



Cambridge IGCSE™ (9–1)

CO-ORDINATED SCIENCES

0973/51

Paper 5 Practical Test

May/June 2022

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.

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 **12** pages. Any blank pages are indicated.

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) a leaf of 4–6 cm length with lobes, e.g. ivy, geranium, oak, maple, acer, labelled **A**
- (ii) a leaf of the same species as leaf **A**, but supplied on a white tile, labelled **B** (see note)
- (iii) a 30 cm ruler graduated in millimetres
- [MH] (iv) Benedict's solution with a dropper, labelled **Benedict's solution**
- [C] (v) biuret solution with a dropper, labelled **biuret solution**
- [MH][N] (vi) iodine solution with a dropper, labelled **iodine solution**
- (vii) 2 test-tubes (approximately 125 mm × 16 mm) and a means to support them
- (viii) access to a hot water-bath at a temperature of about 80 °C
- (ix) test-tube holder
- (x) means of labelling glassware
- (xi) sight of a clock with a second hand
- (xii) scalpel
- (xiii) forceps.

Note

Leaf **B** should have the chlorophyll removed. This can be done by dipping in boiling water, heating in ethanol and then rinsing with cold water.

For Question 2

No apparatus or materials are required for Question 2.

For Question 3

Each candidate will require:

- (i) evaporating basin
- (ii) spatula
- [C][MH][N] (iii) 3g of hydrated copper(II) sulfate crystals, labelled **copper sulfate crystals** (see note 1)
- (iv) heatproof mat
- (v) tripod
- (vi) gauze
- (vii) Bunsen burner and a means to light it
- (viii) access to a balance (see note 2)
- (ix) tongs.

Notes

1. The crystals should be roughly crushed.
2. Candidates will need to measure the mass three times during this experiment.

For Question 4

Each candidate will require:

- (i) approximately 25 cm³ of 1.0 mol dm⁻³ sodium chloride solution, labelled **solution Q**
- (ii) 5 test-tubes (approximately 125 mm × 16 mm) and a means to support them
- (iii) wooden splint
- (iv) Bunsen burner and a means to light it
- [MH][N] (v) access to 0.1 mol dm⁻³ silver nitrate in a bottle with a dropper or supplied with a dropping pipette, labelled **aqueous silver nitrate**
- (vi) access to 0.1 mol dm⁻³ barium nitrate in a bottle with a dropper or supplied with a dropping pipette, labelled **aqueous barium nitrate**
- [C] (vii) approximately 10 cm³ of 1.0 mol dm⁻³ nitric acid, labelled **dilute nitric acid**
- [MH][N] (viii) access to 0.5 mol dm⁻³ ammonia solution, labelled **aqueous ammonia**
- [C] (ix) access to 0.5 mol dm⁻³ sodium hydroxide solution, labelled **aqueous sodium hydroxide**
- (x) paper towels
- (xi) 2 dropping pipettes for use with (viii) and (ix).

For Question 5

Each candidate will require:

- (i) 30 cm ruler with a millimetre scale
- (ii) 100 cm³ beaker
- (iii) 250 cm³ beaker containing approximately 200 cm³ of water
- (iv) 100 cm³ measuring cylinder
- (v) dropping pipette
- (vi) 2 rectangular blocks of wood. The dimensions of the blocks are not important, but the longest sides should be of length at least twice the diameter of the beaker in (ii). Their height should be no more than half the height of the beaker in (ii). The wooden blocks must have smooth, straight sides
- (vii) paper towels.

Action at changeover

Empty the water from the measuring cylinder and top up the 250 cm³ beaker with water, if required.

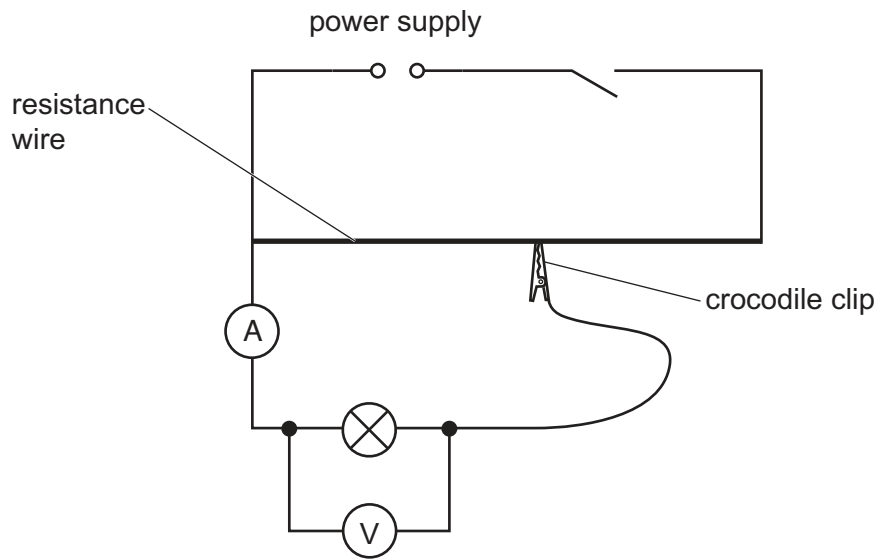
For Question 6

Each candidate will require:

- (i) d.c. power supply of approximately 3V. If candidates are supplied with a power supply of variable voltage output, the voltage should be set by the supervisor and fixed e.g. taped (see note 1)
- (ii) filament lamp, 2.5V, 0.2A, or similar, in a holder
- (iii) voltmeter capable of measuring up to 3.0V with minimum resolution of 0.1V (see note 2)
- (iv) ammeter capable of measuring up to 1.00A with a minimum resolution of 0.05 A (see note 2)
- (v) switch. The switch may be an integral part of the power supply
- (vi) wooden or plastic metre rule
- (vii) approximately 100 cm of straight, bare constantan wire of diameter 0.27 mm (32 swg), taped to a metre rule at two places (see note 3)
- (viii) sliding contact - this should be a crocodile clip attached to a lead.

Notes

1. If dry cells are used as the power supply, check that they remain adequately charged during the examination. Spare cells should be available.
2. Either analogue or digital meters are suitable. Any variable settings should be set by the supervisor and fixed, e.g. taped.
3. The wire should be taped to the metre rule in such a way that candidates are able to obtain potential differences of between 0.3V and 2.6V when the crocodile clip is connected to the wire.
4. The circuit shown in Fig. 6.1 must be set up for the candidates. The switch must be open. The crocodile clip must be connected to the resistance wire. The position of the crocodile clip on the wire is not important.

**Fig. 6.1****Action at changeover**

Check that the circuit is still connected correctly and working.

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Supervisor's report

Syllabus and component number

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Centre number

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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)