Cambridge Assessment International Education

Cambridge O Level

CHEMISTRY **5070/31**

Paper 3 Practical Test **May/June 2025**

CONFIDENTIAL INSTRUCTIONS

6229489167

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 and 2 and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

Apparatus

The apparatus listed must be provided to each candidate.

Question 1

1 × 250 cm^3 beaker
1 × 100 cm^3 measuring cylinder
1 × stirring rod
1 × marker suitable for labelling glassware
1 × 25 cm^3 volumetric pipette
1 × pipette filler
1 × 50 cm^3 burette
1 × stand
1 × burette clamp
1 × funnel for filling burette
1 × white tile
1 × conical flask or other suitable vessel for titration
1 × teat/dropping pipette
access to distilled water

Question 2

6 × test-tubes
1 × stopper to fit test-tubes
1 × test-tube rack
1 × test-tube holder (suitable for holding a boiling tube)
2 × boiling tubes
1 × wash bottle containing distilled water
1 × Bunsen burner
1 × heat-proof mat
a supply of teat/dropping pipettes
1 × beaker (for washing teat/dropping pipettes)
paper towels
red and blue litmus papers
wooden splints
apparatus normally used in the centre to test for carbon dioxide with limewater*
apparatus normally used in the centre for flame tests

*If the apparatus normally used in the centre is a delivery tube and stopper, this equipment should be provided to fit both test-tubes and boiling tubes.

Candidates are expected to rinse and reuse test-tubes and boiling tubes where necessary.
Additional tubes should be available.

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Materials

The materials listed in the table must be provided to each candidate. An excess of at least 10% of each material must be prepared to cover accidental loss.

N.B. Small amounts of Cl_2 **[O] [T] [N]**, which can cause respiratory distress in some people, may be produced. **The laboratory must be well ventilated.**

label		per candidate	identity	notes
Question 1				
	A	1.0 g	1.0 g of calcium carbonate powder	The powder should be weighed and placed in a suitable container such as a weighing bottle. It must not be provided in a 250 cm^3 beaker.
	0.250 mol/dm^3 hydrochloric acid	120 cm^3	0.250 mol/dm^3 hydrochloric acid	Dilute 21 cm^3 of concentrated (35–37%; approximately 11 mol/dm^3) HC*l* **[C] [MH]** to 1 dm^3. Candidates should be provided with sufficient acid to measure 100 cm^3 using a measuring cylinder.
	0.100 mol/dm^3 sodium hydroxide	100 cm^3	0.100 mol/dm^3 sodium hydroxide	Dissolve 4.0 g of NaOH **[C]** in each dm^3 of solution. **Care:** the process of solution is exothermic and any concentrated solution is very corrosive.
[C] [F] [HH] [MH] [N] [T]	methyl orange indicator	2 cm^3	methyl orange indicator	See preparation instructions in the 2023–25 syllabus.
Supervisors are asked to carry out a standard acid–base titration using methyl orange indicator and 10.0 cm^3 of the 0.250 mol/dm^3 hydrochloric acid against the 0.100 mol/dm^3 sodium hydroxide solution to ensure that the concentrations of the two solutions fall within the required range. It is essential that 10.0 cm^3 of 0.250 mol/dm^3 hydrochloric acid reacts with between 24 and 26 cm^3 of the 0.100 mol/dm^3 sodium hydroxide.				
Question 2				
	W	15 cm^3	1 mol/dm^3 aqueous potassium iodide	Dissolve 16.6 g of potassium iodide in each 100 cm^3 of solution.
[O] [MH] [N]	**X**	15 cm^3	1 mol/dm^3 aqueous zinc nitrate	Dissolve 29.8 g of hydrated zinc nitrate, $Zn(NO_3)_2 \cdot 6H_2O$ **[O] [MH] [N]**, in each 100 cm^3 of solution.
[MH] [N]	aqueous chlorine	10 cm^3	aqueous chlorine	This should be prepared shortly before the start of the practical session. In a fume cupboard, place 10 cm^3 of 10–14% w/v available chlorine sodium chlorate(I), NaC*l*O, in a beaker. Add 80 cm^3 of distilled water and 10 cm^3 of 2 mol/dm^3 hydrochloric acid. Stir to ensure even mixing. The solution should either be placed at a central location, preferably in a fume cupboard if available, and candidates collect their sample when they are ready to use it, or individual samples should be provided in a stoppered container, e.g. test-tube with a stopper.

label		per candidate	identity	notes
	aluminium foil	1 cm × 2 cm piece		Additional pieces should be available for candidates who need to repeat a test.
	starch solution	10 cm^3	1% starch solution	Mix 1 g of soluble starch with a little cold water until a smooth paste is obtained. Add 100 cm^3 of boiling water and stir. Boil until a clear solution is obtained (about 5 minutes).
[C] [MH]	aqueous iron(III) nitrate	10 cm^3	0.3 mol/dm^3 $Fe(NO_3)_3$	Dissolve 12.1 g of hydrated iron nitrate, $Fe(NO_3)_3 \cdot 9H_2O$ **[MH] [O]**, in each 100 cm^3 of solution made with 1 mol/dm^3 nitric acid, HNO_3 **[C]**.
[C]	dilute nitric acid	10 cm^3	1.0 mol/dm^3 HNO_3	See preparation instructions in the 2023–25 syllabus. If necessary, each of these reagents can be provided as a communal supply for groups of up to 6 candidates. Invigilators must be alert to the risk of contamination and the opportunity for malpractice when using a communal supply.
[MH]	dilute sulfuric acid	10 cm^3	0.5 mol/dm^3 H_2SO_4	
[MH] [N]	aqueous ammonia	10 cm^3	1.0 mol/dm^3 NH_3	
[C]	aqueous sodium hydroxide	25 cm^3	1.0 mol/dm^3 NaOH	
	aqueous barium nitrate	10 cm^3	0.1 mol/dm^3 $Ba(NO_3)_2$	
	aqueous silver nitrate	5 cm^3	0.05 mol/dm^3 $AgNO_3$	
[MH]	limewater	10 cm^3	saturated aqueous calcium hydroxide, $Ca(OH)_2$	

- All solutions must be thoroughly mixed.
- If you are unable to source any of these chemicals, you must contact Cambridge International as far as possible in advance of the exam for advice.
- Materials must be labelled only as specified in the 'label' column. The identities of chemicals labelled with letter codes, e.g. **P**, may be different from their descriptions in the question paper. Candidates must use the descriptions given in the question paper.
- If chemicals are prepared in more than one batch, clearly labelled supervisor's results **must** be provided for each batch. The candidates using each batch must be listed on the supervisor's report.

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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.

If chemicals have been prepared in more than one batch, list the candidates using each batch. Supervisor's results must be prepared and submitted using each batch of chemicals.

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) .....