



### 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  $N/4$ , 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.

Centres may find it more convenient and easier to administer if  $N/3$  sets (plus one or two 'spares') of apparatus are provided.

The order in which a given candidate attempts the four questions is immaterial.

### 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) Clamp, boss and stand.
- (ii) Two pendulum bobs, each attached to approximately 80cm of thin inextensible string. See notes 1 and 2.
- (iii) Metre rule.
- (iv) Stopclock or stopwatch with a minimum precision of 0.1 s. Candidates may use their own wristwatch facility if they wish.
- (v) Split cork or similar device to hold the string of the pendulum between the jaws of the clamp. See note 1.

**Notes**

1. One pendulum should be set up for the candidates with length approximately 30 cm. The candidates must be able easily to adjust the length of the pendulum.
2. The other pendulum is to have a bob with a mass approximately double the mass of the first bob.
3. It may be necessary to increase the stability of the clamp stand (for example, by placing a weight on the base).

**Action at changeover**

Arrange the pendulum as described in note 1, using the pendulum bob with the smaller mass.

**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) Two  $250\text{cm}^3$  beakers, with the  $200\text{cm}^3$  level clearly marked. The beakers must be clearly labelled '1' and '2'.
- (iii) Clamp, boss and stand.
- (iv) Stopclock, stopwatch or wall-mounted clock showing seconds. Candidates may use their own wristwatch facility if they wish. The question will refer to a stopclock.
- (v) Supply of hot water. See notes 1 and 2.
- (vi) Stirrer. A teaspoon is suitable.
- (vii) A lid to cover beaker 1. A circle of cardboard is suitable.
- (viii) Supply of paper towels to mop up any spillages of water.

**Notes**

1. The hot water is to be supplied for each candidate by the Supervisor. The candidates will be required to refill the beakers during the experiment. The water should be maintained at a temperature as hot as is reasonably possible. Each candidate will require at least  $800\text{cm}^3$  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 are to be set up with the thermometer held in the clamp. The candidates must be able easily and safely to read temperatures up to  $100^{\circ}\text{C}$  and to move the thermometer in and out of the water without the danger of the beaker tipping.

**Action at changeover**

Empty the  $250\text{cm}^3$  beakers. Check the supply of hot water.

### Question 3

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

- (i) Power supply of approximately 1.5–2V. Where candidates are provided with a power supply with a variable output voltage, the voltage setting should be set by the Supervisor and fixed (e.g. taped).
- (ii) Ammeter capable of measuring current with a minimum resolution of 0.05 A. See note 3.
- (iii) Voltmeter capable of measuring the supply p.d. with a minimum resolution of 0.1V.
- (iv) Switch. The switch may be an integral part of the power supply.
- (v) Metre rule.
- (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. 3.1.
- (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. 3.1.

#### Notes

1. The circuit shown in Fig. 3.1 must be set up for the candidates.

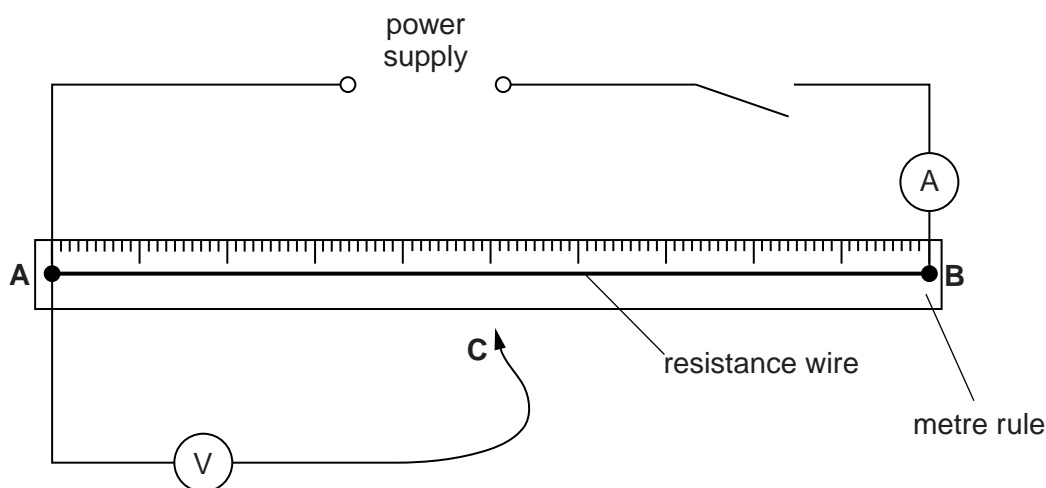


Fig. 3.1

2. If cells are used as the power supply they must remain adequately charged throughout the examination.
3. Either analogue or digital meters would be suitable.

#### Action at changeover

Check that the circuit is connected correctly. If cells are used, check that they are adequately charged.

### Question 4

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

- (i) Converging lens, focal length approximately 150 mm, with a suitable holder.
- (ii) Illuminated object with a triangular hole of height 1.5 cm (see Figs. 4.1 and 4.2). The hole is to be covered with thin translucent paper (e.g. tracing paper).
- (iii) Metre rule.
- (iv) Screen. A white sheet of stiff card approximately 150 mm × 150 mm, fixed to a wooden support, is suitable. See Fig. 4.3.

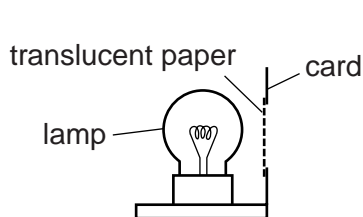


Fig. 4.1

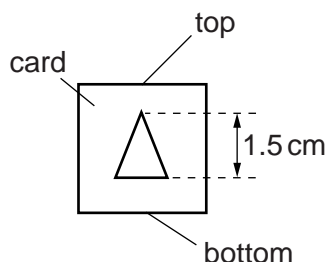


Fig. 4.2

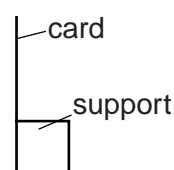


Fig. 4.3

### Notes

1. The lamp for the illuminated object should be a low-voltage lamp, approximately 24W or higher power (a car headlamp bulb is suitable), 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.

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

**REPORT ON PRACTICAL PHYSICS**

(IGCSE OCTOBER/NOVEMBER 2013)

*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.



*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

