
CO-ORDINATED SCIENCES

0654/51

Paper 5 Practical Test

May/June 2018

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) approximately 5 cm³ of bean puree in a 50 cm³ measuring cylinder which has divisions of 1 cm³ (see note 1)
- (ii) 10 cm³ of 5 volumes (1.5%) hydrogen peroxide, labelled **1.5% hydrogen peroxide** (see note 2)
- (iii) a stopclock
- (iv) 5 cm³ syringe without needle.

Notes

1. The bean puree can be made by liquidising 50g of soaked beans, for example white beans or butter beans, with approximately 35 cm³ of distilled water. If the measuring cylinders have divisions different to 1 cm³, this must be noted on the Supervisor's Report.
2. Prior to the examination it should be checked that 5 cm³ of bean puree and 5 cm³ of 1.5% hydrogen peroxide produces a volume of over 25 cm³ but less than 50 cm³ after 5 minutes. The concentration of the hydrogen peroxide may be adjusted, however, it **must** be labelled 1.5% hydrogen peroxide.

Question 2

Each candidate will require:

- (i) approximately 10cm^3 0.1mol dm^{-3} sodium bromide solution, labelled **K**
- (ii) approximately 10cm^3 0.1mol dm^{-3} sodium chloride solution, labelled **H**
- (iii) approximately 10cm^3 0.1mol dm^{-3} sodium iodide solution, labelled **J**
- [N] (iv) approximately 10cm^3 0.05mol dm^{-3} silver nitrate solution, labelled **silver nitrate**, supplied with a dropper
- [MH][N] (v) approximately 60cm^3 1.0mol dm^{-3} ammonia solution, labelled **ammonia**
- (vi) approximately 10cm^3 0.13mol dm^{-3} (1% w/v) sodium chlorate(I) solution (sodium hypochlorite solution), labelled **chlorine water** (see note 1)
- (vii) 2% starch solution, labelled **starch**, supplied with a dropper (see note 2)
- (viii) 6 test-tubes ($125\text{mm} \times 15\text{mm}$) (see note 3)
- (ix) a stirring rod.

Notes

1. Prior to the examination it should be checked that equal volumes of **J** and chlorine water followed by a few drops of starch solution produce a blue-black colour. Small amounts of chlorine gas [**C**][**T**], which can cause respiratory distress in some people, may be produced. The laboratory must be well ventilated.
2. Starch solution should be made as close as possible to the start of the examination.
3. Centres may provide fewer test-tubes, the minimum being 3 test-tubes ($125\text{mm} \times 15\text{mm}$). If this is the case, candidates will have to rinse test-tubes with distilled water so this must be provided.

Question 3

Each candidate will require:

- (i) a steel spring. An expendable steel spring is suitable, for example a 55 mm long spring, of diameter 15 mm (see www.philipharris.co.uk, catalogue number B8G87194)
- (ii) a stand, boss and clamp
- (iii) a 30 cm or 50 cm rule, graduated in millimetres
- (iv) loads of 1.0 N, 2.0 N, 3.0 N, 4.0 N and 5.0 N. A 100 g mass hanger, labelled 1.0 N with four 100 g slotted masses, each labelled 1.0 N is ideal. If these are not available, a suitable light hook must be provided so that the masses hang on the spring.

Notes

1. The apparatus is to be set up for candidates as shown in Fig. 3.1. The spring is to be sufficiently high above the bench so that when the 5.0 N load is hung on the spring, the bottom of the load is approximately 10 cm above the surface of the bench. Ensure that the spring is held tightly in the clamp.

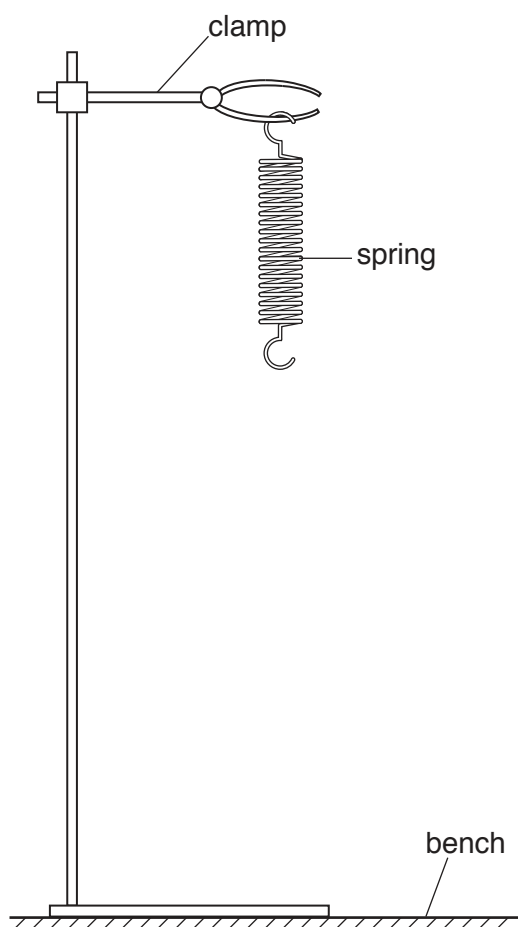


Fig. 3.1

2. At changeover, restore the apparatus to the form described in Note 1. Check that the spring has not been overstretched.

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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