of $\frac{V}{l}$.

(ii) Complete the table by writing in the unit for $\frac{V}{l}$.

[3]

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(c) A 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 or not you agree with this suggestion and justify your answer by reference to the results.

Statement ....

Justification ....

....[2]

(d) State one precaution that you would take in order to obtain accurate readings of *V* in this experiment.

....

....

....[1]

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4 An IGCSE student is investigating reflection from a plane mirror.

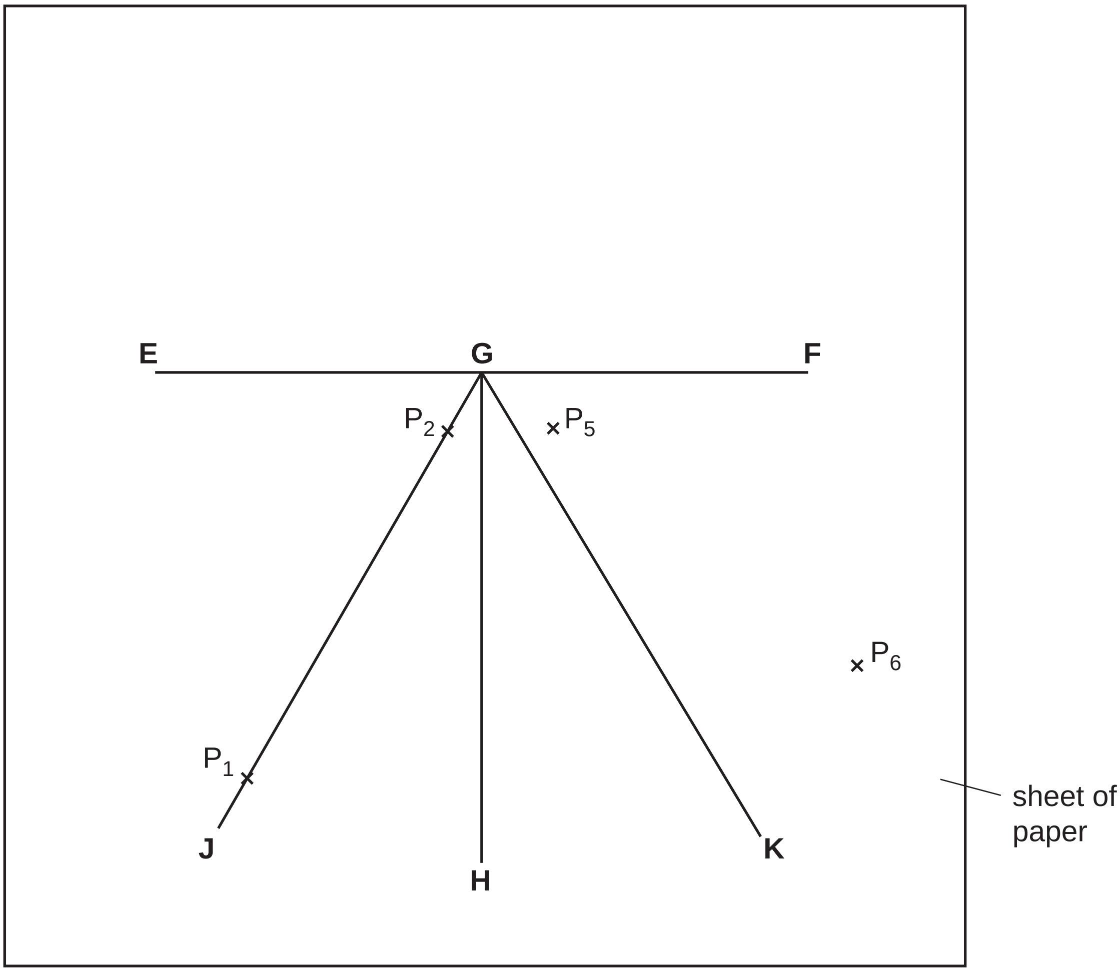

Fig. 4.1

The student is using a sheet of plain paper on a pin board. Fig. 4.1 shows the sheet of paper. The straight line **EF** shows the position of the reflecting surface of a plane mirror standing vertically on the sheet of paper. Line **GH** is a normal to line **EF**. Line **JG** marks an incident ray and line **GK** is the corresponding reflected ray. The student marks the position of the incident ray with two pins (P_1 and P_2) and uses two more pins (P_3 and P_4) to find the direction of the reflected ray.

(a) **(i)** On Fig. 4.1 mark with two neat crosses, labelled P_3 and P_4, suitable positions for the pins to find the direction of the reflected ray.

(ii) On Fig. 4.1 measure the angle of incidence *i*.

i = ...

(iii) On Fig. 4.1 measure the angle of reflection r_1.

r_1 = ...

[3]

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(b) (i) On Fig. 4.1 draw a line **E'GF'** such that the angle θ between this line and the line **EGF** is 10°. Start with **E'** below the line **EGF**. The straight line **E'F'** shows a new position of the reflecting surface of the plane mirror standing vertically on the sheet of paper.
The points labelled P_5 and P_6 mark the positions of two pins placed so that P_5, P_6 and the images of P_1 and P_2 appear in line with each other. P_1 and P_2 have not been moved since the original set-up.

(ii) Using a ruler, draw a line joining the points labelled P_5 and P_6, and continue this line to meet the line **E'F'**.

(iii) Measure the angle of reflection r_2 between line **GH** and the line joining the points labelled P_5 and P_6.

r_2 = ...

(iv) Calculate the angle α through which the reflected ray has moved.

α = ...

(v) Calculate the difference between 2θ and α.
θ is the angle between the two positions of the mirror.

difference between 2θ and α = ...
[3]

(c) Theory suggests that if the mirror is moved through an angle θ then the reflected ray will move through an angle of 2θ.
State whether your result supports the theory and justify your answer by reference to the result.

Statement ....

Justification ....

....[2]

5 The IGCSE class is investigating the swing of a loaded metre rule.

The arrangement of the apparatus is shown in Fig. 5.1.

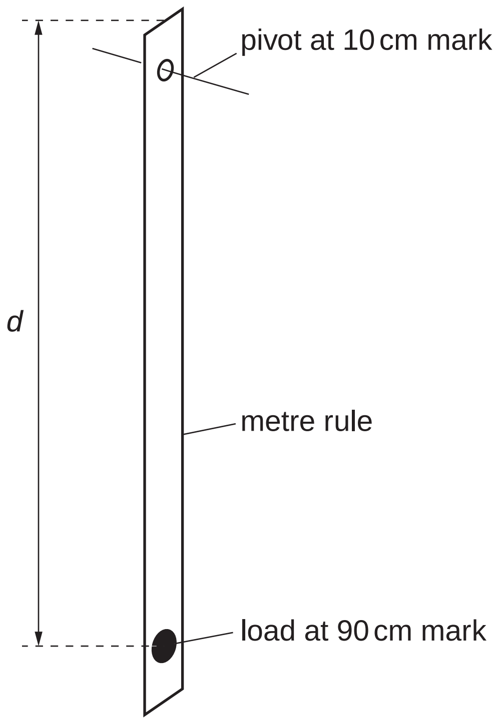

Fig. 5.1

A student displaces the rule a small distance to one side and allows it to swing. The time *t* taken for 10 complete swings is recorded. She calculates the time *T* taken for one swing. She repeats the procedure using different values of the distance *d*.

The readings are shown in the Table 5.1.

Table 5.1

0.900	18.4	1.84	
0.850	17.9	1.79	
0.800	17.5	1.75	
0.750	17.1	1.71	
0.700	16.7	1.67	

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

(b) Explain why the student takes the time for ten swings and then calculates the time for one swing, rather than just measuring the time for one swing.

....

....[1]

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(c) The student tries to find a relationship between T and d. She first suggests that $T \times d$ is a constant.

(i) Calculate the values of $T \times d$ and enter the values in the final column of the table.

(ii) State whether or not the results support this suggestion and give a reason for your answer.

Statement ....

....

Reason ....

....
[2]

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