Cambridge Assessment International Education

Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/51**

Paper 5 Practical Test **May/June 2021**

CONFIDENTIAL INSTRUCTIONS

0537485078

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.

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[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, 3, 4, 6 and 7 and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

For Question 1

Each candidate will require:

(i) a fresh celery stalk of about 6 cm length without leaves
(ii) hand lens
(iii) white tile
(iv) knife or cutting blade
(v) paper towel
(vi) stop-clock or sight of a clock with a second hand
(vii) small beaker with red coloured water to a depth of about 1 cm (see note).

Note

Coloured water can be made using 1 cm^3 of red food colouring in 100 cm^3 of distilled water.

For Question 2

Each candidate will require:

(i) about 5 cm^3 of celery puree in a test-tube labelled **celery puree** (see note)
[MH] **(ii)** Benedict's solution and dropper labelled **Benedict's solution**
[C] **(iii)** biuret solution and dropper labelled **biuret solution**
[MH] [N] **(iv)** iodine solution and dropper labelled **iodine solution**
(v) 3 test-tubes (approximately 125 mm × 16 mm) and means to support them
(vi) access to water-bath of at least 80 °C
(vii) test-tube holder
(viii) stop-clock or sight of a clock with a second hand.

Note

Celery stalks can be chopped in a liquidiser with sufficient water so that a puree that can be poured is made.

For Question 3

Each candidate will require:

(i) 20 cm^3 aqueous sodium hydrogencarbonate, 0.5 mol dm^{-3}, labelled **aqueous sodium hydrogencarbonate** (see note 1)

(ii) 20 cm^3 aqueous sodium carbonate, 0.5 mol dm^{-3}, labelled **aqueous sodium carbonate** (see note 1)

[C] [F] [HH] [MH] [N] [T] **(iii)** access to methyl orange in a dropping bottle

(iv) 20 cm^3 hydrochloric acid, 1.0 mol dm^{-3}, labelled **dilute hydrochloric acid**

(v) 20 cm^3 magnesium chloride solution, 0.5 mol dm^{-3}, labelled **aqueous magnesium chloride**

(vi) 2 wooden splints

(vii) 8 test-tubes (approximately 125 mm × 16 mm) and a means to support them (see note 2)

(viii) Bunsen burner and a means to light it

(ix) apparatus used by Centre to test for carbon dioxide

[MH] **(x)** limewater labelled **limewater**.

Note 1

Ensure both solutions in **(i)** and **(ii)** turn methyl orange yellow.

Note 2

Centres may provide fewer test-tubes, the minimum being four test-tubes. If this is the case, candidates will have to rinse test-tubes with distilled water, so this must be provided.

For Question 4

Each candidate will require:

(i) 50 cm^3 hydrochloric acid, 1.0 mol dm^{-3}, labelled **dilute hydrochloric acid**

(ii) 3 large marble chips labelled **large marble chips**

(iii) 7 small marble chips labelled **small marble chips**

(iv) approximately 3 spatulas of powdered calcium carbonate labelled **powdered marble chips**

(v) spatula

(vi) stopwatch

(vii) boiling tube (large test-tube) (approximately 150 mm × 25 mm) and a means to support it (see Fig. 4.1)

(viii) test-tube (approximately 125 mm × 16 mm) (see Fig. 4.1)

(ix) delivery tube and stopper (see Fig. 4.1)

(x) large container, needs to be large enough for collecting gas (see Fig. 4.1)

(xi) waste container.

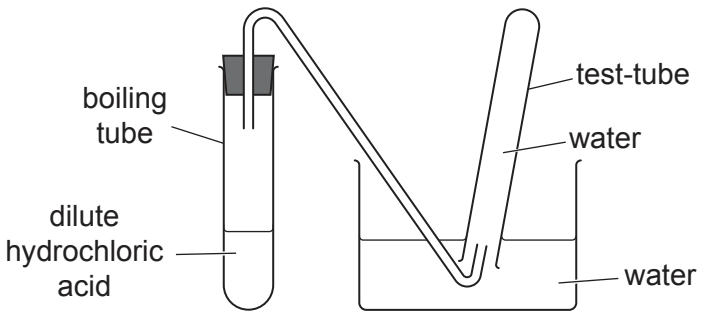

Fig. 4.1

For Question 5

No apparatus is required for this question.

For Question 6

Each candidate will require:

- **(i)** a d.c. power source of approximately 1.5 V to 2 V. If candidates are supplied with a power source of variable voltage output, the voltage should be set by the supervisor and fixed e.g. taped
- **(ii)** 2.5 V, 0.2 A lamp in a suitable holder
- **(iii)** voltmeter capable of measuring the supply p.d. with minimum precision of 0.1 V
- **(iv)** ammeter capable of reading up to 1.0 A with a minimum precision of 0.05 A
- **(v)** switch. The switch may be an integral part of the power supply
- **(vi)** wooden or plastic metre rule
- **(vii)** approximately 105 cm of straight, bare constantan wire of diameter 0.38 mm (28 swg) or 0.32 mm (32 swg), taped to a metre rule at two places (between the zero and 5.0 cm mark and between the 95.0 and 100.0 cm mark). The zero end of the wire is to be labelled **X**, the other end is to be labelled **Y**
- **(viii)** a suitable terminal (e.g. a crocodile clip) attached to the constantan wire at end **X** of the metre rule, so that the lamp can be attached to the resistance wire
- **(ix)** sliding contact, labelled **S**. This may be a crocodile clip connected to a lead.

The circuit shown in Fig. 6.1 must be set up for the candidates.

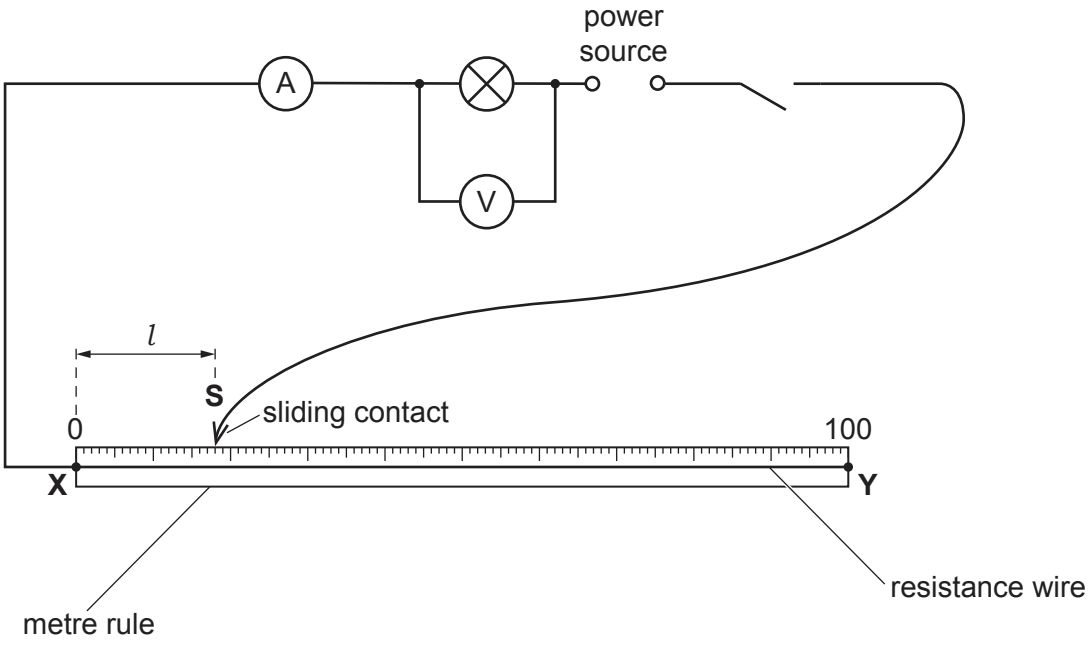

Fig. 6.1

Action at Changeover

Check that the circuit is still connected correctly. If cells are used, check that they are adequately charged.

For Question 7

Each candidate will require:

- **(i)** steel spring. An expendable steel spring is suitable, for example a 55 mm long spring, of diameter 15 mm (see www.philipharris.co.uk, catalogue number B8G87194)
- **(ii)** clamp, stand and boss
- **(iii)** 30 cm or 50 cm ruler, graduated in millimetres
- **(iv)** mass of 200 g. A 100 g mass hanger with one 100 g slotted mass is ideal. If these are not available, a suitable light hook must be provided so that the 200 g mass can be suspended from the spring
- **(v)** stone of mass between 150 g and 250 g (see note 2)
- **(vi)** 500 cm^3 beaker containing approximately 300 cm^3 of cold water.

Note 1

The apparatus is to be set up for candidates as shown in Fig. 7.1. The spring is to be sufficiently high above the bench so that when the 200 g mass is suspended from the spring, the bottom of the mass is approximately 20 cm above the surface of the bench. Ensure that the spring is held tightly in the clamp.

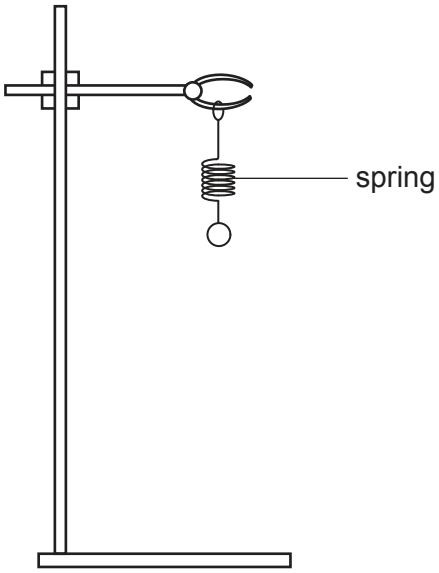

Fig. 7.1

Note 2

There must be a means of allowing the stone to be suspended from the spring. A small length of copper wire wound around the stone, with the end of the wire bent to form a hook shape is sufficient. The stone must be provided for candidates with the wire already attached.

Action at Changeover

Ensure that the stone is removed from the spring and dried. Restore the apparatus to the form described in Note 1.

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) .....