



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

**PHYSICS**

**9702/34**

Paper 3 Advanced Practical Skills 2

**May/June 2013**

**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 advanced of the examination.**



If you have any problems or queries regarding these Instructions, please contact Cambridge  
by e-mail: [info@cie.org.uk](mailto:info@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 Cambridge:

by e-mail: info@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)**

Uniform wooden strip of length 100 cm and with approximate cross-section 2.5 cm × 0.5 cm. See Note 1.

String. See Note 1.

Stand of height at least 60 cm.

Boss.

Round nail with approximate diameter 3 mm and approximate length 6 cm. See Note 2.

Newton-meter with range 0–10 N and 0.1 N divisions. It should be modified, if necessary, so that it has hooks at the top and bottom, and its overall length at full extension should not be greater than 35 cm.

10 g of modelling clay (e.g. Plasticine).

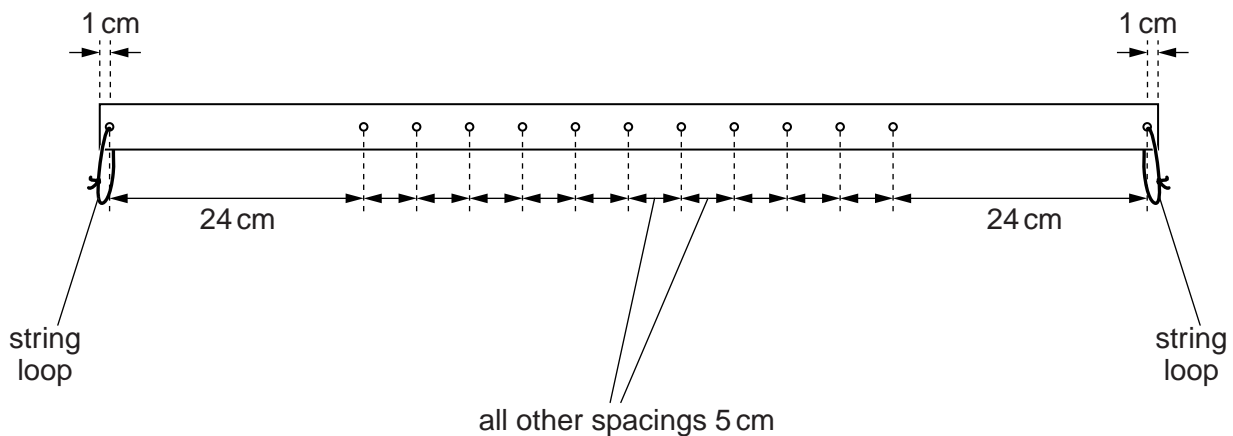
Mass hanger and masses. See Note 3.

Mass of between 1.5 kg and 2.5 kg. See Note 4.

Metre rule with a millimetre scale.

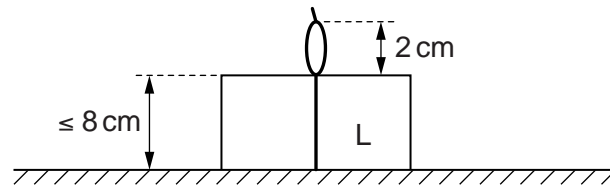
**Notes**

- 1 The wooden strip should have 13 holes drilled through it at the positions shown in Fig. 1.1. The holes should be slightly larger than the diameter of the nail so that the wooden strip pivots freely. String loops of approximate circumference 8 cm should be tied through each of the end holes.

**Fig. 1.1**

- 2 The point of the nail should be filed or cut off to prevent injury. The nail should be clamped in the boss and attached to the stand at a height of approximately 50 cm.
- 3 The total mass of the mass hanger and masses should be approximately 200 g greater than the mass of the newton-meter. The mass hanger and masses should be taped together and labelled M.

- 4 This mass should be labelled L. It could be a brick or an iron mass or similar, and should not be taller than 8 cm. It should have string tied around it with a loop at the top, and the loop should not project more than 2 cm above the top of the mass, as shown in Fig. 1.2.



**Fig. 1.2**

- 5 The apparatus should be laid out on the bench. If it is to be used by another 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)**

Flexible plastic tube of length 20 cm with an inside diameter of approximately 4 mm ('aquarium tube' in this size is suitable). The ends should be cut squarely.

Stand, boss and clamp.

Scissors.

50 ml plastic syringe with 1 ml graduations. See Note 1.

Round (or rectangular) bowl or tray with approximate depth 5 cm and with a base of approximate diameter 30 cm (or 30 cm × 30 cm).

Approximately 50 g of modelling clay or Blu-Tack.

Vernier calipers (not digital calipers).

Metre rule with a millimetre scale.

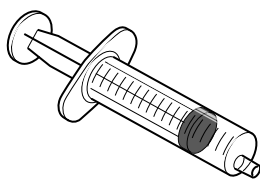
Beaker or jug containing 500 ml of water.

Paper towels.

Stopwatch reading to 0.1 s or better.

**Notes**

- 1 The syringe should be of the type shown in Fig. 2.1. It should have a nozzle that fits securely into the flexible tube.



**Fig. 2.1**

- 2 Lay the apparatus out on the bench. If it is to be used by a second candidate, then it should be restored to its original state with a new length of tube provided. Ensure that the plunger is pushed fully into the syringe body.

**Information required by Examiners**

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

**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 Cambridge Assessment Group. Cambridge Assessment is the brand name of 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.

### **SUPERVISOR'S REPORT FORM**

#### **General Certificate of Education Advanced Subsidiary Level and Advanced Level**

#### **May/June Session 2013**

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 Cambridge 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 .....

