



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**COMBINED SCIENCE**

**0653/52**

Paper 5 Practical Test

**October/November 2011**

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.

\* 6 7 1 9 8 5 9 8 1 3 \*

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.

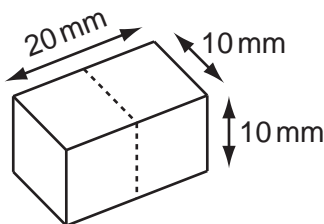
Centres are reminded that they are **not** permitted to open the question paper envelopes before the examination. Centres are also referred to the Handbook for Centres, and in particular Section 3.1.2(c)(i), Security of Question Papers and Examination Materials, as well as 3.3.11.1, Practical Examinations 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) 1 block of agar jelly dimensions: 20 mm x 10 mm x 10 mm ( $\pm 1$  mm all dimensions) ;



To prepare the agar jelly:

- Smear a small amount of oil around the base of a clean 10 cm Petri dish (or other suitable receptacle).
- Dissolve 20 g of agar in 1000 cm<sup>3</sup> of deionised water. Mix thoroughly and heat almost to a boil. Stir frequently until the solution is clear.
- Remove from the heat and as the solution is cooling add 10 cm<sup>3</sup> of 1% phenolphthalein solution (1g phenolphthalein in 100ml 95% ethanol) and 20 cm<sup>3</sup> of bench (2 mol dm<sup>-3</sup>) ammonium hydroxide.  
[To make 2 mol dm<sup>-3</sup> ammonium hydroxide dilute 11 cm<sup>3</sup> 0.880 ammonia with 89 cm<sup>3</sup> tap water.]  
The agar solution should be a strong pink colour. If not, add a little more ammonium hydroxide.
- Mix thoroughly and pour into the 10 cm Petri dishes to a depth of 1 cm. Allow to cool and go solid. Cut the agar into blocks immediately before the practical exam.

To store the prepared dishes of agar:

- Place the Petri dish into a sealed plastic bag and place into the fridge with a small beaker of ammonium hydroxide to maintain an alkaline environment. The colour of the agar should be pink/purple.

To test the agar:

- Place a 10 mm x 10 mm x 10 mm cube into a tube of 2 M hydrochloric acid. It should take about 10 mins to become colourless.

(ii) a scalpel or sharp cutting knife ;

(iii) a cutting tile ;

(iv) a ruler (10 cm or 30 cm in length, graduated in mm) ;

[H] (v) approximately 100 ml of 2 mol dm<sup>-3</sup> hydrochloric acid ;

(vi) 3 large test-tubes (150 mm x 25 mm) ;

(vii) a large test-tube rack ;

(viii) a method of labelling ;

(ix) a stopclock ;

(x) tweezers (or a means of picking up the agar block) ;

(xi) a measuring cylinder (minimum capacity 25 cm<sup>3</sup>) .

**For Question 2**

Each candidate will require the following:

- (i) 1 hard glass test-tube 125 x15 mm ;
- (ii) 4 test-tubes 125 x15 mm ;
- (iii) a test-tube rack ;
- (iv) means of holding a test-tube ;
- (v) a spatula ;
- (vi) a small beaker ;
- (vii) a Bunsen burner ;
- [H] (viii) access to solid calcium hydroxide, labelled as such ;
- [C] (ix) access to  $1.0 \text{ mol dm}^{-3}$  aqueous sodium hydroxide labelled as such ;
- [C] (x) access to  $1.0 \text{ mol dm}^{-3}$  nitric acid labelled as such ;
- (xi) access to  $0.1 \text{ mol dm}^{-3}$  barium nitrate (as used in the test for a sulfate) labelled as such ;
- [N][H] (xii) access to  $0.05 \text{ mol dm}^{-3}$  silver nitrate solution labelled as such ;
- (xiii) equivalent of 5 spatula loads per candidate of a 1:1 mixture by mass of zinc sulfate and ammonium chloride labelled **X** ;  
(note that the mixture **X** could be zinc chloride and ammonium sulfate)
- (xiv) red and blue litmus papers .

**For Question 3**

Each candidate will require the following:

- (i) a rectangular glass or equivalent perspex block ;
- (ii) 4 pins and a pin board of about A4 size ;
- (iii) a rule with mm divisions ;
- (iv) a protractor ;
- (v) blank sheets of A4 paper.

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.

October/November 2011

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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