



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

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PHYSICS

9702/33

Paper 3 Advanced Practical Skills 1

May/June 2012

CONFIDENTIAL INSTRUCTIONS

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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 **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 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 (9702/33).

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)**

Two stands with height at least 65 cm.

Two bosses.

Two clamps.

Three expendable springs with an outside diameter approximately 15 mm, coiled length approximately 20 mm and spring constant approximately 25 N m^{-1} (e.g. Philip Harris product code B8G87194). See Note 1.

Cylindrical wooden rod of length 15 cm and approximate diameter 1.5 cm. See Note 2.

Two short lengths of string. See Note 2.

Two 100 g mass hangers.

Two 100 g slotted masses.

One 50 g slotted mass.

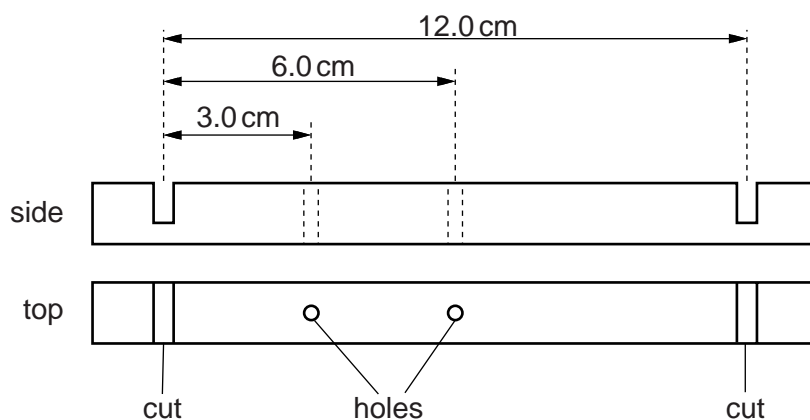
Metre rule with a millimetre scale.

180° protractor.

Set square.

Notes

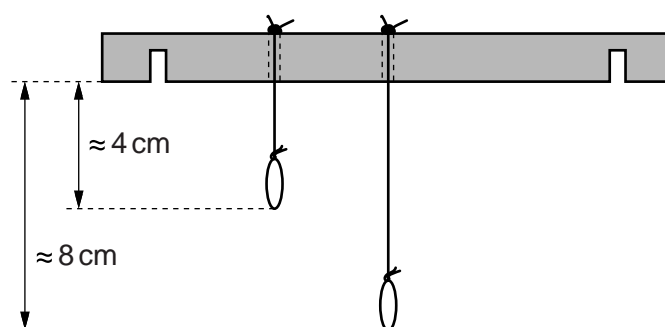
- 1 Two of the springs should have their loops joined together so that the springs are in series.
- 2 Two holes should be drilled and two cuts should be sawn in the wooden rod, as shown in Fig. 1.

**Fig. 1.1**

The cuts should go approximately half way through the wood and be just wide enough to accommodate the loop at the end of a spring.

The holes should be just wide enough to allow a length of string to pass through. A knot tied in the string should then prevent it from passing back through the hole.

The rod and strings should be assembled as shown in Fig. 1.2.

**Fig. 1.2**

- 3 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 its original 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)**

Long stem thermometer with a range of -10°C to 110°C reading to the nearest 1.0°C or 0.5°C .

250 ml beaker with 50 ml graduations.

Container with 500 ml of cold water or access to a sink.

Stopwatch reading to 0.1 s or better.

Metre rule with a millimetre scale.

Triangular prism with minimum height 1 cm.

Cup. See Note 1.

Bowl. See Note 1.

Access to a source of boiling water, e.g. kettle. See Note 2.

Pen capable of making a mark on the cup and the bowl.

Paper towels.

Notes

- 1 The cup and bowl could be household items. They must both be able to contain 200 ml of water. They should be made from the **same** type of material, e.g. glass, plastic or ceramic, and be able to withstand boiling water.
- 2 Candidates should be made aware of the dangers of working with boiling water.
- 3 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 its original state.

Any marks that have been made on the cup and bowl should be removed, or it may be preferable to supply fresh items.

Information required by Examiners

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

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

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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

