



### 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) Clamp, boss and stand.
- (ii) Pendulum bob attached to approximately 60 cm of thin, inextensible string.
- (iii) Metre rule with a mm scale.
- (iv) Stopwatch with a resolution of at least 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.

**Notes**

1. The pendulum should be set up for the candidates with the length approximately 45 cm from the bottom of the split cork to the bottom of the pendulum bob.
2. Candidates must be able easily to adjust the length of the pendulum.
3. It may be necessary to increase the stability of the clamp stand, for example by using a G-clamp or by placing a weight on the base.

**Action at changeover**

Check that the apparatus is set up as described in note 1.

**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, labelled **A**.
- (iii)  $250\text{ cm}^3$  beaker, labelled **B**.
- (iv)  $100\text{ cm}^3$  or  $250\text{ cm}^3$  measuring cylinder.
- (v) Clamp, boss and stand. See note 4.
- (vi) Supply of hot water. See notes 1 and 2.
- (vii) Supply of water at room temperature. See note 3.
- (viii) Supply of paper towels to mop up any water spillages.
- (ix) Stirrer.
- (x) Lid for beaker **A**, with a hole for the thermometer. See notes 5 and 7.
- (xi) Sufficient insulating material to wrap once round beaker **A**. See notes 6 and 7.
- (xii) Two elastic bands to secure the insulating material round beaker **A**. See note 7.

**Notes**

1. Hot water is to be available for each candidate throughout the experiment. The water should be maintained at an approximately constant temperature between  $80^{\circ}\text{C}$  and  $100^{\circ}\text{C}$ . Each candidate will require about  $250\text{ cm}^3$  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 or scalds when using very hot water.
3. Water at room temperature is to be available for each candidate throughout the experiment. The supply of water must be labelled '**cold water**'. Each candidate will require about  $250\text{ cm}^3$  of water at room temperature.
4. 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 a beaker tipping.
5. The lid is to be cut from a sheet of suitable insulating material, e.g. cardboard or expanded polystyrene.
6. Any flexible insulating material may be used, e.g. cotton wool, felt or corrugated cardboard.
7. Items (x), (xi) and (xii) must be placed on a sheet of plain paper labelled '**items for use in Question 2 part (d)**'.

**Action at changeover**

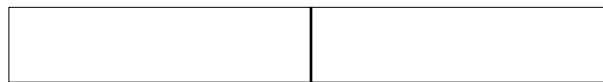
Empty the beakers and measuring cylinder. Check the supply of hot water. Check the supply of water at room temperature. Return items (x), (xi) and (xii) to the sheet of paper. Replace the insulation if wet.

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

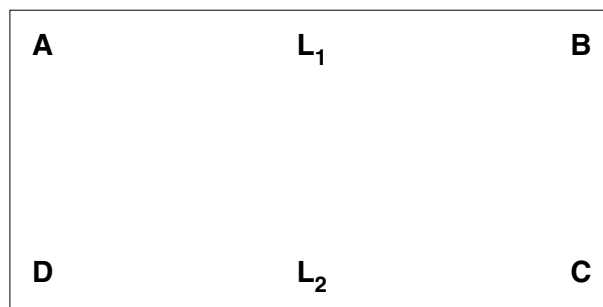
- (i) Sheet of plain A4 size paper with a hole in one corner, one per candidate.
- (ii) Rectangular, transparent glass or Perspex block, approximate size 11 cm × 6 cm × 2 cm. See notes 1 and 2.
- (iii) Optics pin.
- (iv) Pin board (e.g. a cork mat), A4 size or larger.
- (v) Protractor. Candidates may use their own.
- (vi) 50 cm or 30 cm ruler, graduated in mm. Candidates may use their own.
- (vii) String or treasury tag (to tie the plain A4 sheet of paper into the Question Paper). One per candidate.

**Notes**

1. The block must have a thin vertical line drawn at the centre on each of the longest sides of the block, as shown in Fig. 3.1. These lines may be drawn with a permanent marker pen.

**Fig. 3.1**

2. Label the top face of the block as shown in Fig. 3.2.

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

Check that the lines and labels have not been rubbed off the block. Supply a sheet of plain A4 paper (as in (i) above) and string or treasury tag (as in (vii) above).

**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**

(IGCSE OCTOBER/NOVEMBER 2016)

*General*

The Supervisor is invited 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

