



Cambridge IGCSE™

CO-ORDINATED SCIENCES

0654/51

Paper 5 Practical Test

October/November 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 **8** 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, 2, 3, 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) three cylinders of beetroot approximately 4 cm long. See Note 1.1
- (ii) three test-tubes (approximately 125 mm × 16 mm) and a means to support them
- (iii) means of labelling test-tubes (e.g. a marker pen)
- (iv) stoppers to fit the test-tubes
- (v) 30 cm ruler graduated in mm
- (vi) a white tile
- (vii) a sharp knife or cutting blade
- (viii) three approximately 250 cm³ beakers to use as water baths for test-tubes
- (ix) access to approximately 200 cm³ of water at room temperature
- (x) access to approximately 200 cm³ of water at 40 °C
- (xi) access to approximately 200 cm³ of water at 60 °C
- (xii) forceps
- (xiii) paper towels
- (xiv) a beaker of water at room temperature, labelled **rinsing** water
- (xv) a thermometer (–10 to 110 °C with 1 °C graduations)
- (xvi) a stop-clock or sight of a clock with a second hand.

Note 1.1

The beetroot cylinders should be freshly cut using a cork borer with approximately 8 mm diameter and placed in a beaker of tap water which has been changed once to remove most of the red colour.

For Question 2

Each candidate will require:

- (i) a test-tube approximately (125 mm × 16 mm) approximately half full of tap water that is colourless, labelled **A**
- (ii) a test-tube approximately (125 mm × 16 mm) approximately half full of diluted milk that mimics cloudy limewater, labelled **B**
- (iii) a means to support the test-tubes.

For Question 3

Each candidate will require:

- (i) approximately 30 cm³ of white vinegar, approximately 5%, labelled **vinegar**
- (ii) approximately 150 cm³ of **full fat** milk, labelled **milk**. See Note 3.1
- [F] (iii) universal indicator in a bottle with a dropper or supplied with a dropping pipette
- (iv) access to pH colour chart for use with universal indicator solution
- [MH] (v) 4 large spatula loads of sodium carbonate powder
- (vi) 4 test-tubes (approximately 125 mm × 16 mm) and a means to support them
- (vii) 3 × 100 cm³ beakers
- (viii) 2 cm³ syringe **without** a needle
- (ix) means to label beakers and paper towels
- (x) a balance, see Note 3.2
- (xi) a piece of cling film (plastic wrap). See Note 3.3
- (xii) scissors to cut cling film. See Note 3.3
- (xiii) a spatula
- (xiv) approximately 9 paper towels
- (xv) a 100 cm³ measuring cylinder.

Note 3.1

The milk must be fresh, whole or full fat milk (3.5% minimum fat content) and needs to be supplied at a temperature of approximately 55 °C.

Note 3.2

The balance can measure to either 1 or 2 decimal places. Each candidate will need to measure three different masses.

Note 3.3

The cling film should be large enough to cut into 3 pieces, each of which will be used when weighing on the balance.

For Question 4

No apparatus is required for this question.

For Question 5

Each candidate will require:

- (i) two 250 cm³ glass beakers labelled **X** and **Y**. See Note 5.1
- (ii) a 100 or 250 cm³ measuring cylinder
- (iii) a thermometer (−10 °C to 110 °C with 1 °C graduations), suitable for stirring
- (iv) a supply of hot water. See Notes 5.2 and 5.3
- (v) a stop-watch.

Note 5.1

The beakers should be supplied as shown in Fig. 5.1.

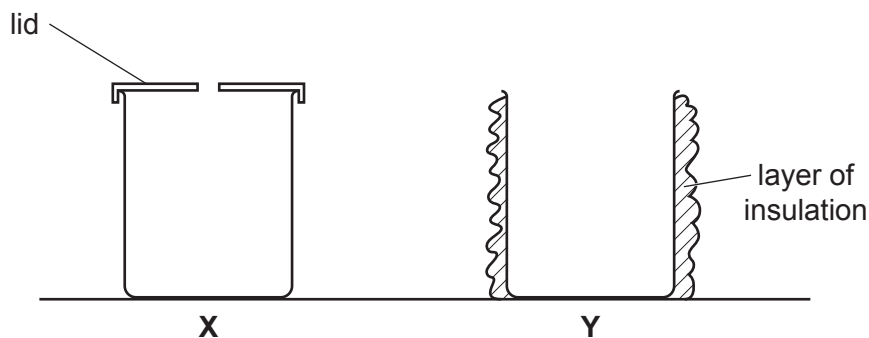


Fig. 5.1

Beaker **X** should have an insulating lid (e.g. a piece of thick card) in which there is a hole to insert the thermometer.

Beaker **Y** should have a layer of insulation (e.g. cotton wool, cloth, corrugated cardboard), fastened with rubber bands or tape.

Note 5.2

Each candidate will require approximately 350 cm³ of hot water. The hot water should be supplied and maintained at a temperature of approximately 80 °C.

Note 5.3

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

Note 5.4

Spare beakers and thermometers should be available in case of breakages.

Action at Changeover

Remove the thermometer and empty the water from the beakers.

For Question 6

Each candidate will require:

- (i) a metre rule with a millimetre scale. See Note 6.1
- (ii) a pivot – a prism or wooden block placed on the bench
- (iii) a 30 cm ruler with a millimetre scale
- (iv) a 150 g load, labelled M – this can be made from a combination of slotted masses taped together.

Note 6.1

It is assumed that all candidates will use similar metre rules, unless stated otherwise by the supervisor.

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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)