

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) 100 cm³ beaker, labelled **A**.
- (ii) Larger beaker, labelled **B**, capacity approximately 400 cm³.
- (iii) Thermometer, –10 °C to 110 °C, graduated in 1 °C intervals.
- (iv) 100 cm³ or 250 cm³ measuring cylinder.
- (v) Stopclock or stopwatch or wall-mounted clock showing seconds. Candidates will be required to take readings at 30-second intervals. They may use their own wristwatches. The question will refer to a stopclock.
- (vi) Supply of hot water. See note 1.
- (vii) Supply of paper towels to mop up any water spillages.

Notes

1. Hot water is to be available for each candidate throughout the experiment. The hot water should be maintained at an approximately constant temperature between 80 °C and 100 °C. Each candidate will require about 200 cm³ of hot water in total. Candidates must be able to pour hot water into the measuring cylinder and beakers safely.
2. Candidates should be warned of the dangers of burns and scalds when using very hot water.

Action at changeover

Empty the water from the beakers. Check the supply of hot water. Check that the apparatus is intact.

Question 2

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

- (i) A resistance wire of length about 105 cm. 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) Filament lamp, 2.5V 0.2A, or similar, in holder.
- (iii) Metre rule or wooden strip. See note 1.
- (iv) Power supply of approximately 3V. See note 3. Where candidates are provided with a variable power supply, the voltage should be set by the Supervisor and fixed, e.g. taped.
- (v) Switch. The switch may be an integral part of the power supply.
- (vi) Sufficient connecting leads to set up the circuit shown in Fig. 2.1. See note 2.
- (vii) Crocodile clip. A jockey is a suitable alternative. The question will refer to a crocodile clip. See note 2.
- (viii) Ammeter capable of measuring currents up to 1.00A with a resolution of at least 0.05 A. See note 4.
- (ix) Voltmeter capable of measuring up to 3.0V with a resolution of at least 0.1V. See note 4.

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 0.2V and 2.6V.
2. The circuit is to be set up for candidates as shown in Fig. 2.1, with the crocodile clip clipped to the resistance wire. The position of the crocodile clip is not important.

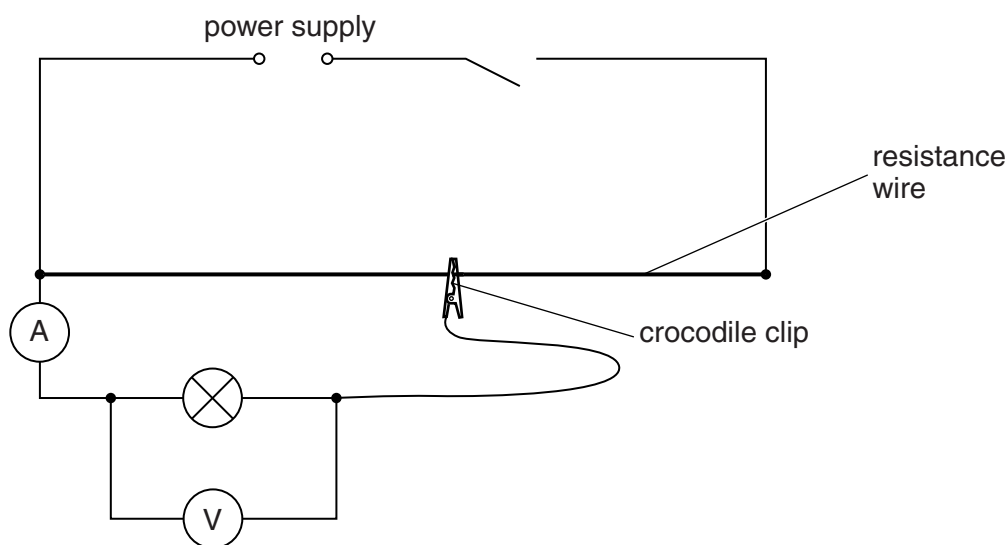


Fig. 2.1

3. If cells are used, they must remain adequately charged throughout the examination. Spare cells must be available.
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

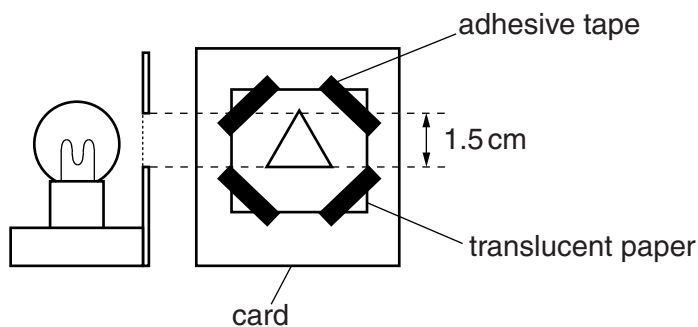
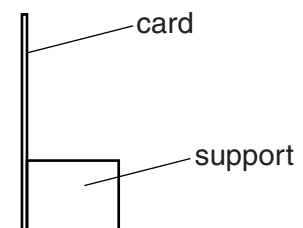
Ensure that the circuit is connected as shown in Fig. 2.1 and check that the circuit is working. Switch the circuit off.

Question 3**Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)**

- (i) Converging lens of focal length approximately 15 cm, with a suitable holder.
- (ii) Metre rule with a mm scale.
- (iii) Illuminated object consisting of rigid card with a triangular hole of height 1.5 cm (see Fig. 3.1). The hole is to be covered with thin translucent paper (e.g. tracing paper) secured with adhesive tape.
- (iv) Screen. A white sheet of stiff card approximately 150 mm × 150 mm, fixed to a wooden support is suitable (see Fig. 3.2).
- (v) 50 cm or 30 cm ruler, graduated in mm. Candidates may use their own.

Notes

1. The lamp used for the illuminated object should be low voltage, 24W or greater.
2. The lamp filament, the centre of the hole which forms the object and the centre of the lens in its holder must all be the same height above the bench.
3. The apparatus should be situated away from direct sunlight.

**Fig. 3.1****Fig. 3.2****Action at changeover**

Check that the apparatus is intact and that the lamp is working.

Question 4

No apparatus is required for this question.

This form must be completed and returned with the scripts.

REPORT ON PRACTICAL PHYSICS

(IGCSE OCTOBER/NOVEMBER 2016)

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

