



Cambridge IGCSE™

CO-ORDINATED SCIENCES

0654/53

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 **8** pages.

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) boiling tube (approximately 150 mm × 25 mm) and stopper with delivery tube to fit (see note 1)
- (ii) container for collecting gas over water (see note 1)
- (iii) 25 cm³ measuring cylinder (see note 1)
- (iv) two clamps, bosses and stands (see note 1)
- (v) 5 cm³ celery puree, labelled **celery puree** (see note 2)
- (vi) 5 cm³ freshly made 10 volumes hydrogen peroxide solution, labelled **hydrogen peroxide solution** in a container suitable for use with the syringe
- (vii) 5 cm³ syringe without needle
- (viii) stop-watch
- (ix) stirring rod
- (x) paper towels.

Notes

1. The apparatus should be set up as shown in Fig. 1.1.

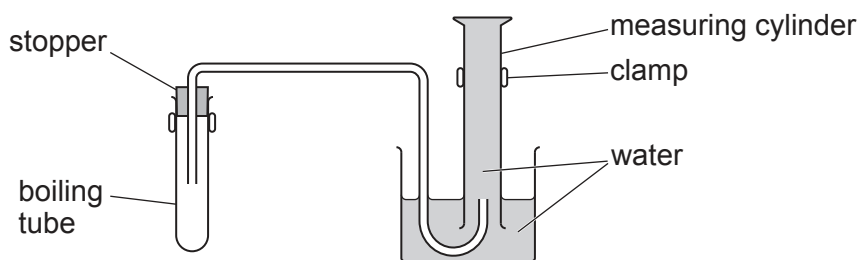


Fig. 1.1

2. Celery puree can be made by liquidising celery stem with distilled/deionised water. It should be runny enough to pour easily and freshly made on the day of the exam.

Prior to the exam, the supervisor should check that 3 cm³ of celery puree mixed with 2 cm³ of hydrogen peroxide solution produces 10–20 cm³ of gas in 8 minutes. The concentration of the hydrogen peroxide solution may be adjusted to achieve this.

For Question 2

Each candidate will require:

- (i) two test-tubes with about 2 cm depth potato puree in each test-tube, labelled **potato puree** (see note 1)
- (ii) two test-tubes with about 2 cm depth celery puree in each test-tube, labelled **celery puree** (see note 2)
- (iii) means to support test-tubes
- [C] (iv) biuret solution with dropper, labelled **biuret solution**
- [MH][N] (v) iodine solution with dropper, labelled **iodine solution**.

Notes

1. The potato puree can be made by liquidising uncooked potato with distilled/deionised water. It should be runny enough to pour easily and freshly made just prior to the exam.
2. Celery puree can be made by liquidising celery stem with distilled/deionised water. It should be runny enough to pour easily. This can be the same puree used for Question 1.

For Question 3

Each candidate will require:

- (i) approximately 50 cm³ of 1 mol dm⁻³ dilute hydrochloric acid, labelled **dilute hydrochloric acid** (see note 1)
- (ii) approximately 10 cm³ orange juice, labelled **orange juice** (see note 2)
- (iii) approximately 10 cm³ aqueous sodium chloride, labelled **salt solution** (see note 3)
- (iv) approximately 10 cm³ soap solution, labelled **soap solution** (see note 4)
- (v) approximately 10 cm³ white vinegar, labelled **vinegar** (see note 5)
- [MH] (vi) approximately 10 cm³ limewater, labelled **limewater** (see note 6)
- (vii) universal indicator solution in a bottle with a dropper or supplied with a dropper, labelled **universal indicator solution**
- (viii) universal indicator colour chart
- [MH] (ix) approximately 16 spatulas of sodium carbonate powder in a container, labelled **sodium carbonate**
- (x) 6 test-tubes (approximately 125 mm × 16 mm) and a means to support them
- (xi) 6 boiling tubes (approximately 150 mm × 25 mm) and a means to support them
- (xii) spatula
- (xiii) stop-watch
- (xiv) paper towels.

Notes

1. Dilute hydrochloric acid should have the lowest pH of all (i) to (vi).
2. The orange juice should have a pH of around 5, the juice should be diluted so the colour is pale orange and the pH adjusted.
3. Sodium chloride solution, any concentration, adjusted to pH 7.
4. The soap solution should be adjusted to have an alkaline pH of **about 9**.
5. Colourless vinegar is preferred, usual concentration is 5%, the pH should be 3 or 4.
6. Limewater should have the highest pH of all (i) to (vi).

For Question 4

No apparatus or materials are required for Question 4.

For Question 5

Each candidate will require:

- (i) clamp, boss and stand
- (ii) pendulum bob attached to approximately 100 cm of thread
- (iii) split cork or similar to hold the thread in the clamp
- (iv) metre rule with a millimetre scale
- (v) a stop-watch.

Notes

1. The pendulum must be set up for the candidates with a length l of exactly 40.0 cm from the bottom of the split cork to the middle of the pendulum bob (see Fig. 5.1).

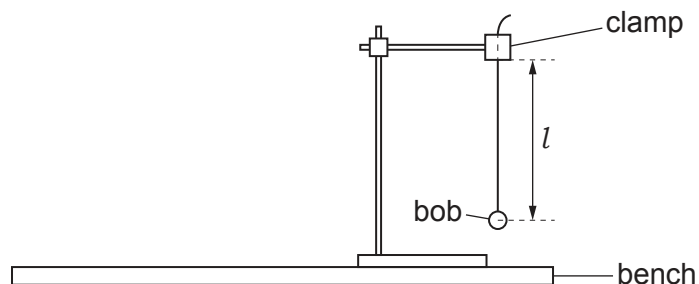


Fig. 5.1

2. Candidates must be able to adjust the length of the pendulum easily up to a length of 82 cm. Retort stands of 82 cm or less in height may be used if the retort stand is reversed so that the pendulum hangs below the level of the bench. The base of the stand would need to be secured with a G-clamp and/or a heavy weight. Supervisors would need to warn candidates of the difference between the diagram in Fig. 5.1 and the set-up of their experiments.

Action at changeover

The pendulum is to be restored to the state described in note 1.

For Question 6

Each candidate will require:

- (i) metre rule with a millimetre scale (see note 1)
- (ii) two clamps, bosses and stands (see notes 1 and 2)
- (iii) thermometer -10°C to 110°C
- (iv) 12V, 24W lamp (e.g. philipharris.co.uk cat. no. B8A56820) mounted in a suitable holder with an appropriate power source
- (v) sight of a clock with a second hand
- (vi) 30 cm ruler, graduated in millimetres.

Notes

1. The metre rule must be clamped with its zero touching the outer edge of the glass envelope of the lamp, as shown in Fig. 6.1.

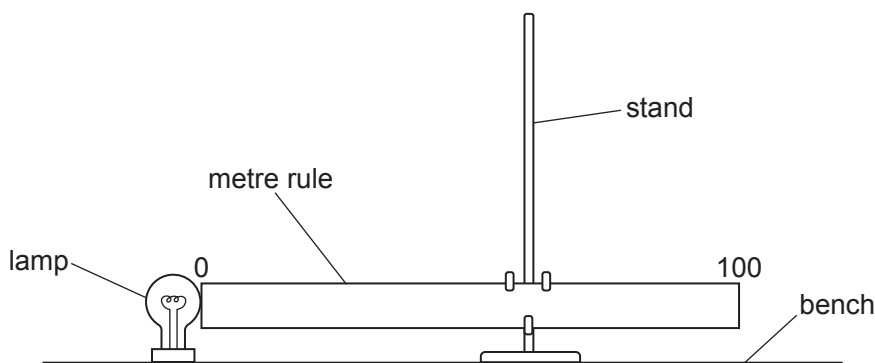


Fig. 6.1

2. The thermometer must be clamped vertically with its bulb at the same height above the bench as the lamp filament.

Action at changeover

Check that the rule and lamp are in the correct positions, as shown in Fig. 6.1, with the lamp switched off.

Adjust the position of the thermometer in the clamp so that it is restored to the vertical position described in note 2.

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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)