	Centre Number	Candidate Number
Candidate Name ______________________		

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

PHYSICS 0625/6

PAPER 6 Alternative to Practical

MAY/JUNE SESSION 2002

1 hour

Candidates answer on the question paper.
No additional materials required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages.

UNIVERSITY *of* CAMBRIDGE
Local Examinations Syndicate

1 Fig. 1.1 shows how a student used a rule to measure *h*, the height of a pile of wooden blocks. The reading was inaccurate because the student's practical technique was poor.

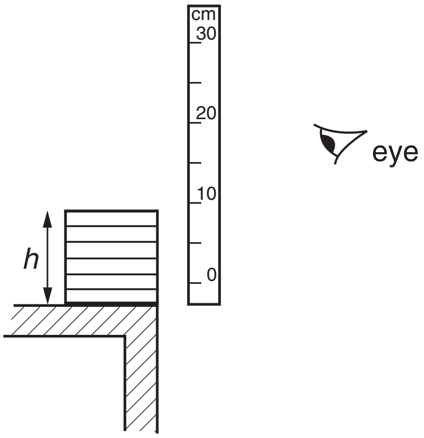


Fig. 1.1

(a) Complete Fig. 1.2 to show the correct method to read the height *h* using the metre rule. [2]

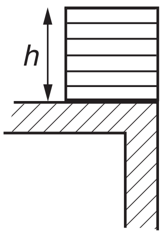


Fig. 1.2

(b) (i) Use *your* rule to measure the height marked *h* on Fig. 1.2.

h = ...

(ii) Fig. 1.2 is drawn to scale. It is a tenth of actual size.

Calculate *t*, the actual thickness of **one** block of wood.

t = ...
[5]

2 **(a)** A student set up a circuit in order to measure the current through a lamp when different potential differences were applied. Fig. 2.1 below shows the diagram that the student drew. The diagram is incomplete. A voltmeter and an ammeter are required.

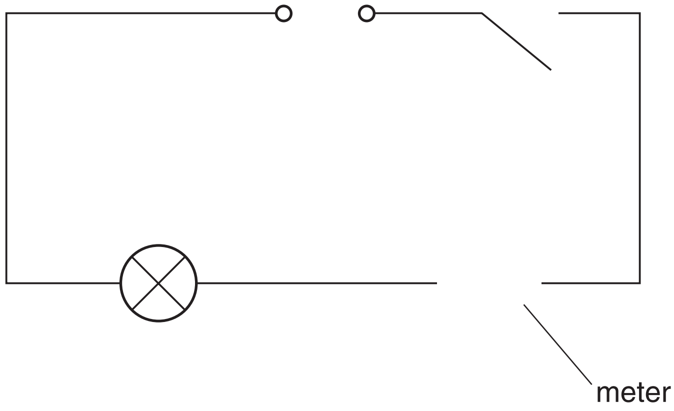


Fig. 2.1

(i) Draw the appropriate symbol in the space labelled 'meter'.

(ii) Draw the circuit symbol for the other meter and show it connected correctly to the circuit.

[2]

(b) Fig. 2.2 shows the scale of the ammeter.

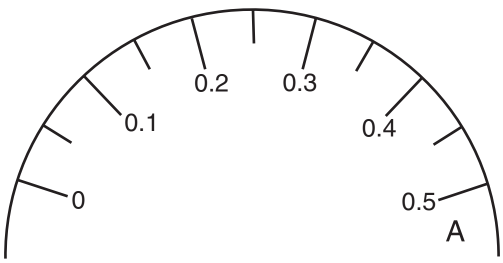


Fig. 2.2

(i) On Fig. 2.2, draw the position of the pointer when the ammeter reading is 0.46 A.

(ii) What is the range of the ammeter shown?

....[2]

(c) When the current is 0.46 A, the voltmeter reading is 6.0 V. Calculate the resistance of the lamp filament, using the equation $V = IR$.

resistance = ...[3]

3 The IGCSE class was asked to investigate the solubility of sugar under different conditions. They were reminded of the importance of carrying out a 'fair test' by controlling the possible variables. One student decided to investigate the effect of temperature on the rate at which the sugar dissolved.

For each test the student added water to some sugar in a beaker, stirred the mixture briefly, and recorded θ, its temperature, and t, the time taken for all the sugar to dissolve. The readings are shown below.

temperature, θ/ °C	dissolving time, t/s
20	450
25	240
31	145
36	90
39	72
46	45
50	24

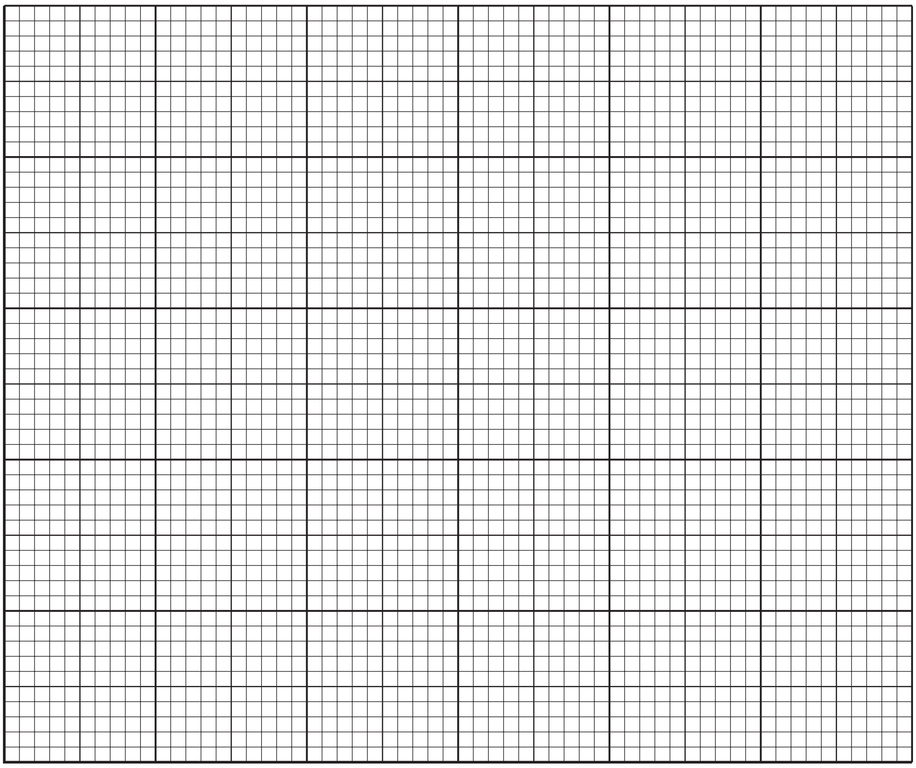
(a) List **three** possible variables that this student should keep constant throughout the experiment.

....

....

....[3]

(b) Plot the graph of t/s (y-axis) against θ/°C (x-axis). Start both axes at zero. Draw the best-fit curve.



[5]

(c) **(i)** When the temperature of the water is increased, what is the effect on the time taken for sugar to dissolve?

....

....

(ii) Calculate the ratios $\dfrac{\text{dissolving time at 20°C}}{\text{dissolving time at 30°C}}$,

ratio = ...

$\dfrac{\text{dissolving time at 40°C}}{\text{dissolving time at 50°C}}$.

ratio = ...

(iii) Use your answers from part **(ii)** to predict a possible value for the ratio

$\dfrac{\text{dissolving time at 50°C}}{\text{dissolving time at 60°C}}$.

ratio = ...[4]

4 A student carried out an experiment to find the position of an image in a plane mirror. The object was an optics pin. The arrangement is shown in Fig. 4.1.

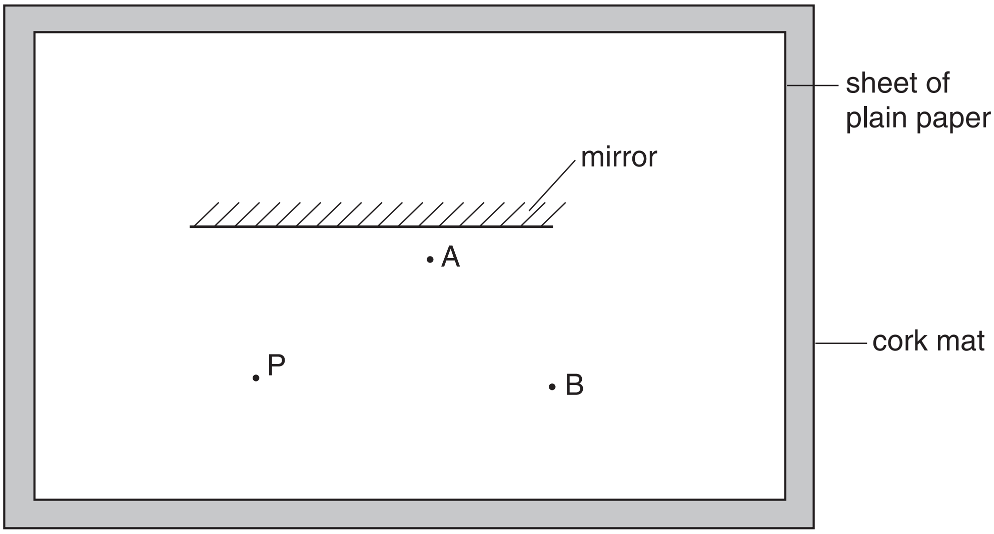


Fig. 4.1

The student viewed the image of the object pin P in the mirror. He placed two pins A and B some distance apart so that the image of P and pins A and B were exactly in line, one behind the other.

Then, without moving the object pin P, he viewed the image from a different position and repeated the experiment with pins C and D. The student's ray trace sheet is shown in Fig. 4.2.

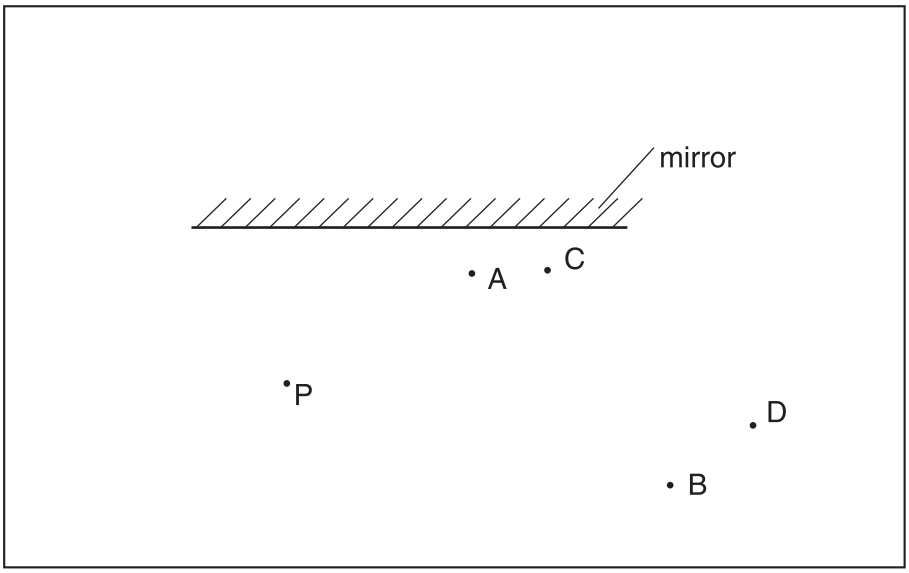


Fig. 4.2

For Examiner's Use

(a) On Fig. 4.2

(i) draw in the two reflected rays,

(ii) draw in the two incident rays that produced the reflected rays you have drawn,

(iii) show clearly, on the incident and reflected rays, the direction in which the light is travelling,

(iv) find the position of the image of the object pin P by using the directions of the reflected rays. Show clearly on the diagram how you found the image position. Label the image position I. [6]

(b) State whether the image is real or virtual.

....

Justify your answer by reference to the lines you have drawn in part **(a)**.

....

....[2]

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5 In an experiment to study the effect of increasing pressure on the volume of air, the IGCSE class used the apparatus shown in Fig. 5.1.

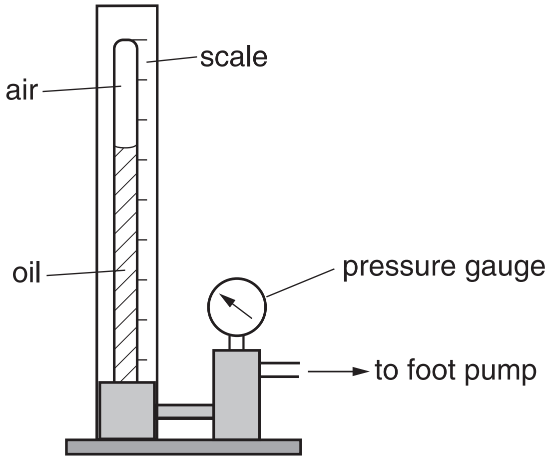

Fig. 5.1

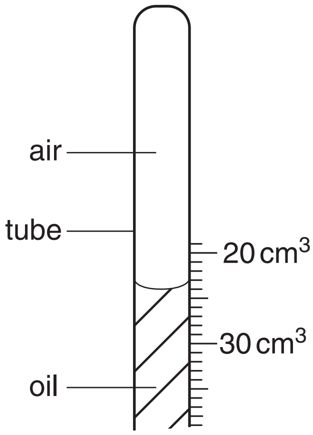

Fig. 5.2

(a) What is the volume reading shown in Fig. 5.2?

volume reading = ...[1]

For Examiner's Use

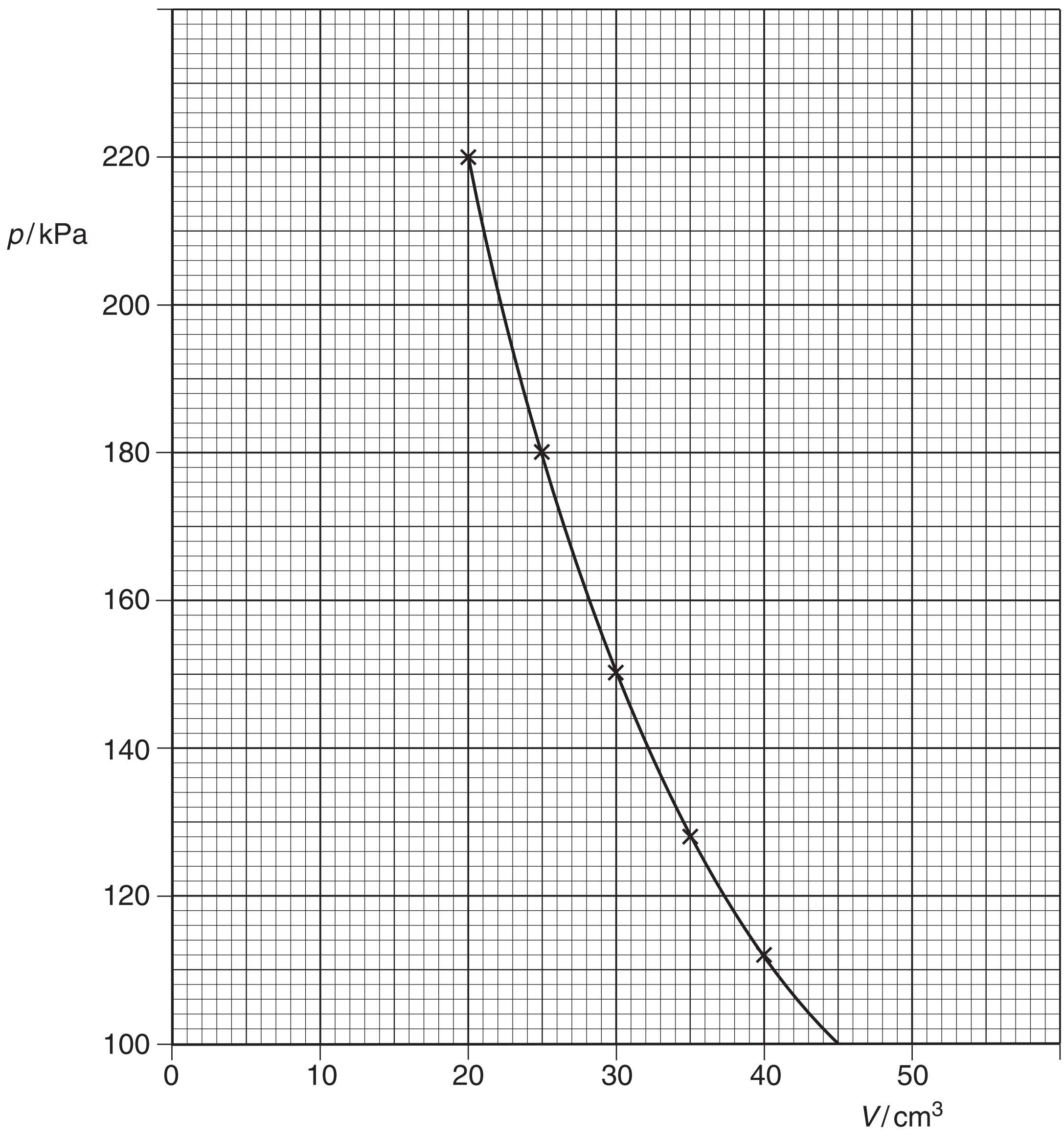

Fig. 5.3

Fig. 5.3 shows the graph that one student plotted from the readings. She drew a best-fit curve.
Theory suggests that the relationship between pressure and volume is given by the equation

$$p \times V = \text{constant}.$$

The student is required to find the value of the constant.

(b) Why is it better to find the value of the constant using the graph than from a single measurement of *p* and *V*?

....

....[1]

(c) **(i)** Use these two examples, taken from the graph, to show that the readings from the experiment support the theory.

Example 1: when $p = 200$ kPa

$V = \ldots\ldots\ldots$ cm^3

$pV = \ldots\ldots\ldots\ldots$

Example 2: when $V = 37\ cm^3$

$p = \ldots\ldots\ldots$ kPa

$pV = \ldots\ldots\ldots\ldots$

(ii) Using your answers from **(c)(i)**, predict the pressure required to reduce the volume to $18\ cm^3$.

$p = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ kPa

[4]

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