



# Cambridge International AS & A Level

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**CHEMISTRY**

**9701/03**

Paper 3 Advanced Practical Skills

**For examination from 2020**

SPECIMEN 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.**

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**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](mailto:info@cambridgeinternational.org)  
phone +44 1223 553554

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This document has **10** pages. 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:

<b>C</b>	corrosive	<b>MH</b>	moderate hazard
<b>HH</b>	health hazard	<b>T</b>	acutely toxic
<b>F</b>	flammable	<b>O</b>	oxidising
<b>N</b>	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

### Before the exam

#### 1 Preparation of materials

Where quantities are specified for each candidate, they are sufficient for the experiments described in the Question Paper to be completed.

In preparing materials, **the bulk quantity for each substance should be increased by 25%** as spare material should be available to cover accidental loss. More material may be supplied if requested by candidates, without penalty.

All solutions should be bulked and mixed thoroughly before use to ensure uniformity.

Every effort should be made to keep the concentrations accurate.

If the concentrations differ slightly from those specified, the Examiners will make the necessary allowance. They should be informed of the exact concentrations.

#### 2 Labelling of materials

Materials must be labelled as specified in these Confidential Instructions. Materials with an **FA** code number should be so labelled **without** the identities being included on the label. Where appropriate the identity of an **FA** coded chemical is given in the Question Paper itself.

#### 3 Identity of materials

It should be noted that descriptions of materials given in the Question Paper may not correspond with the specifications in these Confidential Instructions. **The candidates must assume the descriptions given in the Question Paper.**

#### 4 Size of group

In view of the difficulty of the preparation of large quantities of solution of uniform concentration, it is recommended that the maximum number of candidates per group be 30 and that separate supplies of solutions be prepared for each group.

## Apparatus

1 In addition to the fittings ordinarily contained in a chemical laboratory, the apparatus and materials specified below will be necessary.

2 Pipette fillers (or equivalent safety devices), suitable eye protection and disposable gloves should be used where necessary.

3 *For each candidate*

- 1 × 25 cm<sup>3</sup> pipette
- 1 × 50 cm<sup>3</sup> burette
- 2 × 150 cm<sup>3</sup> or 250 cm<sup>3</sup> conical flask
- 1 × 250 cm<sup>3</sup> volumetric (graduated) flask
- 1 × 250 cm<sup>3</sup> beaker
- 1 × burette stand and clamp
- 1 × funnel (for filling burette)
- 1 × white tile
- 1 × spatula
- 2 × teat/dropping pipette
- 1 × glass rod
- 1 × crucible with lid, capacity approximately 15 cm<sup>3</sup>
- 1 × crucible tongs
- 1 × heatproof mat
- 1 × tripod
- 1 × Bunsen burner
- 1 × pipe-clay triangle
- 1 × boiling tube
- 8 × test-tube\*
- 1 × test-tube rack
- 1 × test-tube holder
- 1 × wash bottle containing distilled water
- 1 × marker pen (suitable for labelling glassware)
- stop clock or sight of a clock
- paper towels
- access to a balance weighing to at least 0.1 g

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

**Where balance provision is limited, some candidates should be instructed to start the exam with different questions. See the current syllabus for balance : candidate**

## Chemicals required

- 1 It is **especially important** that great care is taken that the confidential information given below does **not** reach the candidates either directly or indirectly.
- 2 It should be noted that descriptions of substances given in the Question Paper may not correspond with the specifications in these Confidential Instructions.

### 3 Particular requirements

hazard	label	per candidate	identity	notes (hazards given in this column are for the raw materials)
	<b>FA 1</b>	150 cm <sup>3</sup>	0.0500 mol dm <sup>-3</sup> sulfuric acid	Dilute 50.0 cm <sup>3</sup> of 1.00 mol dm <sup>-3</sup> sulfuric acid <b>[MH]</b> to 1.00 dm <sup>3</sup> with distilled water. Prepare 1.00 mol dm <sup>-3</sup> sulfuric acid <b>[MH]</b> according to instructions in the current syllabus.
	<b>FA 2</b>	2.0–2.1 g	baking soda (impure sodium hydrogencarbonate)	Grind together with a pestle and mortar, 95.0 g of sodium hydrogencarbonate, NaHCO <sub>3</sub> , and 5.0 g of sodium chloride, NaCl, to ensure thorough mixing. Provide 2.0–2.1 g of this mixture in a stoppered container. (Note: <b>FA 4</b> is the same mixture as <b>FA 2</b> .)
	<b>FA 4</b>	2.0–2.1 g	baking soda (impure sodium hydrogencarbonate)	See instructions for <b>FA 2</b> .
	<b>FA 6</b>	20 cm <sup>3</sup>	0.2 mol dm <sup>-3</sup> manganese(II) chloride	Dissolve 39.6 g of manganese(II) chloride, MnCl <sub>2</sub> ·4H <sub>2</sub> O <b>[MH]</b> , in 1.00 dm <sup>3</sup> of solution. Provide 20 cm <sup>3</sup> in a stoppered bottle.
	<b>FA 7</b>	20 cm <sup>3</sup>	0.2 mol dm <sup>-3</sup> aluminium sulfate	Dissolve 126.1 g of aluminium sulfate, Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> ·16H <sub>2</sub> O, in 1.00 dm <sup>3</sup> of solution. Provide 20 cm <sup>3</sup> in a stoppered bottle.
<b>[F]</b> <b>[MH]</b> <b>[HH]</b>	<b>methyl orange</b>	10 cm <sup>3</sup>	methyl orange	See preparation instructions in the current syllabus.
<b>[MH]</b>	<b>sodium carbonate</b>	1.0–1.1 g	sodium carbonate	1.0–1.1 g of sodium carbonate, Na <sub>2</sub> CO <sub>3</sub> , <b>[MH]</b> or Na <sub>2</sub> CO <sub>3</sub> ·10H <sub>2</sub> O <b>[MH]</b> in a stoppered container.
	<b>distilled water</b>		distilled water	At least 300 cm <sup>3</sup> per candidate will be required.

4 The reagents below should also be provided. Unless otherwise stated, each candidate should require no more than 10 cm<sup>3</sup> of any of these reagents. If necessary, they may be made available from a communal supply; however, the attention of the Invigilators should be drawn to the fact that such an arrangement may lead to contamination of reagents and enhance the opportunity for malpractice between candidates.

hazard	label	notes
	<b>dilute hydrochloric acid</b>	
[C]	<b>dilute nitric acid</b>	
[MH]	<b>dilute sulfuric acid</b>	
[C] [MH] [N]	<b>aqueous ammonia</b>	
[C]	<b>aqueous sodium hydroxide</b>	
	<b>0.1 mol dm<sup>-3</sup> barium chloride</b> Or <b>0.1 mol dm<sup>-3</sup> barium nitrate</b>	
[N]	<b>0.05 mol dm<sup>-3</sup> silver nitrate</b>	
[MH]	<b>limewater</b>	
[MH]	<b>aqueous acidified potassium manganate(VII)</b>	

**See identity details and preparation instructions in the current syllabus**

5 The following materials and apparatus should be available.

red and blue litmus papers, aluminium foil for testing nitrate/nitrite, wooden splints and the apparatus normally used in the centre for use with limewater in testing for carbon dioxide

### Responsibilities of the Supervisor during the exam

- 1 The Supervisor, or other competent chemist, **must, out of sight of the candidates, carry out the experiments in Question 1 and Question 2** and complete tables of readings on a spare copy of the Question Paper. This should be labelled 'Supervisor's Results' and show the centre number and appropriate session / laboratory number.

This should be done for **each session** held and **each laboratory** used in that session, and **each batch** of solutions supplied.

**N.B. The Question Paper front cover requests the candidate to fill in details of the exam session and the laboratory used for the exam.**

**It is essential that each packet of scripts contains a copy of the applicable Supervisor's Results as the candidates' work cannot be assessed accurately without such information.**

- 2 The Supervisor must complete the Supervisor's Report on page 7 to show which candidates attended each session. If all candidates took the exam in one session, please indicate this on the Supervisor's Report. A copy of the Supervisor's Report must accompany each copy of the Supervisor's Results in order for the candidates' work to be assessed accurately.

The Supervisor must give details on page 8 of any particular difficulties experienced by a candidate, especially if the Examiner would be unable to discover this from the written answers.

### After the exam

Each envelope returned to Cambridge International must contain the following items.

- 1 The scripts of those candidates specified on the barcode label provided.
- 2 A copy of the Supervisor's Results relevant to the candidates in 1.
- 3 A copy of the Supervisor's Report, including details of any difficulties experienced by candidates (see pages 7 and 8).
- 4 The Attendance Register.
- 5 A Seating Plan for each session / laboratory.

Failure to provide appropriate documentation in each envelope may cause candidates to be penalised.

### Colour blindness

With regard to colour blindness it is permissible to advise candidates who request assistance on colours of, for example, precipitates and solutions (especially titration end-points). Please include with the scripts a note of the candidate numbers of such candidates.

Experience suggests that candidates who are red / green colour-blind – the most common form – do not generally have significant difficulty. Reporting such cases with the scripts removes the need for a Special Consideration Form.

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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.

The candidate numbers of candidates attending each session were:

*first session*

*second session*



**Declaration**

- 1 Each packet that I am returning to Cambridge International contains 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) .....