UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CHEMISTRY **5070/03**

Paper 3 Practical Test **May/June 2008**

CONFIDENTIAL INSTRUCTIONS

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

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: International@cie.org.uk,
by phone: +44 1223 553554,
by fax: +44 1223 553558,
stating the nature of the query and the syllabus number quoted above.

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

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 and safety goggles.

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, first-aid and disposal of chemicals.

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

Preparing 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 50 of those specified.

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

3 Labelling of materials

Materials must be labelled as specified in these instructions. Materials with a letter code (e.g. **P**, **Q**) should be so labelled, **without** the identities being included on the label – where appropriate, the identity of a letter-coded chemical is given in the question paper itself.

4 Identity of materials

It should also 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) and safety goggles should be used where necessary.

3 *For each candidate*

1 × 50 cm^3 burette
1 × burette clamp
1 × stand
1 × funnel for filling burette
1 × white tile
1 × 20 cm^3 or 25 cm^3 pipette
(It is essential that all candidates at a Centre have pipettes of the same capacity.)
1 × pipette filler (or equivalent safety device)
1 × flask or other suitable vessel for titration
a supply of test-tubes
1 × test-tube rack
1 × stirring rod

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
[H]	**P**	150 cm^3	0.05 mol/dm^3 sulphuric acid	
[H]	**Q**	150 cm^3	0.10 mol/dm^3 sodium hydroxide	4.0 g/dm^3 sodium hydroxide **[C]**
			methyl orange or screened methyl orange indicator	
Supervisors are asked to carry out a standard acid/base titration between solutions **P** and **Q** to ensure that the concentrations of the two solutions fall within the given range. It is **essential** that 25.0 cm^3 of **Q** reacts with between 23.0 cm^3 and 27.0 cm^3 of **P** (or 20.0 cm^3 of **Q** reacts with between 18.0 cm^3 and 22.0 cm^3 of **P**).				
[H]	**S**	30 cm^3	approximately 0.2 mol/dm^3 iron(III) chloride	50 g of hydrated iron(III) chloride, $FeCl_3.6H_2O$ **[H]**, in 1 dm^3 aqueous sodium chloride containing 10 g/dm^3 NaCl
[H] [N]	**T**	30 cm^3	approximately 0.2 mol/dm^3 copper(II) sulphate	50 g of hydrated copper(II) sulphate, $CuSO_4.5H_2O$ **[H] [N]**, dissolved in 1 dm^3 of distilled water *A small volume of dilute sulphuric acid should be added to the solution to prevent hydrolysis. (10 cm^3 of 0.5 mol/dm^3 sulphuric acid per 1.0 dm^3 of solution should be sufficient.)*
[H]	**U**	30 cm^3	approximately 0.35 mol/dm^3 nickel(II) sulphate	100 g of hydrated nickel(II) sulphate, $NiSO_4.7H_2O$ **[H]**, dissolved in 1 dm^3 of distilled water *A small volume of dilute sulphuric acid should be added to the solution to prevent hydrolysis. (10 cm^3 of 0.5 mol/dm^3 sulphuric acid* **[H]** *per 1.0 dm^3 of solution should be sufficient.)*

3 The standard bench reagents specifically required are set out below. 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 enhance the opportunity for malpractice between candidates.

hazard	label	identity	notes
[T] [N]	**aqueous lead(II) nitrate**	0.2 mol/dm^3 lead(II) nitrate	66 g/dm^3 lead(II) nitrate **[T] [N]**
[C] [N]	**aqueous silver nitrate**	0.05 mol/dm^3 silver nitrate	
[T]	**aqueous barium nitrate**	0.2 mol/dm^3 barium nitrate	0.2 mol/dm^3 barium chloride **[T]** (labelled barium nitrate) may be used as an alternative.
[C]	**aqueous sodium hydroxide**	1.0 mol/dm^3 sodium hydroxide	
[H]	**aqueous ammonia**	1.0 mol/dm^3 ammonia	
	aqueous potassium iodide	0.2 mol/dm^3 potassium iodide	

4 The reagents, materials and apparatus to test the gases listed in the syllabus must be available to candidates. 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 enhance the opportunity for malpractice between candidates.

hazard	label	identity	notes
[C]	**limewater**	saturated aqueous calcium hydroxide, $Ca(OH)_2$	Prepare fresh limewater by leaving distilled water to stand over solid calcium hydroxide **[C]** for several days, shaking occasionally. Decant or filter the solution.
[T] [N]	**aqueous potassium dichromate(VI)**	0.10 mol/dm^3 $K_2Cr_2O_7$	Dissolve 29.5 g of $K_2Cr_2O_7$ **[T] [N]** in each dm^3 of solution which should contain about 10% of dilute (1.0 mol/dm^3) sulphuric acid. *The use of plastic gloves may be considered to prevent contact with skin.*
		red and blue litmus paper or universal indicator paper plain filter paper strips for use with aqueous potassium dichromate (VI) wooden splints the apparatus normally used in the Centre for use with limewater in testing for carbon dioxide	

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During the Examination

1 The Supervisor, or other competent chemist **must carry out the experiments in question 1 and question 2** and record the results 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 set of solutions supplied.

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 – a minor handicap, relatively common in males – 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 for this handicap.

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

Supervisors are asked to use a spare copy of the question paper to report their results for **Q.1 and Q.2** and enclose this copy of the question paper with the candidate's answers. This copy of the question paper should be clearly labelled 'Supervisor's Results'. Failure to enclose these results and this report form may lead to candidates being unavoidably penalised.

If candidates from more than one Centre are taking the examination, it is essential that a copy of the 'Supervisor's Results' should be sent with the scripts from **each Centre**.

2 The candidate numbers of candidates attending each session were:

First session	*Second session*

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3 The Supervisor is invited to report details of any difficulties experienced by particular candidates, giving names and candidate numbers. This report 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.

NAME OF CENTRE .....

SIGNED .....
Supervisor

CENTRE NUMBER .....

If the candidates' Centre number is different from the number of the Centre at which the examination was taken, the Supervisor should write **both Centre numbers in the space provided.**

DECLARATION (to be signed by the Principal).

The preparation of this Practical examination has been carried out so as to maintain fully the security of the examination.

SIGNED .....

NAME (in block capitals) .....