



### 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  $N/3$ , 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, followed by 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) Metre rule with a mm scale. See note 1.
- (ii) Triangular block to act as a pivot for the metre rule. This block is to stand on the bench.
- (iii) 100 g mass labelled **P**.
- (iv) 80 g mass labelled **Q**.
- (v) Top-pan balance capable of measuring mass to a precision of at least 1 g. One balance per set of apparatus is not essential but candidates must have easy access to a balance without delay.

**Note**

1. The metre rule should approximately balance on the pivot when the 50 cm mark is over the pivot.

**Action at changeover**

Check that the apparatus is ready for the next candidate.

## Question 2

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

- (i) Power source of approximately 1.5 V–2 V. 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 precision of at least 0.1 V.
- (iii) Ammeter capable of measuring the current in the circuit shown in Fig. 2.1 with a precision of at least 0.02 A.
- (iv) A lamp in a suitable holder. The lamp must glow when connected as shown in Fig. 2.1, and not blow if the sliding contact is moved to a distance 10 cm from **A**.
- (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) Two suitable terminals (e.g. crocodile clips) attached to the constantan wire at the ends of the metre rule so that connections can be made to the circuit shown in Fig. 2.1.
- (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. 2.1.

### Notes

1. The circuit is to be set up for the candidates as shown in Fig. 2.1.

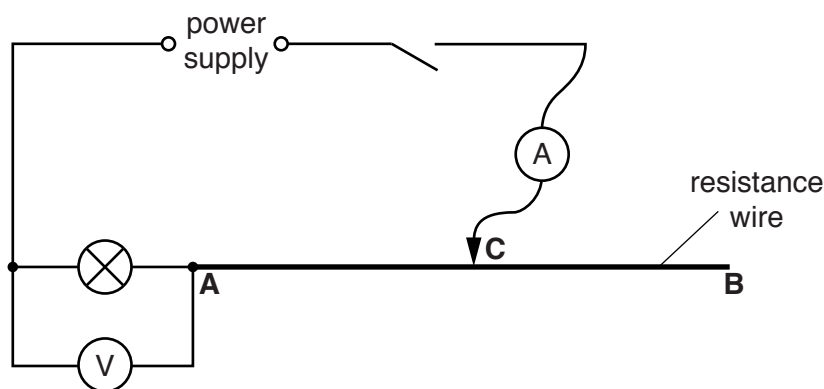


Fig. 2.1

2. If cells are to be used they must remain adequately charged throughout the examination. Spare cells should be available.
3. Candidates must be able easily and quickly to rearrange the circuit.
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**

Check that the circuit is arranged as shown in Fig. 2.1.  
Check the power supply and lamp.

### Question 3

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

- (i) Converging lens, focal length approximately 15 cm, with a suitable holder. See note 2.
- (ii) Illuminated object made from stiff white card with a triangular hole of height 1.5 cm (see Figs. 3.1 and 3.2). The hole is to be covered with thin translucent paper (e.g. tracing paper). See notes 1 and 2.
- (iii) Metre rule with a mm scale.
- (iv) Screen. A white sheet of stiff card approximately 15 cm × 15 cm, fixed to a wooden support, is suitable. See Fig. 3.3.
- (v) Plane mirror fixed to a wooden support so that it stands vertically, as shown in Fig. 3.4. The height of the mirror must be at least the height above the bench of the top of the lens in its holder. The width of the mirror must be at least the diameter of the lens.

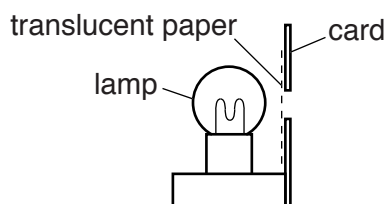


Fig. 3.1

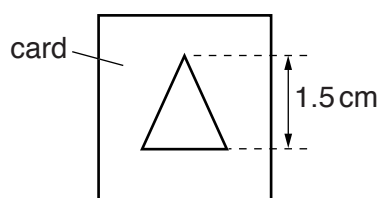


Fig. 3.2

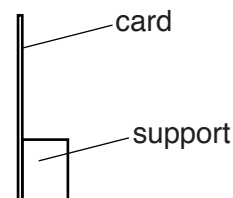


Fig. 3.3

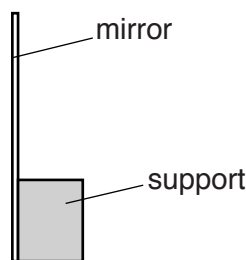


Fig. 3.4

#### Notes

1. The lamp for the illuminated object should be a low voltage lamp, approximately 24W or higher power, with a suitable power supply.
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 is to be situated away from direct sunlight.

#### Action at changeover

Check that the apparatus is ready for the next candidate.

### Question 4

No apparatus is required for this question.

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

### **REPORT ON PRACTICAL PHYSICS**

#### *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 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

