Cambridge Assessment International Education

Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/51**

Paper 5 Practical Test **May/June 2024**

CONFIDENTIAL INSTRUCTIONS

4449077240

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 experiment in Questions 1, 2, 3, 4 and 5 and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

Question 1

Each candidate should be provided with:

hazard	materials and apparatus	quantity per candidate
	freshly cut slice of a citrus fruit, e.g. orange (see note 1)	1
	white tile	1
	30 cm ruler graduated in mm	1

Notes

1. The fruit should be sliced so that the segments are clearly visible as shown in Fig. 1.1.

Fig. 1.1

Question 2

Each candidate should be provided with:

hazard	materials and apparatus	quantity per candidate
[HH] [MH] [N]	0.1% DCPIP labelled **DCPIP** supplied with a dropper (see note 1)	10 cm^3
	white spotting tile	1
	orange juice labelled **orange juice** supplied with a dropper (see note 2)	5 cm^3
	apple or white grape juice labelled **juice F** supplied with a dropper (see note 3)	5 cm^3
	water containing a dissolved vitamin C tablet labelled **juice E** supplied with a dropper (see note 4)	5 cm^3
	water containing a dissolved vitamin C tablet labelled **juice D** supplied with a dropper (see note 5)	5 cm^3
	paper towels	3

Notes

1. The 0.1% DCPIP can be made by dissolving 0.1 g of DCPIP powder in 100 cm^3 of distilled water or can be made from a stock solution diluted accordingly.

2. This can be from freshly squeezed oranges or purchased as juice. The juice should be decanted from any pulp and needs to be clear.

3. Fresh fruit can be squeezed but the juice needs to be clear juice (not cloudy) without pulp.

4. Prior to the examination, one vitamin C tablet should be added to 200 cm^3 of water and fully dissolved.

5. Prior to the examination, one vitamin C tablet should be added to 100 cm^3 of water and fully dissolved.

6. Prior to the examination, using a spotting tile with 2 drops of DCPIP in each of four wells and adding dropwise, test juices **D**, **E**, **F** and **orange juice** ensuring that the DCPIP is decolourised before each well is full and all juices give different results. The concentration of the DCPIP or fruit juice may be adjusted to achieve this.

Question 3

Each candidate should be provided with:

hazard	materials and apparatus	quantity per candidate
[C][MH][N]	1.0 mol dm^{-3} aqueous copper(II) sulfate labelled **1.00 M copper sulfate** (see note 1)	35 cm^3
[C][N]	0.75 mol dm^{-3} aqueous copper(II) sulfate labelled **0.75 M copper sulfate** (see note 1)	35 cm^3
[C][N]	0.5 mol dm^{-3} aqueous copper(II) sulfate labelled **0.50 M copper sulfate** (see note 1)	35 cm^3
[C][N]	0.25 mol dm^{-3} aqueous copper(II) sulfate labelled **0.25 M copper sulfate** (see note 1)	35 cm^3
[F]	magnesium powder	6 spatula loads
	container to hold waste solutions (approximately 500 cm^3 of waste will be generated) labelled **waste** (see note 2)	1
	polystyrene cup	1
	beaker to hold the polystyrene cup	1
	thermometer –10 °C to +110 °C with 1 °C graduations suitable for stirring	1
	25 cm^3 measuring cylinder	1
	spatula	1
	paper towels	5
	access to water for rinsing polystyrene cup	

Notes

1. The aqueous copper sulfate will need to be poured from the container it is supplied in.

2. Each candidate needs their own waste container.

[Turn over

Question 4

Each candidate should be provided with:

hazard	materials and apparatus	quantity per candidate
	1.0 mol dm^{-3} aqueous potassium chloride labelled **H**	20 cm^3
	0.5 mol dm^{-3} aqueous ammonia labelled **aqueous ammonia**	6 cm^3
[MH]	0.4 mol dm^{-3} aqueous sodium hydroxide labelled **aqueous sodium hydroxide**	6 cm^3
[C]	access to 1.0 mol dm^{-3} nitric acid labelled **dilute nitric acid** (see note 1)	
	access to 0.1 mol dm^{-3} aqueous barium nitrate labelled **aqueous barium nitrate**, supplied in a bottle with a dropper or with a dropping pipette (see note 1)	
	access to 0.05 mol dm^{-3} aqueous silver nitrate labelled **aqueous silver nitrate**, supplied in a dark bottle with a dropper (see note 1)	
	test-tubes (approximately 125 mm × 16 mm)	5
	means to support test-tubes	1
	wooden splints	2
	Bunsen burner and a means to light it	1
	laboratory mat	1
	paper towels	3

Notes

1. Each candidate will need to use approximately 3 cm^3 of dilute nitric acid, 1 cm^3 of aqueous barium nitrate and a few drops of aqueous silver nitrate. If these reagents are shared, no more than 4 candidates should share each sample.

Question 5

Each candidate should be provided with:

hazard	materials and apparatus	quantity per candidate
	d.c. power source of approximately 2 V to 3 V (see notes 2 and 3)	1
	2.5 V, 0.2 A lamp, or similar, in a suitable holder	1
	voltmeter capable of measuring the supply voltage with a minimum precision of 0.1 V (see note 4)	1
	ammeter capable of reading up to 1.00 A with a minimum precision of 0.02 A (see note 4)	1
	switch. The switch may be an integral part of the power supply	1
	wooden or plastic metre rule graduated in millimetres	1
	approximately 105 cm of straight, bare constantan wire of diameter 0.31 mm (30 swg), taped to the metre rule at two places (between the zero and 5.0 cm mark and between the 95.0 and 100.0 cm mark). The zero end of the wire is to be labelled **P** and the other end is to be labelled **Q**	1
	suitable terminal (e.g. a crocodile clip) attached to the constantan wire at end **P** of the metre rule, so that a connecting lead can be attached to the resistance wire	1
	sliding contact labelled **S**. This may be a crocodile clip connected to a lead	1

Notes

1. The circuit shown in Fig. 5.1 is to be set up for candidates by the supervisor. The switch must be left open.

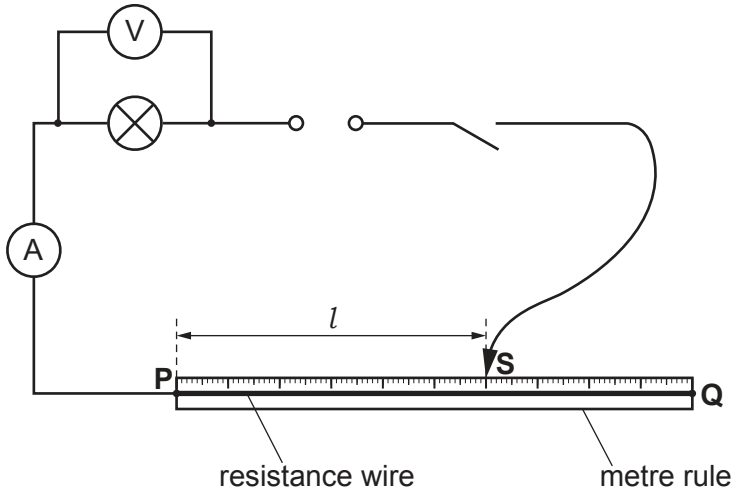

Fig. 5.1

2. 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).

3. If dry cells are used, check that they are adequately charged. Spare cells should be available.

4. 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, working and switched off.

Question 6

No apparatus or materials are required for Question 6.

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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) .....