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Cambridge Assessment International Education

Cambridge O Level

PHYSICS **5054/31**

Paper 3 Practical Test **May/June 2024**

CONFIDENTIAL INSTRUCTIONS

4045619936

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

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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):

- six similar small glass balls (marbles) (see Note 1)
- a metre rule fixed in place on the bench (see Note 2)
- two set squares
- a 50 cm^3 measuring cylinder
- a 100 cm^3 beaker containing approximately 50 cm^3 water
- access to a top-pan (electronic) balance capable of measuring to the nearest gram (See Note 3)
- paper towel(s) or a cloth to mop up any water spillages.

Notes

1. Each small glass ball should have a diameter of 1.6 ± 0.2 cm. The set of six should fit into the measuring cylinder. There should be some spare balls available. If any candidate requires a replacement ball, their candidate number should be noted in the supervisor's report.

2. The metre rule is to be fixed horizontally (flat) on the bench at each end with a small piece of adhesive putty.

3. All candidates should have quick and convenient access to a top-pan (electronic) balance and be able to move easily to it. Balances may be shared.

Action at changeover

Ensure that the small glass balls have been removed from the beaker and dried. Empty water from the measuring cylinder. Make sure the metre rule is still fixed to the bench.

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 stop-watch
- a 250 cm^3 beaker (see Note 1)
- a 500 cm^3 or 600 cm^3 beaker (see Note 1)
- a thermometer (–10 to +110 °C)
- a supply of hot water (see Note 2)
- a supply of mixed ice and water (see Note 4)
- paper towel(s) or a cloth to mop up any water spillages.

Notes

1. A mark should be placed on both beakers to show the level of 100 cm^3 of water.

The 250 cm^3 beaker should fit easily inside the 500 cm^3 or 600 cm^3 beaker with a small space between them. The water from the larger beaker should not spill into the smaller beaker when the smaller beaker is put into the larger beaker. See the arrangement shown in the diagram in Fig. 2.1.

2. A supply of hot water at a temperature greater than 75 °C but less than 85 °C should be available. The supervisor will need to pour approximately 100 cm^3 of the hot water into the 250 cm^3 beaker for each candidate at two points in the experiment when requested. The temperature of the water after pouring into the 250 cm^3 beaker should be higher than 70 °C.

3. Candidates should be warned of the dangers of burns and scalds when using very hot water.

4. A supply of mixed ice and water is to be available so that each candidate can pour 100 cm^3 of this water into the 500 cm^3 beaker when needed. This could be in a third beaker placed close to the area where the candidate is working.

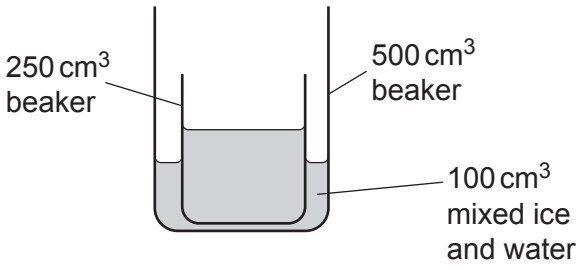


Fig. 2.1

Action at changeover

Pour away any water in the beakers. Ensure the stop-watch is set to zero. Ensure sufficient hot and iced water is available for the next set of candidates.

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 3

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

- a lamp (see Note 1)
- tracing paper
- a piece of card with an L shape cut out to be the illuminated object (see Note 2)
- a screen (see Note 3)
- a convex lens (see Note 4)
- a metre rule.

Fig. 3.1 shows the apparatus. The apparatus is to be set up for the candidate to use with the lens between the object and the screen as shown in Fig. 3.1.

The apparatus should be set up in a darkened area of the laboratory, beside the metre rule, so that the lamp, illuminated object, lens and screen are in a straight line and the lamp, the centre of the card containing the illuminated object, the centre of the lens and the centre of the screen are all at the same height.

Distance *D* should be approximately one metre for the set up.

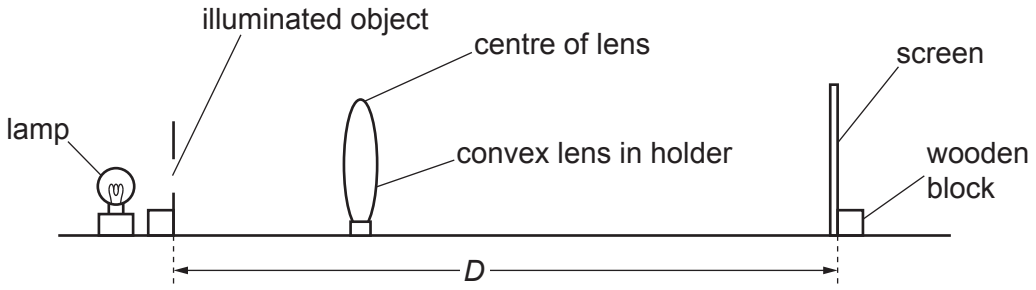


Fig. 3.1

Notes

1. The lamp to illuminate the object should be a low voltage lamp, of power approximately 24 W or higher, with a suitable power supply.

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2. The illuminated object is made using a piece of card of size approximately 8.0 cm by 8.0 cm. An L shape is cut out from the centre of the card as shown in Fig. 3.2, with the dimensions shown.

A piece of tracing paper should be taped to the back of the card to cover the cut-out shape. A lamp is placed to illuminate the L shape. The object can be made to stand vertically by a small wooden block fixed to its base.

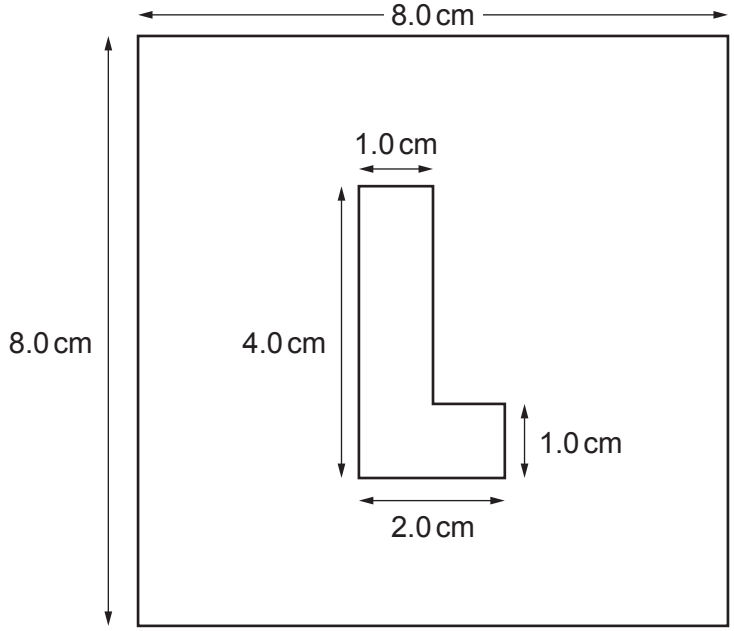


Fig. 3.2

3. The screen is made from a piece of stiff white card approximately 15 cm by 15 cm, fixed to a wooden support to stand upright so that it can be moved back and forth.

4. A convex lens of focal length 15.0 cm (e.g. Philip Harris product code B8L27169) is to be mounted in a lens holder.

Action at changeover

Ensure the apparatus is set up as in Fig. 3.1.

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.

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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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