



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

**PHYSICS**

**9702/31**

Paper 3 Advanced Practical Skills 1

**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.**

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.

This document consists of **8** printed pages.



## 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 (9702/31).

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)**

Stand.

Boss.

100 g mass hanger.

Two 100 g slotted masses able to fit on the mass hanger.

50 g slotted mass able to fit on the mass hanger.

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).

Wooden cylindrical rod of approximate length 20 cm and approximate diameter 1.5 cm. The rod should fit easily through the loop of the spring.

Wooden strip of approximate dimensions 35 cm × 3 cm × 0.5 cm. See Note 1.

Two small hooks. One should be closed and the other open. See Note 1.

Rectangular wooden block of minimum dimensions 6 cm × 4 cm × 3 cm.

G-clamp. See Note 2.

30 cm ruler with a millimetre scale.

Protractor. See Note 3.

Small set square.

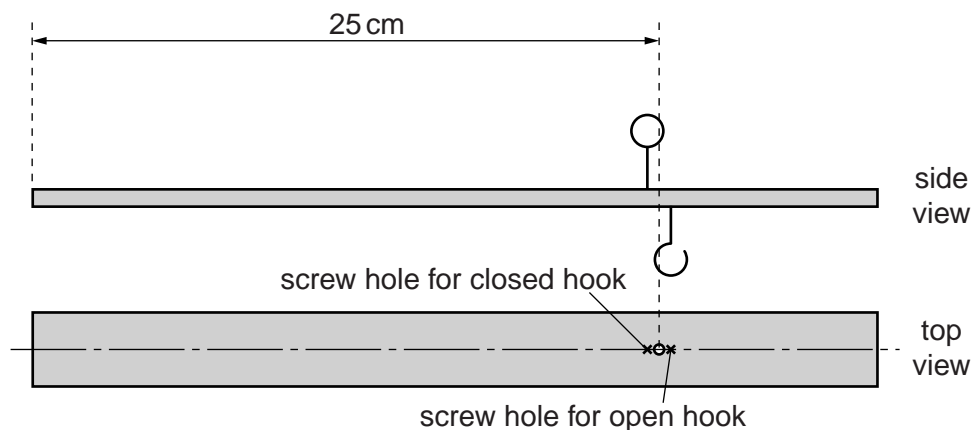
Approximately 0.5 g of Blu-Tack.

## Notes

- 1 The hooks should be attached to the wooden strip as shown in Fig. 1.1.

The closed hook should be large enough to accommodate the handle of the mass hanger.

Fig. 1.1 shows the central position of the point at which the hooks are inserted into the wooden strip. The hooks may have to be slightly offset to avoid both hooks going through the same hole.

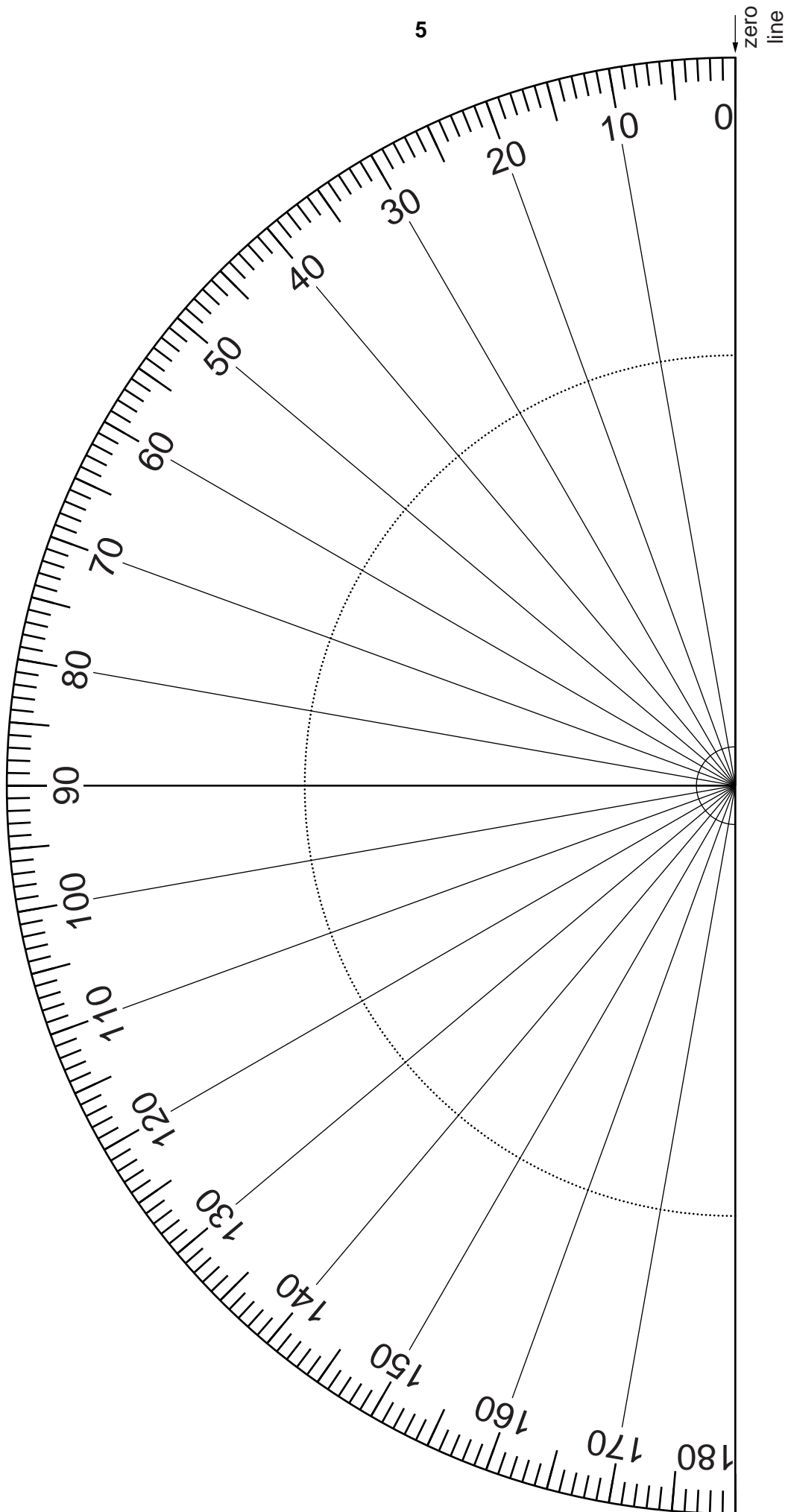


**Fig. 1.1**

- 2 The G-clamp must be large enough to clamp the wooden block to the bench with the shortest edge of the block vertical.
- 3 The protractor should be made by photocopying Fig. 1.2, fixing the copy to a thin card and cutting along the zero line.
- 4 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. The hooks should **not** be removed from the wooden strip.

## Information required by Examiners

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



5

zero  
line

Fig. 1.2

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

Metre rule with millimetre scale. See Note 1.

Half-metre rule with millimetre scale. See Note 1.

30 cm ruler with millimetre scale. See Note 1.

100 g mass hanger.

Stop clock reading to 0.1 s or better.

Two stands.

Two bosses.

Two clamps.

Two pieces of thick string each of length approximately 60 cm.

**Notes**

- 1 The masses of the three rules should be written on a card as shown in Fig. 2.1 and given to the nearest 5 g.

**The metre rule and the half-metre rule should be made from the same material, preferably wood.**

<p>Mass of metre rule = .....g <math>\pm</math> 5 g</p> <p>Mass of half-metre rule = .....g <math>\pm</math> 5 g</p> <p>Mass of 30 cm ruler = .....g <math>\pm</math> 5 g</p>
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**Fig. 2.1**

- 2 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 with new pieces of string 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**

**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 .....

