

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Advanced Level

**PHYSICS**

**9702/05**

Paper 5 Practical Test

May/June 2006

**1 hour 30 minutes**

**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 **6** printed pages and **2** blank pages.



## Instructions for preparing apparatus

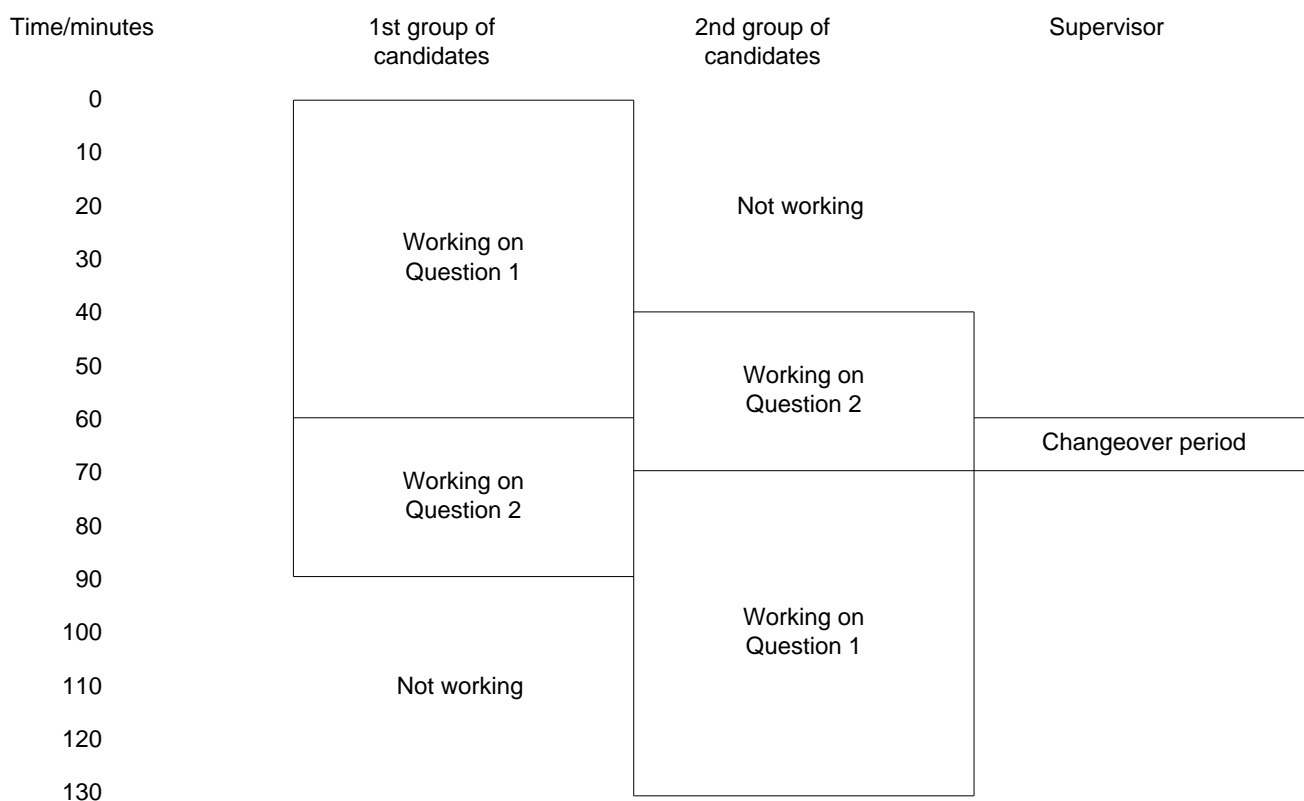
These instructions detail the apparatus required for the experiment in this paper. No access is permitted to the Question Paper in advance of the examination session.

It is assumed that the ordinary apparatus of a Physics laboratory will be available.

## Number of sets of apparatus

In addition to a few spare sets, there should ideally be one set of apparatus per candidate.

If this is not possible, then the minimum number of sets of apparatus to be provided should be sufficient for half the candidates to carry out the experiment simultaneously, plus a few spare sets. With this number of sets available, a staggered start to the examination will be required, which may be organised as shown in the diagram below.



## Instructions for the Practical Physics Supervisor

Candidates should be informed that, if they find themselves in real difficulty, they may ask the Supervisor for practical assistance but that the extent of this assistance will be reported to the Examiner, who may make a deduction of marks.

The Supervisor should complete the report form on pages 7 and 8 and enclose it in the envelope containing the answers of the candidates. A note of any help given to, or any particular difficulties experienced by, a candidate should also be enclosed, especially if the Examiner would be unable to discover these from the written answers.

It is assumed that candidates will provide themselves with standard items such as a 30 cm rule, a pair of compasses, a 0° to 180° protractor, a set square and a calculator.

Squared paper should be available.

Whenever a stopwatch or stopclock is specified, candidates should be advised, in advance, that they may, if they wish, use quartz wristwatches with stopwatch facilities.

## Question 1

### Apparatus requirement (per set unless otherwise specified)

Continuously-variable low voltage power supply unit capable of delivering potential differences in the range 0 – 5 V d.c. If a continuously-variable power supply is not available, then a stepped power supply (or dry cells) with a potentiometer would be acceptable. Candidates should be able to adjust the output of the supply without difficulty.

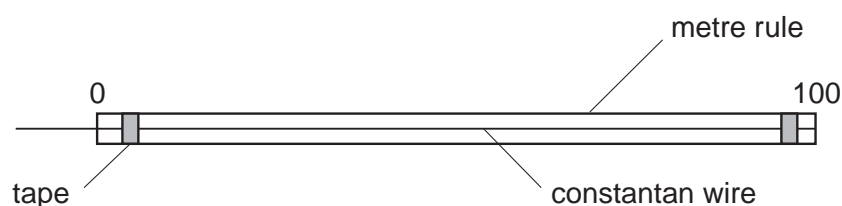
Ammeter, range 0 – 1 A. A digital meter would be most suitable.

Voltmeter capable of reading a potential difference of about 3 V to at least two significant figures. A digital meter would be most suitable.

Micrometer screw gauge. It is permissible for candidates to share micrometers if there are insufficient for candidates to have one each.

Metre rule.

1.05 m length of 36 swg (about 0.19 mm diameter) of bare constantan wire. The wire should be taped along the central part of the rule using two small pieces of Sellotape positioned at the 5 cm and 95 cm marks. A short length of wire of approximately 5 cm should be left protruding from the zero end. The arrangement is shown in Fig. 1.1.



**Fig. 1.1**

Resistor, 10  $\Omega$ , with a power rating of at least 1 W.

Three crocodile clips.

Six stackable connecting wires.

### Note

The apparatus should not be assembled. If the apparatus is to be used by a second candidate, the circuit should be dismantled at the end of the first candidate's experiment and the equipment laid out on the bench ready for the next candidate to use. The constantan wire should be checked for damage. Spare rules with wire attached should be available.

### Information required by Examiners

Diameter of the constantan wire supplied to candidates.

**Question 2**

Question 2 is a design exercise that does not require apparatus.

**BLANK PAGE**

**BLANK PAGE**

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

**This form should be completed and sent to the Examiner with the scripts.**

**REPORT ON PRACTICAL PHYSICS**

**General Certificate of Education Advanced Level**

**May/June Session 2006**

**General**

The Supervisor is invited to give details, on the reverse of this form, of any difficulties experienced by particular candidates, giving names and candidate numbers. These should include reference to:

- (a) accidents to apparatus or materials;
- (b) any other information that is likely to assist the Examiner, especially if this cannot be discovered in the scripts;
- (c) any help given to a candidate.

Other cases of individual hardship, e.g. illness, disability, should be reported direct to CIE on the normal 'Special Consideration Form'.

In cases of faulty apparatus (not arising from a candidate's mishandling) which prevent the required readings being taken, the following action is permissible.

The Invigilator – in consultation with the Physics teacher responsible for preparing the examination – may allow extra time to give the candidate a fair opportunity to perform the experiment as if the fault had not been present. The candidate should use a spare copy of the Question Paper when the fault has been rectified or when working with a second set of apparatus. The Invigilator is asked to provide CIE with details of such cases of time compensation (a copy being enclosed with the scripts), especially

- (i) the candidate's name and candidate number,
- (ii) the extra time allowed,
- (iii) notes on the nature of the fault, the action taken to rectify the difficulty and any other comments that would be helpful to the Examiner in making a fair assessment of the candidate's work during the practical examination.



**Information required**

Diameter of constantan wire supplied to candidates = ..... mm

A list, by name and candidate number, of candidates requiring help, with details of help provided.

**Declaration** (to be signed by the Principal)

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

Signed .....

Centre Number .....

Name of Centre .....

