



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**CO-ORDINATED SCIENCES**

**0654/51**

Paper 5 Practical Test

**October/November 2012**

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 8 which must be completed and returned with the scripts.**

If you have any 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.

\* 9 3 4 7 3 0 7 3 0 0 \*

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



## Instructions for preparing apparatus

These instructions detail the apparatus, reagents and specimens required by each candidate for the 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, and in particular Section 3.1.2(c)(i), Security of Question Papers and Examination Materials, as well as 3.3.11.1, Practical Examinations in Science Subjects.

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 [international@cie.org.uk](mailto:international@cie.org.uk), by phone to +44 1223 553554 or by fax to +44 1223 553558.

**For Question 1**

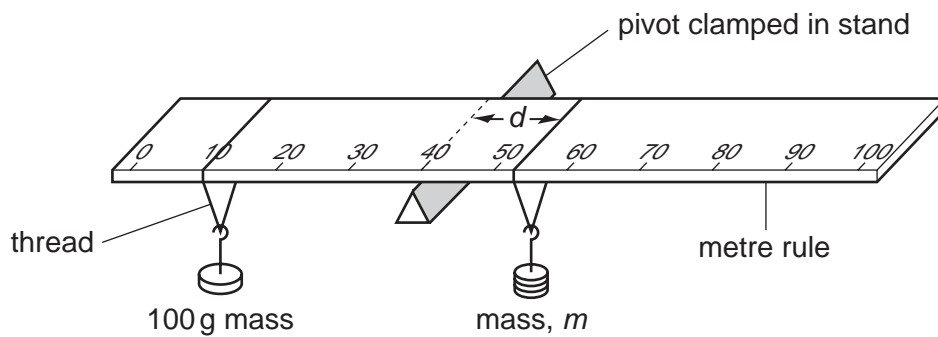
Each candidate will require the following:

- (i) four Petri dishes, labelled **A**, **B**, **C** and **D**, each dish containing 10 pea seeds on cotton wool, set up 7 days in advance, as follows:
- all the pea seeds are soaked in water for 24 hours.
  - 10 seeds are then placed in each dish, on cotton wool.
  - in dishes **A** and **C**, the cotton wool is left dry. In dishes **B** and **D**, the cotton wool is thoroughly moistened with water.
  - the dishes are then left in a warm place for 7 days: dishes **A** and **B** in the light, dishes **C** and **D** in the dark. During this time, the cotton wool in dishes **B** and **D** should be kept moist, but without submerging the seeds.
  - by the day of the examination, there should be clear emergence of radicles from at least five of the seeds in dishes **B** and **D** (if growth is proceeding too fast, the seeds can be slowed down by placing them in a refrigerator). There should be no radicles visible in dishes **A** and **C**
- (ii) mortar and pestle
- (iii) access to water (to wash the mortar and pestle, and to add to test-tubes/beaker)
- (iv) four large test-tubes (approximately 150 × 25 mm), and a means to support them
- (v) a means of labelling the test-tubes
- (vi) a white tile
- (vii) a mounted razor blade, or a scalpel
- (viii) a spatula
- (ix) candidates should have access to a very hot (simmering) water bath. They should have means to support their test-tubes in the water
- (x) access to Benedict's solution in a labelled dropping bottle, or in another labelled container with a dropping pipette
- (xi) access to iodine solution, in a labelled dropping bottle, or in another labelled container with a dropping pipette
- (xii) a means of measuring 10-15 cm<sup>3</sup> of water. A paper or plastic cup with a mark on the side to show the appropriate level will be sufficient.

**For Question 2**

Each candidate will require the following:

- (i) knife edge or triangular section piece of wood to act as a pivot
- (ii) stand and clamp to hold knife edge
- (iii) metre rule with mm divisions, of mass in the range 50 g to 150 g
- (iv) 100 g mass, labelled
- (v) supply of labelled masses to enable 50 g, 60 g, 70 g, 80 g and 90 g to be suspended from the rule as in Fig. 2.1
- (vi) 60 cm thread to attach masses to rule.



**Fig. 2.1**

**For Question 3**

Each candidate will require the following:

- (i) 60 cm<sup>3</sup> of 4.8 g dm<sup>-3</sup> citric acid, labelled **S**
- [H] (ii) 50 cm<sup>3</sup> of a fresh solution of saturated calcium hydroxide, labelled **alkali aqueous calcium hydroxide**
- (iii) 100 cm<sup>3</sup> beaker
- (iv) 10 cm<sup>3</sup> measuring cylinder
- (v) dropping pipette
- [N] [H] (vi) phenolphthalein indicator with dropper, labelled **P**
- (vii) stirring rod
- (viii) Universal Indicator with dropper (colour chart available on request), labelled **Universal Indicator**
- (ix) spatula
- (x) powdered calcium carbonate, labelled **calcium carbonate** (allow 2 g per candidate)
- [H] (xi) powdered calcium hydroxide, labelled **calcium hydroxide** (allow 2 g per candidate)
- (xii) 2 test-tubes, approximately 125 × 15 mm
- (xiii) stoppers for test-tubes in (xii)
- (xiv) eye protection
- (xv) distilled water in a wash bottle to rinse measuring cylinder between uses.

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.**





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

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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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