

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**PHYSICS**

**0625/05**

Paper 5 Practical Test

October/November 2005

**CONFIDENTIAL INSTRUCTIONS**

**Great care should be taken that any confidential information given does not reach the candidates either directly or indirectly.**

This document consists of **8** printed pages.



### 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 that you think would improve the accuracy of your experiments, and you should say, on your script, how you use any such apparatus supplied.'

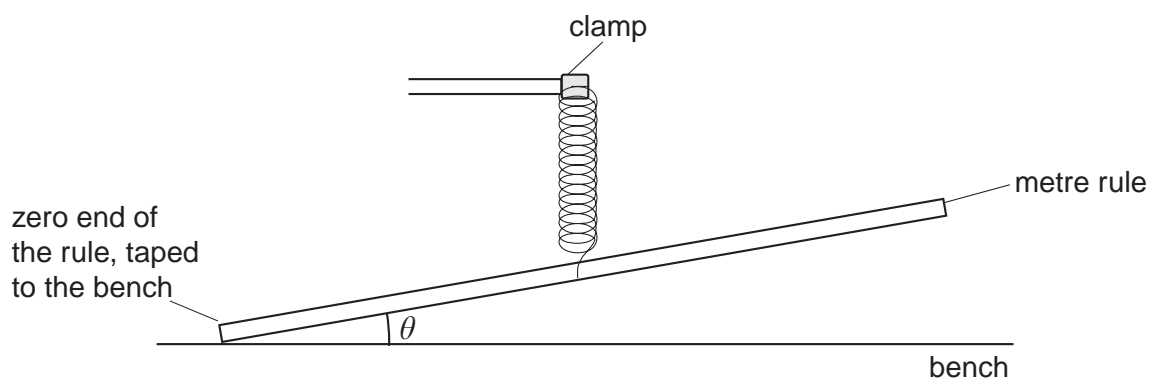
**Question 1**

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

- (i) Metre rule.
- (ii) Expendable spring, spring constant approximately 0.6 mm/g, capable of supporting at least 500 g without overstretching (e.g. Philip Harris expendable steel spring 41397).
- (iii) 10 g, 20 g, 30 g, 40 g and 50 g masses that can be placed on the rule (a set of slotted masses is ideal).
- (iv) Clamp, stand and boss.
- (v) String.
- (vi) 180° protractor.

**Notes**

1. The apparatus is to be set up as shown in Fig. 1.1. One end of the spring should be attached to the clamp. The other end of the spring is to be attached with string to the metre rule at the 50.0 cm mark. The string can be taped to the rule so that it does not slip.
2. The zero end of the rule on the bench should be held in position with Sellotape so that it does not slip but the other end is free to move up or down. The Sellotape should adhere securely to the surface of the bench. If the Sellotape lifts when the 50 g load is placed at the 90.0 cm mark on the rule, then the tape should be attached to the bench using a G-clamp.
3. The height of the spring should be adjusted so that when the 50 g load is placed at the 90.0 cm mark on the rule, the end of the rule is approximately 5 cm above the bench. The spring must be vertical so that the rule only moves in a vertical plane when the masses are added.

**Fig. 1.1****Action at changeover**

Check that the rule is arranged as described above and that the load is removed from the rule.

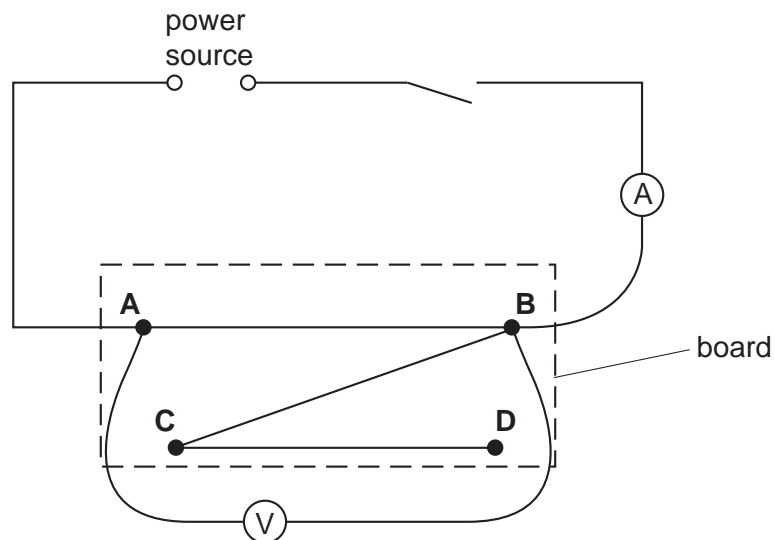
## Question 2

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

- (i) Power source of approximately 1.5 – 2.0 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 minimum precision of 0.1 V.
- (iii) Ammeter capable of reading up to 1.0 A with a minimum precision of 0.05 A.
- (iv) Approximately 150 cm of wire, taped to a board as shown in Fig. 2.1, such that the distances **AB** = **BC** = **CD** = 50 cm. The wire may be bare nichrome (diameter 0.45 mm (26 swg) or 0.38 mm (28 swg)) or bare constantan (0.32 mm (30 swg)).
- (v) Four suitable terminals attached to the wire so that connections can be made to the circuit shown in Fig. 2.1 at positions labelled **A**, **B**, **C** and **D**.
- (vi) Sufficient connecting leads to set up the circuit shown in Fig. 2.1, plus one extra connecting lead.
- (vii) Switch (this can be an integral part of the power supply).

## Notes

1. The circuit is to be set up for the candidates as shown in Fig. 2.1.
2. If cells are used as the power source, they must remain adequately charged throughout the examination.



**Fig. 2.1**

## Action at changeover

Reconnect the circuit as shown in Fig. 2.1. Check that the output of the power source is close to its original value.

**Question 3**

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

- (i) Thermometer,  $-10^{\circ}\text{C}$  to  $110^{\circ}\text{C}$  capable of being read to the nearest  $1^{\circ}\text{C}$ .
- (ii)  $250\text{ cm}^3$  beaker, labelled **A**.
- (iii)  $250\text{ cm}^3$  beaker, labelled **B**. This beaker is to be insulated with a layer of an insulating material about  $0.5\text{ cm}$  thick. Cotton wool is suitable.
- (iv) A supply of hot water. Each candidate will require about  $400\text{ cm}^3$ .
- (v) Stopwatch or stopclock.

**Notes**

1. The hot water is to be supplied for each candidate by the Supervisor. The water temperature should be between  $80^{\circ}\text{C}$  and  $100^{\circ}\text{C}$ .
2. Candidates should be warned of the dangers of burns or scalds when using very hot water.
3. Cloths or tissues should be available in case of spillages.
4. The type and thickness of the insulating material is not critical. The base of the beaker should not be insulated and the beaker should not have a lid.

**Action at changeover**

Empty beakers **A** and **B**.

Replenish the supply of hot water.

Replace the insulation if it has become wet.

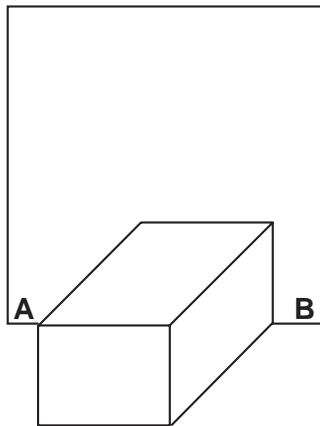
**Question 4**

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

- (i) Plane mirror with a suitable holder (see note 2).
- (ii) 3 optics pins.
- (iii) Pin board (e.g. a cork mat), A4 size or larger.
- (iv) Protractor.
- (v) 50 cm or 30 cm rule, graduated in mm.
- (vi) Square piece of stiff card 5 cm × 5 cm fixed to a supporting block (see note 1).

**Notes**

1. The piece of card is to have one edge labelled **A** and the opposite edge labelled **B**. The card is to be fixed to a supporting block as shown in Fig. 4.1.
2. The mirror should be capable of standing vertically with one edge on the Answer Booklet.



**Fig. 4.1**

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

**REPORT ON PRACTICAL PHYSICS**

(IGCSE OCTOBER/NOVEMBER 2005)

*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 Answer Booklets.



*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

