



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

0653/52

Paper 5 Practical Test

May/June 2015

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: 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.

This document consists of 7 printed pages and 1 blank page.

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, by phone to +44 1223 553554 or by fax to +44 1223 553558.

For Question 1

Each candidate will require

- (i) two 8 mm internal diameter (cork borer number 4) unpeeled potato cylinders of at least 6 cm length each, submerged in a dish of distilled water
- (ii) white tile
- (iii) knife or cutting blade
- [H] (iv) 100 cm³ beaker filled to the 75 cm³ mark with 20 vols fresh hydrogen peroxide, labelled **hydrogen peroxide**
- (v) forceps
- (vi) 30 cm ruler graduated in mm
- (vii) stopclock or timer
- (viii) 250 cm³ beaker or suitable container, labelled **waste**
- (ix) paper towels.

Potato cylinders should be cut no more than 30 minutes before the exam and kept submerged in distilled water.

It is important that the hydrogen peroxide provided is fresh. Supervisors should check that a 5 mm cylinder of potato will rise to the top of a 100 cm³ beaker containing 75 cm³ hydrogen peroxide within 1 minute.

For Question 2

Each candidate will require

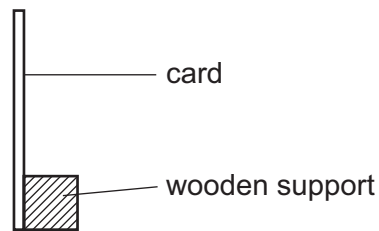
- (i) 2 large spatula loads of sodium chloride solid, labelled **solid A**
- (ii) 2 large spatula loads of sodium carbonate solid, labelled **solid B**
- (iii) 2 large spatula loads of zinc sulfate solid, labelled **solid C**
- (iv) 2 large spatula loads of copper sulfate solid, labelled **solid D**
- (v) approximately 50 cm³ distilled water, labelled **distilled water**
- [H] (vi) approximately 30 cm³ 2.0 mol dm⁻³ ammonia solution, labelled **ammonia**
- (vii) approximately 30 cm³ 1.0 mol dm⁻³ hydrochloric acid, labelled **hydrochloric acid**
- [H] (viii) approximately 20 cm³ 0.1 mol dm⁻³ barium chloride solution, labelled **barium chloride**
- [N] [H] (ix) approximately 20 cm³ 0.05 mol dm⁻³ silver nitrate solution, labelled **silver nitrate**
- [H] (x) approximately 40 cm³ limewater, labelled **limewater**
- (xi) spatula
- (xii) stirring rod
- (xiii) delivery tube to fit test-tube (approx. 125 mm x 15 mm)
- (xiv) 5 test-tubes (approx. 125 mm x 15 mm)
- (xv) 3 test-tubes (approx. 150 mm x 25 mm)
- (xvi) test-tube rack or other means of supporting test-tubes.

Centres may provide fewer test-tubes, the minimum being 3 test-tubes (approx. 125 mm x 15 mm) and 1 test-tube (approx. 150 mm x 25 mm). If this is the case, candidates will have to rinse test-tubes with distilled water which must be provided.

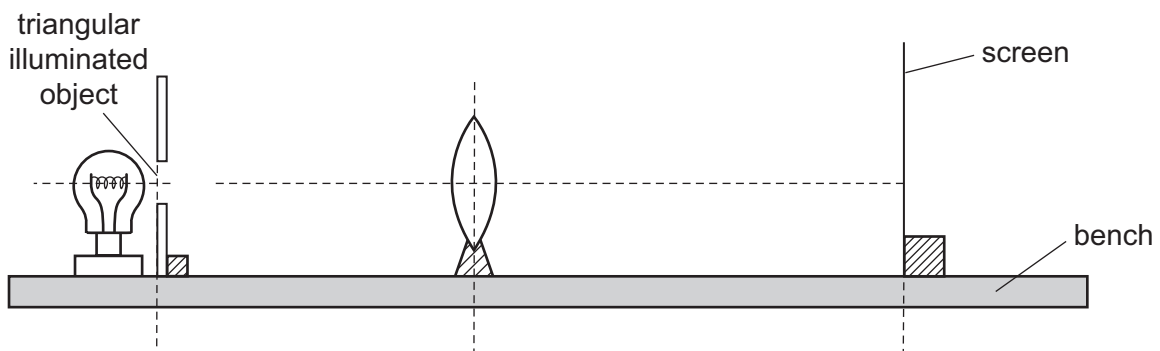
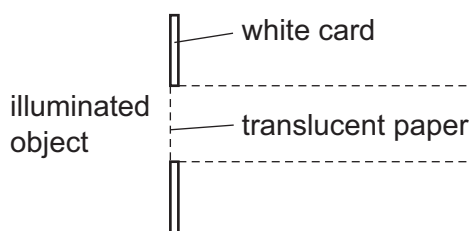
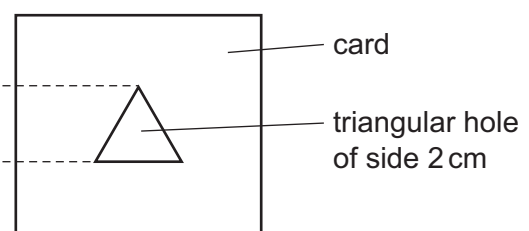
For Question 3

Each candidate will require

- (i) a convex lens with focal length $f = 15 \text{ cm}$, with holder
- (ii) a metre rule, with a mm scale
- (iii) a 30 cm or a 50 cm rule, with a mm scale
- (iv) a white screen. The screen can be made from a sheet of white card (approximately $10 \text{ cm} \times 10 \text{ cm}$). Some means of supporting the screen vertically must be supplied (e.g. fixing the white card to a small block of wood)

**Fig. 3.1**

- (v) an illuminated object with a hole in the shape of an equilateral triangle of side approximately 2 cm. The object is made by cutting a triangular hole in a piece of white card, and covering the hole with translucent paper. The illumination can be provided by a 12 V, 24 W lamp, or similar, connected to a suitable power source. The lamp filament, the centre of the hole in the object card and the centre of the lens and screen should be arranged to be the same height above the bench. The illuminated object must be supported.

**Fig. 3.2****Fig. 3.3****Fig. 3.4**

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 6.

May/June 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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