

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**PHYSICS**

**0625/05**

Paper 5 Practical Test

May/June 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 **11** printed pages and **1** blank page.



## 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 11 and 12) 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)*

- (a) Thermometer,  $-10^{\circ}\text{C}$  to  $110^{\circ}\text{C}$ , capable of being read to the nearest  $1^{\circ}\text{C}$ .
- (b)  $250\text{ cm}^3$  beaker, labelled **A**, containing  $100\text{ cm}^3$  of hot water.
- (c) A supply of water at room temperature. Each candidate will require about  $150\text{ cm}^3$ .
- (d)  $100\text{ cm}^3$  measuring cylinder.

**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.

**Action at changeover**

Empty beaker **A** and refill it with  $100\text{ cm}^3$  of hot water. Check the supply of water at room temperature.

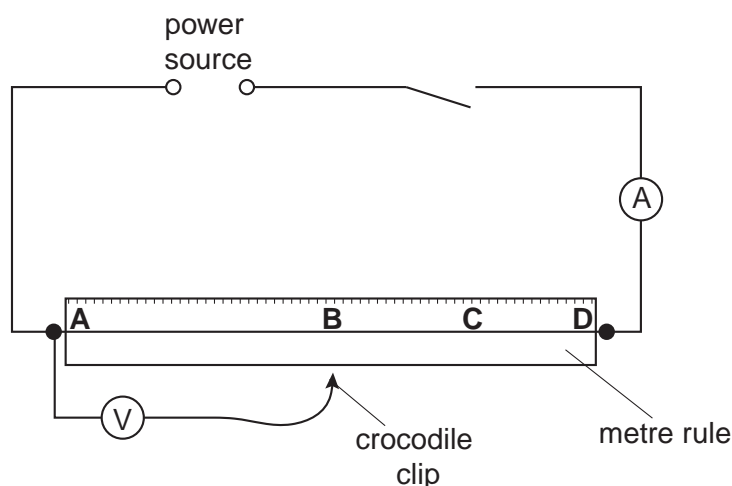
## Question 2

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

- (a) Power source of approximately 1.5 – 2.0 V. Where candidates are supplied with a power source with a variable output voltage, the voltage should be set by the Supervisor and fixed (e.g. taped).
- (b) Voltmeter capable of measuring the supply p.d. with a minimum precision of 0.1 V.
- (c) Ammeter capable of reading up to 1.0 A with a minimum precision of 0.05 A.
- (d) Approximately 105 cm of straight, bare wire, taped to a metre rule. The wire may be constantan (diameter 0.45 mm (26 swg) or 0.38 mm (28 swg) or 0.32 mm (30 swg)) or nichrome (diameter 0.45 mm (26 swg)). The taping must allow connections to be made at points **A**, **B**, **C** and **D**. (See note 3).
- (e) Crocodile clip.
- (f) Sufficient connecting leads to set up the circuit shown in Fig. 2.1.
- (g) 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.
3. Labels are to be attached to the metre rule as shown in Fig. 2.1. **A** is at the zero end of the rule, **B** at the 50.0 cm mark, **C** at the 75.0 cm mark and **D** at the 100.0 cm mark. The labels should not obscure the scale of the metre rule.



**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.

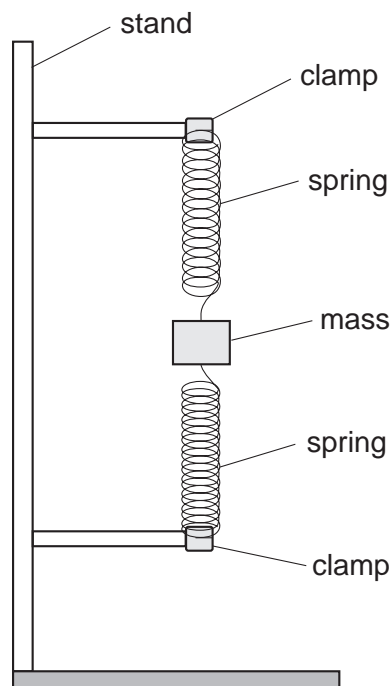
**Question 3**

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

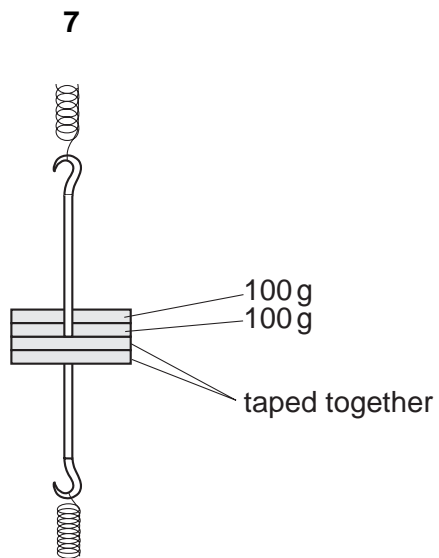
- (a) Two expendable springs, 55 mm  $\times$  15 mm diameter, capable of supporting at least 500 g without overstretching (e.g. Philip Harris expendable steel spring A41397).
- (b) 200 g mass, 300 g mass and 400 g mass.
- (c) Stand, two clamps and two bosses.
- (d) Stopwatch.

**Notes**

- 1. The apparatus is to be set up as shown in Fig. 3.1, with the 400 g mass between the two springs.
- 2. The mass should be attached to the springs so that it can be easily removed and replaced with either of the other two masses. Two 100 g mass holders taped together with additional 100 g masses as required can be used as shown in Fig. 3.2.
- 3. The distance between the clamps should be adjusted so that the lower spring is always in tension when the 400 g mass undergoes small oscillations (amplitude less than 1 cm).



**Fig. 3.1**



**Fig. 3.2**

**Action at changeover**

Check that the springs are arranged as described above using the 400 g mass.

**Question 4**

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

- (a) Three copies (*per candidate*) of the ray trace sheet printed opposite. Each copy should have a hole in the top right-hand corner so that it can be tied into the Answer Booklet.
- (b) Rectangular, transparent glass or perspex block 10 cm × 6 cm × 1.5 cm or similar size.
- (c) 4 optics pins.
- (d) Pin board (e.g. a cork mat) A4 size or larger.
- (e) Protractor.
- (f) 30 cm rule graduated in mm.
- (g) String to tie ray trace sheets ((a) above) into the Answer Booklet.

**Note**

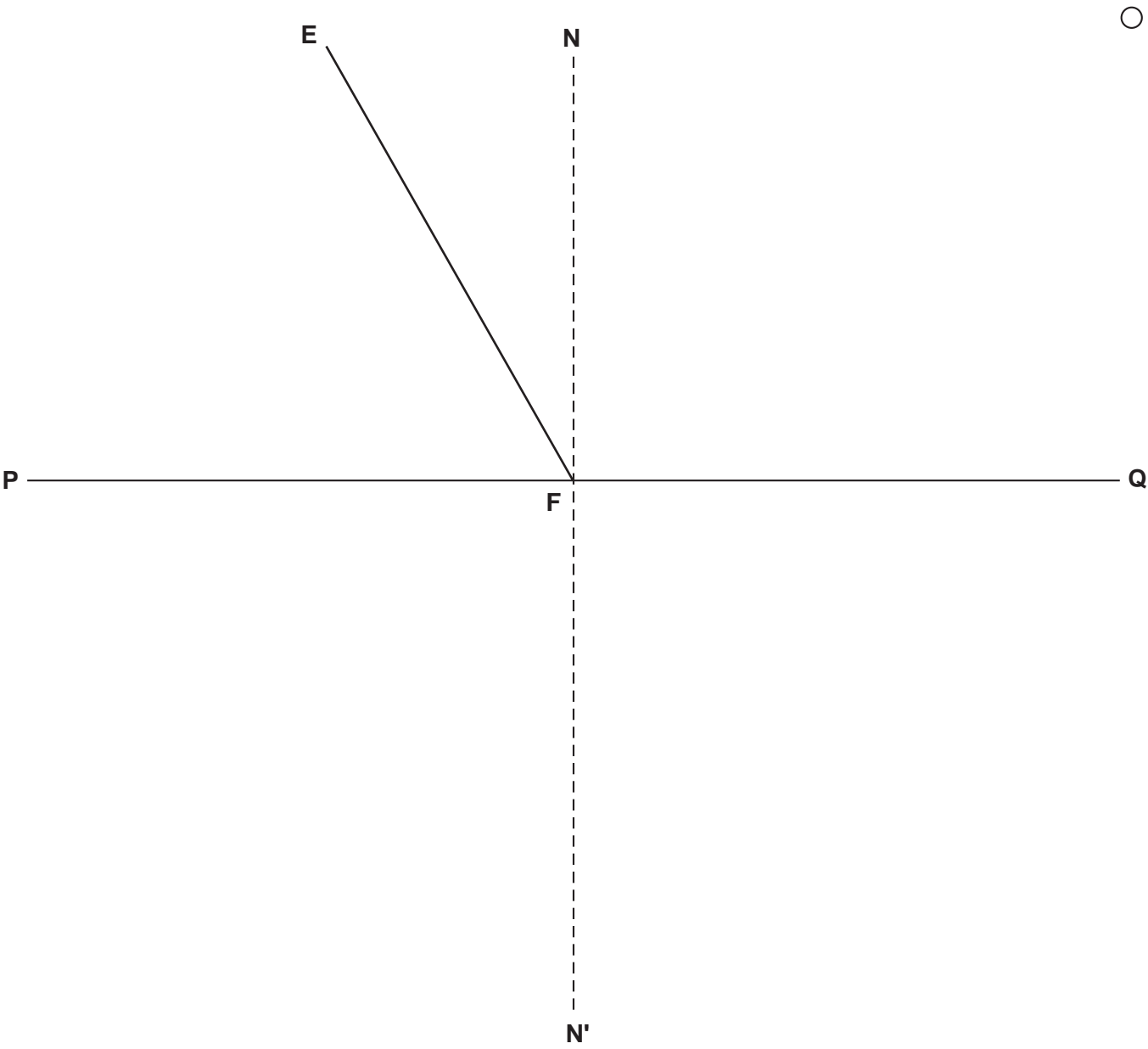
Some spare ray trace sheets should be available.

**Action at changeover**

Supply three new ray trace sheets (as in (a) above).



Ray trace sheet



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

**REPORT ON PRACTICAL PHYSICS**

(IGCSE MAY/JUNE 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

