



Cambridge IGCSE™ (9–1)

PHYSICS

0972/51

Paper 5 Practical Test

May/June 2022

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.

INSTRUCTIONS

- 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.
email info@cambridgeinternational.org
phone +44 1223 553554

This document has **8** 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

Question 1

Items to be supplied by the centre (per set of apparatus, unless otherwise specified)

- (i) Clamp, boss and stand.
- (ii) Expendable spring, approximately 55 mm overall length (including loops) \times 15 mm diameter, capable of supporting at least 500 g without overstretching (e.g. Philip Harris expendable steel spring, www.philipharris.co.uk).
- (iii) A 100 g mass hanger and four 100 g slotted masses. See note 1.
- (iv) Metre rule graduated in mm. See note 3.
- (v) Set square.
- (vi) Spare springs should be available.

Notes

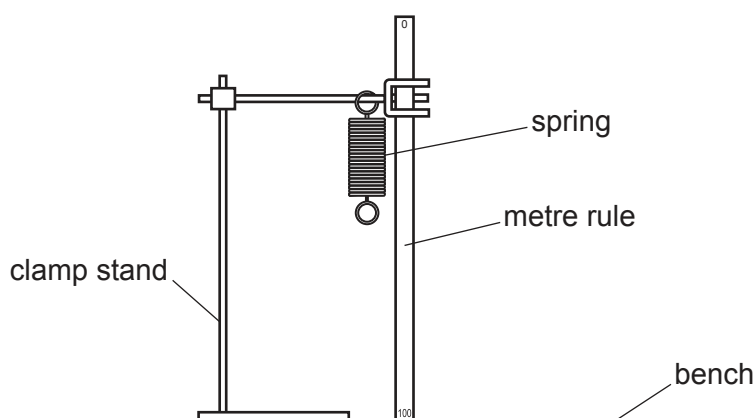


Fig. 1.1

1. The four 100 g slotted masses and the 100 g mass hanger should each be labelled '**1.0 N**'.

An alternative to individually labelling the masses is to provide a card with the words '**each mass and the mass hanger have a weight of 1.0 N**'.

If slotted masses are not available, a light hook must be provided so that a 100 g mass, labelled '**1.0 N**', and a 500 g mass, labelled '**5.0 N**', can be suspended in turn from the spring.

2. The apparatus is to be set up for the candidates as shown in Fig. 1.1. The spring is to be suspended from the clamp, supported by a boss and stand. The spring must be sufficiently high above the laboratory bench so that when the 500 g mass is suspended from the spring, the bottom of the mass is above the surface of the bench.
3. The metre rule (supported by the clamp, boss and stand) must be near to, but not touching, the spring. The 100 cm end of the metre rule must be touching the bench.

If the metre rule has two scales in opposite directions, one scale must be taped over.

Action at changeover

Check that the apparatus is set up ready for the next candidate, as shown in Fig. 1.1, with the spring near to the metre rule.

Replace the spring if it has been overstretched.

Question 2**Items to be supplied by the centre (per set of apparatus, unless otherwise specified)**

- (i) Thermometer, -10°C to 110°C , graduated in 1°C intervals. See note 1.
- (ii) Clamp, boss and stand. See note 1.
- (iii) Metal can. See note 2.
- (iv) An insulating sleeve to fit the can. A sleeve made from cardboard is suitable. See note 5.
- (v) 250cm^3 measuring cylinder, graduated in 1cm^3 or 2cm^3 intervals.
- (vi) Stop-clock or stop-watch or wall-mounted clock showing seconds. The question will refer to a stop-clock.
- (vii) Supply of hot water. See note 3.
- (viii) Supply of paper towels to mop up any spills of water.

Notes

1. The thermometer should be held by the clamp approximately 2cm above the bench. The thermometer should be able to be placed inside the metal can without the thermometer touching the bottom of the can.
2. The can must be similar in size to a 250cm^3 beaker and capable of holding 250cm^3 of hot water.
3. Hot water is to be supplied for each candidate by the supervisor. The water should be maintained at a temperature as hot as is reasonably and safely possible. Each candidate will require about 250cm^3 of hot water.
4. Candidates should be warned of the dangers of burns or scalds when using very hot water.
5. The purpose of the sleeve is to protect the candidate's hands when pouring hot water into and out of the can. Spare insulating sleeves should be available.

Action at changeover

Empty the can and measuring cylinder.

Check the supply of hot water.

Remove the insulating sleeve from the can and replace the insulating sleeve if it has become wet.

Question 3

Items to be supplied by the centre (per set of apparatus, unless otherwise specified)

- (i) Power supply of approximately 1.5V–3V. Where candidates are provided with a power supply with a variable output voltage, the voltage must be set by the supervisor and fixed (e.g. taped). See note 2.
- (ii) Switch. The switch may be an integral part of the power supply.
- (iii) Ammeter capable of reading up to 1.00A with a minimum resolution of 0.05A. See note 3.
- (iv) Voltmeter capable of measuring the supply p.d. with a minimum resolution of 0.1V. See note 3.
- (v) Approximately 105cm of straight, bare constantan (Eureka) wire, diameter 0.45mm (26swg) or 0.38mm (28swg) or 0.32mm (30swg). The wire must be taped to a metre rule only between the 8cm and 12cm marks and between the 88cm and 92cm marks. The end of the wire at the zero end of the rule is to be labelled 'B'. The other end is to be labelled 'C'. See note 4.
- (vi) Two suitable terminals (e.g. crocodile clips) attached to the constantan wire at the ends of the metre rule so that connections can be made to the circuit shown in Fig. 3.1.
- (vii) Sliding contact, labelled 'S'. This may be a jockey or a small screwdriver connected to a lead by means of a crocodile clip.
- (viii) Sufficient connecting leads to set up the circuit shown in Fig. 3.1.

Notes

1. The circuit is to be set up for the candidates as shown in Fig. 3.1 and Fig. 3.2.

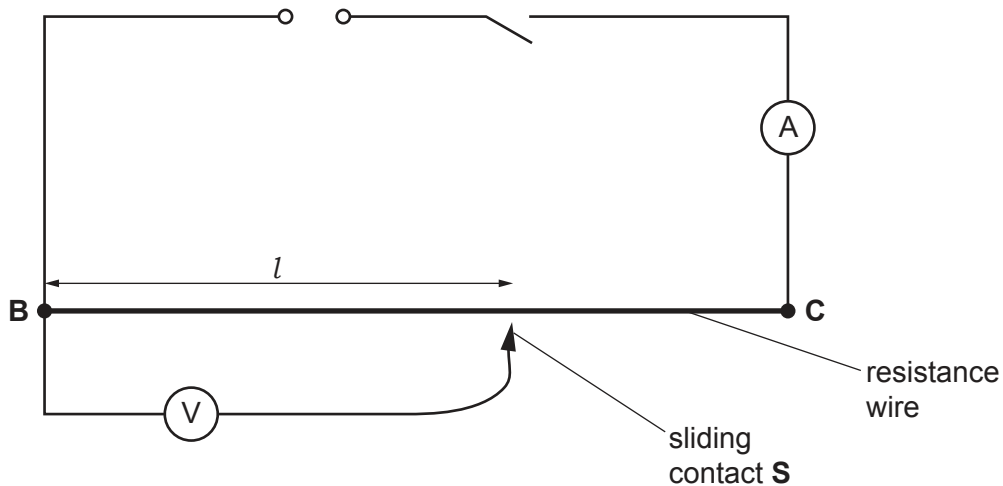


Fig. 3.1

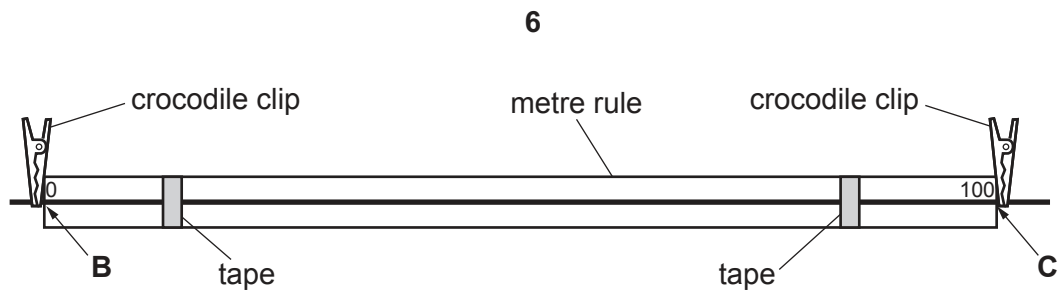


Fig. 3.2

2. If cells are to be used, they must remain adequately charged throughout the examination. Spare cells should be available.
3. Either analogue or digital meters are suitable. Any variable settings should be set by the supervisor and fixed (e.g. taped). Spare meters should be available.
4. The wire must be attached to the metre rule as shown in Fig. 3.2.

Action at changeover

Check that the circuit is arranged as shown in Fig. 3.1.

Check that the circuit works. Open the switch.

Question 4

No apparatus is required for this question.

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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 all of 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)