



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

0653/51

Paper 5 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 8 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 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

MH = moderate hazard

HH = health hazard

T = acutely toxic

F = flammable

O = oxidising

N = hazardous to the aquatic 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.

Question 1

Each candidate will require:

- (i) approximately 25 cm³ 0.1 mol dm⁻³ iron(II) ammonium sulfate solution labelled **J** and made up as close to the examination as possible
- [F][N] (ii) approximately 0.5 g zinc powder labelled **L**, preferably from an unopened and newly purchased container
- (iii) approximately 20 cm³ 1.0 mol dm⁻³ hydrochloric acid labelled **hydrochloric acid**
- [MH] (iv) approximately 20 cm³ 0.1 mol dm⁻³ nitric acid labelled **nitric acid**
- [MH] (v) approximately 75 cm³ 0.40 mol dm⁻³ sodium hydroxide solution labelled **sodium hydroxide**
- (vi) approximately 5 cm³ 0.1 mol dm⁻³ barium nitrate solution labelled **barium nitrate**
- [N] (vii) approximately 5 cm³ 0.05 mol dm⁻³ silver nitrate solution labelled **silver nitrate**
- [MH] (viii) approximately 10 cm³ limewater labelled **limewater**
- (ix) stirring rod
- (x) spatula
- (xi) filter funnel
- (xii) filter papers
- (xiii) wooden splints
- (xiv) 6 test-tubes (125 mm × 15 mm)
- (xv) 2 large test-tubes (150 mm × 25 mm)
- (xvi) delivery tube to fit test-tube
- (xvii) bung to fit test-tube
- (xviii) Bunsen burner and means to light it
- (xix) dropping pipette.

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

Question 2

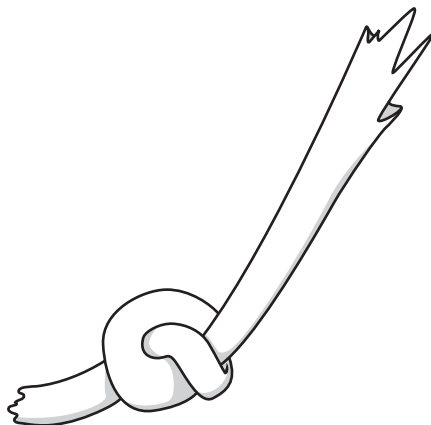
Each candidate will require:

- (i) two pieces of pre-soaked dialysis tubing approximately 15 cm in length and sealed at one end with a knot approximately 2 cm from one end. (See note 1)
- (ii) 100 cm³ beaker labelled **A**
- (iii) 10 cm³ 10% starch solution labelled **starch solution**. (See note 2)
- [N] (iv) approximately 50 cm³ iodine solution in a 100 cm³ beaker labelled **B**
- (v) 2 or 5 cm³ syringe barrel and plunger without needle
- (vi) stirring rod
- (vii) paper towels
- (viii) stopwatch
- (ix) access to tap water.

Notes

1. The dialysis tubing should be provided in a beaker of tap water.

At the start of the exam, supervisors should demonstrate how to open the end of the dialysis tubing and tie a knot in it. Keeping the dialysis tubing wet should help getting the end open.



2. The starch solution should be made up not more than 24 hours before the exam.

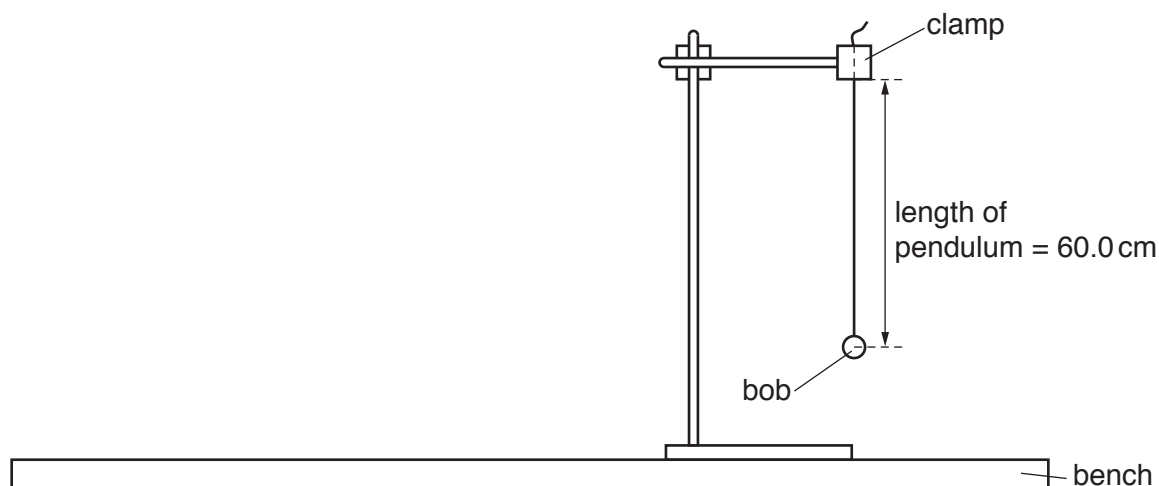
Question 3

Each candidate will require:

- (i) clamp, boss and retort stand
- (ii) pendulum bob attached to approximately 70 cm of thread
- (iii) split cork/similar to hold the thread in the clamp
- (iv) metre rule with a millimetre scale
- (v) stopwatch.

Note

1. The simple pendulum is to be set up for the candidates with the length of the pendulum (distance from the point of support to the **centre** of the pendulum bob) exactly 60.0 cm.



Retort stands of 60 cm or less in height may be used if the retort stand is reversed so that the pendulum hangs below the level of the bench. The base of the stand would need to be secured with a G-clamp and/or a heavy weight. Supervisors would need to warn candidates of the difference between this diagram and the set-up of their experiments.

Action at Changeover

Reset the pendulum to a length of exactly 60.0 cm.

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 as mentioned on page 6.

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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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