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**PHYSICS**

**0625/53**

Paper 5 Practical Test

**May/June 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. The 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 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 a 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) A resistance wire about 105 cm in length. 32 swg (0.274 mm diameter) constantan (Eureka) is suitable, or any other wire with a resistance of approximately  $8\Omega\text{m}^{-1}$ . See note 1.
- (ii) Metre rule or wooden strip. See note 1.
- (iii) Power supply of approximately 3 V. See notes 3 and 4.
- (iv) Switch. The switch may be an integral part of the power supply.
- (v)  $1\Omega$ , 3 W resistor and insulating tape, required **only** if the power supply does **not** consist of dry cells. See note 4.
- (vi) Sufficient connecting leads to set up the circuit shown in Fig. 1.1.
- (vii) Crocodile clip. A jockey is a suitable alternative. The question will refer to a crocodile clip.
- (viii) Ammeter capable of measuring currents up to 1.00 A with a resolution of at least 0.05 A. See note 5.
- (ix) Voltmeter capable of measuring up to 3.0 V with a resolution of at least 0.1 V. See note 5.

#### Notes

1. The resistance wire is to be fixed to the metre rule or wooden strip in such a way as to allow candidates to connect a crocodile clip to points on the wire that will allow them to obtain potential difference values of between 1.1 V and 2.1 V. These must be obtainable without overheating of the resistance wire.
2. The circuit is to be set up for candidates as shown in Fig. 1.1, with the crocodile clip disconnected from the resistance wire. The free end of the resistance wire must be labelled **X**. Label **P** and **Q** as shown in Fig. 1.1.

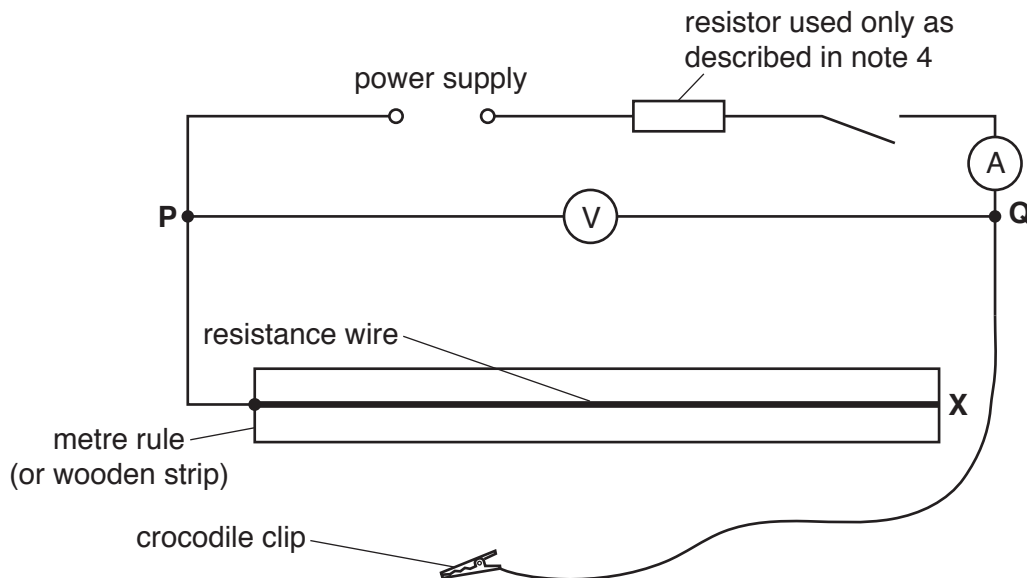


Fig. 1.1

3. If cells are used as the power supply, they must remain adequately charged throughout the examination. Spare cells must be available.
4. Where candidates are provided with a variable power supply, the voltage should be set by the Supervisor and fixed, e.g. taped. If the power supply is a power pack or lead acid cells, rather than dry cells, a  $1\ \Omega$ , 3 W resistor must be connected in series with the power supply as shown in Fig. 1.1. Appropriate insulating tape should be used to cover this resistor and hide it from view.
5. 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. 1.1.

Check that the circuit is working and that a potential difference of 2.1 V is obtainable.

Switch the circuit off.

**Question 2****Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)**

- (i) Forcemeter capable of measuring forces up to 2.0 N with a resolution of at least 0.1 N.
- (ii) Irregular piece of modelling clay of mass approximately 100 g. A loop of thin string or strong cotton must be incorporated so that the modelling clay can hang from the forcemeter. See notes 1 and 2.
- (iii) 250 cm<sup>3</sup> measuring cylinder.
- (iv) Balance capable of measuring masses up to 500 g with a resolution of at least 1 g. See note 3.
- (v) Supply of cold water. See note 4.
- (vi) Paper towels to soak up any water spillages.

**Notes**

1. The modelling clay must be non-porous and able to keep its shape when immersed in water. Plasticine is suitable.
2. The modelling clay, suspended from the forcemeter, must be able to be totally immersed in water in the measuring cylinder without touching the sides.
3. The measuring cylinder must be able to stand unsupported on the balance without the danger of tipping. The balance may be shared, but enough should be available so that candidates have easy individual access.
4. Each candidate will require approximately 200 cm<sup>3</sup> of water. The temperature of the water is not critical.

**Action at changeover**

Ensure that the measuring cylinder is empty.

Ensure that the modelling clay and measuring cylinder are as dry as possible.

### Question 3

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

- (i) Sheet of plain A4 paper (per candidate) with a hole punched in one corner so that it can be tied into the Question Paper.
- (ii) Rectangular transparent glass or acrylic (Perspex) block, 10 cm × 6 cm × 1.5 cm or similar size.
- (iii) Plane mirror, capable of standing upright and approximately the same length as the largest dimension of the rectangular block.
- (iv) Four optics pins.
- (v) Pinboard (e.g. cork mat), A4 size or larger.
- (vi) 50 cm rule or 30 cm ruler, graduated in mm. Candidates may use their own.
- (vii) Protractor. Candidates may use their own.
- (viii) String or treasury tag (per candidate) to tie the ray-trace sheet, (i) above, into the Question Paper.

#### Notes

1. Spare sheets of plain paper, as in (i) above, and pins should be available.

#### Action at changeover

Supply a sheet of plain A4 paper, as in (i) above, and string or treasury tag, as in (viii) above.

### 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