



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

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**PHYSICS**

**0625/51**

Paper 5 Practical Test

**May/June 2012**

**CONFIDENTIAL INSTRUCTIONS**

**Great care should be taken to ensure that any confidential information given does not reach the candidates either directly or indirectly.**

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If you have any problems or queries regarding these Instructions, please contact CIE  
by e-mail: [International@cie.org.uk](mailto:International@cie.org.uk),  
by phone: +44 1223 553554,  
by fax: +44 1223 553558,  
stating the Centre number, the nature of the query and the syllabus number quoted above.



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This document consists of **8** printed pages.



### Instructions for preparing apparatus

The Supervisor is **not** allowed to consult the Question Paper before the examination. This teacher should, as part of the preparation of the examination requirements, test the apparatus in order to ensure that it is satisfactory.

The Supervisor is asked to give (and attach to the Report form printed on pages 7 and 8) a *brief* description of the apparatus supplied, mentioning any points that are likely to be of importance to the Examiner in marking the answers. The Supervisor should also report any assistance given to candidates. All reports should be signed by the Supervisor and by the person responsible for preparing the apparatus.

In addition to the usual equipment of a physics laboratory, each candidate will require the apparatus specified in these Instructions. If a candidate breaks any of the apparatus, or loses any of the material supplied, the matter should be rectified and a note made in the Report.

### Number of sets of apparatus

As a *minimum*, the number of sets of apparatus provided should be  $N/4$ , where  $N$  is the number of candidates (per session). A few spare sets should, preferably, be available to avoid any candidate being delayed when moving to another question.

Centres may find it more convenient and easier to administer if  $N/3$  sets (plus one or two 'spares') of apparatus are provided.

The order in which a given candidate attempts the four questions is immaterial.

### Assistance to Candidates

The purpose of the Practical Physics test is to find out whether the candidates can carry out simple practical work themselves. The Examiners are aware that candidates may sometimes be unable to show their practical ability through failure to understand some point in the theory of the experiment. If an Examiner were present in the laboratory, he/she would be willing to give a hint to enable such a candidate to get on with an experiment. In order to overcome this difficulty, the Supervisor is asked to co-operate with the Examiners to the extent of being ready to give (or allow the Physics teacher to give) a hint to a candidate who is unable to proceed.

The following regulations must be strictly adhered to.

- (i) No hint may be announced to the candidates as a whole.
- (ii) A candidate who is unable to proceed and requires assistance must come up to the Supervisor and state the difficulty. Candidates should be told that the Examiners will be informed of any assistance given in this way.
- (iii) A report must be made of any assistance given to the candidate, with the name and candidate number of the candidate.

It is suggested that the following announcement be made to the candidates.

'The Examiners do not want you to waste time through inability to get on with an experiment. Any candidate, therefore, who is unable to get on with the experiment after spending five minutes at it may come to me and ask for help. I shall report to the Examiners any help given in this way, and some marks may be lost for the help given. You may ask me for additional apparatus which you think would improve the accuracy of your experiments, and you should say, on your script, how you use any such apparatus supplied.'

**Question 1**

**Items to be supplied by the Centre (per set of apparatus unless otherwise specified)**

- (i) 100 cm<sup>3</sup> measuring cylinder.
- (ii) 250 cm<sup>3</sup> beaker containing approximately 200 cm<sup>3</sup> of water at room temperature.
- (iii) Test-tube (approximate size 120 mm × 15 mm).
- (iv) Cloth or paper towels (to mop up any spilt water).

**Note**

1. Spare test-tubes should be available.

**Action at changeover**

Supply a dry test-tube. Check that the measuring cylinder is empty and that the beaker contains approximately 200 cm<sup>3</sup> of water at room temperature.

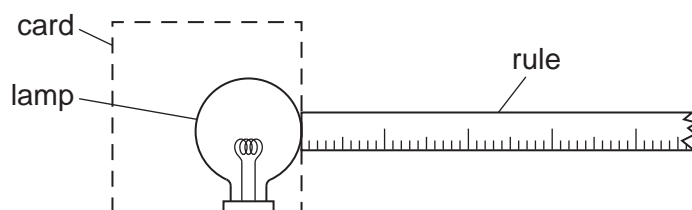
## Question 2

### Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)

- (i) Thermometer,  $-10^{\circ}\text{C}$  to  $110^{\circ}\text{C}$ , capable of being read to the nearest  $1^{\circ}\text{C}$ .
- (ii) 12V, 24W lamp mounted in a suitable holder with an appropriate power source (a car headlamp bulb is suitable).
- (iii) Two clamps, two bosses, two stands (see notes 1 and 2).
- (iv) Metre rule or half-metre rule (see note 1).
- (v) A small card suitably mounted to stand vertically (see note 3).
- (vi) A thin wooden rod of length 100 mm.

### Notes

1. The rule is to be clamped with its zero touching the outer edge of the glass surface of the lamp, as shown in Fig. 2.1.



**Fig. 2.1**

2. The thermometer is to be held vertically in a clamp and stand, with the thermometer bulb at the same height above the bench as the lamp filament.
3. A small card can be used to protect candidates from the direct glare of the lamp. The card must not prevent the candidates from observing the thermometer scale or the rule.

### Action at changeover

Check that the thermometer has cooled. (If not, supply a replacement.)

Check that the rule and lamp are in the correct positions as shown in Fig. 2.1, with the lamp switched off.

Return the thermometer to the original position as described in note 2.

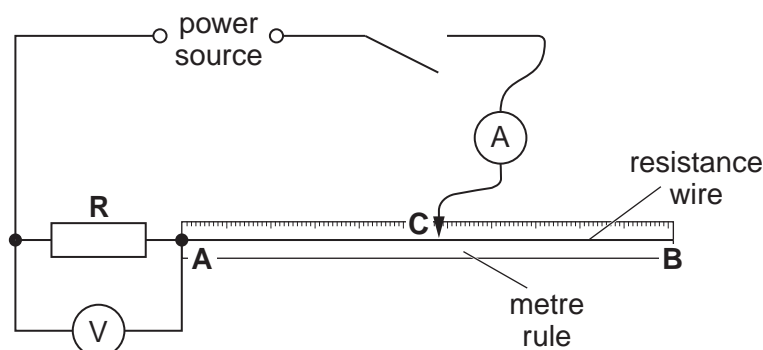
### Question 3

#### Items to be supplied by the Centre (per set of apparatus unless otherwise specified)

- (i) Power source of approximately 1.5V–2V. Where candidates are supplied with a power source with a variable output voltage, the voltage setting should be set by the Supervisor and fixed (e.g. taped).
- (ii) Voltmeter capable of measuring the supply p.d. with a minimum precision of 0.1 V.
- (iii) Ammeter capable of measuring the current in the circuit shown in Fig. 3.1 with a minimum precision of 0.02 A. Either a 0–1 A analogue meter or a digital meter would be suitable.
- (iv) Resistor of nominal value  $1.5\ \Omega$  (see note 2).
- (v) Switch. The switch may be an integral part of the power supply.
- (vi) Approximately 105 cm of straight, bare constantan (Eureka) wire, diameter 0.45 mm (26 swg) or 0.38 mm (28 swg) or 0.32 mm (30 swg), taped to a metre rule only between the 3 cm and 7 cm marks and between the 93 cm and 97 cm marks. The end of the wire at the zero end of the rule is to be labelled 'A'; the other end is to be labelled 'B'.
- (vii) A suitable terminal (e.g. crocodile clip) attached to the constantan wire at the zero end of the metre rule so that a connection can be made to the circuit shown in Fig. 3.1.
- (viii) Sliding contact, labelled 'C'. This may be a jockey or a small screwdriver connected to a lead by means of a crocodile clip.
- (ix) Sufficient connecting leads to set up the circuit shown in Fig. 3.1.

#### Notes

1. The circuit is to be set up for the candidates as shown in Fig. 3.1.
2. The resistor can be made from an appropriate length of the constantan wire i.e. 50 cm of 26 swg or 34 cm of 28 swg or 24 cm of 30 swg. It must be labelled 'R'. The resistor must have suitable terminals so that connections can be made to the voltmeter and resistance wire as shown in Fig. 3.1.



**Fig. 3.1**

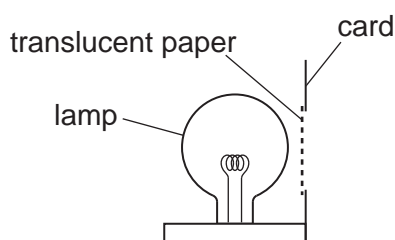
#### Action at changeover

Check that the circuit is set up as shown in Fig. 3.1.

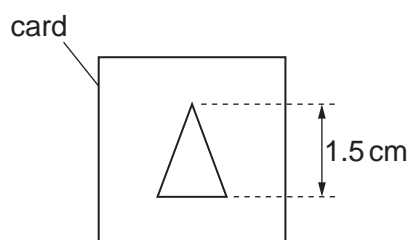
## Question 4

### Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)

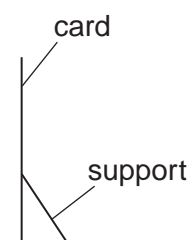
- (i) Converging lens, focal length approximately 150 mm, with a suitable holder.
- (ii) Illuminated object with a triangular hole of height approximately 1.5 cm (see Fig. 4.1 and Fig. 4.2). The hole is to be covered with thin translucent paper (e.g. tracing paper).
- (iii) Metre rule.
- (iv) Screen. (A white sheet of stiff card approximately 150 mm × 150 mm, fixed to a wooden support is suitable. See Fig. 4.3.)



**Fig. 4.1**



**Fig. 4.2**



**Fig. 4.3**

### Notes

1. The lamp for the illuminated object should be a low voltage lamp, 24W or higher power (a car headlamp bulb is suitable), with a suitable power source.
2. The centre of the hole which forms the object, the lamp filament and the centre of the lens in its holder, are all to be at the same height above the bench.
3. The apparatus should be situated away from direct sunlight.

### Action at changeover

None.

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**This form must be completed and returned with the scripts.**

**REPORT ON PRACTICAL PHYSICS**

(IGCSE MAY/JUNE 2012)

*General*

The Supervisor is invited to give details of any difficulties experienced by particular candidates giving their names and candidate numbers. These should include reference to:

- (a) difficulties due to faulty apparatus;
- (b) accidents to apparatus or materials;
- (c) any other information that is likely to assist the Examiner, especially if this cannot be discovered in the scripts;
- (d) any help given to a candidate.

*Information required*

A plan of workbenches, giving details by candidate number of the places occupied by the candidates for each experiment for each session, must be enclosed with the scripts.

The space below can be used for this, or it may be on separate paper.



*Information required (cont.)*

A list by name and candidate number of candidates requiring help, with details of the help provided.

CENTRE NO. ....

NAME OF CENTRE .....

*Declaration (to be signed by the Supervisor and the person responsible for preparing the apparatus)*

The preparation of the practical examination has been carried out so as to maintain fully the security of the examination.

SIGNED .....  
Supervisor

SIGNED .....  
Person responsible for preparing the apparatus

