Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CHEMISTRY **9701/03**

Paper 3 Advanced Practical Skills **For Examination from 2016**

SPECIMEN CONFIDENTIAL INSTRUCTIONS

Great care should be taken to ensure that any confidential information given does not reach the candidates either directly or indirectly.

No access to the Question Paper is permitted in advance of the examination.

The Supervisor's attention is drawn to the form on page 7 which must be completed and returned with the scripts.

If you have any problems or queries regarding these instructions, please contact CIE
by e-mail: info@cie.org.uk
by phone: +44 1223 553554
by fax: +44 1223 553558
stating the Centre number, the nature of the query and the syllabus number quoted above.

This document consists of **8** printed pages.

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Safety

Supervisors are advised to remind candidates that all substances in the examination should be treated with caution.
Only those tests described in the question paper should be attempted. Please also see under 'Apparatus' on the use of pipette fillers, safety goggles and plastic gloves.

In accordance with COSHH (Control of Substances Hazardous to Health) Regulations, operative in the UK, a hazard appraisal of the examination has been carried out.

Attention is drawn in particular, to certain materials used in the examination. The following codes are used where relevant.

C	corrosive substance	**F**	highly flammable substance
H	harmful or irritating substance	**O**	oxidising substance
T	toxic substance	**N**	dangerous for the environment

The attention of Supervisors is drawn to any local regulations relating to safety and first-aid.

'Hazard Data Sheets', relating to materials used in this examination, should be available from your chemical supplier.

Before the Examination

1 Access to the question paper is NOT permitted in advance of the examination.

2 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 to within one part in two hundred of those specified.

Supervisors are asked to carry out any confirmatory tests given on pages 4 and 5 to ensure the materials supplied are appropriate.

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

3 Labelling of materials

Materials must be labelled as specified in these 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.

4 Identity of materials

It should be noted that descriptions of solutions given in the question paper may not correspond exactly with the specifications in these Instructions. **The candidates must assume the descriptions given in the question paper.**

5 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), safety goggles and disposable plastic gloves should be used where necessary.

3 *For each candidate*

1 × 25 cm^3 measuring cylinder
1 × 250 cm^3 plastic or glass measuring cylinder
1 × stand, clamp and boss
1 × single-hole rubber bung, of correct size for a conical flask, fitted with glass tube and additional tubing (glass, plastic or rubber) to act as a delivery tube, at least 25 cm long
1 × trough for containing water (to a depth of about 8 cm) (*1 litre ice cream tub or similar is suitable*)
1 × 50 cm^3 burette
1 × burette stand and clamp
1 × 25 cm^3 pipette
1 × 250 cm^3 volumetric (graduated) flask
1 × funnel (for filling burette)
2 × 150 cm^3 or 250 cm^3 conical flask**
1 × white tile
1 × glass rod
6 × test-tube*
1 × test-tube rack
2 × teat/dropping pipette
1 × wash bottle containing distilled water
1 × stop clock (stop watch) or sight of a clock with a second hand display
paper towels

access to a balance weighing to at least 0.1 g

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

** Candidates are expected to rinse and re-use the conical flask used in Question 1. However, a side-arm conical flask may be provided for Question 1 in addition to the 2 conical flasks. In this case a bung with no hole should be provided for the side-arm conical flask and the delivery tube should attach to the side arm.

If the provision of balances and/or 250 cm^3 measuring cylinders is limited then some candidates should be instructed to start the paper with a different question.

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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 Particular requirements

hazard	label	per candidate	identity	notes (hazards given in this column are for the raw materials)
	FA 1	1.0 g **small** marble chips	calcium carbonate	Provide 1.0 ± 0.1 g of $CaCO_3$ as small marble chips (diameter 4–6 mm or < 9 mm) in a stoppered container.
[H]	**FA 2**	50 cm^3	2.00 mol dm^{-3} hydrochloric acid	See preparation instructions on pages **56** and **57** of the 2016 syllabus.
	methyl orange	2 cm^3	methyl orange indicator	See preparation instructions on pages **56** and **57** of the 2016 syllabus.
[H]	**FA 3**	150 cm^3	0.080 mol dm^{-3} sodium hydroxide	Dissolve 3.2 g of NaOH **[C]** in each dm^3 of solution.
	FA 5	20 cm^3	0.1 mol dm^{-3} copper(II) sulfate and 0.2 mol dm^{-3} sodium nitrite	Dissolve approximately 25.0 g of $CuSO_4.5H_2O$ **[H][N]** and 14.0 g of $NaNO_2$ **[T][N][O]** in each dm^3 of solution.
	distilled water	≥ 250 cm^3	distilled water	distilled or deionised water

3 The reagents below should also be provided. Unless otherwise stated, each candidate should require no more than 10 cm^3 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
[H]	**dilute hydrochloric acid**	**See identity details and preparation instructions on pages 56 and 57 of the 2016 syllabus**
[C]	**dilute nitric acid**	
[H]	**dilute sulfuric acid**	
	aqueous ammonia	
[C]	**aqueous sodium hydroxide**	
[H]	**0.1 mol dm^{-3} barium chloride or 0.1 mol dm^{-3} barium nitrate**	
	0.05 mol dm^{-3} silver nitrate	
[H]	**limewater**	
	0.1 mol dm^{-3} potassium iodide	
	0.02 mol dm^{-3} potassium manganate(VII)	
	starch indicator	
[H]	**acidified aqueous potassium manganate**	Mix equal volumes of 0.02 mol dm^{-3} $KMnO_4$ **[N]** and 1.0 mol dm^{-3} sulfuric acid **[H]**.

4 The following materials and apparatus to test the gases listed in the syllabus must be available to candidates.

red and blue litmus paper, plain filter paper strips for use with acidified manganate(VII), aluminium foil for testing for nitrate/nitrite, wooden splints, the apparatus normally used in the Centre for use with limewater in testing for carbon dioxide

Responsibilities of the Supervisor during the Examination

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 which should be labelled 'Supervisor's Results'.

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 cover requests the candidate to fill in details of the examination session and the laboratory used for the examination.

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 Report Form on page 7 to show which candidates attended each session. If all candidates took the examination in one session, please indicate this on the Report Form. A copy of the Report Form 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 Examination

Each envelope returned to Cambridge must contain the following items.

1 The scripts of those candidates specified on the bar code label provided.

2 A copy of the Supervisor's Report relevant to the candidates in **1**.

3 A copy of the Report Form, 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' application.

REPORT FORM

This form must be completed and sent to the Examiner in the envelope with the scripts.

Centre number …… Name of Centre ……

1 Supervisor's Results

Please submit details of the readings obtained in **Question 1** and **Question 2** on a spare copy of the question paper clearly marked 'Supervisor's Results' **and showing the Centre number and appropriate session/laboratory number**.

2 The candidate numbers of candidates attending each session were:

First Session	*Second Session*

3 The Supervisor is required to give details overleaf of any difficulties experienced by particular candidates, giving names and candidate numbers. These should include reference to:

(a) any general difficulties encountered in making preparation;

(b) difficulties due to faulty apparatus or materials;

(c) accidents to apparatus or materials;

(d) assistance with respect to colour-blindness.

Other cases of hardship, e.g. illness, temporary disability, should be reported direct to CIE on the normal 'Application for Special Consideration' form.

4 A plan of work benches, giving details by candidate numbers of the places occupied by the candidates for each experiment for each session, must be enclosed with the scripts.

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Report on any difficulties experienced by candidates.