



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

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**PHYSICS**

**9702/32**

Paper 32 Advanced Practical Skills 2

**October/November 2008**

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 **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 (9702/32).

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)**

Lever apparatus constructed from:  
(see Note 1)

Stand, boss and clamp.

Uniform strip of wood 0.500 m long and with a cross-section similar to that of a metre rule.

Short length of round, rigid tube about 8 cm diameter and 4 cm long (plastic rainwater pipe is suitable).

Nail about 3 mm diameter and about 5 cm long.

Protractor (semicircular plastic).

Thin string.

Sellotape.

Approximately 300 cm<sup>3</sup> plastic container (e.g. the bottom half of a small plastic water bottle).

Simple pendulum constructed from:  
(see Note 2)

Stand, boss and clamp.

Pendulum bob.

60 cm of thin string.

30 g of paper clips, all of similar size and type.

Metre rule with a millimetre scale.

Set square.

Stopwatch reading to 0.1 s or better.

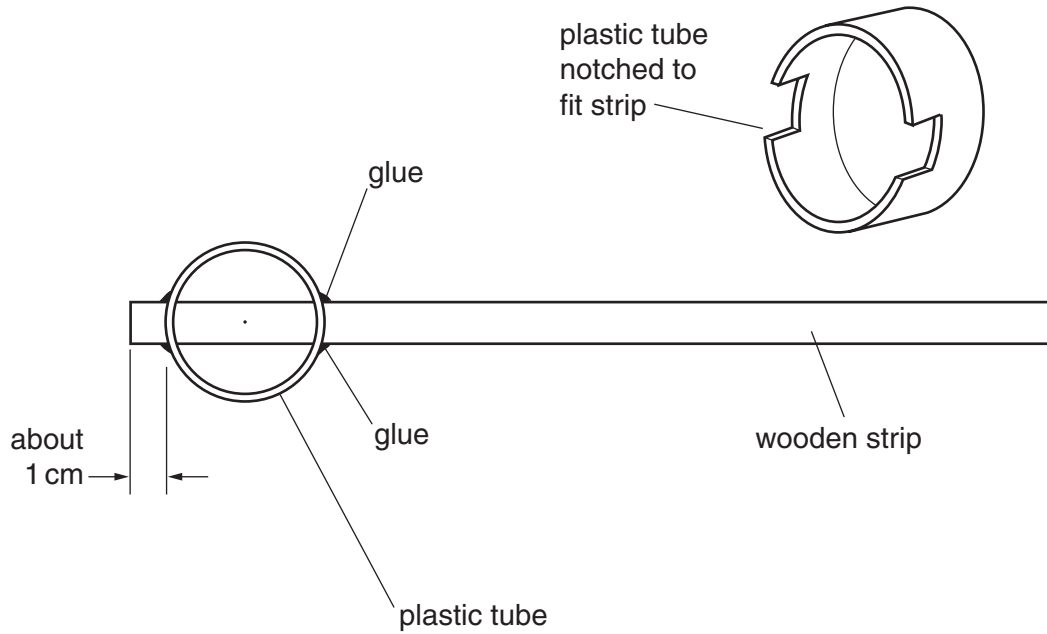
500 cm<sup>3</sup> beaker containing 400 cm<sup>3</sup> of dry sand or fine soil.

Card with the average mass (in gram) of a paper clip written on it.

## Notes

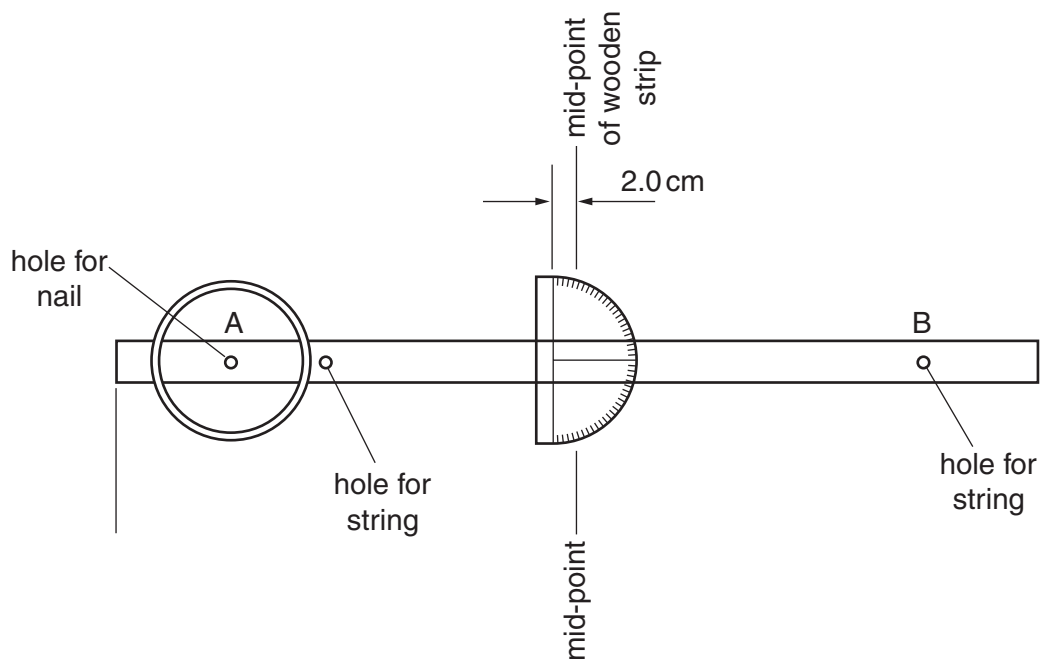
1 The lever apparatus should be prepared as follows.

- Notch the tube and glue it securely near to one end of the wooden strip as shown in Fig.1.1.



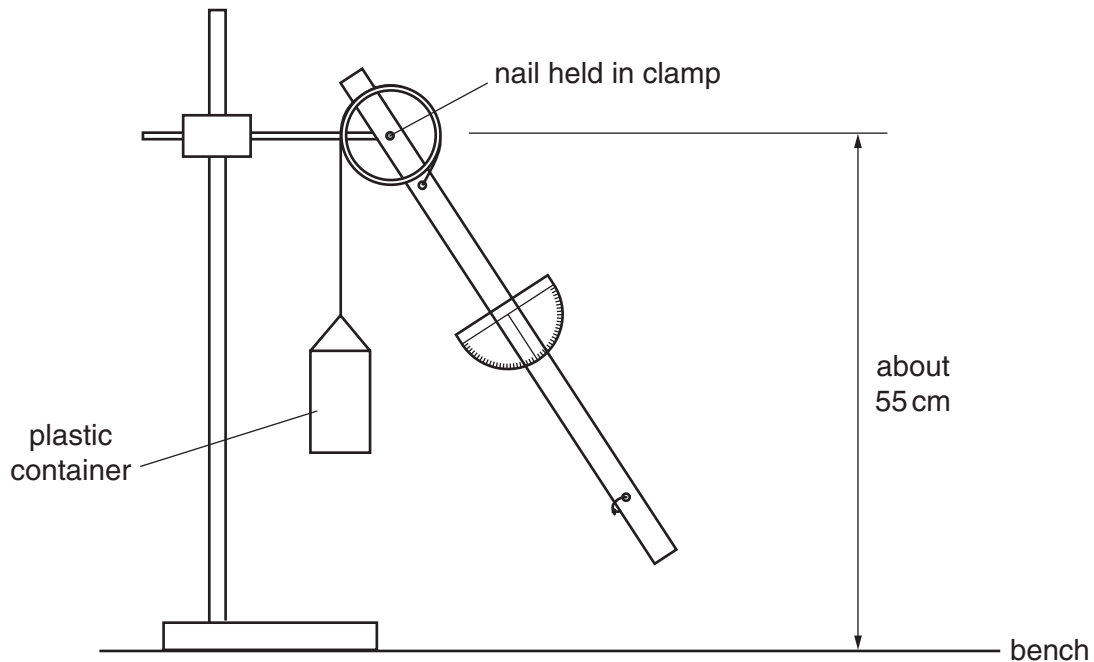
**Fig. 1.1**

- Referring to Fig. 1.2, mark position A on the wooden strip at the centre of the tube and drill a hole just large enough for the strip to pivot freely on the nail. It is important that the centre of this hole is within 1 mm of the axis of the tube.



**Fig. 1.2**

- Again referring to Fig. 1.2, mark position B such that A and B are equidistant from their respective ends of the strip. Drill a hole at B just large enough for the string to pass through. Drill another hole, the same size as B, close to the tube, as shown.
- Again referring to Fig. 1.2, attach the protractor to the strip as shown, using Sellotape. The origin of the protractor should be 2 cm from the middle of the strip, towards the tube.
- Assemble the apparatus as shown in Fig. 1.3. Check that the wooden strip can pivot freely.



**Fig. 1.3**

- Suspend the plastic container from about 30cm of string. Pass the other end of the string over the tube as shown, then pass it through the hole and tie a knot in it so that it will not pass back through the hole.
  - Tie a loose loop of string through the hole at B.
- 2** The simple pendulum should be prepared as follows.
- Tie the pendulum bob to one end of the string.
  - Clamp the string at a height of 60 cm above the bench.
- 3** If the apparatus is to be used by a second candidate, it should be restored to its original state.

### Information required by the Examiners

Mass of the 0.500 m wooden strip.

Average mass of a paper clip.

## Question 2

### Apparatus requirements (per set of apparatus unless otherwise specified)

Hacksaw blade at least 25 cm long with two 100 g masses attached (see Note 1).

Stopwatch reading to 0.1 s or better.

Wooden block about 6 cm by 6 cm by 12 cm.

Second wooden block about 1 cm by 3 cm by 6 cm.

Additional two 100 g masses.

Sellotape.

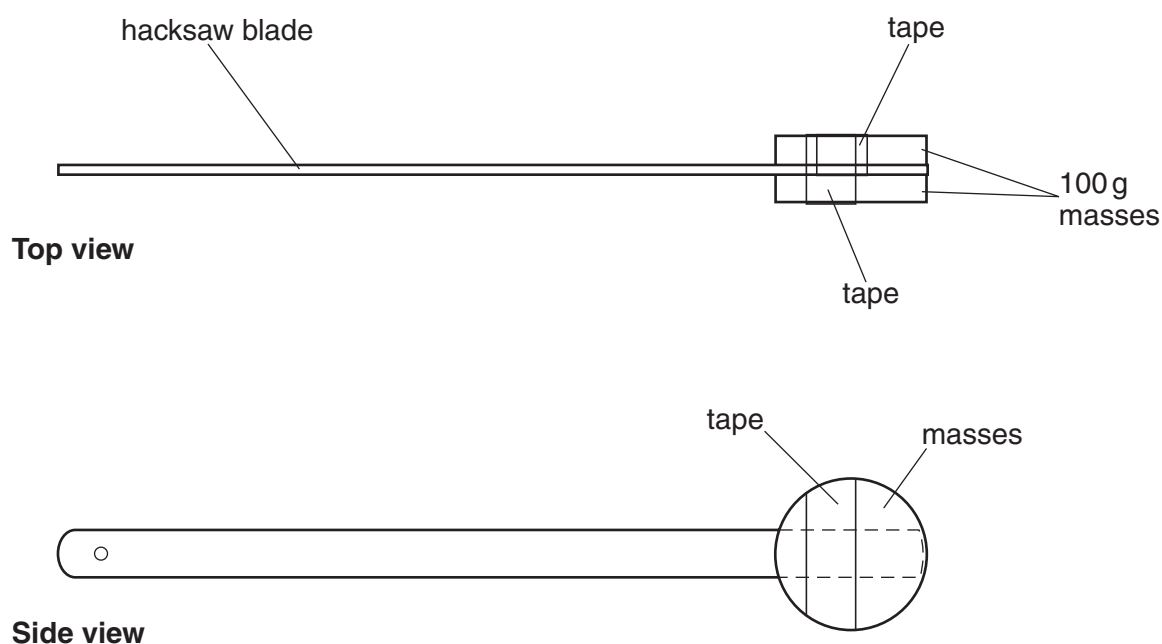
G-clamp to clamp the larger wooden block to the bench.

Second G-clamp capable of opening to 8 cm.

Half-metre rule with a millimetre scale.

### Notes

- 1 Tape two 100 g masses to one end of the hacksaw blade as shown in Fig. 2.1.



**Fig. 2.1**

Cover the serrated edge of the hacksaw blade with Sellotape.

- 2 If the apparatus is to be used by a second candidate, it should be restored to its original state.

### Information required by the Examiners

None.

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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 2008

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

Question 1: Mass of the 0.500 m wooden strip = ..... g

Average mass of a paper clip = ..... g

Question 2: None.

#### 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 .....

