

COMBINED SCIENCE

0653/51

Paper 5 Practical Test

October/November 2017

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 Confidential Instructions, please contact Cambridge stating the Centre number, the nature of the query and the syllabus number quoted above.

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

READ THESE INSTRUCTIONS FIRST

These Confidential Instructions detail the apparatus, reagents and specimens required by each candidate for each experiment in this paper.

The Supervisor is **not** allowed to consult the Question Paper before the examination. This teacher should, as part of the preparation of the examination requirements, test the apparatus in order to ensure that it is satisfactory.

All specimens should carry only the code letters and numbers as indicated and their identity should not be revealed to the candidates.

More material may be issued if required, without penalty, but this should not be necessary. If a candidate breaks any of the apparatus the matter should be rectified and a note made in the Supervisor's Report.

It is assumed that the ordinary apparatus of a science laboratory will be available, including a supply of purified water (distilled or deionised).

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. Suitable eye protection should be provided.

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.

Attention is drawn, in particular, to certain materials used in the examination. The following codes are used where relevant.

C corrosive substance

MH moderate hazard

HH health hazard

T acutely toxic

F flammable

O oxidising

N hazardous to the aquatic environment

Hazard data sheets should be available from your suppliers.

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**.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with **each** packet of scripts.

Question 1

Each candidate will require:

- (i) 20 cm³ milk in a small beaker, labelled **milk** (see note 1)
- [MH] (ii) 10 cm³ 4% trypsin in a small beaker, labelled **4% enzyme solution** (see note 2)
- (iii) 2 test-tubes (125 × 15 mm)
- (iv) three 5 cm³ syringes without needle
- (v) a stirring rod
- (vi) distilled water
- (vii) a stopclock
- (viii) a means of labelling test-tubes.

Notes

1. Milk should be made as a 2% solution from powdered skimmed milk, not fresh milk, with a protein content of approximately 35%.
2. Powdered trypsin made up to 4% solution with distilled water.

Prior to the exam the supervisor should test that when equal volumes of milk and enzyme are mixed at room temperature, the milk should clear in about one minute. The enzyme concentration may be adjusted accordingly. Candidates must **not** be made aware of any changes to the enzyme concentration.

Question 2

Each candidate will require:

- (i) approximately 30 cm³ distilled water labelled **distilled water**
- [C] [MH] (ii) approximately 3.0 g solid calcium oxide labelled **H**
- (iii) 10 marble chips (3–4 mm)
- (iv) approximately 20 cm³ 1.0 mol dm⁻³ hydrochloric acid labelled **hydrochloric acid**
- [C] [MH] (v) approximately 10 cm³ 0.5 mol dm⁻³ copper nitrate solution labelled **J**
- [MH] [N] (vi) approximately 20 cm³ 1.0 mol dm⁻³ ammonia solution labelled **ammonia**
- (vii) Universal indicator paper with access to pH chart
- (viii) a stirring rod
- (ix) a delivery tube to fit test-tube (125 mm × 15 mm)
- (x) 100 cm³ beaker
- (xi) 4 test-tubes (125 mm × 15 mm)
- (xii) 1 large test-tube (150 mm × 25 mm)
- (xiii) means to support test-tubes
- (xiv) a filter funnel
- (xv) filter paper
- (xvi) safety glasses or goggles.

Question 3

Each candidate will require:

- (i) a d.c. power source of approximately 1.5V to 2V. This should preferably be a type C dry cell. If candidates are supplied with a power source of variable voltage output, the voltage should be set by the supervisor and fixed e.g. taped
- (ii) a low voltage lamp that glows when connected to the power supply. The lamp must be supplied in a suitable holder
- (iii) a voltmeter capable of measuring up to 2.5V with minimum resolution of 0.1V
- (iv) an ammeter capable of measuring up to 1.00A with a minimum resolution of 0.05A
- (v) a switch. The switch may be an integral part of the power supply
- (vi) a wooden or plastic metre rule
- (vii) approximately 100 cm of straight, bare constantan wire of diameter 0.32mm (30 swg), taped to a metre rule at two places (between the 5.0 cm and 10.0 cm mark and between the 90.0 cm and 95.0 cm mark). The zero end of the wire is to be labelled **S**.
- (viii) 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.

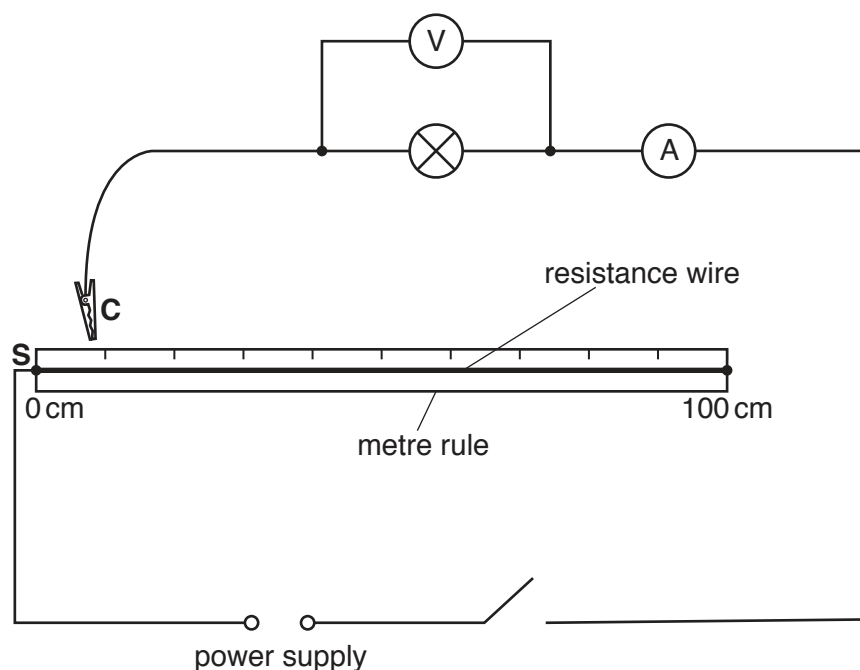


Fig. 3.1

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. Spare lamps should be available.

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 Supervisor)

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 (Supervisor)

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