UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

PHYSICS **5054/03**

Paper 3 Practical Test **May/June 2007**

CONFIDENTIAL INSTRUCTIONS

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

No access to the Question Paper is permitted in advance of the examination.

If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: 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 ad 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° to 180° 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

Apparatus requirements (per set of apparatus, unless otherwise specified)

Converging lens of focal length 15 cm, in a lens holder labelled 'converging lens'.

Diverging lens of focal length 30 cm, in a lens holder labelled 'diverging lens'.

Cross-wire object.

Lamp to illuminate the object.

White screen of approximate dimensions 20 cm by 20 cm.

Metre rule.

Notes

1. If a diverging lens of focal length 30 cm is not available, then a diverging lens with any focal length in the range 15 cm to 90 cm is suitable.

2. The cross-wire object should be made from a 20 cm square piece of card or board. A hole of diameter 2 cm should be made in the board. Two small pieces of thin wire should be glued so that they cross the hole along two perpendicular diameters.

3. The cross-wire object and the screen should be supported so that they can stand perpendicular to the bench. This may be done either by attaching blocks of wood to the base of the object and screen or by supporting them with clamps, stands and bosses.

4. The centre of the hole, the lamp and the centres of the lenses when they are supported in the holders should be at the same height above the bench.

5. The apparatus should be in a dimly-lit area of the laboratory and the lamp should be bright enough so that candidates can see images formed on the screen.

6. At the changeover the Supervisor should dismantle any apparatus that has been left set up by the candidate. The Supervisor should check that the lenses are still in the correct lens holders.

Information required by Examiners

None.

Question 2

Apparatus requirements (per set of apparatus, unless otherwise specified)

12 microscope slides each of approximate dimensions 7.5 cm × 2.5 cm × 0.1 cm.

Half-metre rule.

Access to a top-pan balance reading up to at least 100 g to a precision of at least 0.1 g.

Notes

1. The microscope slides should all have approximately the same dimensions.

2. All of the microscope slides should be put together in the form of a stack. Tape should be wrapped around the stack as shown in Fig. 2.1 so that the candidates are unable to remove the slides.

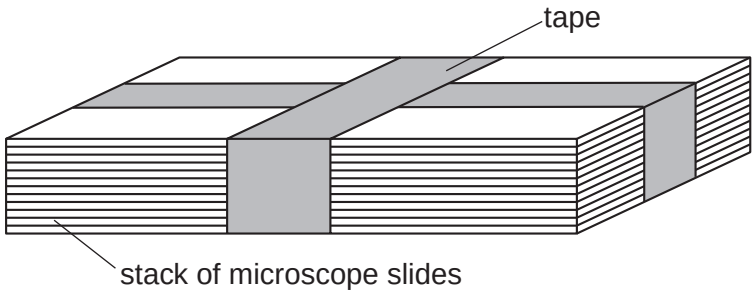

Fig. 2.1

3. At the changeover Supervisors should check that the tape around the stack of slides has not been disturbed. The tape should be replaced if necessary.

Information required by examiners

None.

Question 3

Apparatus requirements (per set of apparatus, unless otherwise specified)

Table tennis ball.

Metre rule.

Set square.

Stand, clamp and boss.

Card on which is written the mass in kg of the table tennis ball to a precision of ± 0.0001 kg.

Cardboard screen.

Notes

1. Candidates will bounce the ball on the bench surface. The bench surface should be reasonably smooth so that the ball bounces approximately vertically.

2. The cardboard screen should be made from four pieces of cardboard, each of length approximately 50 cm, taped together as shown in Fig. 3.1.

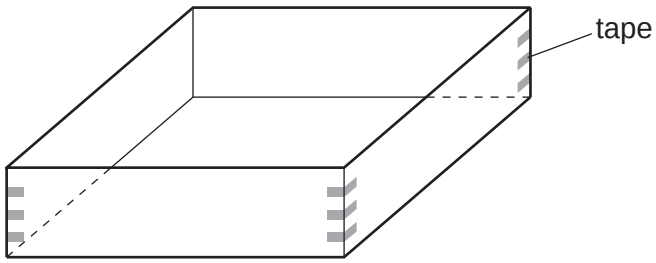

Fig. 3.1

3. Spare table tennis balls should be available.

4. At the changeover the Supervisor should check that the card is still in place and should dismantle any apparatus that has been left set up by the candidate.

Information required by examiners

None.

Question 4

Apparatus requirements (per set of apparatus, unless otherwise specified)

6 V d.c. power supply, e.g. four 1.5 V dry cells in a suitable holder.

Ammeter capable of measuring a current of up to 0.60 A to a precision of 0.01 A. A digital or analogue meter is suitable.

10 Ω, 5 W resistor, labelled X.

Switch or plug key.

Three further resistors of values 3.3 Ω, 4.7 Ω and 6.8 Ω, each with a power rating of at least 2 W.

Connecting leads to enable the Supervisor to set up the circuit shown in Fig. 4.1.

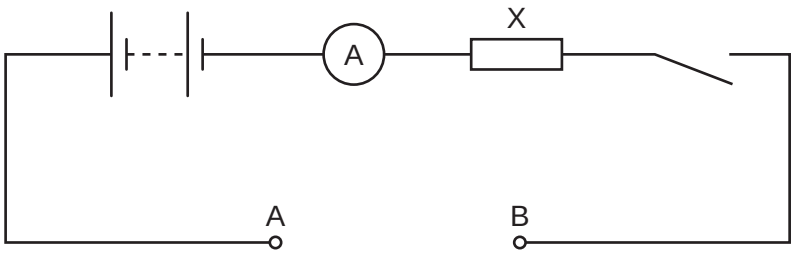

Fig. 4.1

Two further connecting leads.

Notes

1. The resistors should all have suitable terminations to enable them to be connected into the circuit.

2. The value of the 10 Ω resistor should be obscured from the candidates by covering the resistor in opaque tape. It should be labelled X.

3. The nominal values of the other three resistors should be clearly marked on the resistors for the candidates to use. This can be done by placing masking tape around the resistor and then writing the value of the resistor on the masking tape.

4. In the circuit shown in Fig. 4.1, the terminals A and B should be clearly labelled.

5. Candidates will be instructed to open the switch after every reading. Supervisors should be aware that, if the switch remains closed, the resistors may become hot.

6. At the changeover the Supervisor should check that the circuit is still set up as described above. The switch should be open. The additional resistors should be disconnected from the circuit and the labels at terminals A and B should still be in place.

Information required by examiners

None.

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 number 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.