
BIOLOGY (PRINCIPAL)

9790/03

Paper 3 Practical Examination

May/June 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 7 which must be completed and returned with the scripts.



If you have any problems or 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 Centre number, the nature of the query and the syllabus number quoted above.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 3 Pre-U Certificate.

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) 50 cm³ 1% Neutrase[®] solution prepared, as follows:

Dissolve 1 cm³ Neutrase[®] solution in 30 cm³ distilled water and make up to 100 cm³ with more distilled water. Supply in a beaker labelled **bacterial protease**.

Neutrase[®] solution must be prepared on the day of the examination.

Neutrase[®] must be obtained from the NCBE.

National Centre for Biotechnology Education
University of Reading
2 Earley Gate
Whiteknights
PO Box 226
Reading
RG6 6AU

Tel: 0118 9873743

Fax: 0118 9750140

email: NCBE@reading.ac.uk

website: www.ncbe.reading.ac.uk

- (ii) 200 cm³ of a 10 g dm⁻³ milk solution prepared from freshly bought Marvel[™] skimmed milk powder, as follows:

Dissolve 2 g Marvel[™] in some distilled water and make up to 200 cm³ with more distilled water. Supply in a beaker labelled **10 g dm⁻³ milk solution**.

The skimmed milk solution must be prepared on the day of the examination.

- (iii) 20 cm³ of a 1 g dm⁻³ milk solution. This can be prepared by diluting the 10 g dm⁻³ milk solution. Supply in a beaker labelled **1 g dm⁻³ milk solution**.
- (iv) 200 cm³ distilled water in a beaker labelled **distilled water**.
- (v) 250 cm³ distilled water in a beaker labelled **washing water**.
- (vi) 10 test-tubes.
- (vii) Rack or racks to contain at least 10 test-tubes.
- (viii) 4 small beakers (e.g. 50 cm³ or 100 cm³).
- (ix) 3 × 10 cm³ syringes, 3 × 1 cm³ syringes.
- (x) Glass rod.

- (xi) Marker pen.
- (xii) Stopwatch, stop clock or bench timer.
- (xiii) 400 cm³ beaker as a water-bath for the test-tubes.
- (xiv) Bunsen burner, tripod and gauze.
- (xv) Thermometer (–10 to 110 °C).
- (xvi) Test-tube holder.
- (xvii) Candidates should be provided with water at 30 °C and at 40 °C, for example from thermostatically-controlled water-baths, but they should not have the use of these water-baths for their own test-tubes.
- (xviii) Paper towels.
- (xix) Protective gloves.
- (xx) Eye protection.
- (xxi) Beaker for waste, labelled **waste**.

Extra supplies of the bacterial protease solution, 10 g dm⁻³ milk solution, distilled water, test-tubes, beakers and syringes should be available if candidates request them.

Questions 2 and 3

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 (mm/cm).

- (iv) Some fruits of shepherd's purse, *Capsella bursa-pastoris*, as shown in Fig. 3.1.

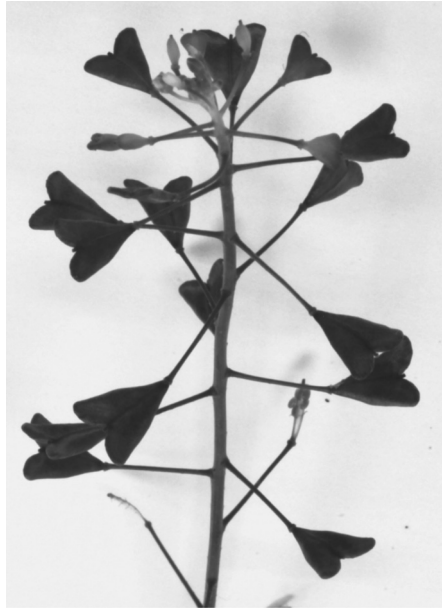


Fig. 3.1

The fruits should be cut from the main stem leaving the long pedicel attached. Candidates should be provided with the fruits in a Petri dish or other suitable container, labelled **K2**.

- (v) Fine forceps.
- (vi) Mounted needle.
- (vii) Scalpel (e.g. Swann-Morton No. 11).
- (viii) Single-edged razor blade.
- (ix) Small beaker of water labelled **water** with a disposable plastic pipette.
- (x) Iodine in potassium iodide solution in a dropping bottle or small beaker labelled **iodine solution**.
- (xi) 3 × microscope slides.
- (xii) White tile.
- (xiii) Filter papers and paper towels.
- (xiv) Six soaked maize grains. These should be soaked in water for at least two days before the examination. Candidates should be provided with the grains in a Petri dish or other suitable container, labelled **K4**.

To be supplied by CIE:

Question 1

No materials to be supplied by CIE.

Questions 2 and 3

- (i) Slides **K1** and **K3**. The number of slides supplied by CIE will be equal to half the candidate entry.

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
CIE Laboratory
1 Hills Road
Cambridge
CB1 2EU

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**.

