



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

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**PHYSICS**

**9702/31**

Paper 3 Advanced Practical Skills 1

**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 advance of the examination.**

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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.

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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 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 (9702/31).

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)**

Metre rule with a millimetre scale.

Stand of height at least 60 cm.

Clamp.

Boss.

Wooden strip of approximate dimensions 100 cm × 2 cm × 0.6 cm. See Note 1.

Three loops of thin string. See Note 1.

Rubber band of unstretched circumference approximately 20 cm, and maximum width 6 mm.

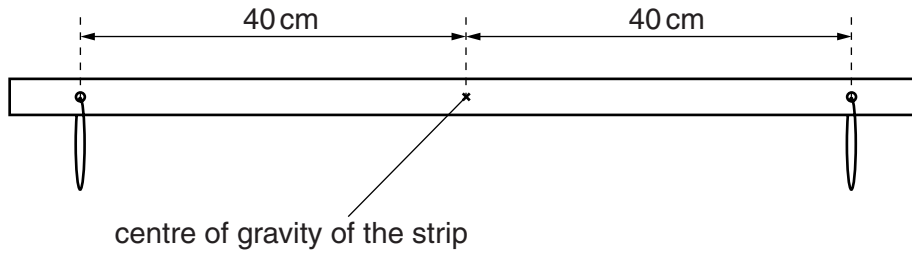
Mass labelled M and an accompanying card. See Note 2.

10 g mass hanger with its value of mass clearly labelled.

50 g slotted mass and four 10 g slotted masses. It must be possible to fit the slotted masses onto the 10 g mass hanger.

## Notes

- 1 The wooden strip should have two holes drilled in it as shown in Fig. 1.1.

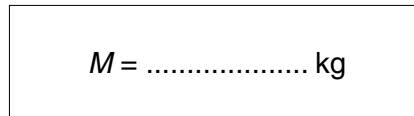


**Fig. 1.1**

The three loops of string should each be of approximate circumference 15 cm. Two of the loops should be tied through the holes in the strip as shown in Fig. 1.1. The third loop should be placed on the bench for use by the candidate.

- 2 The mass labelled  $M$  should have the **same mass** as the wooden strip to within 0.001 kg. This mass should consist of a mass hanger and sufficient slotted masses and modelling clay if necessary. This mass should be taped so that it cannot be changed by the candidate.

The mass should be written to the nearest 0.001 kg on a card as shown in Fig. 1.2.



**Fig. 1.2**

- 3 The apparatus is to be laid out on the bench. If it is to be used by another candidate, then it should be dismantled and 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)**

Cylindrical wooden rod of approximate length 50 cm and approximate diameter 12 mm. See Note 1.

Cylindrical wooden rod of approximate length 8 cm and approximate diameter 12 mm. See Note 1.

Nail of approximate length 5 cm. See Note 1.

String. See Note 1.

100 g mass hanger.

Stand of height at least 60 cm with a flat base.

Clamp.

Boss.

Stopwatch reading to 0.1 s or better.

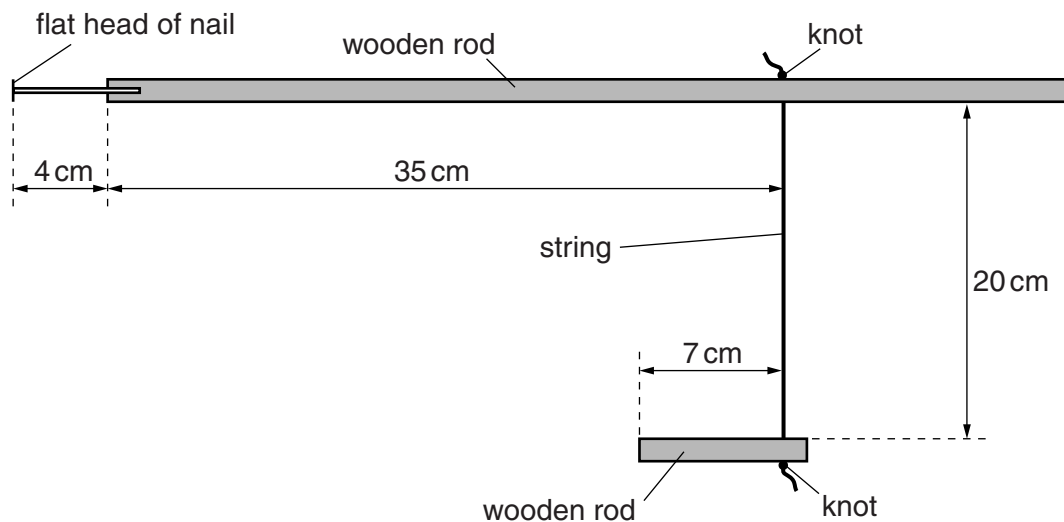
180° protractor reading to the nearest degree or better.

Metre rule with a millimetre scale.

Bracket. See Note 2.

**Notes**

- 1 The two wooden rods, nail and string should be assembled as shown in Fig. 2.1.

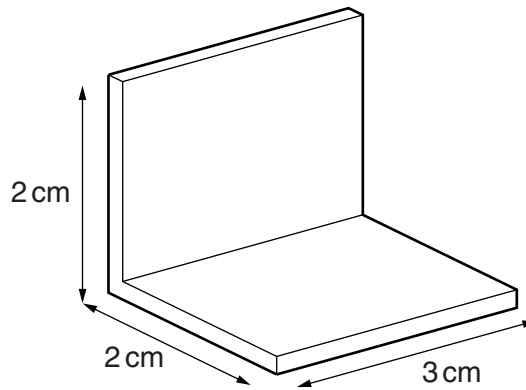
**Fig. 2.1**

The nail should be inserted centrally and firmly in one end of the longer wooden rod.

Holes should be drilled through the wooden rods to enable the string to pass through.

The knots should be large enough that they do not slip back through the holes when force is applied.

- 2 The bracket should be made from stiff card, wood or metal and have approximate dimensions as shown in Fig. 2.2.



**Fig. 2.2**

- 3 The apparatus is to be laid out on the bench. If it is to be used by another candidate, then it should be dismantled and 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.

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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 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 .....

