

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**PHYSICS**

**5054/03**

Paper 3 Practical Test

May/June 2006

**CONFIDENTIAL INSTRUCTIONS**

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

If you have any problems or queries regarding these Instructions, please contact CIE  
by e-mail: [International@cie.org.uk](mailto:International@cie.org.uk),  
by phone: +44 1223 553554,  
by fax: +44 1223 553558,  
stating the Centre number, the nature of the query and the syllabus number quoted above.

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



## Instructions for preparing apparatus

These instructions detail the apparatus required for each experiment in this paper. No access is permitted to the Question Paper in advance of the examination session.

## Number of sets of apparatus

In addition to a few spare sets, the minimum number of sets of apparatus to be provided should be sufficient to enable candidates to spend 20 minutes with the apparatus for each of Questions 1, 2 and 3, and one hour with the apparatus for Question 4. The order in which candidates answer the questions will be determined by the Supervisor. Candidates may spend one hour circulating around Questions 1, 2 and 3, followed by an hour on Question 4, or vice versa.

Extra graph paper should be available. It is assumed that candidates will supply their own calculator and geometrical instruments, such as a set square,  $0^\circ$  to  $180^\circ$  protractor, pair of compasses and 30 cm rule. Candidates should be advised in advance that they may, if they wish, use quartz wristwatches with stopwatch facilities, providing that such wristwatches afford the required precision.

## Instructions for the supervision of the examination

The Supervisor, who may be a Physics teacher, is responsible for the administration of the examination according to the procedures detailed in the Handbook for Centres. In all instances, a Physics teacher should be present. Preferably, this teacher should have been responsible for the preparation of the apparatus. Two invigilators must be present at all times: it is not acceptable for a teacher who has been responsible for preparing the candidates for this paper to be the sole Supervisor or Invigilator.

Supervisors may make the following announcement at the start of the examination.

'The Examiners do not want you to waste time when you are unable to do any experiment. Any candidate who is unable to get results with an experiment may ask for help. The extent of this help will be reported to the Examiners, who may make a deduction of marks.'

Supervisors should note that a candidate may only be given enough assistance to allow some raw readings or observations to be made. On no account should any assistance be given with the treatment or analysis of these readings and observations.

Supervisors may draw to the attention of the candidates any significant deviation between the apparatus provided and that detailed in the Question Paper, particularly where diagrams are given in the paper.

Candidates should be reminded that all their work should be written on the printed Answer Booklet. Rough paper must not be used.

The Supervisor must complete the Report at the back of these Instructions. Details should be given of any significant deviation between the apparatus used and that specified in these Instructions. A sample set of results can often help Examiners. A copy of this Report must be included in **each** packet of scripts.

**Question 1****Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)**

100 cm<sup>3</sup> glass beaker labelled A.

Beaker labelled B containing approximately 100 cm<sup>3</sup> of water.

Twenty glass spheres of approximate diameter 1.5 cm.

100 cm<sup>3</sup> measuring cylinder.

Two set squares.

Two metre rules.

Paper towels or cloths to mop up spillages.

**Notes**

1. The spheres should be placed inside beaker A.
2. At the changeover, Supervisors should return the water from the measuring cylinder to beaker B and replenish beaker B if necessary. The spheres and beaker A should be dried if necessary and then the spheres should be returned to beaker A.

**Information required by examiners**

None.

**Question 2****Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)**

Expendable steel spring, e.g. Griffin catalogue number XBV-590-010H.

400 g mass, e.g. three 100 g masses taped to a 100 g mass hanger.

Metre rule.

Set square.

Stand with two clamps and two bosses.

Stopwatch reading to 0.1 s or better.

**Notes**

1. Candidates will suspend the 400 g mass from the spring. Supervisors should ensure that the extension of the spring is greater than 10 cm when this is done. If the extension is less than 10 cm, Supervisors should increase the mass. The elastic limit of the spring should not be exceeded.
2. At the changeover, Supervisors should dismantle the apparatus set up by the candidate.

**Information required by examiners**

None.

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

Power supply, d.c., approximately 3 V, e.g. two 1.5 V cells in a cell holder.

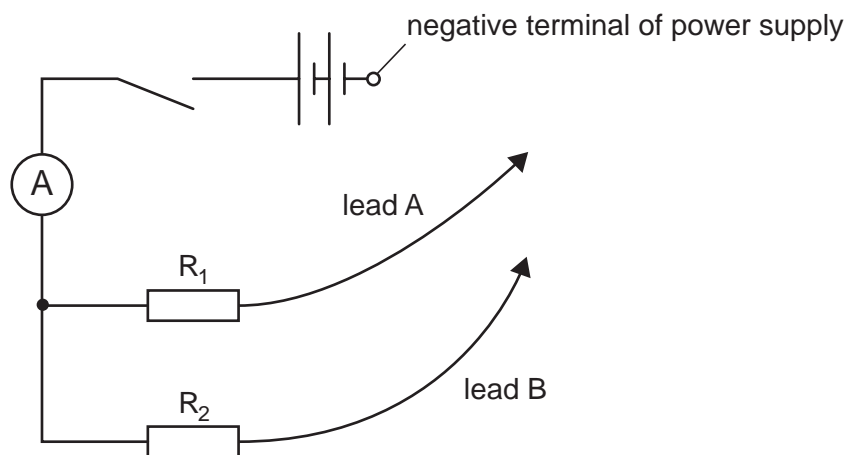
Ammeter capable of reading up to 1 A to a precision of 0.01 A. A 2 A digital meter would be suitable.

Switch.

10  $\Omega$ , 1 W resistor labelled  $R_1$ .

18  $\Omega$ , 1 W resistor labelled  $R_2$ .

Six connecting leads to enable the Supervisor to set up the arrangement shown in Fig. 3.1.



**Fig. 3.1**

**Notes**

1. When the Supervisor sets up the arrangement as shown in Fig. 3.1, the lead connected to the 10  $\Omega$  resistor should be labelled A and the lead connected to the 18  $\Omega$  resistor should be labelled B.
2. The resistances of the two resistors should be hidden from the candidates.
3. If two 1.5 V cells are used as the power supply, candidates should be instructed to open the switch immediately after a reading has been taken in order to prevent the cells “running down”.
4. At the changeover, Supervisors should check that the arrangement is still set up as shown in Fig. 3.1.

**Information required by examiners**

None.

**Question 4****Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)**

100 cm<sup>3</sup> Pyrex beaker.

–10 °C to 110 °C thermometer.

Supply of water at room temperature.

Candle with base to ensure that it will stand upright, e.g. tea light.

Means of lighting the candle, e.g. box of matches.

Stand with a clamp and two bosses.

Second clamp.

Plastic stirrer.

Stopwatch or stop clock.

Access to a top-pan balance reading to 0.1 g or better.

Paper towels or cloths to mop up spillages.

**Notes**

1. The bosses should be attached to the stand and the clamp should be held in the lower of the two bosses.
2. The jaws of the clamp must open widely so that the clamp can hold the beaker.
3. The thermometer should be held in the second clamp so that the scale from 0 °C to 60 °C is not obscured. A label should be attached to the clamp saying “do not adjust”.
4. If candidates are sharing top-pan balances, Supervisors should ensure that candidates do not communicate while using the balances, and should ensure that candidates are not unduly delayed while others use the balances.
5. If the examination room has ceiling fans or is draughty, draught shields should be provided so that the candle can burn with a steady flame.
6. At the changeover, the Supervisor is to dismantle the apparatus set up by the candidate. The 100 cm<sup>3</sup> beaker should be emptied and its base wiped clean. The supply of water at room temperature should be replenished if necessary.

**Information required by examiners**

None.

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**This form must be completed and returned with the Answer Booklets.**

### REPORT ON PRACTICAL PHYSICS

The Supervisor is asked to give the following details, using the space provided on page 8.

- (a) Information required at the end of the test, as indicated in the Instructions.
- (b) Any help given to a candidate.
- (c) Any general difficulties encountered in preparing the apparatus.
- (d) Any difficulties experienced by particular candidates. These should include reference to difficulties due to faulty apparatus or materials and accidental damage to apparatus or materials. Candidates should be identified by name and candidate number.

Other cases of hardship, such as disability or illness, should be reported to CIE in the normal way.

The Supervisor is asked to provide a plan of the work benches, giving details by candidate numbers of the places occupied by the candidates for each session. The plan should be enclosed with the Answer Booklets, together with the Information required by Examiners.

#### Declaration to be signed by the Principal

The preparation of this practical examination has been carried out so as fully to maintain the security of the examination.

Signed .....

Name (in block capitals) .....

Centre Number .....

Centre Name .....



**Information required**

Details of difficulties and any help given to candidates.

