Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/51**

Paper 5 Practical Test **October/November 2019**

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.

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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This document consists of **7** printed pages and **1** blank page.

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Cambridge Assessment International Education

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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.

Specific information for this practical exam

During the exam, the supervisor (NOT the invigilator) must do the experiments in Questions 1, 3, 4, 5 and 6 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) liquidised beans labelled **liquidised beans** (see note 1)
(ii) 3 × test-tubes approximately 150 × 25 mm and means of supporting them
(iii) spatula
[MH] **(iv)** 10 cm^3 10 volumes (3%) freshly made hydrogen peroxide solution in a small beaker labelled **hydrogen peroxide solution** (see note 2)
(v) 1 cm^3 syringe without needle
(vi) stopclock
(vii) supply of distilled/deionised water
(viii) beaker of approximately 200 cm^3 labelled **waste**
(ix) Benedict's solution with dropper labelled **Benedict's solution**
[C] **(x)** biuret solution with dropper labelled **biuret solution**
(xi) access to a hot water bath of approximately 80 °C (see note 3).

Note 1

Dried beans e.g. butter beans, should be soaked overnight and then 50 g liquidised with 35 cm^3 water. This is sufficient for 3 candidates.

Prior to the examination, 1 cm depth of liquidised beans should be placed in a test-tube approximately 150 × 25 mm and 1 cm^3 hydrogen peroxide solution added. The mixture including any foam should fill the test-tube in approximately 60 to 90 seconds. If this is not the case then the concentration of hydrogen peroxide solution can be adjusted up to a maximum of 18 volumes (5%) or candidates advised to adjust the depth of liquidised beans accordingly.

Note 2

The hydrogen peroxide solution should be made up no more than 24 hours prior to the examination and stored in a cool, dark place.

Note 3

Candidates should be warned of the risks of burns and scalds when handling hot water.

For Question 3

Each candidate will require:

- **(i)** approximately 120 marble chips (2–4 mm) in a container labelled **marble chips**
- **(ii)** approximately 30 cm^3 1.0 mol dm^{-3} hydrochloric acid labelled **hydrochloric acid**

[MH] **(iii)** approximately 40 cm^3 limewater labelled **limewater**

- **(iv)** stopclock
- **(v)** 1 test-tube (approx. 125 mm × 15 mm), and a means to support it
- **(vi)** 1 test-tube (approx. 125 mm × 15 mm) with a line marked with a permanent marker about one third from the bottom of the test-tube, and a means to support it
- **(vii)** delivery tube with bung to fit the test-tube in **(v)**
- **(viii)** 10 cm^3 measuring cylinder
- **(ix)** large container labelled **waste**.

For Question 4

Each candidate will require:

- **(i)** approximately 40 cm^3 distilled / deionised water

[MH] **(ii)** approximately 3 g solid ammonium chloride labelled **compound H**

[MH] **(iii)** approximately 5 cm^3 0.1 mol dm^{-3} nitric acid labelled **nitric acid**

- **(iv)** approximately 5 cm^3 0.1 mol dm^{-3} barium nitrate solution labelled **barium nitrate**

[N] **(v)** approximately 5 cm^3 0.05 mol dm^{-3} silver nitrate solution labelled **silver nitrate**

- **(vi)** 2 × test-tubes (approximately 125 mm × 15 mm)
- **(vii)** 1 × test-tube (approximately 150 mm × 25 mm)
- **(viii)** stirring rod
- **(ix)** spatula
- **(x)** 25 cm^3 measuring cylinder or test-tube (approximately 150 mm × 25 mm) marked at 25 cm^3
- **(xi)** −10 to +110 °C stirring thermometer in 1 °C graduations.

For Question 5

Each candidate will require:

- **(i)** a piece of modelling clay of mass approximately 100 g (the modelling clay should be softened and moulded into an approximately spherical shape)
- **(ii)** a 30 cm or a 50 cm rule with a millimetre scale
- **(iii)** a pivot – a prism or triangular wooden block placed on the bench
- **(iv)** a metre rule with a millimetre scale
- **(v)** a 50 g mass secured to the metre rule with its centre above the 15.0 cm mark on the rule.

Action at changeover

1 Re-mould the modelling clay into an approximately spherical shape.

2 Check that the 50 g mass is still securely attached to the rule above the 15.0 cm mark.

For Question 6

Each candidate will require:

- **(i)** d.c. power supply 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)** voltmeter capable of measuring up to 2.5 V with minimum resolution of 0.1 V (see note 3)
- **(iii)** ammeter capable of measuring up to 1.00 A with a minimum resolution of 0.02 A (see note 3)
- **(iv)** switch (the switch may be an integral part of the power supply)
- **(v)** a wooden or plastic metre rule
- **(vi)** approximately 100 cm of straight, bare constantan wire of diameter 0.27 mm (32 swg), taped to a metre rule at two places between the 0 cm and 5.0 cm mark and between the 95.0 cm and 100.0 cm mark (the zero end of the wire is to be labelled **A** and the other end **B**)
- **(vii)** a sliding contact labelled **C** (this should be a crocodile clip attached to a lead)
- **(viii)** two terminals, e.g. crocodile clips, attached to the constantan wire at the ends of the metre rule so that connections can be made to the circuit shown in Fig. 6.1.

Note 1

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

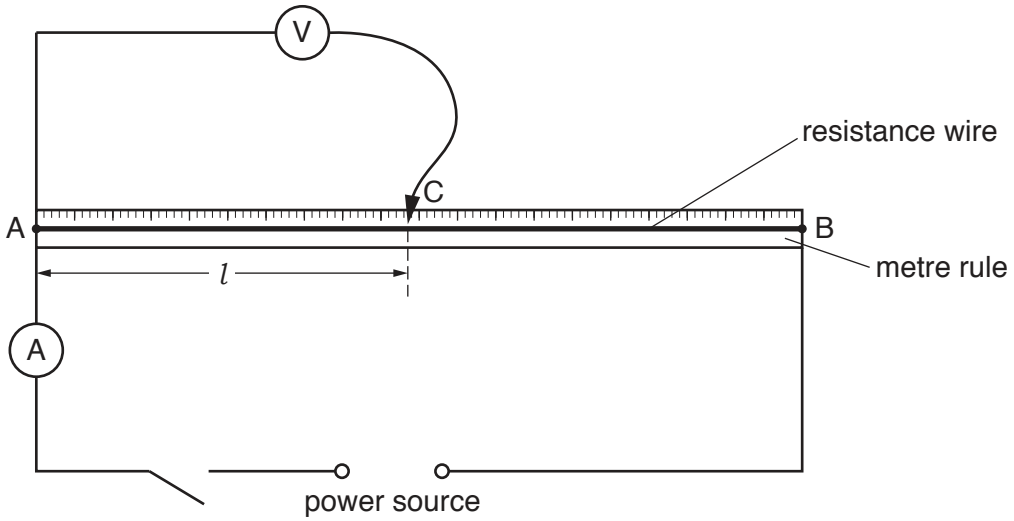

Fig. 6.1

Note 2

If dry cells are used as the power source, check that they remain adequately charged during the examination. Spare cells should be available.

Note 3

Either analogue or digital meters are suitable. Any variable settings should be set by the Supervisor and fixed (e.g. taped).

Action at changeover

Check that the circuit is still connected correctly and working.

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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.

Declaration

1 Each packet that I am returning to Cambridge International contains 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) .....