
PHYSICS

9702/34

Paper 3 Advanced Practical Skills 2

May/June 2019

CONFIDENTIAL INSTRUCTIONS



This document gives details of how to prepare for and administer the practical exam.

The information in this document and the identity of any materials supplied by Cambridge International are confidential and must NOT reach candidates either directly or indirectly.

The supervisor must complete the report at the end of this document and return it with the scripts.

If you have any queries regarding these confidential instructions, contact Cambridge International stating the centre number, the syllabus and component number and the nature of the query.

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This document consists of **9** printed pages and **3** blank pages.

General information about practical exams

Centres must follow the guidance on science practical exams given in the *Cambridge Handbook*.

Safety

Supervisors must follow national and local regulations relating to safety and first aid.

Only those procedures described in the question paper should be attempted.

Supervisors must inform candidates that materials and apparatus used in the exam should be treated with caution. Suitable eye protection should be used where necessary.

Before the exam

- The packets containing the question papers must **not** be opened before the exam.
- It is assumed that standard school laboratory facilities, as indicated in the *Guide to Planning Practical Science*, will be available.
- Spare materials and apparatus for the tasks set must be available for candidates, if required.

During the exam

- It must be made clear to candidates at the start of the exam that they may request spare materials and apparatus for the tasks set.
- Where specified, the supervisor **must** perform the experiments and record the results as instructed. This must be done **out of sight** of the candidates, using the same materials and apparatus as the candidates.
- Any assistance provided to candidates must be recorded in the supervisor's report.
- If any materials or apparatus need to be replaced, for example, in the event of breakage or loss, this must be recorded in the supervisor's report.

After the exam

- The supervisor must complete a report for each practical session held and each laboratory used.
- Each packet of scripts returned to Cambridge International must contain the following items:
 - the scripts of the candidates specified on the bar code label provided
 - the supervisor's results relevant to these candidates
 - the supervisor's reports relevant to these candidates
 - seating plans for each practical session, referring to each candidate by candidate number
 - the attendance register.

Specific information for this practical exam

The supervisor must be a teacher of Physics or other competent physicist. During the exam, the supervisor (NOT the invigilator) should obtain a sample set of numerical results by following the relevant steps in the question paper. The results should be clearly labelled 'Supervisor's results' and recorded on the supervisor's report or on a spare copy of the question paper.

Organisation of the exam

- 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 exam.
- Candidates should not be provided with any additional apparatus beyond that specified in these instructions.
- 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

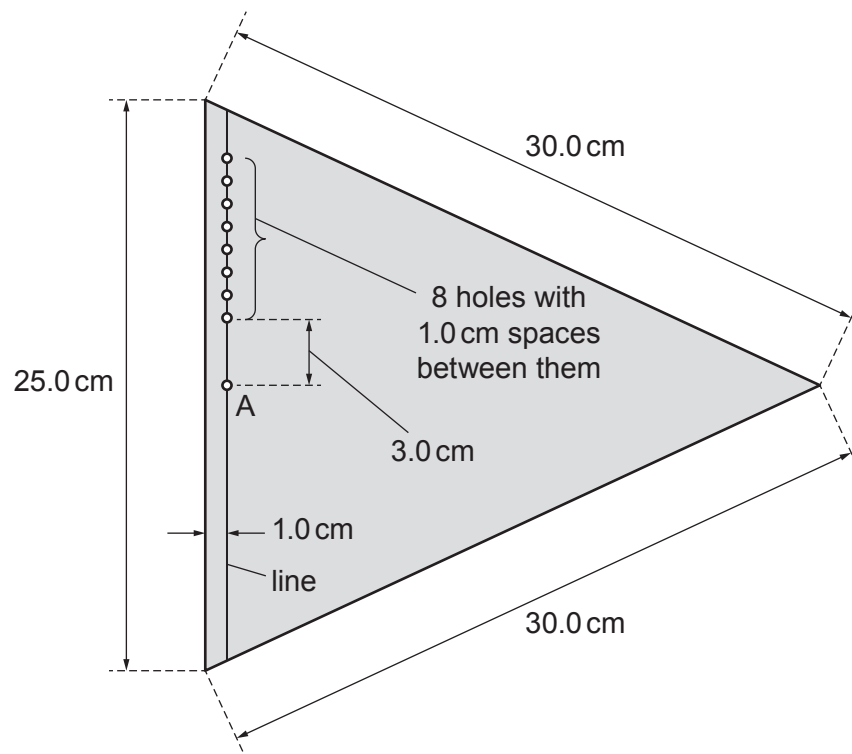
- Candidates should be informed that, if they find themselves in real difficulty, they may ask the supervisor for practical assistance, but that the extent of this assistance will be reported to the Examiner, who may not award full credit for the relevant skills.
- Assistance should only be given when it is asked for by a candidate 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.
- In cases of faulty apparatus that prevent the required measurements being taken, the supervisor should allow extra time to give the candidate a fair opportunity to perform the experiment as if the fault had not been present.
- Any assistance or extra time given to candidates must be recorded in the supervisor's report.

Apparatus and materials for Question 1 (per set of apparatus unless otherwise specified)

- Triangle of corrugated cardboard. See Note 1.
- Stand, boss and clamp.
- Flat-headed nail of approximate diameter 2.5 mm and approximate length 6 cm. It should be possible to hold the nail securely in the clamp.
- 180° protractor with 1° divisions.
- Stop-watch reading to 0.1 s or better.
- 30 cm ruler with a millimetre scale.
- Steel wire of approximate diameter 1 mm. See Note 2.
- Modelling clay (e.g. Plasticine). See Note 3.

Notes

- 1 The triangle should have the dimensions shown in Fig. 1.1. The corrugated cardboard should be thick enough for the triangle to have a mass of at least 20 g.

**Fig. 1.1** (not to scale)

Draw a line parallel to the shortest side and 1.0 cm from it.

Make a hole of approximate diameter 3 mm half-way along the line and label it A.

Make eight more holes of approximate diameter 3 mm on the line in the positions shown in Fig. 1.1.

- 2 The wire should be bent at each end to make a hook as shown in Fig. 1.2. The central section should be as straight as possible.

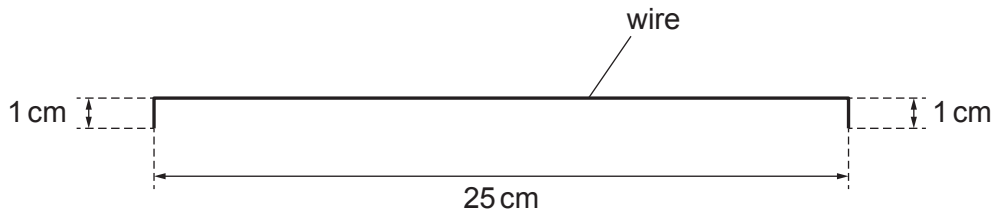


Fig. 1.2

- 3 Attach enough modelling clay to one end of the wire hook to give a total mass for the wire and the modelling clay **equal to $\frac{2}{3}$ of the mass of the triangle**. The modelling clay should be attached as shown in Fig. 1.3.

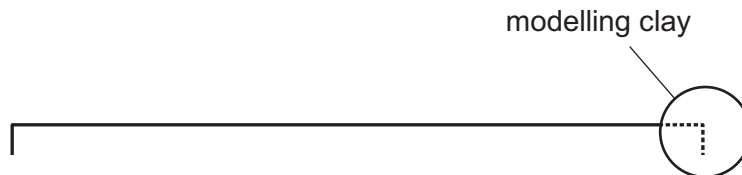


Fig. 1.3

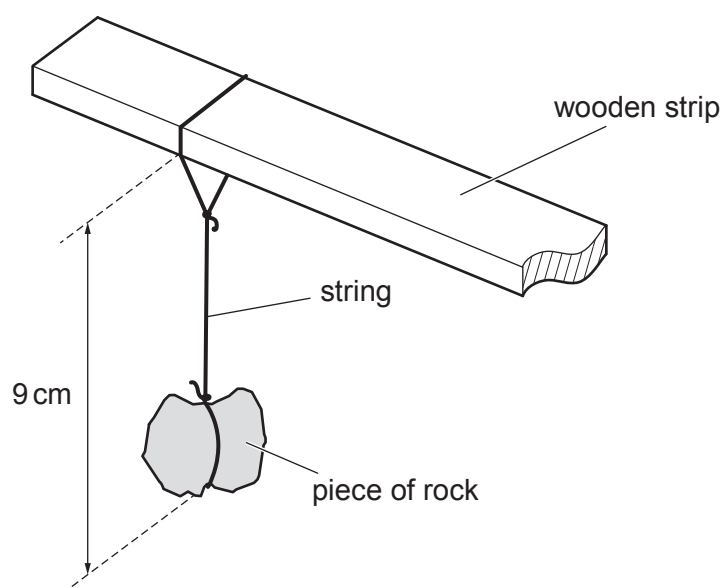
- 4 The apparatus should be laid out on the bench. If the apparatus is to be used by another candidate, then it should be restored to its original state.

Apparatus and materials for Question 2 (per set of apparatus unless otherwise specified)

- String of approximate diameter 2 mm. See Note 1.
- Two pieces of rock. The rock can be any type that sinks in water, as long as both pieces are of the same type. The approximate masses of the pieces should be 100 g and 70 g, and each should have an irregular shape that can be suspended securely by string tied around it. See Note 1.
- Wooden strip of approximate length 90 cm and approximate cross-section 2 cm × 1 cm.
- 100 g slotted mass.
- Beaker large enough to hold the larger piece of rock, and with an approximate height of 10 cm.
- Rubber band suitable for fitting around the beaker.
- Jug containing enough water to fill the beaker.
- Triangular prism to act as a pivot for the wooden strip. See Note 2.
- Wooden block. See Note 2.
- Metre rule with a millimetre scale.
- Paper towels to mop up any spillage.

Notes

- 1 Each piece of rock should have a string tied securely around it. The other end of the string should have a loop so that the piece can be suspended from the wooden strip with the bottom of the piece approximately 9 cm below the strip, as shown in Fig. 2.1.

**Fig. 2.1**

- 2 The prism should be attached to the wooden block so that the top of the prism is approximately 12 cm above the bench, as shown in Fig. 2.2.

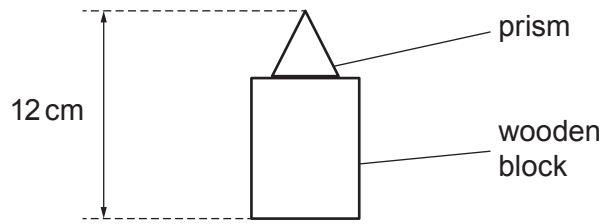


Fig. 2.2

- 3 The apparatus should be laid out on the bench. If the apparatus is to be used by another candidate, then it should be restored to its original state. A new wooden strip should be provided and the pieces of rock should be fitted with new string.

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Supervisor's report

Syllabus and component number

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Centre number

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Centre name

Time of the practical session

Laboratory name/number

Give details of any difficulties experienced by the centre or by candidates (include the relevant candidate names and candidate numbers).

You must include:

- any difficulties experienced by the centre in the preparation of materials
- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
- any specific assistance given to candidates.

Declaration

- 1 Each packet that I am returning to Cambridge International contains the following items:
 - the scripts of the candidates specified on the bar code label provided
 - the supervisor's results relevant to these candidates
 - the supervisor's reports relevant to these candidates
 - seating plans for each practical session, referring to each candidate by candidate number
 - the attendance register
- 2 Where the practical exam has taken place in more than one practical session, I have clearly labelled the supervisor's results, supervisor's reports and seating plans with the time and laboratory name/number for each practical session.
- 3 I have included details of difficulties relating to each practical session experienced by the centre or by candidates.
- 4 I have reported any other adverse circumstances affecting candidates, e.g. illness, bereavement or temporary injury, directly to Cambridge International on a *special consideration form*.

Signed (supervisor)

Name (in block capitals)