
CO-ORDINATED SCIENCES

0654/52

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.

For Question 1

Each candidate will require

- (i) 6 test-tubes approx. 125 mm x 25 mm (or a minimum of 3 with rinsing)
- (ii) iodine solution, labelled **iodine solution**
- (iii) biuret solution, labelled **biuret solution**
- (iv) Benedict's solution, labelled **Benedict's solution**
- (v) 3 dropping pipettes
- (vi) access to a hot water-bath at 80 °C with a means of supporting a test-tube in the bath
- (vii) large beaker to use as a water-bath, 450 cm³ or similar
- (viii) **dry** rice grains (about 40) in a suitable container, labelled **rice**
- (ix) 20 cm³ milk in a suitable container, labelled **milk**
- (x) forceps
- (xi) means of labelling a test-tube.

Note: If the test-tubes are to be reused, candidates must be given access to a supply of distilled water for rinsing and a means to dispose of the wastewater from the rinsing.

For Question 2

Each candidate will require

(i) hard-glass test-tube (approx. 125 mm x 15 mm) containing 3 cm depth of calcium ethanoate (calcium acetate), $\text{Ca}(\text{CH}_3\text{CO}_2)_2 \cdot \text{H}_2\text{O}$ solid, stoppered and the stopper labelled **P for (a)**. It is not important that the monohydrate is used

(ii) approx. 0.5 g solid calcium ethanoate (calcium acetate), $\text{Ca}(\text{CH}_3\text{CO}_2)_2 \cdot \text{H}_2\text{O}$ solid, labelled **P for (b) and (c)**. It is not important that the monohydrate is used

[C] (iii) about 10 cm^3 approx. 1.0 mol dm^{-3} nitric acid, labelled **nitric acid**

[H] (iv) about 15 cm^3 approx. 2.0 mol dm^{-3} hydrochloric acid, labelled **hydrochloric acid**

[H] (v) approx. 10 cm^3 0.1 mol dm^{-3} barium chloride solution, labelled **barium chloride**

(vi) approx. 10 cm^3 limewater, labelled **limewater**

(vii) about 10 cm^3 approx. 2.0 mol dm^{-3} ethanoic acid, labelled **Q**

(viii) approx. 0.5 g solid calcium carbonate powder, labelled **calcium carbonate**

(ix) approx. 20 cm^3 distilled water, labelled **distilled water**

(x) 4 test-tubes (approx. 125 mm x 15 mm)

(xi) 3 pieces of red litmus paper

(xii) 3 pieces of blue litmus paper

(xiii) 2 wooden splints

(xiv) means of holding a test-tube

(xv) stirring rod

(xvi) spatula

(xvii) Bunsen burner and means to light it

(xviii) delivery tube to fit the hard glass test-tube in (i)

(xix) 100 cm^3 beaker

(xx) 10 cm^3 measuring cylinder and means to rinse it.

For Question 3

Each candidate will require

- (i) a d.c. power source of approximately 1.5 V to 2 V. This should preferably be a type C dry cell. If candidates are supplied with a power supply of variable voltage output, the voltage should be set by the supervisor and fixed e.g. taped. See note 3
- (ii) a voltmeter capable of measuring up to 2.5 V with minimum resolution of 0.1 V
- (iii) an ammeter capable of measuring up to 2.00 A with a minimum resolution of 0.05 A
- (iv) a switch. The switch may be an integral part of the power source such as with a power supply
- (v) a wooden or plastic metre rule
- (vi) at least 100 cm of straight, bare constantan wire of diameter 0.32 mm (30 swg), taped to a metre rule at two places (between the zero and 5.0 cm mark and between the 90.0 cm and 95.0 cm mark). The zero end of the wire is to be labelled **X**. The left hand end of the wire must be taped over up to the 10.0 cm mark to prevent candidates attaching the crocodile clip in this area
- (vii) a sliding contact, labelled **C**. This may be a crocodile clip attached to a lead.

Notes 1 The circuit shown in Fig. 3.1 below must be set up for the candidates. The crocodile clip must not be connected to the resistance wire. At changeover, check that the circuit is still connected correctly and working.

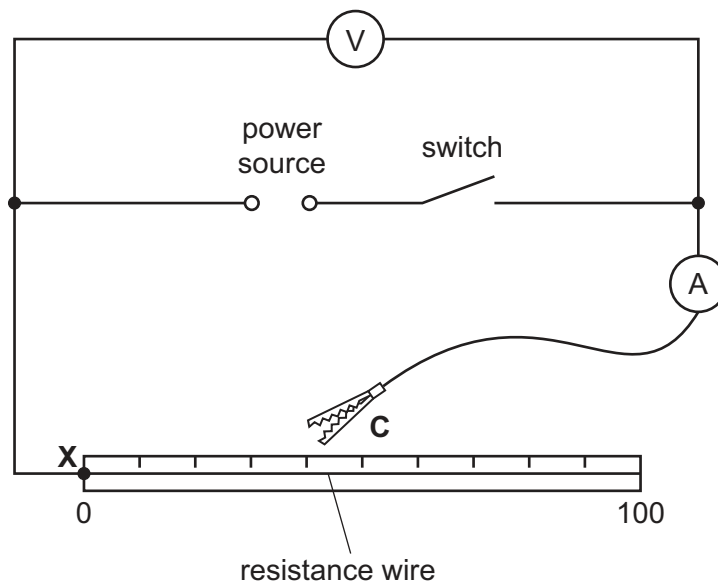


Fig. 3.1

- 2 If dry cells are used as the power source, check that they remain adequately charged during the examination. Spare cells should be available.
- 3 If the power source used is a power pack or a lead acid cell, rather than a dry cell, a 1 Ω , 3 W resistor must be connected in series with the power source.

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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