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**PHYSICS**

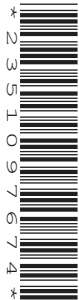
**0625/52**

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. 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 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 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) Power supply of approximately 1.5V–2V. Where candidates are provided with a variable power supply, the voltage should be set by the Supervisor and fixed, e.g. taped.
- (ii) Voltmeter capable of measuring the supply p.d. with a resolution of at least 0.1 V. See note 3.
- (iii) Ammeter capable of measuring the current in the circuit shown in Fig. 1.1 with a resolution of at least 0.02A. See note 3.
- (iv) Switch. The switch may be an integral part of the power supply.
- (v) A metre rule or a half-metre rule graduated in mm.
- (vi) Two lengths of approximately 51 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). The wires must be taped to a metre rule, or a half-metre rule, so that the wires are parallel, but not touching. Tape should be used only between the 3 cm and 7 cm marks and between the 43 cm and 47 cm marks. Label the rule with the letters **A**, **B**, **C** and **D** as shown in Fig. 1.1, with **A** and **C** at the zero end of the rule.
- (vii) Two suitable terminals (e.g. crocodile clips) attached to the constantan wires at **A** and **B**, 50 cm apart, so that connections can be made to the circuit shown in Fig. 1.1.
- (viii) Two suitable terminals (e.g. crocodile clips) attached to the constantan wires at **C** and **D**, 50 cm apart.
- (ix) Sliding contact, labelled **S**. This may be a jockey or a small screwdriver connected to a lead by means of a crocodile clip.
- (x) Sufficient connecting leads to set up the circuit shown in Fig. 1.1, plus an additional short lead suitable for connecting points **B** and **D**.

#### Notes

1. The circuit is to be set up for the candidates as shown in Fig. 1.1.

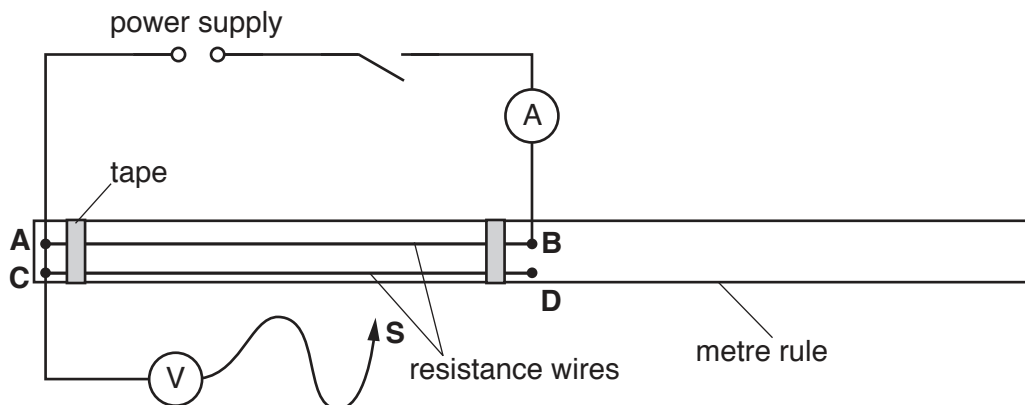


Fig. 1.1

2. If cells are used they must remain adequately charged throughout the examination. Spare cells should be available.
3. 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.
4. The polarities of the power supply, voltmeter and ammeter should be such that, on closing the switch and touching **S** to wire **AB**, the readings on both the ammeter and the voltmeter are positive.

**Action at changeover**

Check that the circuit is arranged as shown in Fig. 1.1.  
Check the power supply.

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

- (i) Metre rule with a mm scale. See note 1.
- (ii) Triangular block of approximate height, 1 cm to 3 cm, to act as a pivot for the metre rule. This block is to stand on the bench.
- (iii) 100g mass labelled **P**. See note 2.
- (iv) 80g mass labelled **Q**. See note 2.
- (v) Top-pan balance capable of measuring masses up to 200g to the nearest gram. A balance may be shared between several candidates but the balance must be situated so that it is easily accessible to them.

**Notes**

1. The metre rule should approximately balance on the pivot when the 50 cm mark is over the pivot.
2. The masses must have a regular shape with a flat base so that they can be placed on the metre rule. Laboratory masses or cubes of modelling clay are suitable. The values of the masses must be obscured from the candidates.

**Action at changeover**

Check that the apparatus is ready for the next candidate.

If modelling clay has been used, **P** and **Q** should be checked to confirm that their mass values are as stated. An additional supply of masses **P** and **Q** should be available.

### 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 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) Four optics pins.
- (iv) Pinboard (e.g. a cork mat), A4 size or larger.
- (v) Protractor. Candidates may use their own.
- (vi) 30 cm ruler, graduated in mm. Candidates may use their own.
- (vii) String or treasury tag (per candidate) to tie the ray-trace sheet (see (i) above) into the Question Paper.

#### Notes

1. Spare sheets of plain paper should be available.
2. Spare pins should be available.

#### Action at changeover

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

### 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