



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

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**PHYSICS**

**9702/34**

Advanced Practical Skills 2

**October/November 2010**

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 (9702/34).

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)**

Rigid plastic or glass beaker with a diameter between 8 cm and 10 cm. See Note 1.

Strip of sandpaper or glasspaper (any grade) measuring approximately 2.5 cm by 10 cm. See Note 2.

Flat board with dimensions approximately 15 cm × 15 cm × 2 cm.

Approximately 30 g of modelling clay (e.g. Plasticine) or Blu-Tack.

15 identical paperclips, each of mass approximately 0.4 g.

Stopwatch reading to 0.1 s or better.

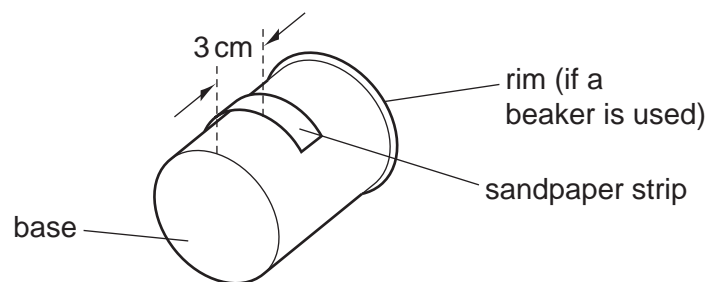
Thin cotton thread tied into a loop approximately 7 cm in circumference.

Wooden metre rule with a millimetre scale and of mass about 100 g. See Note 3.

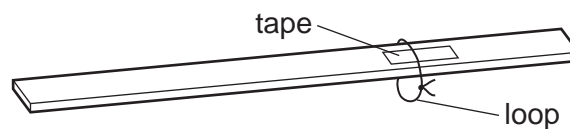
Another metre rule with a millimetre scale.

**Notes**

- 1 If a plastic or glass beaker is not available, then any rigid cylinder with a diameter of between 8 cm and 10 cm is suitable (e.g. a plastic bottle completely filled with water, a section of plastic pipe, or a cylindrical wooden rod).
- 2 The sandpaper strip should be fixed around the beaker using a light glue (such as Pritt Stick or UHU), as shown in Fig. 1.1.

**Fig. 1.1**

- 3 The loop of cotton thread should be fixed at the 65 cm mark of the wooden 100 g metre rule using a small piece of adhesive tape, as shown in Fig. 1.2

**Fig. 1.2**

- 4 If the apparatus is to be used by another candidate it should be restored to its original state. New paperclips should be provided.

**Information required by Examiners**

Average mass of a paperclip.

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)**

Clear plastic drink bottle, without the cap, of capacity 0.5 litre or 1 litre. See Note 1 and Note 2.

Beaker or similar container containing 1 litre of water.

Funnel.

Metre rule with a millimetre scale.

30 cm ruler with a millimetre scale.

Two large set squares.

Protractor.

Tray to contain any spillage.

Paper towels.

Stopwatch reading to 0.1 s or better.

Retort stand, boss and clamp.

**Notes**

- 1 The bottle should have a circular cross-section and its sides should be parallel for at least two 1.5 cm sections of its height. The diameters of these two sections should be approximately identical, and the two sections should be at least 6 cm apart, as shown in Fig. 2.1. A 1.5 mm diameter hole should be drilled at the **lowest point** in the base of the bottle.
- 2 Two white labels should be fixed to the parallel-sided sections of the bottle, as shown in Fig. 2.1. The upper label should be marked P and have two horizontal lines with a vertical separation of 12 mm. The lower label should be marked Q and have two horizontal lines with a vertical separation of 9 mm. The distance between the the lower line on P and the upper line on Q should be at least 6 cm.
- 3 The apparatus should be assembled as in Fig. 2.1.

- 4 If the apparatus is to be used by another candidate then it should be restored to its original state. Replace labels P and Q if necessary.

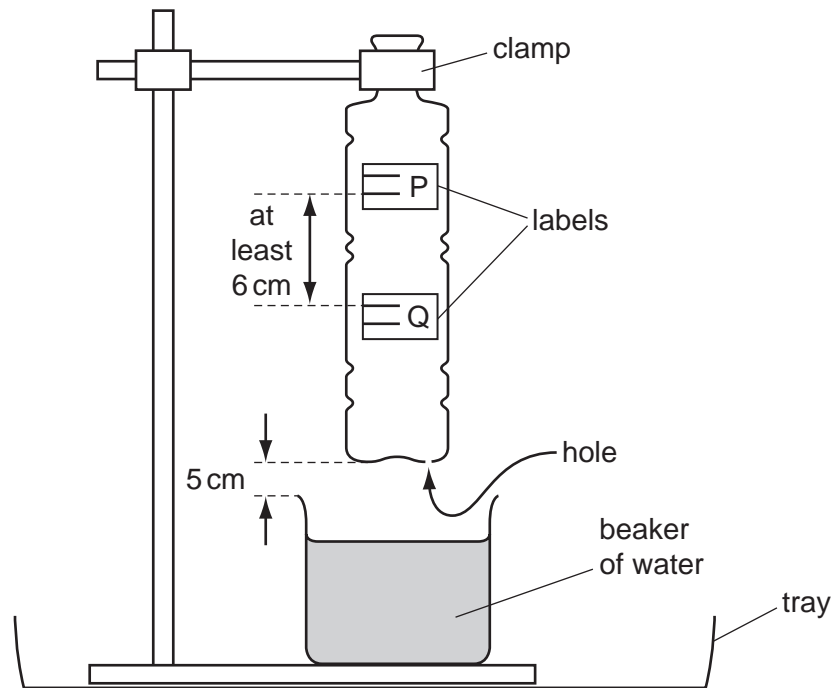


Fig. 2.1

#### 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 2010

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

Average mass of a paperclip in Question 1: .....g

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 .....

