



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

PHYSICS

9702/34

Paper 3 Advanced Practical Skills 2

October/November 2012

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.



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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 **7** printed pages and **1** blank page.



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 contents 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 (9702/34).

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)**

Four round, flat-headed nails of length approximately 2 cm. See Note 1.

Board (e.g. MDF or plywood) of dimensions 100 cm × 6 cm and approximate thickness 1 cm. See Note 1.

Rheostat with a range from $0\ \Omega$ up to at least $8\ \Omega$.

$12\ \Omega$ 0.5W resistor (e.g. RS Components product code 707-8075) with terminals.

D.C. power supply with an output in the range 3.0V to 3.5V.

Digital ammeter with a range of 0–200 mA. If a multimeter is used, it should be fixed on this range and any unused terminals covered.

Six connecting leads. One of these should have a length of at least 70 cm with one end suitable for use as a contact, and should be labelled X.

Crocodile clip.

2.05 m length of 32 swg bare nichrome resistance wire. See Note 2 and Note 3.

Metre rule with a millimetre scale.

Notes

- 1 The nails should be hammered into the board in the positions shown in Fig. 1.1.

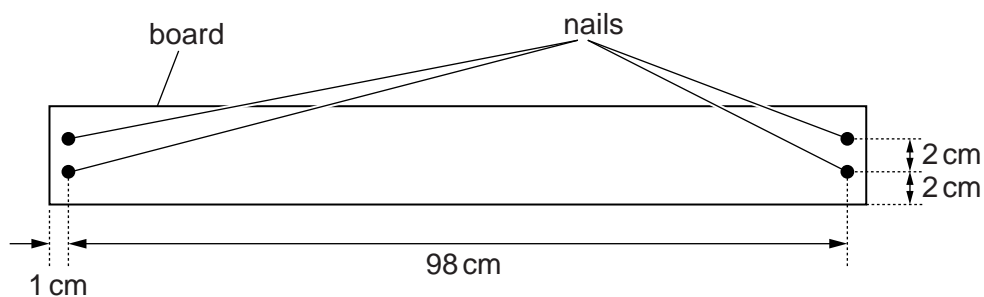


Fig. 1.1

- 2 If 32 swg nichrome wire is not available, any bare resistance wire of resistance approximately $20\ \Omega\text{m}^{-1}$ (e.g. 36 swg constantan) is suitable.

- 3 The resistance wire should be looped around the nails and its ends tightly twisted together as shown in Fig. 1.2. This wire loop should be secured to the board using adhesive tape as shown. The board should be labelled A and B next to two of the nails, as shown in Fig. 1.2.

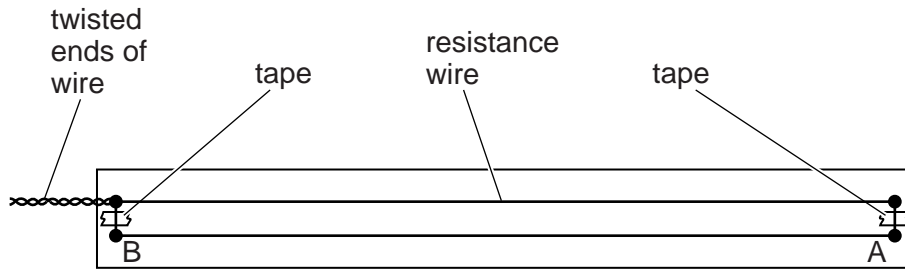


Fig. 1.2

- 4 The apparatus should be laid out on the bench. If it is to be used by a second candidate, then it should be restored to this state.

Information required by Examiners

Sample set of numerical results, clearly labelled "Supervisor's Results" and obtained out of sight of the candidates.

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

Hard sphere with diameter in the range 1.5 to 2.5 cm (e.g. a glass marble or steel ball bearing).

Smooth plastic or metal track of length 100 cm, suitable for the sphere to roll along (e.g. curtain track). See Note 1.

Straight strip of wood of length 100 cm with cross-section approximately 3 cm × 2 cm. See Note 1.

Wooden block approximately 10 cm × 6 cm × 6 cm. See Note 2.

180° protractor with 1° divisions.

Stand, boss and clamp. See Note 2.

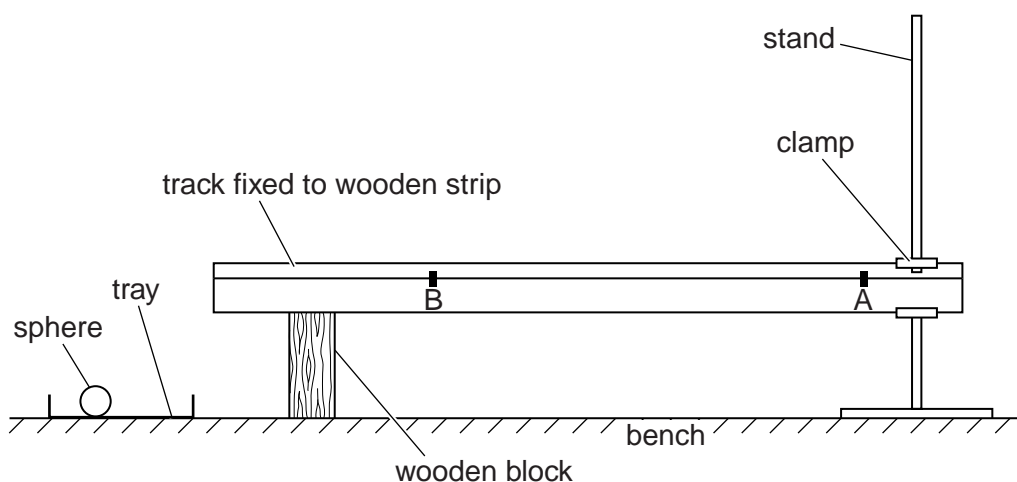
Small plastic or metal tray (e.g. a petri dish) to catch the sphere. See Note 2.

Metre rule with a millimetre scale.

Stopwatch reading to 0.1 s or better.

Notes

- 1 The plastic or metal track should be fixed to the wooden strip in such a way that the sphere can roll along it. A mark labelled A should be made 10 cm from one end and a mark labelled B should be made 20 cm from the other end.
- 2 The apparatus should be assembled with the track horizontal, as shown in Fig. 2.1. If necessary, a piece of paper towel should be placed in the tray to prevent the sphere bouncing out when it drops in.

**Fig. 2.1**

- 3 If the apparatus is to be used by a second candidate, then it should be restored to its original state with the track horizontal and the sphere in the tray.

Information required by Examiners

Sample set of numerical results, clearly labelled "Supervisor's Results", and obtained out of sight of the candidates.

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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 2012

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

For each question, please enclose a sample set of numerical results, obtained out of sight of the candidates and clearly labelled "Supervisor's Results".

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

