



### 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) Plastic or polystyrene drinks cup with a volume of approximately  $180\text{ cm}^3$  –  $250\text{ cm}^3$ .
- (ii) 30 cm ruler graduated in mm. Candidates may use their own.
- (iii)  $250\text{ cm}^3$  or  $100\text{ cm}^3$  measuring cylinder.
- (iv) A beaker containing approximately  $200\text{ cm}^3$  of water at room temperature. See note 1.
- (v) Top-pan balance capable of measuring masses up to 200 g 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.
- (vi) Supply of paper towels to mop up any spills of water.

**Notes**

1. The beaker must be labelled 'W'.

**Action at changeover**

Refill the beaker W.

Empty the measuring cylinder and plastic cup.

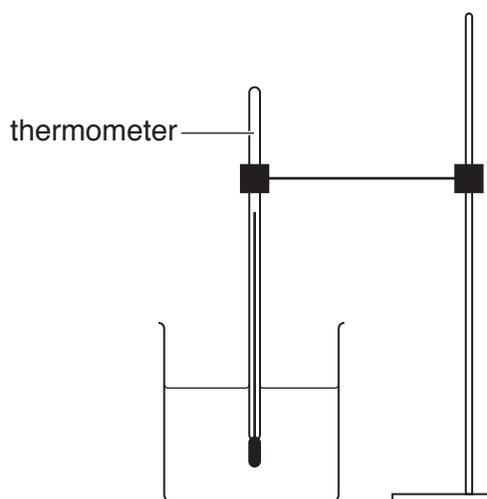
Replace the plastic cup, if necessary.

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

- (i) Thermometer,  $-10^{\circ}\text{C}$  to  $110^{\circ}\text{C}$ , graduated in  $1^{\circ}\text{C}$  intervals.
- (ii)  $250\text{ cm}^3$  beaker.
- (iii)  $100\text{ cm}^3$  or  $250\text{ cm}^3$  measuring cylinder.
- (iv) Stopclock, stopwatch or wall-mounted clock showing seconds. Candidates may use their own wristwatch if suitable. The question will refer to a stopclock.
- (v) Supply of hot water. See notes 1 and 2.
- (vi) Clamp, boss and stand. See note 3.
- (vii) Supply of paper towels to mop up any spills of water.

**Notes**

1. The hot water is to be supplied for each candidate by the Supervisor. The water should be maintained at a temperature as hot as is reasonably and safely possible. Each candidate will require about  $300\text{ cm}^3$  of hot water.
2. Candidates should be warned of the dangers of burns or scalds when using very hot water.
3. The clamp, boss and stand must be set up for the candidates with the thermometer held in the clamp. The candidates must be able to read temperatures up to  $100^{\circ}\text{C}$ .

**Fig. 2.1****Action at changeover**

Empty the beaker and measuring cylinder.

Check the supply of hot water.

### Question 3

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

- (i) Converging lens, focal length between 14 cm and 16 cm, with a suitable holder.
- (ii) Illuminated object with a triangular hole of height 1.5 cm to 2.0 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 calibrated in mm.
- (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) Spare lamps should be available.

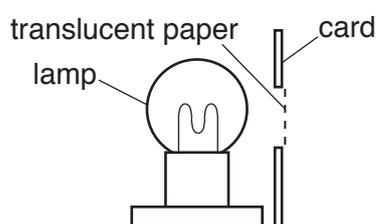


Fig. 3.1

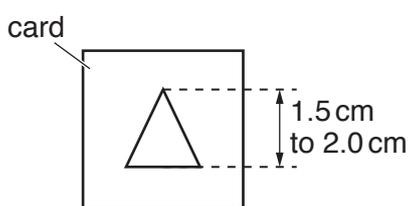


Fig. 3.2

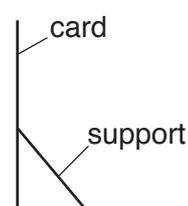


Fig. 3.3

### Notes

1. The lamp for the illuminated object should be a low voltage lamp, approximately 24 W 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.**

### **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