

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**CHEMISTRY**

**5070/03**

Paper 3 Practical Test

CONFIDENTIAL INSTRUCTIONS

May/June 2006

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

**READ THESE INSTRUCTIONS FIRST**

Teachers responsible for the examination are **NOT** allowed to consult the question paper before the day of the examination. However, they are asked to carry out any tests specified in these instructions.

On the day of the examination, the Supervisor is asked to perform the experiments in **Questions 1 and 2** and to record the results on a spare copy of the question paper clearly labelled "Supervisor's Results", followed by the number of the Centre. **This must be enclosed with the scripts. Unless this is done candidates may be unavoidably penalised.**

**It is essential that candidates accept the descriptions of the solutions as they appear in the question paper.**

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 for each Centre.

Supervisors are advised to remind candidates that all substances in the examination should be treated with caution. Please also see under 'General 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

Hazard data sheets should be available from your suppliers.

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 **5** printed pages and **3** blank pages.



## INSTRUCTIONS TO SUPERVISORS

## For Question 1

Each candidate will require the following.

- (a) A solution of  $0.0166 \text{ mol/dm}^3$  aqueous sodium iodate(V),  $\text{NaIO}_3$ , (3.3 g of  $\text{NaIO}_3$  dissolved in  $1 \text{ dm}^3$  of distilled water), labelled **P**. If sodium iodate(V) is not available **P** may be prepared using potassium iodate(V), (3.6 g of  $\text{KIO}_3$  dissolved in  $1 \text{ dm}^3$  of distilled water).

Allow each candidate approximately  $150 \text{ cm}^3$ .

- (b) A solution of  $0.10 \text{ mol/dm}^3$  sodium thiosulphate (24.8 g of  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$  dissolved in  $1 \text{ dm}^3$  of distilled water), labelled **Q**.

Allow each candidate approximately  $150 \text{ cm}^3$ .

- (c) A freshly prepared solution of approximately  $0.5 \text{ mol/dm}^3$  potassium iodide (84.0 g of KI dissolved in  $1 \text{ dm}^3$  of distilled water), labelled 'aqueous potassium iodide'.

Allow each candidate approximately  $100 \text{ cm}^3$ .

- (d) 2% aqueous starch.

[This reagent may be made as follows. Mix 2 g of soluble starch with a little cold water until a firm paste is obtained. Add  $100 \text{ cm}^3$  of boiling water and stir. Boil until a clear solution is obtained (about 5 min.) **This solution should be freshly prepared.**]

Allow each candidate approximately  $10 \text{ cm}^3$ .

- [H] (e) Access to  $1.0 \text{ mol/dm}^3$  sulphuric acid.

Allow each candidate approximately  $100 \text{ cm}^3$ .

Pipette a  $25.0 \text{ cm}^3$  (or  $20.0 \text{ cm}^3$ ) portion of **P** into a flask and add about a test-tubeful of dilute sulphuric acid followed by about a test-tubeful of aqueous potassium iodide (see (c) above). The solution should turn red-brown. Do **not** add the starch indicator at this stage.

Add **Q** from the burette until the red-brown colour fades to pale yellow, **then** add a few drops of the starch indicator. This will give a dark blue solution. Continue adding **Q** slowly from the burette until one drop of **Q** causes the blue colour to disappear, leaving a colourless solution.

**Note:** Some variation in the above concentrations is acceptable but it is **essential** that  $25.0 \text{ cm}^3$  of **P** reacts with between  $24.0 \text{ cm}^3$  and  $26.0 \text{ cm}^3$  of **Q** (or  $20.0 \text{ cm}^3$  of **P** reacts with between  $19.0 \text{ cm}^3$  and  $21.0 \text{ cm}^3$  of **Q**.)

The following apparatus should be provided for each candidate:

- a  $50 \text{ cm}^3$  burette,
- a  $25 \text{ cm}^3$  (or  $20 \text{ cm}^3$ ) pipette,
- a flask or other suitable vessel for titration,
- two test tubes,
- a teat (squeeze) pipette.

**All candidates at a Centre should have pipettes of the same capacity.**

**For Question 2**

Each candidate will require the following.

**[H]** (a) Manganese(IV) oxide, labelled **R**.

Allow each candidate approximately 0.5 g.

**[H]** (b) A solution of  $0.20 \text{ mol/dm}^3$  manganese(II) sulphate ( $45.0 \text{ g MnSO}_4 \cdot 4\text{H}_2\text{O}$  dissolved in  $1 \text{ dm}^3$  of distilled water) labelled **S**.

Allow each candidate approximately  $30 \text{ cm}^3$ .

(c) Access to

**[H]** (i) approximately '20 volume' (6% w/v) aqueous hydrogen peroxide,

**[C]** (ii) a solution made by diluting concentrated hydrochloric acid with an equal volume of water and labelled 'concentrated hydrochloric acid',

**[C]** (iii) approximately  $1.0 \text{ mol/dm}^3$  aqueous sodium hydroxide,

**[C]** (iv) approximately  $0.05 \text{ mol/dm}^3$  aqueous silver nitrate,

**[C]** (v) approximately  $1.0 \text{ mol/dm}^3$  nitric acid,

**[H]** (vi) approximately  $0.2 \text{ mol/dm}^3$  aqueous barium nitrate (or approximately  $0.2 \text{ mol/dm}^3$  aqueous barium chloride, labelled 'barium nitrate'),

**[H] [C]** (vii) a solution containing approximately  $3.0 \text{ g/dm}^3$  potassium manganate(VII) dissolved in  $1.0 \text{ mol/dm}^3$  sulphuric acid, labelled 'acidified potassium manganate(VII)',

**[T]** (viii) the usual reagents and apparatus needed to test for the gases mentioned in the syllabus, including limewater, approximately  $0.1 \text{ mol/dm}^3$  aqueous potassium dichromate(VI),  $\text{K}_2\text{Cr}_2\text{O}_7$ , red and blue litmus paper or Universal Indicator paper, splints, Bunsen burner.

(d) A supply of test tubes, approximately  $125 \text{ mm} \times 16 \text{ mm}$ , one of which must be *Pyrex* or hard glass.

(e) A stirring rod.

It is advisable to issue candidates with a pipette filler (or equivalent safety device) and safety goggles.

In both questions, more material may be issued without penalty, if required, but this should not be necessary.

The standard Report Form to be included with the scripts is given on pages 7 and 8. Please detach and enclose it with the scripts in the normal way.

See also the side-lined notes on pages 1, 7 and 8.







This form must be completed and returned in the envelope with the scripts.

### REPORT ON PRACTICAL CHEMISTRY

#### ORDINARY LEVEL

1 (a) *Supervisor's results*

Supervisors must use a spare copy of the question paper to record their results for **Q.1 and Q.2** and enclose this copy of the question paper with the candidates' 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**. At larger centres where scripts are to be despatched in more than one envelope, it is essential that a copy of the Supervisor's Results is enclosed in each envelope.

(b) The index number of the candidates in each session were as follows.

First session

Second session

- 2 The Supervisor is invited to report details of any difficulties experienced by candidates, giving names and index numbers.

This report should include reference to:

- (a) any general difficulties encountered in making preparation;
- (b) difficulties due to faulty apparatus or material;
- (c) accidents to apparatus or materials.

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

**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)** .....

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.