



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

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PHYSICS

9702/31

Paper 31 Advanced Practical Skills 1

October/November 2007

CONFIDENTIAL INSTRUCTIONS

2 hours

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



Preparing apparatus

These instructions detail the apparatus required for the experiments in the Question Paper. It is essential that absolute confidentiality is maintained in advance of the examination: the content of these instructions must not be revealed either directly or indirectly to candidates.

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

If you have problems or queries regarding these instructions, please contact CIE:

by e-mail: international@cie.org.uk,
or by telephone: +44 1223 553554,
or by fax: +44 1223 553558,

stating the nature of the query and quoting the syllabus and paper numbers (9702/31).

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

Number of sets of apparatus

The number of sets of apparatus provided for each experiment should be $\frac{1}{2}N$, where N is the number of candidates taking the examination. There should, in addition, be a few spare sets of apparatus available in case problems arise during the examination.

Organisation of the examination

Candidates should be allowed access to the apparatus for each experiment for one hour only. After spending one hour on one experiment, candidates should change over to the other experiment. The order in which a candidate attempts the two experiments is immaterial.

Assistance to Candidates

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.

Assistance should only be given:

when it is asked for by a candidate,
or as directed in the Notes sections of these instructions,
or where apparatus is seen to have developed a fault.

Assistance should be restricted to enabling candidates to make observations and measurements. Observations and measurements must not be made for candidates, and no help should be given with data analysis or evaluation.

All assistance given to candidates must be reported on the Supervisor's Report Form.

Faulty apparatus

In cases of faulty apparatus (not arising from a candidate's mishandling) that prevent the required measurements being taken, the Supervisor 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.

Supervisor's Report

The Supervisor should complete the Supervisor's Report Form on pages 7 and 8 and enclose it in the envelope containing the answers of the candidates. If more than one envelope is used, a copy of the report must be enclosed in each envelope.

Question 1**Apparatus requirements (per set of apparatus unless otherwise specified)**

Metre rule.

Four crocodile clips.

1.10m length of 36 swg (diameter 0.19 mm) constantan wire, taped to a metre rule at the ends of the rule as shown in Fig. 1.1. Small lengths of wire should be left at the ends of the rule so that connections can be made to the wire using crocodile clips.

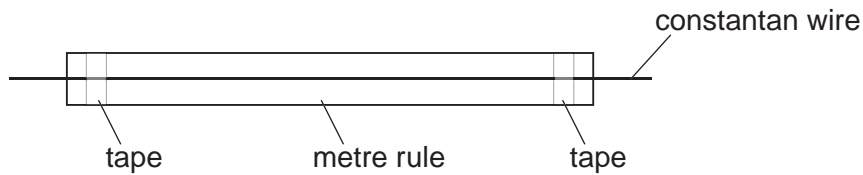


Fig. 1.1

Card on which is written 'The resistivity ρ of the material of the wire is $5.2 \times 10^{-7} \Omega \text{ m}$ '.

Three 1.5V dry cells in series to form a battery. Candidates must be able to make connections to this battery without difficulty.

Two mounted 10Ω resistors. One resistor should be labelled R and the other labelled S. The values of the resistors should be hidden. Candidates must be able to make connections to the resistors without difficulty.

Digital voltmeter. The meter must be capable of measuring voltages in the range 0–5V to a precision of 0.01V.

Seven connecting leads. One of the leads should be at least 60 cm long.

Micrometer screw gauge.

Notes

- 1 If a candidate asks for help with connecting the circuit, the Supervisor should give help. The extent of the help given must be detailed on the Supervisor's Report Form and sent with the scripts.
- 2 If the apparatus is to be used by a second candidate, it 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.

Information required by Examiners

None.

Question 2**Apparatus requirements (per set of apparatus unless otherwise specified)**

100 g mass (or two 50 g masses if a 100 g mass is not available).

Two wooden metre rules. One of the rules should have the 100 g mass (or two 50 g masses) firmly attached to an end.

G-clamp.

Stopwatch reading to 0.1 s or better.

Stand, boss and clamp.

Notes

- 1 The jaws of the G-clamp should be large enough to fit comfortably around the edge of the bench.
- 2 If the apparatus is to be used by a second candidate then the apparatus should be dismantled and laid out on the bench ready for the next candidate to use.

Information required by Examiners

None.

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

SUPERVISOR'S REPORT FORM

General Certificate of Education Advanced Subsidiary Level and Advanced Level

October/November Session 2007

The Supervisor's Report should give full details of:

- (a) any help given to a candidate (including the nature of the help given and the name and candidate number of the candidate);
- (b) any cases of faulty apparatus (including the nature of the problem, the action taken to rectify it, any additional time allowed, and the name and candidate number of the candidate);
- (c) any accidents that occurred during the examination;
- (d) any other difficulties experienced by candidates, or any other information that is likely to assist the Examiner, especially if this information cannot be discovered in the scripts.

Cases of individual hardship, such as illness, bereavement or disability, should be reported direct to CIE on the normal Special Consideration form.

Information required by Examiners

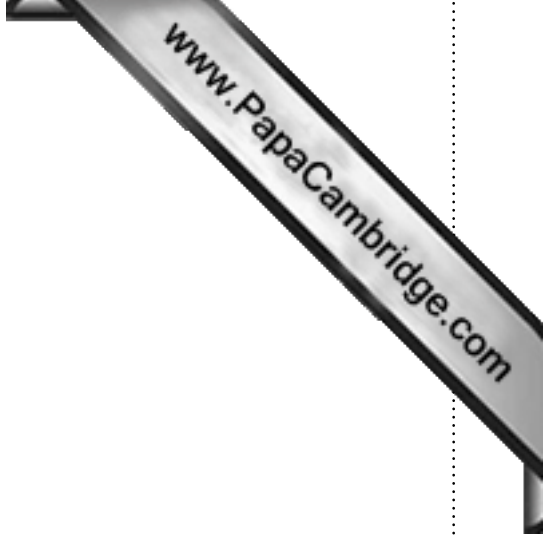
Question 1: none.

Question 2: none.

Supervisor's Report



Supervisor's Report (continued)



Declaration

(to be signed by the Supervisor)

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

Signed

Name

Centre Number

Name of Centre

