Cambridge Assessment International Education

Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/52**

Paper 5 Practical Test **October/November 2024**

CONFIDENTIAL INSTRUCTIONS

9077512616

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.

DC (PQ) 347579

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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'.

Question 1

Each candidate will require:

(i)	4	boiling tubes (approximately 150 mm × 25 mm) and a means to support them
(ii)	20 cm^3	5% yeast suspension labelled **yeast**. See note 1
(iii)	10 cm^3	6% (20 volumes) hydrogen peroxide solution labelled **6% hydrogen peroxide [MH]**. See note 2
(iv)	10 cm^3	4% hydrogen peroxide solution labelled **4% hydrogen peroxide**
(v)	10 cm^3	2% hydrogen peroxide solution labelled **2% hydrogen peroxide**
(vi)	10 cm^3	distilled/deionised water labelled **0% hydrogen peroxide**
(vii)	5	2 cm^3 syringes without needle
(viii)		30 cm ruler graduated in millimetres
(ix)		glass rod
(x)		stop-watch
(xi)		access to paper towels.

Note 1

The yeast and hydrogen peroxide need to be in containers such as small beakers that can be accessed by a syringe.

The yeast suspension can be made by mixing 5 g active dried yeast with 100 cm^3 distilled/deionised water **without** any sugar. It must be made up fresh not more than 60 minutes before the exam and kept at 35–40 °C.

Note 2

The hydrogen peroxide solution must be fresh.

Prior to the examination the supervisor should test that when 2 cm^3 of 6% (20 volumes) hydrogen peroxide solution are added to 2 cm^3 of the warm yeast cell suspension in a boiling tube and left for 2 minutes, the foam produced does not rise above the top of the boiling tube. The hydrogen peroxide concentration may be adjusted accordingly. Candidates must **not** be made aware of any changes to the hydrogen peroxide concentration.

The 4% hydrogen peroxide solution is made by mixing 100 cm^3 of the 6% (20 volumes) hydrogen peroxide solution and 50 cm^3 distilled water.

The 2% hydrogen peroxide solution is made by mixing 50 cm^3 of the 6% hydrogen peroxide solution and 100 cm^3 distilled water.

Question 2

No materials required.

Question 3

Each candidate will require:

(i)	4 spatula loads	copper carbonate powder labelled **copper carbonate [MH][N]**. See note 1
(ii)	4 spatula loads	magnesium carbonate powder labelled **magnesium carbonate [low haz]**. See note 2
(iii)	4 spatula loads	iron(II) carbonate powder labelled **iron(II) carbonate**
(iv)	4 spatula loads	zinc carbonate powder labelled **zinc carbonate [low haz]**
(v)	90 cm^3	limewater labelled **limewater [MH]**
(vi)	5	hard-glass test-tubes (approximately 125 mm × 16 mm)
(vii)	1	means to support the test-tubes. See note 3
(viii)	1	spatula
(ix)	1	test-tube holder to hold the test-tube in a Bunsen flame
(x)	1	delivery tube with stopper to fit the hard-glass test-tube. See note 5
(xi)	1	Bunsen burner and a means to light it
(xii)	1	heatproof mat
(xiii)	1	stop-clock. See note 4
(xiv)		access to paper towels
(xv)		access to water for rinsing test-tube.

Note 1

Basic copper carbonate (copper(II) carbonate hydroxide) is suitable.

Note 2

Basic magnesium carbonate (magnesium carbonate hydroxide) is suitable.

Note 3

The procedure for the candidates refers to a test-tube rack. If something else is used by the centre the candidates need to be advised of the change.

Note 4

The stop-clock can be replaced by a stop-watch but it must read to the nearest second.

Note 5

A delivery tube with stopper is to be provided. It can be made of glass or flexible tubing. See Fig. 3.1.

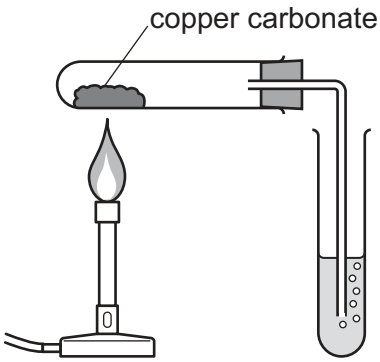

Fig. 3.1

Question 4

Each candidate will require:

(i)	50 cm^3	1 mol dm^{-3} sodium chloride solution labelled **aqueous salt solution**. See note 2
(ii)	1	strip of iron labelled **iron [F]**. See note 1
(iii)	2	strips of copper labelled **copper**. See note 1
(iv)	1	strip of zinc labelled **zinc**. See note 1
(v)	1	strip of magnesium labelled **magnesium [F]**. See note 1
(vi)	1	100 cm^3 beaker
(vii)	1	voltmeter with a minimum resolution of 0.1 V
(viii)	2	leads with a crocodile clip at one end
(ix)		access to paper towels.

Note 1

The strips of metal need to be large/small enough to enable the apparatus shown in Fig. 4.1 to be assembled. Physical labels do not need to be attached but each metal must be clearly identified to the candidates.

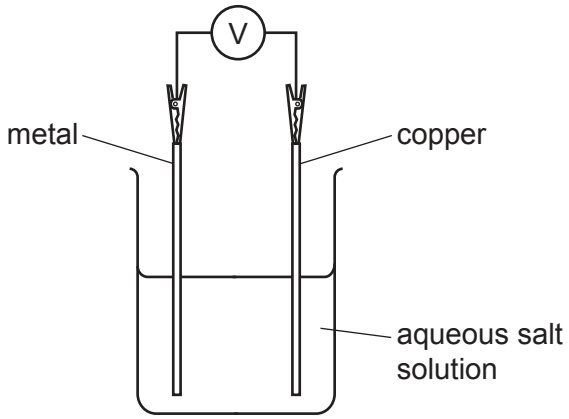

Fig. 4.1

Note 2

1 mol dm^{-3} sodium chloride solution is made by dissolving 58.5 g of sodium chloride in 1 dm^3 of solution.

Question 5

Each candidate will require:

(i)	1	d.c. power supply of approximately 1.5 V to 2 V. See notes 1 and 2
(ii)	1	voltmeter capable of measuring the supply voltage with a resolution of 0.1 V or better. See note 3
(iii)	1	ammeter capable of measuring up to 1.00 A with a resolution of 0.02 A or better. See note 3
(iv)	1	resistor of nominal value 3.3 Ω, labelled R with a power rating of 2 W. See note 4
(v)	1	switch (it may be an integral part of the power supply)
(vi)	1	wooden or plastic metre rule graduated in millimetres
(vii)		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 X and the other end Y
(viii)	1	sliding contact, labelled S. This should be a crocodile clip attached to a lead
(ix)	2	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 as shown in Fig. 5.1.

The circuit shown in Fig. 5.1 must be set up for the candidates.

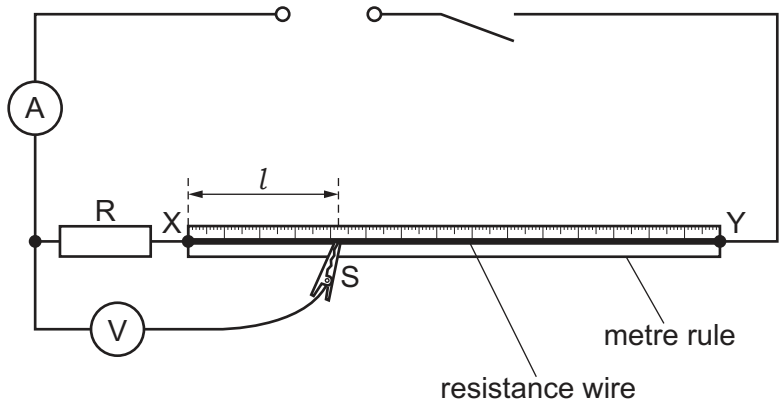

Fig. 5.1

Note 1

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.

Note 2

If dry cells are used, check that they are adequately charged. 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.

Note 4

Suitable resistors can be obtained from RS Components Ltd. Catalogue number RS 683-5629.

Action at changeover

Check that the circuit is still connected correctly, working and switched off.

Question 6

Each candidate will require:

(i) 1 100 cm^3 **dry** measuring cylinder
(ii) 1 **dry** test-tube, approximately 15 mm diameter and 125 mm in length. See note 1
(iii) access to a balance capable of measuring masses up to 200 g to the nearest gram. Each candidate will take three readings
(iv) a supply of water. See note 2.

Note 1

The mass of the test-tube should be no more than 25 g. The test-tube should be able to float approximately upright and not touch the bottom of the measuring cylinder when the measuring cylinder contains approximately 60 cm^3 of water.

Note 2

A supply of 100 cm^3 of water in a beaker is sufficient.

Action at changeover

Remove the test-tube from the measuring cylinder.
Empty the measuring cylinder.
Ensure that the measuring cylinder is **dry**.
Supply a clean, **dry** test-tube.

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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 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) .....