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**PHYSICS**

**0625/52**

Paper 5 Practical Test

**February/March 2017**

**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 queries regarding these Confidential Instructions, please contact Cambridge stating the Centre number, the nature of the query and the syllabus number quoted above.

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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 **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 Supervisor's 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.

In addition to the usual equipment of a physics laboratory, each candidate will require the apparatus specified in these Confidential 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 Supervisor's Report.

### Number of sets of apparatus

As a *minimum*, the number of sets of apparatus provided should be  $N/3$ , 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.

The order in which a given candidate attempts the four questions is immaterial. It is suggested that candidates spend **about 20 minutes on each of questions 1 to 3, and about 15 minutes on question 4.**

### Assistance to candidates

The purpose of the Physics Practical 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.

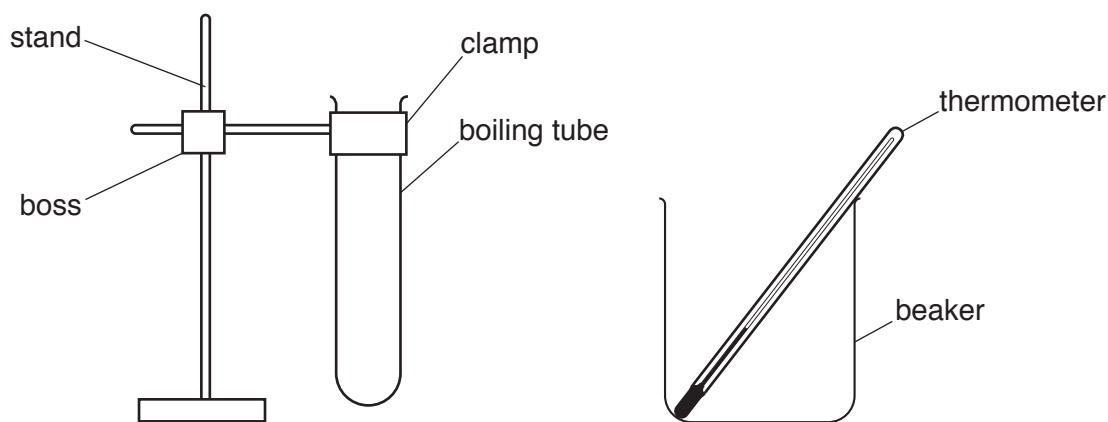
'The Examiners do not want you to waste time through inability to get on with an experiment. Any candidate, therefore, who is unable to get on with the experiment after spending five minutes at it may come to me and ask for help. I shall report to the Examiners any help given in this way, and some marks 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) 250 cm<sup>3</sup> beaker. See note 1.
- (ii) Boiling tube (approximate capacity between 50 cm<sup>3</sup> and 70 cm<sup>3</sup>). See note 1.
- (iii) Thermometer, –10 °C to 110 °C, graduated in 1 °C intervals.
- (iv) 100 cm<sup>3</sup> or 250 cm<sup>3</sup> measuring cylinder.
- (v) Stopclock or stopwatch or wall-mounted clock showing seconds. Candidates will be required to take readings at intervals of 30 s. The question will refer to a stopclock.
- (vi) Clamp, boss and stand. See note 1.
- (vii) Supply of cold water, at least 400 cm<sup>3</sup>.
- (viii) Supply of very hot water. See note 2.
- (ix) Paper towels to soak up any water spillages.

**Notes**

1. The apparatus should be supplied to candidates as shown in Fig. 1.1.

**Fig. 1.1**

2. Very hot water is to be available for each candidate throughout the experiment. This water should be maintained at an approximately constant temperature between 80 °C and 95 °C. Each candidate will require about 200 cm<sup>3</sup> of hot water in total. Candidates must be able to pour hot water into the measuring cylinder, boiling tube and beaker safely.
3. Candidates should be warned of the dangers of burns and scalds when using very hot water.

**Action at changeover**

Empty the water from the beaker and boiling tube.  
Return the thermometer to the beaker if necessary.  
Check that the apparatus is intact.

## Question 2

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

- (i) Three lengths of resistance wire labelled **X**, **Y** and **Z**, about 90 cm, 70 cm and 50 cm in length respectively. 32 SWG (0.274 mm diameter) constantan (Eureka) is suitable. Any other wire with a resistance of approximately  $8\ \Omega\text{m}^{-1}$  can be used. See note 1.
- (ii) Strip of rigid insulating material approximately 4 cm wide and 95 cm long. Wood or plastic is suitable. See note 1.
- (iii) Power supply of approximately 2 V–3 V. See note 3.  
Where candidates are provided with a variable power supply, the voltage should be set by the Supervisor and fixed, e.g. taped.
- (iv) Switch. The switch may be an integral part of the power supply.
- (v) Sufficient connecting leads to set up the circuit shown in Fig. 2.1.
- (vi) 2 crocodile clips.
- (vii) Ammeter capable of measuring currents up to 1.00 A with a resolution of at least 0.05 A. See note 4.
- (viii) Voltmeter capable of measuring up to 3.0 V with a resolution of at least 0.1 V. See note 4.
- (ix) Metre rule with a mm scale.

### Notes

1. The wires are to be fixed to the insulating strip in such a way that they are parallel, but not touching. Candidates must be able to connect the crocodile clips near the ends of each wire without the possibility of the crocodile clips touching other bare wires on the insulating strip.
2. The circuit is to be set up for candidates as shown in Fig. 2.1, with the crocodile clips connected to resistance wire **X**. The circuit should be switched off.

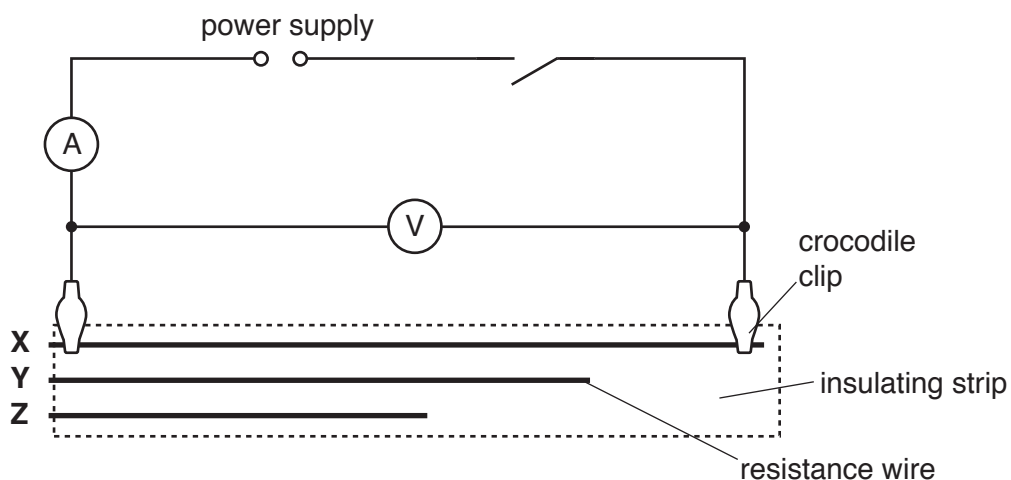


Fig. 2.1

3. If cells are used, they must remain adequately charged throughout the examination. Spare cells must be available.
4. Either analogue or digital meters are suitable. Any variable settings should be set by the Supervisor and fixed, e.g. taped. Spare meters should be available.

**Action at changeover**

Ensure that the circuit is connected as shown in Fig. 2.1 and check that the circuit is working. Switch the circuit off.

### Question 3

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

- (i) Converging lens of focal length between 14.0 cm and 16.0 cm with a suitable holder.
- (ii) Metre rule with a mm scale.
- (iii) Illuminated object consisting of rigid card with a triangular hole of height 1.5 cm (see Fig. 3.1). The hole is to be covered with thin translucent paper (e.g. tracing paper) secured with adhesive tape.
- (iv) Plain white screen. A sheet of stiff white card approximately 15 cm × 15 cm, fixed to a wooden support, is suitable (see Fig. 3.2).
- (v) 50 cm or 30 cm ruler, graduated in mm. Candidates may use their own.
- (vi) 12 V, 24 W (or greater) bulb and holder, 0–12 V power supply, 2 connecting leads.

#### Notes

1. The lamp used for the illuminated object should be low voltage, 24 W or greater.
2. The lamp filament, the centre of the hole which forms the object and the centre of the lens in its holder, must all be the same height above the bench.
3. The apparatus should be situated away from direct sunlight.

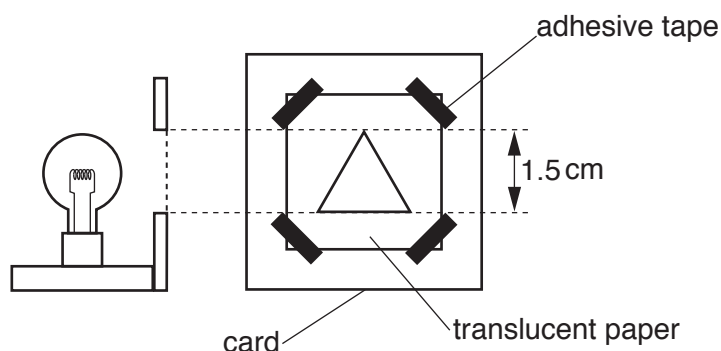


Fig. 3.1

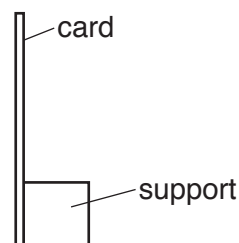


Fig. 3.2

#### Action at changeover

Check that the apparatus is intact and that the lamp is working.  
Replace or re-cover the screen if it has been marked.

### Question 4

No apparatus is required for this question.

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

### **SUPERVISOR'S REPORT**

#### *General*

The Supervisor is required 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)*

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

SIGNED .....  
Supervisor