Cambridge Assessment International Education

Cambridge O Level

PHYSICS **5054/31**

Paper 3 Practical Test **May/June 2025**

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.
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  phone +44 1223 553554

DC (CJ/CB) 346805/4

[Turn over

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.

The following hazard codes are used in these confidential instructions, where relevant:

C	corrosive	**MH**	moderate hazard
HH	health hazard	**T**	acutely toxic
F	flammable	**O**	oxidising
N	hazardous to the aquatic environment		

Hazard data sheets relating to substances used in this exam should be available from your chemical supplier.

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

During the exam, the supervisor (**not** the invigilator) must do the experiments in Questions 1, 2 and 3, and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

Question 1

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

- power supply (see Note 1)
- low voltage filament lamp (2.5 V/0.2 A) in a suitable holder (see Note 2)
- ammeter capable of measuring a current up to 1.0 A to 0.1 A or better. An analogue or digital meter is suitable
- voltmeter with full scale deflection of 5 V and precision of 0.1 V. An analogue or digital meter is suitable
- switch in the 'off' position
- 10 Ω fixed resistor in a component holder or with crocodile clips for connections attached (see Note 3)
- connecting leads to set up the circuit shown in Fig. 1.1, and one further connecting lead to allow the candidates to add the fixed resistor into the circuit.

Notes

1. The following are suitable power supplies:
- two dry cells of 1.5 V each, mounted in holders and arranged in series
- a 3 V d.c. power supply to deliver a maximum current of 0.2 A to the lamp. An appropriate series resistor may be used to prevent the current from becoming too large
- a variable power supply with the control knob fixed at 3 V by taping over it.

2. PP00053708 2.5 V, 0.2 A from philipharris.co.uk or similar is suitable.

3. RS components 707-8580 or similar is suitable. The resistor should be labelled '10 Ω'.

4. The circuit should be set up ready for each candidate as shown in Fig. 1.1, with the switch open. The 10 Ω fixed resistor and extra connector should be at the side of the circuit.

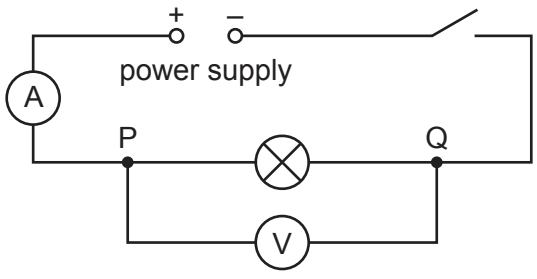

Fig. 1.1

Action at changeover

The supervisor should check that the circuit is set up as in Fig. 1.1, with the switch open and the 10 Ω fixed resistor and extra connector at the side of the circuit.

Information required by examiners

A sample set of numerical results, clearly marked 'supervisor's results', obtained out of sight of the candidates.

Question 2

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

- illuminated slit with lamp (see Notes 1, 2, 3 and 4)
- small plane mirror mounted in a holder (see Note 5)
- 30 cm ruler with mm divisions
- protractor.

Notes

1. The slit should be cut from a piece of rigid card into a rectangle of length 80 mm and width 50 mm. A slit of width 1.0 mm and length 25 mm should be cut into the card as shown in Fig. 2.1. Pieces of adhesive putty should be fixed to the bottom corners of the rigid card to enable it to be placed upright on the page.

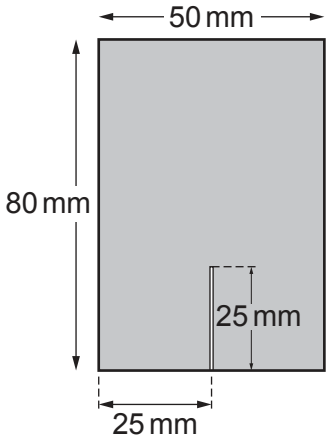

Fig. 2.1

2. The lamp used to illuminate the slit should be a low voltage filament lamp, of power approximately 24 W or higher, with a suitable power supply. A low voltage LED lamp of equivalent brightness can be used.

3. It must be possible for the candidate to arrange the lamp and the slit to give a single thin beam of light across the length of an A4 page.

4. If a ray box and a single slit to fit it are available, that may be used instead.

5. A small mirror, with approximate dimensions 75 mm × 25 mm, is suitable (e.g. Philip Harris B8A44556).

6. The apparatus should be set up in a dimly lit part of the laboratory if possible.

Action at changeover

The supervisor should ensure that the slit and lamp (or ray box) are still capable of providing a beam across the page.

Information required by Examiners

A sample set of numerical results, clearly marked ‘supervisor’s results’, obtained out of sight of the candidates.

Question 3

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

- a clamp, boss and stand
- a can with a small hole at the bottom (see Note 1)
- 200 cm^3 water in a 250 cm^3 beaker labelled 'supply of water'
- a 50 cm^3 measuring cylinder
- a 100 cm^3 measuring cylinder
- a funnel
- a stopwatch
- paper towels to mop up spillage.

Notes

1. The can should be an empty cylindrical food can (e.g. a can originally containing 400 g of tomatoes) with an approximate diameter of 7.0 cm. A hole of diameter 1.5 mm should be drilled into the centre of the base of the can. The can should be clean and free from sharp edges and the edges of the hole made smooth.

Check that it takes about 30 seconds for half the volume of the water in the can to flow out through the hole when the can **initially** contains 100 cm^3 water.

If the time taken for 100 cm^3 water to reduce by half is more than 35 seconds or less than 25 seconds, the hole should be widened slightly, or the can should be discarded and a smaller hole drilled in a new can.

Extra replacement cans should be available in the examination room to replace any broken by the candidates.

2. The apparatus should be set up ready for each candidate as shown in Fig. 3.1, with the 100 cm^3 measuring cylinder and the beaker labelled 'supply of water' placed at one side of the apparatus.

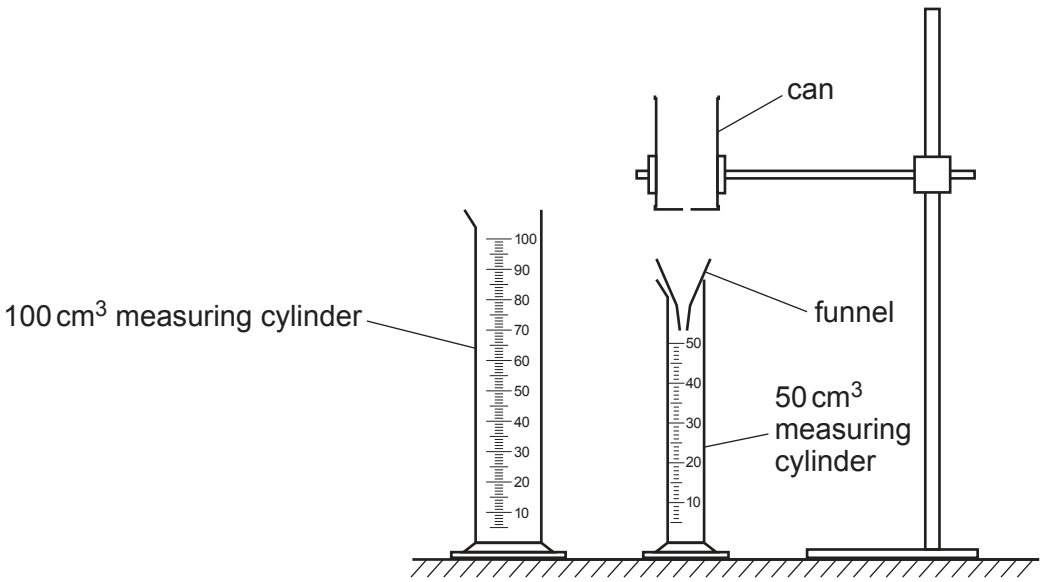

Fig. 3.1

3. Leave enough room between the bottom of the can and the top of the funnel for candidates to put a finger over the hole in the can while filling it with water.

Action at changeover

The supervisor should ensure that the apparatus is set up for each candidate as shown in Fig. 3.1, with the 100 cm^3 measuring cylinder and beaker labelled 'supply of water' placed at one side of the apparatus. The measuring cylinders should be empty, and the water in the beaker labelled 'supply of water' topped up to 200 cm^3.

Check the cans and replace any deformed cans.

Information required by Examiners

A sample set of numerical results, clearly marked 'supervisor's results', obtained out of sight of the candidates.

Question 4

Planning question – no apparatus required for this question.

Supervisor's report

Syllabus and component number | | | | | / | | |

Centre number | | | | | |

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) .....