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Cambridge Assessment International Education

Cambridge O Level

PHYSICS **5054/31**

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

CONFIDENTIAL INSTRUCTIONS

8842879700

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):

- two identical drinking straws (see Note 1 and Note 3)
- two set squares
- a 30 cm ruler with centimetre and millimetre graduations
- a 50 cm^3 measuring cylinder
- access to a container of water (see Note 2)
- scissors
- paper towels to mop up any spillage.

Notes

1. The straws must be completely straight and round, and of a length between 19 cm and 20 cm. The diameter of the straw must be 5.0 mm to 6.0 mm.

2. The container of water must be large enough for the straw to be fully immersed lengthways as shown in Fig. 1.1. A plastic washing up bowl or small container is suitable. There must be approximately 3 cm depth of water in the container. With sufficient time before the examination to make sure that any bubbles have dispersed, add 1 **small** drop of washing up liquid (or similar surfactant) to the water in the container.

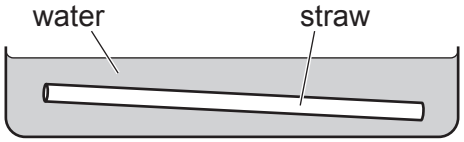


Fig. 1.1

3. Spare straws must be available.

Action at changeover

Replace the straws.

Ensure the container of water contains sufficient water.

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):

- two resistors labelled X and Y respectively (see Note 1)
- an analogue or digital voltmeter capable of measuring voltages up to 5 V with a minimum precision of at least 0.1 V
- an analogue or digital ammeter capable of measuring a current up to 1 A with a minimum precision of at least 0.05 A
- switch
- a power source of 3 V (see Note 2)
- sufficient connecting leads to assemble the circuit shown in Fig. 2.1
- two extra connecting leads for candidates to use in addition to those used in the circuit shown in Fig. 2.1.

Notes

1. Resistor X must have a resistance of 6.8 Ω (e.g. RS component code RS 151-653) and Resistor Y must have a resistance of 10 Ω (e.g. RS component code RS 762-9380). Any colour coding or printed value of the resistance should be taped over so that it is not visible to the candidates. The resistors must have a power rating of 3 W or higher.

   The taped-over resistors must have suitable terminals so that they can be connected into the circuit.

2. The following are suitable power sources:
   - two 1.5 V dry cells in suitable holders connected in series
   - three 1.2 V rechargeable cells in suitable holders connected in series
   - d.c. power supply of 3.0 V.

   Where candidates are provided with a power supply with a variable output p.d., the p.d. must be set by the supervisor and fixed (e.g. taped).

3. The circuit shown in Fig. 2.1 must be set up ready for the candidates to use.

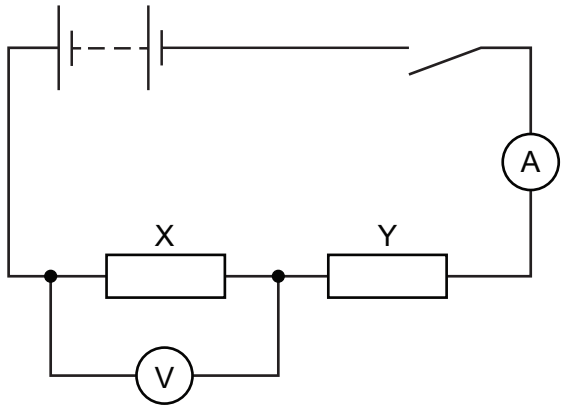


Fig. 2.1

Action at changeover

Ensure the circuit is restored to match the circuit in Fig. 2.1. Check that any cells are still charged and replace depleted cells.

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 metre rule with centimetre and millimetre graduations (see Note 1)
- two 100 g slotted masses taped to the rule at the 5.0 cm mark (see Note 2)
- a pivot (see Note 3)
- six 10 g slotted masses (see Note 4)
- a piece of modelling clay (see Note 5).

Notes

1. The metre rule must have a mass of between 110 g and 130 g. It should be clearly calibrated in cm and mm. If the metre rule has two scales in opposite directions along its length, one of the scales must be taped over.

   If the only metre rules available have a mass of less than 110 g, a small mass can be fixed underneath the rule at the 50 cm mark to bring the mass of the rule into range. Small steel ball bearings embedded in modelling clay or adhesive putty are suitable, as would be a small slotted mass.

2. The two 100 g masses (or one 200 g mass) should be taped to the rule and centred on the 5.0 cm mark on the rule.

3. The pivot can be a wooden or glass triangular prism and should have a vertical height of around 3.0 cm to 4.0 cm.

4. It must be possible for the candidates to balance the six 10 g masses on top of each other on the ruler.

5. The piece of modelling clay must have a mass of 34.0 g ± 1.0 g and be placed on a card labelled ‘piece of modelling clay of unknown mass’.

Action at changeover

Remove any 10 g masses or modelling clay from the metre rule. Ensure that the two 100 g masses are still firmly taped to the rule at the 5.0 cm mark. Remove the metre rule from the pivot. Check that the piece of modelling clay has not been altered.

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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