



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**CO-ORDINATED SCIENCES**

**0654/51**

Paper 5 Practical Test

**October/November 2015**

CONFIDENTIAL INSTRUCTIONS

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

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**The Supervisor's attention is drawn to the form on page 8 which must be completed and returned with the scripts.**

If you have any queries regarding these instructions, please contact CIE

by e-mail: [info@cie.org.uk](mailto:info@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.

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This document consists of **6** printed pages and **2** blank pages.

\* 8 4 9 7 8 6 1 6 3 3 \*

## Instructions for preparing apparatus

These instructions detail the apparatus, reagents and specimens required by each candidate for each experiment in this paper. A summary of the questions that will be presented to the candidates is included, where appropriate, to allow the teacher to test the apparatus appropriately. **No access is permitted to the question paper in advance of the examination session.**

It is assumed that the ordinary apparatus of a science laboratory will be available, including a supply of purified water (distilled or deionised).

If arrangements are made for different sessions for different groups of candidates, care must be taken to ensure that the different groups of candidates are effectively isolated so that **no information passes between them.**

**All specimens should carry only the code letters and numbers as indicated and their identity should not be revealed to the candidates.**

Supervisors should ensure that all specimens have the correct identity attached to the specimen and that these are **not** removed during the examination.

If a candidate breaks any of the apparatus, or loses any of the material supplied, the matter should be rectified and a note made in the Supervisor's Report.

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. 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.

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** = harmful to the environment

The attention of Centres 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.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

Centres are reminded that they are **not** permitted to open the question paper envelopes before the examination. Centres are also referred to the Handbook for Centres, the Security of Question Papers and Examination Materials section and the Practical Examinations in Science Subjects section.

If there are difficulties with any aspect of setting up this practical examination that the Centre is not able to resolve, it is essential, for Centres to contact the Product Manager as soon as possible by e-mail to [info@cie.org.uk](mailto:info@cie.org.uk), by phone to +44 1223 553554 or by fax to +44 1223 553558.

**For Question 1**

Each candidate will require

- (i) two large test-tubes (size approx. 150 x 25 mm) with stoppers. The test-tubes must be completely dry.
- (ii) large test-tube holder
- (iii) large test-tube rack
- (iv) 20 cm<sup>3</sup> limewater, labelled **limewater**
- (v) 10 cm<sup>3</sup> measuring cylinder
- (vi) two pieces of dry cobalt chloride paper. These need to be in a petri dish with a lid or a similar closed container containing a desiccant such as anhydrous calcium chloride to ensure they stay dry (blue).
- (vii) mounted needle
- (viii) piece of cheese approx. 1 cm square or other fatty food that can be mounted on the needle and safely ignited e.g. corn puff, mini cheese biscuit. See Note.
- (ix) large heatproof mat
- (x) Bunsen burner and means to light it
- (xi) small beaker half full of tap water, labelled **water**
- (xii) forceps.

**Note:** The food should be tested before the exam to ensure that it easily ignites and stays lit, burning without too much black smoke, for about a minute.

Consideration should be given to any possible food allergies of candidates.

**For Question 2**

Each candidate will require

- (i) approx. 70 cm<sup>3</sup> of a mixture containing equal volumes of 0.2 mol dm<sup>-3</sup> potassium iodide, KI, and 0.005 mol dm<sup>-3</sup> sodium thiosulfate, Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, labelled **A**.

Once made up this solution should be protected from the light.

- [H] (ii) approx. 70 cm<sup>3</sup> of a 0.1 mol dm<sup>-3</sup> potassium persulfate (potassium peroxodisulfate), K<sub>2</sub>S<sub>2</sub>O<sub>8</sub>, labelled **B**.

This solution needs to be a relatively fresh sample and made up near to the examination e.g. the day before.

- (iii) approx. 5 cm<sup>3</sup> 1% starch solution labelled **starch** and with a dropper

- [H] (iv) approx. 5 cm<sup>3</sup> of a 0.5 mol dm<sup>-3</sup> ammonium iron(II) sulfate, (NH<sub>4</sub>)<sub>2</sub>Fe(SO<sub>4</sub>)<sub>2</sub>·6H<sub>2</sub>O, labelled **Fe<sup>2+</sup>**.

This solution needs to be made as close to the time of the practical exercise as possible, e.g. the day before.

- [H] (v) approx. 5 cm<sup>3</sup> of a 0.5 mol dm<sup>-3</sup> iron(III) chloride, FeCl<sub>3</sub>, labelled **Fe<sup>3+</sup>**

- [H] (vi) approx. 5 cm<sup>3</sup> of a 0.5 mol dm<sup>-3</sup> copper(II) sulfate, CuSO<sub>4</sub>, labelled **X<sup>2+</sup>**

- [H] (vii) approx. 15 cm<sup>3</sup> of a 2.0 mol dm<sup>-3</sup> ammonia solution, labelled **ammonia**

- (viii) 10 cm<sup>3</sup> or 25 cm<sup>3</sup> measuring cylinder, labelled **A** (see Note 1)

- (ix) 10 cm<sup>3</sup> or 25 cm<sup>3</sup> measuring cylinder, labelled **B** (see Note 1)

- (x) 10 cm<sup>3</sup> measuring cylinder, labelled **C** (see Note 2)

- (xi) 50 cm<sup>3</sup> or 100 cm<sup>3</sup> flask or beaker

- (xii) stopclock

- (xiii) one test-tube (size approx. 125 mm x 15 mm).

**Notes:** 1 Measuring cylinder may be replaced by a test-tube with a mark representing 10 cm<sup>3</sup> or a suitable syringe with the needle removed. Candidates must be informed of this replacement at the start of the examination.

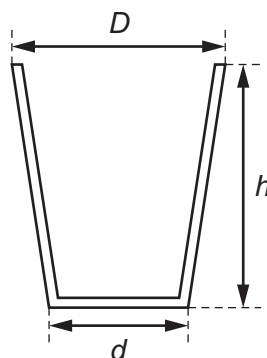
2 Measuring cylinder may be replaced by a test-tube with a mark representing 1 cm<sup>3</sup> or a suitable syringe with the needle removed. Candidates must be informed of this replacement at the start of the examination.

**For Question 3**

Each candidate will require

- (i) disposable drinks cup with a capacity of approximately  $200 \text{ cm}^3$ . See Note 1.
- (ii) 30 cm rule
- (iii) metre rule
- (iv) approx. 80 cm of thin string
- (v)  $250 \text{ cm}^3$  measuring cylinder
- (vi) supply of water. Approximately  $300 \text{ cm}^3$  is required by each candidate.

- Notes:**
- 1 Identical cups must be provided for all candidates.
  - 2 The measuring cylinder must be emptied at changeover. The supply of water must be replenished.
  - 3 Supervisors must record the dimensions  $d$ ,  $D$  and  $h$  of the cup on the copy of the Supervisor's results that is submitted with the scripts.



**Fig. 3.1**

Spare materials and equipment should be available and can be provided without penalty. **Candidates should be made aware of this.**

*Information required from the Supervisor:*

**The Supervisor is asked to carry out the experiments and to enter the results on a spare copy of the examination paper, clearly marked 'Supervisor's Results' and showing the Centre number. This should be done, out of sight of the candidates, using the same solutions, reagents, specimens and apparatus as the candidates.**

**A copy of the 'Supervisor's Results' should be returned with each packet of scripts. Failure to do so may cause the candidates to be penalised.**



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**This form must be completed and returned in the envelope with the scripts together with the seating plan and the Supervisor's Results as mentioned on page 5.**

**October/November 2015**

*General*

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

- (a) difficulties due to faulty apparatus;
- (b) accidents to apparatus or materials;
- (c) physical handicaps, e.g. short sight, colour blindness;
- (d) any other information that is likely to assist the Examiner, especially if this cannot be discovered in the scripts;
- (e) any help given to a candidate.

*The Supervisor is asked to supply the following information:*

Plan of work benches, giving details by candidate numbers of the places occupied by the candidates for each session and a copy of the 'Supervisor's Results'.

NAME OF CENTRE .....

SIGNED .....

*Supervisor*

CENTRE NUMBER .....

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.

NAME .....

(in block capitals)

SIGNED ..... (Principal)



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