
CO-ORDINATED SCIENCES

0654/53

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.

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.

Question 1

Each candidate will require

- (i) three large (approx. 150 x 25 mm) test-tubes held firmly together with a rubber band or similar and placed in a glass or plastic beaker of similar height. Each test-tube to have a horizontal line in marker pen or chinagraph pencil 10 cm from the base
- (ii) one large test-tube (approx. 150 x 25 mm) with an identical horizontal line to those in (i) in a separate beaker of similar height
- (iii) two 0-100 °C thermometers with graduations of at least 1 °C
- (iv) a stopclock
- (v) access to a source of hot water of at least 80 °C and means of pouring this into the test-tubes (see Note)
- (vi) a means of labelling the beakers such as a chinagraph pencil.

Note: The source of water may be from a kettle or an insulated flask. Students should be made aware of the danger of scalds and burns when using hot water.

For Question 2

Each candidate will require

- [F] (i) three 0.5 g portions of fresh zinc powder, Zn, labelled **zinc** (see Note 1)
(ii) 40 cm³ 200 g dm⁻³ copper sulfate, CuSO₄.5H₂O, labelled **copper sulfate**
- [H] (iii) 25 cm³ 0.4 mol dm⁻³ sodium hydroxide, NaOH, labelled **X**
(iv) 100 cm³ small beaker
(v) thermometer 0-100 °C with graduations of 1 °C or smaller
(vi) plastic cup
(viii) two 10 or 25 cm³ measuring cylinders (see Note 2)
(ix) stirring rod
(x) filter funnel
(xi) at least two pieces of filter paper
(xii) supply of water for washing out apparatus
(xiii) large container for discarding reaction mixtures, labelled **waste** (see Note 3)
(xiv) large test-tube (approx. 150 mm x 25 mm).

- Notes:** 1 The zinc powder should have been purchased within the last twelve months and should not have oxidised significantly.
- 2 If a centre does not have sufficient measuring cylinders, two test-tubes marked for volumes of 5 cm³ and 10 cm³ or graduated plastic syringes with the needles removed may be used. Candidates must be informed at the start of the examination if alternatives to measuring cylinders have been provided.
- 3 The heavy metals in this experiment should be disposed of in a way that does not harm the environment.

For Question 3

Each candidate will require

- (i) metre rule
- (ii) 30 cm rule, graduated in millimetres
- (iii) 12 V, 24 W lamp
- (iv) screen. The screen can be made from a sheet of white card (10 cm x 10 cm approx.). Some means of supporting the screen vertically must be supplied (e.g. by fixing the white card to a small block of wood). See Fig. 3.1.

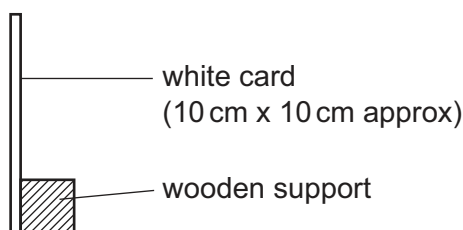


Fig. 3.1

- (v) An object consisting of a 15 mm x 15 mm square of white card attached to a cocktail stick, or similar and mounted securely in a cork or similar (e.g. a piece of plasticine) support. A possible arrangement is shown in Fig. 3.2.

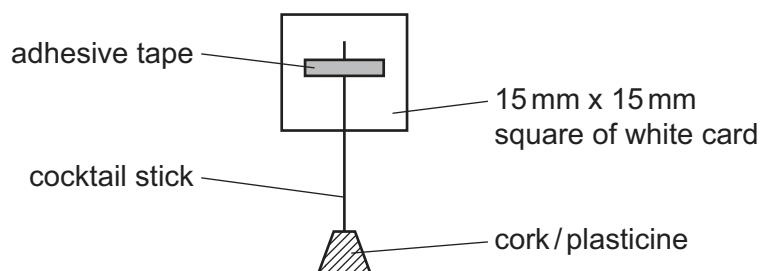


Fig. 3.2

- Notes:**
- 1 The centre of the lamp, the centre of the square object and the centre of the screen must be the same height above the bench.
 - 2 The apparatus must be set up for candidates as shown in Fig. 3.3. The lamp and screen should be aligned, but the distance between them is immaterial.

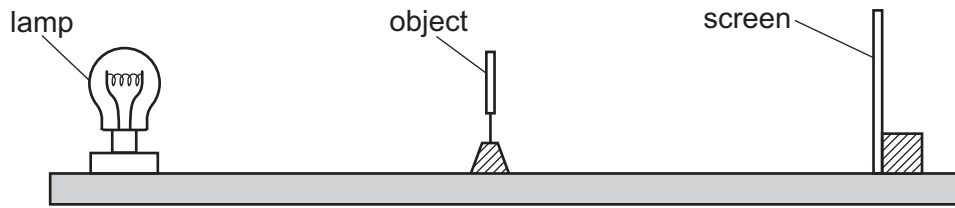


Fig. 3.3

- 3 The apparatus should be situated out of direct sunlight, if possible.
- 4 Reset the apparatus at changeover and check that the lamp works.

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.

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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