

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**CHEMISTRY**

**5070/03**

Paper 3 Practical Test

CONFIDENTIAL INSTRUCTIONS

October/November 2006

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

**INSTRUCTIONS TO SUPERVISORS**

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. Pipette fillers and safety goggles should be used where necessary.

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](mailto: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

In addition to the usual apparatus found in a laboratory, candidates will require the following.

## For Question 1

- [H] (a) A solution of  $0.05 \text{ mol/dm}^3$  acidified hydrogen peroxide,  $\text{H}_2\text{O}_2$ , labelled **P**. This solution should be prepared by diluting  $28 \text{ cm}^3$  of a fresh sample of '20-volume' (6% w/v) hydrogen peroxide with  $0.5 \text{ mol/dm}^3$  sulphuric acid until the final volume is  $1.0 \text{ dm}^3$ .

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

- (b) A solution of  $0.020 \text{ mol/dm}^3$  potassium manganate(VII) ( $3.2 \text{ g KMnO}_4$  dissolved in  $1 \text{ dm}^3$  of distilled water), labelled **Q**.

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

Pipette a  $25.0 \text{ cm}^3$  (or  $20.0 \text{ cm}^3$ ) portion of **P** into a flask and titrate with **Q**. At first the purple colour disappears rapidly. As the titration proceeds, this disappearance is less rapid. At the end-point, one drop of **Q** produces a pink colour that does not disappear on swirling.

**Note:** Some variation in the above concentrations is acceptable but it is **essential** that  $25.0 \text{ cm}^3$  of **P** reacts with between  $23.0 \text{ cm}^3$  and  $27.0 \text{ cm}^3$  of **Q** (or  $20.0 \text{ cm}^3$  of **P** reacts with between  $18.0 \text{ cm}^3$  and  $22.0 \text{ cm}^3$  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.

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

## For Question 2

- [T] (a) A solution containing  $70 \text{ g}$  of sodium **nitrite**,  $\text{NaNO}_2$ , dissolved in  $1 \text{ dm}^3$  of distilled water, labelled **R**.

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

If sodium **nitrite** is not readily available it may be prepared by strongly heating solid sodium **nitrate**.

- [H] (b) A solution containing either  $95 \text{ g}$  of sodium metabisulphite,  $\text{Na}_2\text{S}_2\text{O}_5$ , or  $250 \text{ g}$  of sodium sulphite-7-water,  $\text{Na}_2\text{SO}_3 \cdot 7\text{H}_2\text{O}$ , dissolved in  $1 \text{ dm}^3$  of distilled water, labelled **S**.

If possible a fresh bottle of sodium metabisulphite or sodium sulphite should be used to prepare this solution.

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

## (c) Access to

- [C] (i) a solution made by diluting concentrated hydrochloric acid with an equal volume and labelled 'concentrated hydrochloric acid',
- (ii) a solution containing approximately  $3.0 \text{ g/dm}^3$  potassium manganate(VII) dissolved in  $0.5 \text{ mol/dm}^3$  sulphuric acid, labelled 'acidified aqueous potassium manganate(VII)',
- (iii) approximately  $1.0 \text{ mol/dm}^3$  hydrochloric acid,
- (iv) approximately  $0.25 \text{ mol/dm}^3$  aqueous potassium iodide, KI,
- [H] (v) a solution containing approximately  $55 \text{ g/dm}^3$  hydrated iron(II) sulphate,  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ , dissolved in  $0.5 \text{ mol/dm}^3$  sulphuric acid, labelled 'aqueous iron(II) sulphate',
- [C] (vi) approximately  $1.0 \text{ mol/dm}^3$  sodium hydroxide,
- (vii) small pieces of aluminium foil,
- [H] (viii) approximately  $0.2 \text{ mol/dm}^3$  aqueous barium nitrate (or approximately  $0.2 \text{ mol/dm}^3$  aqueous barium chloride, labelled 'barium nitrate'),
- [T]
- [C] (ix) a solution prepared by dissolving 50 g of hydrated iron(III) chloride,  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ , in  $1 \text{ dm}^3$  aqueous sodium chloride containing  $10 \text{ g/dm}^3$  NaCl, labelled 'aqueous iron(III) chloride',
- [T] (x) the usual reagents 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.
- (d) A supply of test-tubes, approximately  $125 \text{ mm} \times 16 \text{ mm}$ , five 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.

Small amounts of **irritant gas** will be produced in Question 2. In a badly ventilated laboratory this may cause respiratory distress to asthmatic students.

In both questions, more material may be issued without penalty 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' scripts. 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, 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)** .....

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