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Cambridge Assessment International Education

Cambridge O Level

PHYSICS **5054/32**

Paper 3 Practical Test **October/November 2024**

CONFIDENTIAL INSTRUCTIONS

2316264318

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

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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.

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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):

- a standard test-tube (see Note 1)
- a 250 cm^3 glass beaker containing approximately 100 cm^3 of water
- a 100 cm^3 measuring cylinder
- a 30 cm ruler with centimetre and millimetre graduations
- 2 rectangular blocks of wood (see Note 2)
- access to a balance (see Note 3).

Notes

1 A test-tube approximately 15 mm × 125 mm is suitable.

2 The dimensions of the blocks are not important, but the longest sides should be at least equal to the length of the test-tube. The height of the blocks must be equal to or greater than the diameter of the test-tube.

3 Candidates will need access to a top pan balance (or similar), capable of measuring mass to at least 0.1 g.

Action at changeover

Empty the water from the measuring cylinder and top up the 250 cm^3 beaker with water if required.

Dry the test-tube or provide candidates with a new dry test-tube.

Information required by examiners

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

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Question 2

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

- a power source of 4.5 V to 5 V (see Note 1)
- switch (or plug key)
- voltmeter capable of measuring a potential difference of up to 3 V with a minimum resolution of 0.1 V and with two connecting leads (see Note 2)
- a light-emitting diode (LED) (see Notes 3 and 6)
- three resistors of nominal value 270 Ω, 470 Ω and 560 Ω, each with a power rating of 0.25 W or higher (see Notes 4 and 6)
- sufficient connecting leads to assemble the circuit shown in Fig. 2.1 (see Note 5).

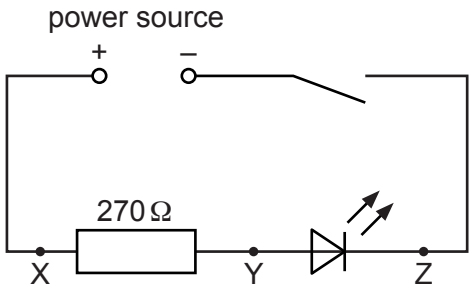


Fig. 2.1

Notes

1 The following are suitable power sources:

- three 1.5 V dry cells in suitable holders connected in series
- four 1.2 V rechargeable cells in suitable holders connected in series
- d.c. power supply of 4.5 V to 5 V.

Where candidates are supplied with a power supply with a variable output voltage, the voltage setting should be set by the supervisor and fixed, e.g. taped.

The positive terminal of the power source **must** be labelled with a '+' sign.

2 The voltmeter must have two connecting leads that can be connected between various points in the circuit. The ends of the leads where they are connected to the voltmeter must be taped in place securely, so that they cannot be removed.

The positive (+) terminal of the voltmeter must be marked with a '+' sign.

3 The RS component code of a suitable LED is RS 228-5988. The maximum forward voltage should be around 2.2 V.

4 The resistors should be clearly labelled with the value of their resistance. The 470 Ω and 560 Ω resistors must be placed by the side of the circuit shown in Fig. 2.1.

The RS component codes of suitable resistors are:
270 Ω: RS 707-7625
470 Ω: RS 707-7647
560 Ω: RS 707-7644.

5 The supervisor must assemble the circuit shown in Fig. 2.1 for the candidates in advance of the exam. The LED should light when the switch is closed to show it is connected the right way round.

Connection points X, Y and Z must be labelled.

6 The resistors and the LED must be connected using terminals suitable for the candidate to connect the voltmeter in parallel with either of these components.

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Action at changeover

The circuit must be restored to its original state shown in Fig. 2.1, with the switch open and the voltmeter disconnected from the circuit. The 270 Ω resistor should be connected into the circuit and the 470 Ω and 560 Ω resistors placed at the side. Check that the LED lights when the switch is closed.

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 converging lens with focal length f = 15 cm, with a suitable holder
- a metre rule with centimetre and millimetre graduations
- a 30 cm ruler with centimetre and millimetre graduations
- a triangular object consisting of a piece of white card with a triangular hole cut in it (see Note 1)
- a lamp with a power supply to illuminate the triangular object (see Note 1)
- a white screen (see Note 2).

Notes

1 The object is made by cutting a hole in the shape of an equilateral triangle of side 2.0 cm in the card (see Fig. 3.1). The triangular hole must be covered with translucent paper (e.g. tracing paper).

The illumination can be provided by a low voltage lamp, approximately 24 W, with a suitable power supply.

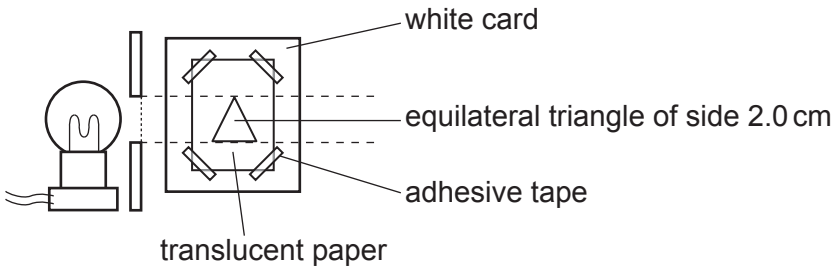


Fig. 3.1

2 The screen can be made from a sheet of rigid white card, approximately 15 cm × 15 cm. Some means of supporting the screen vertically must be provided (e.g. fixing the white card to a small block of wood – see Fig. 3.2).

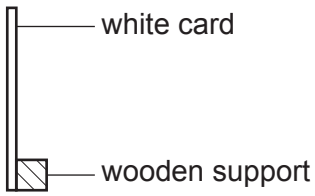


Fig. 3.2

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3 The light source, the centre of the triangular hole in the object card, the centre of the lens in its holder and the centre of the screen must be arranged to be the same height above the bench.

4 The candidates will be asked to focus a distant object such as a wall or window through the lens onto the screen. Please ensure that the candidates are unable to use the Sun as the distant object.

5 This experiment should take place in a darkened area of the laboratory if possible.

Action at changeover

Check that the apparatus is intact and still working.

Replace the screen if it has been marked.

Switch off the lamp.

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 is required for this question.

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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.

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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) .....

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