



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

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**PHYSICS**

Paper 3 Advanced Practical Skills 2

**9702/32**

**May/June 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](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.

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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 (9702/32).

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)**

Thin string of approximate length 100 cm. See Note 1.

Thin string of approximate length 20 cm. See Note 2.

Crocodile clip of approximate length 5 cm. See Note 2.

Two retort stands of height at least 65 cm.

Four bosses.

Metal or wooden rod of approximate diameter 1 cm and length 70 cm (e.g. the rod from a retort stand) to act as a support.

Mass hanger and masses to a total mass of 300 g.

Two round, flat-headed nails of approximate length 5 cm and with a diameter such that the nail can be gripped securely in a boss.

Stopwatch reading to 0.1 s or better.

Cardboard disc. See Note 3.

Expendable spring with an outside diameter approximately 15 mm, coiled length approximately 20 mm and spring constant approximately  $25 \text{ N m}^{-1}$  (e.g. Philip Harris product code B8G87194).

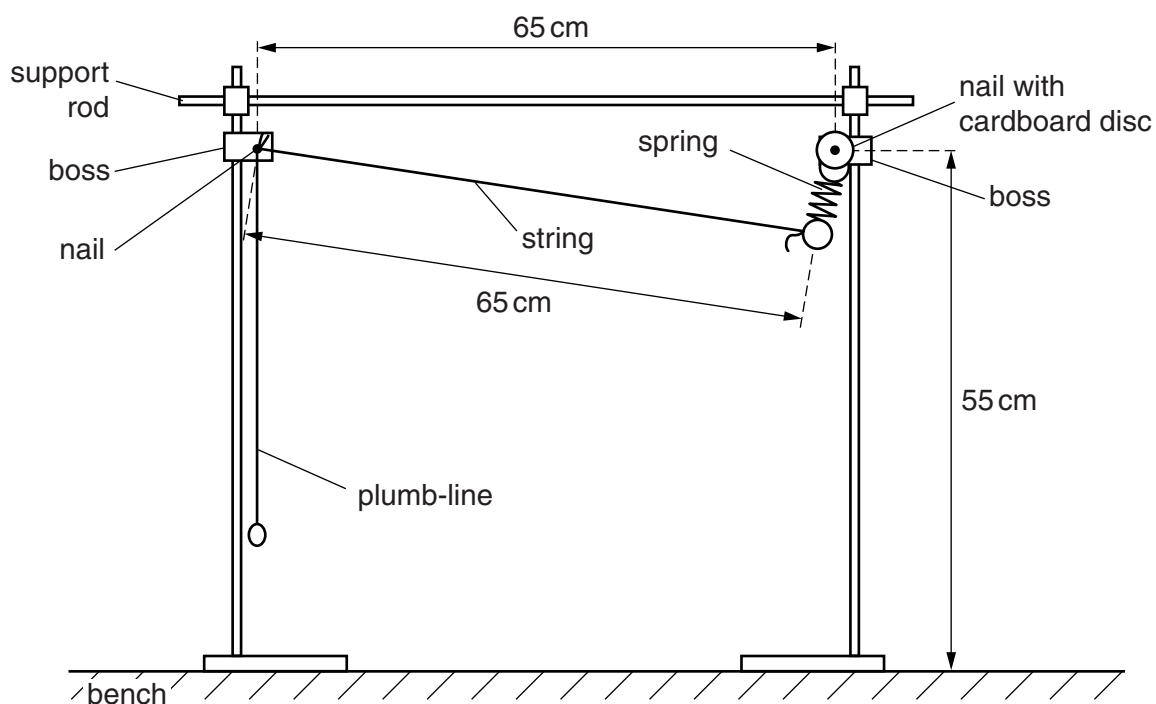
Plumb-line.

Metre rule with a millimetre scale.

30 cm ruler with a millimetre scale.

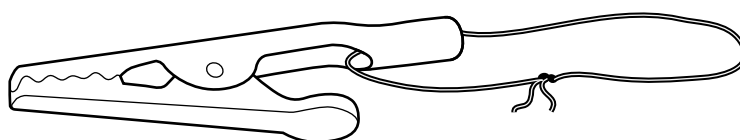
## Notes

- 1 The apparatus should be assembled as shown in Fig. 1.1. The 100 cm length of string should be tied to the nail on the left and to the loop of the spring.



**Fig. 1.1**

- 2 The 20 cm length of string should be attached to the crocodile clip to make a loop, as shown in Fig. 1.2.



**Fig. 1.2**

- 3 The cardboard disc should be pushed on to the nail holding the spring. The disc should be sufficiently large to prevent the spring from sliding over the head of the nail.
- 4 If the apparatus 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)**

Two transparent 30 cm plastic rulers. Each should have at least one flat, smooth surface. See Note 1.

20 cm length of string. See Note 1.

Vernier calipers or electronic digital calipers.

Two cylindrical wooden or metal rods of diameter 1.8–2.2 mm and length approximately 5 cm (e.g. cocktail sticks or lengths of stiff wire).

G-clamp.

Newton-meter with range 0–10 N and reading to 0.5 N or better.

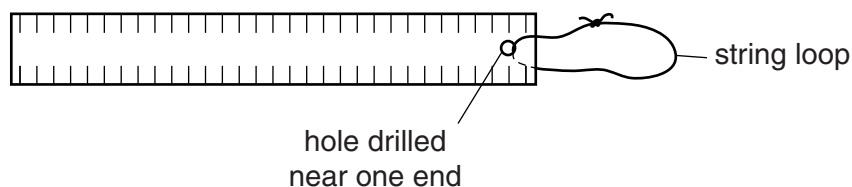
3 g of unused Blu-Tack.

A4 sheet of plain paper.

Scissors.

**Notes**

- 1 A string loop should be attached near one end of one of the transparent rulers, as shown in Fig. 2.1.



**Fig. 2.1**

- 2 If the apparatus is to be used by a second candidate, then it should be restored to its original state, and new Blu-Tack provided.

**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**

**May/June 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 .....

