
BIOLOGY

9790/03

Paper 3 Practical Examination

May/June 2014

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 7 which must be completed and returned with the scripts.



If you have any problems or queries regarding these Instructions, please contact Cambridge
by e-mail: info@cie.org.uk,
by phone: +44 1223 553554,
by fax: +44 1223 553558,
stating the Centre number, the nature of the query and the syllabus number quoted above.

This document consists of **8** printed pages.

Instructions for preparing apparatus

These instructions give details of the apparatus and materials required by each candidate for this paper. Sufficient information is given to permit the Centre to set up and test the apparatus and materials so that the candidates can be fairly assessed. **No access to the question paper is permitted in advance of 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 on the supervisor's report.

Candidates must be provided with a microscope with:

- low-power objective lens, e.g. $\times 10$ (equal to 16 mm or 2/3")
- high-power objective lens, e.g. $\times 40$ (equal to 4 mm or 1/6")
- eyepiece graticule fitted within the eyepiece and visible in focus at the same time as the specimen.

Each candidate should have sole, uninterrupted use of the microscope for at least 60 minutes.

HEALTH AND SAFETY

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 when necessary.

In accordance with the 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

H = harmful or irritating substance

T = toxic substance

F = highly flammable substance

O = oxidising substance

N = dangerous to the environment

The attention of Supervisors 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.

Instructions to Supervisors

Each candidate must be provided with the following apparatus and materials.

To be supplied by the Centre:

Question 1

Each candidate will require, for a period of 90 minutes:

- (i) 100 cm³ of a 7.0% yeast suspension with glucose. This is to be prepared about **one hour** before the examination, as follows.

7.0g of dried yeast for baking is added to warm distilled water, stirred and made up to 100 cm³. This should be kept at a temperature between 35 °C and 40 °C.

After about 30 minutes, 20g of glucose should be **sprinkled over the surface** of the water and stirred. As the mixture will froth, it should be kept in a large container.

The suspension should be provided to candidates in beakers labelled **yeast suspension in glucose solution**. The beakers should be large enough to contain the yeast suspension if it continues to froth. (250 cm³ beakers should be the most appropriate size to use.)

The glucose **must** be added to the yeast at least 10 to 15 minutes before the candidates start Question 1.

Supermarket own brand baker's yeast is suitable for this investigation.

- (ii) 50 cm³ of a 7.0% yeast suspension without glucose. This is to be prepared about **one hour** before the examination, as follows.

3.5g of dried yeast for baking is added to warm distilled water, stirred and made up to 50 cm³. This should be kept at a temperature between 35 °C and 40 °C. Glucose should **not** be added to this suspension.

This should be provided to candidates in small beakers labelled **yeast suspension in water**.

Additional supplies of yeast suspensions (with and without glucose) should be available in case candidates require them.

- (iii) 50 cm³ of a 20% glucose solution. This is to be prepared as follows.

10g of glucose is dissolved in warm distilled water, stirred and made up to 50 cm³. This should be provided to candidates in small beakers labelled **glucose solution**.

(iv) 6 simple respirometers.

Each is assembled by using a 15 mm length of PVC tubing to attach the nozzle of a 10 cm³ syringe to an approximately 160 mm length of soda glass tubing. The glass tubing should have an internal diameter of 2 mm and an external diameter of 4 mm. This is shown in Fig. 1.1.

Before attaching the glass tubing, ensure that the ends are smooth. It is recommended to insert the glass tubing into the PVC tubing while the PVC tubing is soaking in hot water.

If there is more than one sitting of the examination, candidates in subsequent sittings should be given clean, dry apparatus rather than apparatus which has been washed and is still wet.

The simple respirometers may be supported using retort stands and clamps or by standing in boiling tubes.

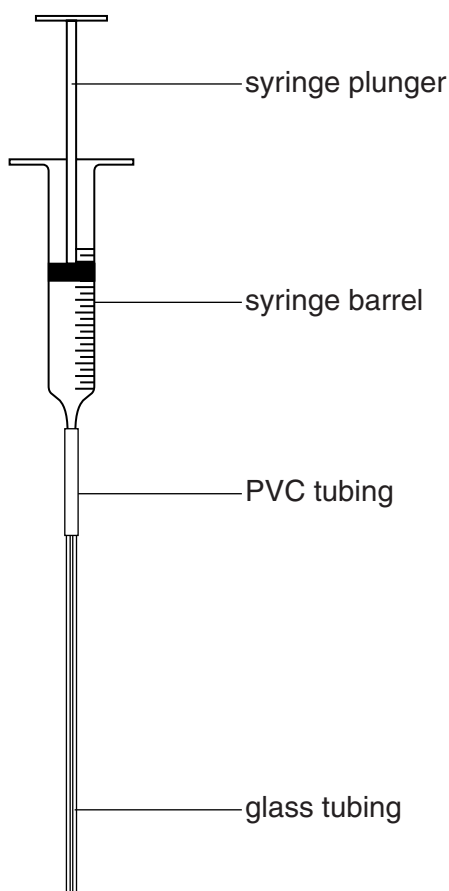


Fig. 1.1

(v) 10 boiling tubes (e.g. 150 × 24 mm).

(vi) A retort stand and clamp.

(vii) 2 × 10 cm³ syringes.

(viii) Rack or racks to contain at least ten boiling tubes.

(ix) Stopwatch, stop clock or bench timer.

(x) 3 × 400 cm³ beakers as water-baths for the boiling tubes.

- (xi) Access to supplies of water at 30 °C, water at 40 °C, hot water from a kettle and crushed ice. Water at 30 °C and water at 40 °C could be provided from thermostatically-controlled water baths, for example.

At the beginning of the examination, candidates should be informed about the water and ice available.

- (xii) Glass rod for stirring.
- (xiii) Bunsen burner, tripod and gauze.
- (xiv) 3 thermometers (–10 to 110 °C).
- (xv) Transparent 30 cm ruler (cm/mm).
- (xvi) Marker pen (fine).
- (xvii) Paper towels.
- (xviii) Beaker for waste, labelled **waste**.
- (xix) Beaker of tap water, labelled **washing water**.

Extra boiling tubes, 400 cm³ beakers and retort stands and clamps should be available in case candidates require them.

Question 2

Each candidate must have sole, uninterrupted use of a microscope fitted with an eyepiece graticule for at least 60 minutes, as described on page 2.

In addition, each candidate will require, for a period of 60 minutes:

- (i) Hand lens, e.g. ×8.
- (ii) Stage micrometer.
- (iii) Transparent ruler (cm/mm).

To be supplied by CIE:

Question 1

No materials to be supplied by CIE.

Question 2

- (i) Slides **K1**, **K2** and **K3**.

RETURN OF EXAMINATION MATERIALS TO CIE

Please read the following instructions carefully.

Immediately after the examination the slides must be returned to CIE in the containers in which they were received, using the self-adhesive labels for the parcel. They must not be included in parcels of scripts.

Please clearly indicate your Centre number when returning slides.

Slides and containers not returned in good condition will be charged at the rate of £3 per item.

The address for the return of slides is:

Ian Couchman,
Cambridge Assessment DC10,
Hill Farm Road,
Whittlesford,
CAMBRIDGE.
CB22 4FZ.

The slides may be purchased from CIE rather than being returned, using the form enclosed with the slides.

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This form must be completed and sent to the Examiner in the envelope with the scripts.

REPORT ON PRACTICAL BIOLOGY

Pre-U

The Supervisor or Teacher responsible for the subject should provide the following information.

1. Was any difficulty experienced in providing the necessary materials? If so, give brief details.

2. Give details of any difficulties experienced by particular candidates, giving names and candidate numbers. Reference should be made to:
 - (a) difficulties arising from faulty specimens or microscopes;
 - (b) accidents to apparatus or materials;
 - (c) assistance provided in case of colour-blindness;
 - (d) any other information that is likely to assist the Examiner, especially if this cannot be discovered from the scripts.

All other cases of individual hardship, e.g. illness or disability, should be reported direct to CIE on the normal 'Application for Special Consideration Form'.



- 3. Results for question 1. These should be obtained by the Supervisor or other competent biologist out of sight of candidates. Separate results should be provided for each session held, each laboratory used in that session and each set of materials supplied.

- 4. Enclose a plan of work benches with the scripts, giving details of the candidate numbers for the places occupied by the candidates for each session.

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.

Signed

Name (in block capitals)

Centre number

Centre name

If scripts are required by CIE to be despatched in more than one envelope, it is essential that a copy of the relevant Supervisor's report and the appropriate seating plan(s) are sent inside **each envelope**.

