Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CHEMISTRY **5070/32**

Paper 3 Practical Test **October/November 2016**

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: 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 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	**MH**	= moderate hazard
HH	= health hazard	**T**	= acutely toxic
F	= flammable	**O**	= oxidising
N	= hazardous to the aquatic 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.

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.

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 specification 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 × 20 cm^3 or 25 cm^3 pipette
(It is essential that all candidates at a Centre have a pipette of the same capacity.)
1 × pipette filler
1 × stand
1 × burette clamp
1 × funnel for filling burette
1 × white tile
1 × flask or other suitable vessel for titration
a supply of test-tubes
1 × test-tube rack
1 × stirring rod
2 × boiling tubes
1 × hard-glass test-tube
1 × Bunsen burner
1 × test-tube holder
1 × heat-proof mat
1 × wash bottle containing distilled water
1 × teat/dropping pipette
1 × spatula

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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 (Hazard symbols given in this column refer to the raw materials.)
[MH]	**P**	150 cm^3	0.1 mol/dm^3 iron(II) sulfate in 0.5 mol/dm^3 sulfuric acid	Dissolve 27.8 g of iron(II) sulfate heptahydrate, $FeSO_4.7H_2O$ **[MH]** or 39.3 g of iron(II) ammonium sulfate hexahydrate, $FeSO_4.(NH_4)_2SO_4.6H_2O$ **[MH]**, in 500 cm^3 1.0 mol/dm^3 sulfuric acid **[MH]** and then dilute the solution with water to 1 dm^3.
	Q	150 cm^3	0.02 mol/dm^3 potassium manganate(VII)	Dissolve 3.16 g of potassium manganate(VII), $KMnO_4$ **[N] [O] [MH]**, in each dm^3 of solution.
Supervisors are asked to carry out a redox 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 **P** reacts with between 24.0 cm^3 and 26.0 cm^3 of **Q** (or 20.0 cm^3 of **P** reacts with between 19.0 cm^3 and 21.0 cm^3 of **Q**).				
[C]	**R**	20 cm^3	1.0 mol/dm^3 nitric acid	
	S	0.2 g	zinc carbonate powder	
[F] [MH] [HH]	**methyl orange indicator**	1 cm^3	methyl orange indicator	
	aluminium	1 piece	aluminium foil	A piece should be about 1 cm square and approximately 0.1 mm thickness.
	aqueous potassium iodide	1 cm^3	0.2 mol/dm^3 potassium iodide	
	aqueous starch	1 cm^3	2% aqueous starch	Mix 2 g of soluble starch with a little cold water until a smooth paste is obtained. Add 100 cm^3 of boiling water and stir. Boil until a clear solution is obtained (about 5 min). **This solution should be freshly prepared**.
[HH] [N]	**copper(II) oxide**	0.1 g	copper(II) oxide powder	
[MH]	**ammonium chloride**	0.1 g	ammonium chloride powder	

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
[C]	**dilute nitric acid**	1.0 mol/dm^3 nitric acid	
[MH]	**dilute sulfuric acid**	0.5 mol/dm^3 sulfuric acid	
[N]	**aqueous silver nitrate**	0.05 mol/dm^3 silver nitrate	
[C]	**aqueous sodium hydroxide**	1.0 mol/dm^3 sodium hydroxide	
[MH] [N]	**aqueous ammonia**	1.0 mol/dm^3 ammonia	
	aqueous barium nitrate	0.2 mol/dm^3 barium nitrate	0.2 mol/dm^3 barium chloride (labelled barium nitrate) may be used as an alternative.

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
[MH]	**limewater**	saturated aqueous calcium hydroxide, $Ca(OH)_2$	Prepare fresh limewater by leaving distilled water to stand over solid calcium hydroxide for several days, shaking occasionally. Decant or filter the solution.
[MH]	**acidified aqueous potassium manganate(VII)**	0.01 mol/dm^3 potassium manganate(VII) 0.5 mol/dm^3 sulfuric acid	Mix equal volumes of 0.02 mol/dm^3 potassium manganate(VII) and 1.0 mol/dm^3 sulfuric acid **[MH]**.
		red and blue litmus paper or Universal Indicator paper plain filter strips for use with acidified aqueous potassium manganate(VII) 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'.

> **N.B. 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 Results 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

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 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**.

2 The candidate numbers of candidates attending each session were:

First Session	*Second Session*

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 with 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 spaces provided**.

Declaration (to be signed by the Principal)

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

SIGNED .....

NAME (in block capitals) .....