



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
Cambridge International Level 3 Pre-U Certificate
Principal Subject

BIOLOGY

9790/04

Paper 4 Practical

May/June 2012

CONFIDENTIAL INSTRUCTIONS

Great care should be taken to ensure that any confidential information given does not reach the candidates either directly or indirectly.



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 $\frac{2}{3}$ ")
- High-power objective lens, e.g. $\times 40$ (equal to 4 mm or $\frac{1}{6}$ ")
- 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 35 minutes. Supervisors are advised to remind all candidates that all substances in the examination should be treated with caution. Pipette fillers and safety goggles should be used when necessary.

HEALTH AND SAFETY

Attention is drawn to the section on Health and Safety in the Pre-U Biology Syllabus. This section covers the Practical Examination as well as the practical work that is done during the course. Centres are reminded that, in UK law, the responsibility for Health and Safety lies with the employer.

Materials used in the examination should display appropriate internationally agreed hazard symbols.

Risk assessments by Centres of chemical and materials as well as labelling of chemicals and materials and provision of safety equipment should follow the legislation in force in the country in which the examination is conducted.

In accordance with the COSHH (Control of Substances Hazardous to Health) Regulation, operative in the UK, a hazard appraisal of the examination has been carried out.

The following codes are used where relevant.

- C = corrosive substance
- H = harmful or irritating substance
- F = highly flammable substance
- O = oxidising substance
- T = toxic substance

Centres are reminded that they are not permitted to open any question paper envelopes before the examination. Centres are also referred to the Handbook for Centres 2007, and in particular Section 3.1.2 (c), Security of Question Papers and Examination Materials, as well as 3.3.11.1, Practical Examinations in Science Subjects.

Instructions to Supervisors

Each candidate must be provided with the following apparatus and materials for **Section A** only.

To be supplied by the Centre.

Question 1

Each candidate will require, for a period of 35 minutes:

- (i) Five balls of cotton wool soaked in the following solutions

C1 tap water

C2 50 g dm^{-3} (5%) glucose solution

C3 1 g dm^{-3} (0.1%) glucose solution and 50 g dm^{-3} (5%) sucrose solution

C4 10 g dm^{-3} (1%) glucose solution

C5 50 g dm^{-3} (5%) sucrose solution

Prepare three stock solutions of glucose as follows:

 50 g dm^{-3} (5%) solution

Put 5 g of glucose into a suitable container and add a few cm^3 of warm distilled water. Stir until the glucose has dissolved and then make up to 100 cm^3 with distilled water.

 10 g dm^{-3} (1%) solution

Put 1 g of glucose into a suitable container and add a few cm^3 of warm distilled water. Stir until the glucose has dissolved and then make up to 100 cm^3 with more distilled water.

 1 g dm^{-3} (0.1%) solution

Put 0.1 g of glucose into a suitable container and add a few cm^3 of warm distilled water. Stir until the glucose has dissolved and then make up to 100 cm^3 with more distilled water. Alternatively this can be prepared by diluting 10 cm^3 of the 10 g dm^{-3} solution with 90 cm^3 of distilled water.

Prepare the solution of sucrose as follows:

 50 g dm^{-3} (5%) solution

Put 5 g of Analar sucrose into a suitable container and add a few cm^3 of distilled water. Stir until the sucrose has dissolved and then make up to 100 cm^3 with distilled water.

Analar reagent must be used to make the sucrose solution so that it is free of reducing sugar.

Prepare the samples as follows:

sample	volume / cm ³				
	distilled water	1 g dm ⁻³ glucose	10 g dm ⁻³ glucose	50 g dm ⁻³ glucose	50 g dm ⁻³ sucrose
C1	40				
C2				40	
C3		20			20
C4			40		
C5					40

Supply the samples in small beakers (e.g. 100 cm³) labelled **C1** to **C5**. Each beaker should contain a ball of cotton wool. The balls of cotton wool should be the same size.

- (ii) 20 cm³ 1 mol dm⁻³ hydrochloric acid in a beaker or screw top bottle labelled **dilute hydrochloric acid – irritant**.
 - (iii) 20 cm³ 1 mol dm⁻³ sodium hydroxide in a beaker or screw top bottle labelled **dilute sodium hydroxide – corrosive**.
 - (iv) 50 cm³ Benedict's solution in a beaker labelled **Benedict's solution**.
 - (v) Five test-tubes (e.g. 12 cm × 1.4 cm) labelled **C1** to **C5** (using a permanent marker) provided in a test-tube rack.
 - (vi) 400 cm³ glass beaker to act as a hot water bath; Bunsen burner, gauze, tripod or hot plate for heating water; thermometer; test-tube holder.
- Candidates should be provided with hot water for setting up their water bath and are not expected to boil water from cold.
- (vii) 2 × 10 cm³ syringes; 2 × 5 cm³ syringes; 2 × 1 cm³ syringes; glass rod, 2 × disposable pipettes.
 - (viii) A supply of Universal Indicator paper and colour chart. These should be provided in a suitable container, such as a Petri dish with lid or stoppered specimen (sample) tube.
 - (ix) 250 cm³ beaker half filled with cold water labelled **cold water bath**.
 - (x) An empty beaker labelled **waste liquids**, and a beaker half filled with cold distilled or deionised water labelled **water for washing**.
 - (xi) Stopwatch, stop clock or bench timer.
 - (xii) Eye protection.
 - (xiii) Paper towels.
 - (xiv) Two empty test-tubes.
 - (xv) Small filter funnel and 5 filter papers (e.g. Whatman Grade 1 or Grade 4).
 - (xvi) A4 sheet of white card or stiff white paper.

Question 2

Each candidate must have sole use of a microscope for 35 minutes.

- (i) Hand lens, e.g. $\times 10$.
- (ii) Slide **T1**, provided by CIE.
- (iii) Candidates must be provided with a microscope with:
 - Low-power objective lens, e.g. $\times 10$ (equal to 16 mm or $\frac{2}{3}$ ")
 - High-power objective lens, e.g. $\times 40$ (equal to 4 mm or $\frac{1}{6}$ ")
 - Eyepiece graticule fitted within the eyepiece and visible in focus at the same time as the specimen. Eyepiece graticule to be supplied by CIE.
- (iv) Slide micrometer (to be provided by CIE).

No equipment is required for questions **3**, **4** and **5**.

RETURN OF EXAMINATION MATERIALS TO CAMBRIDGE

Immediately after the examination the microscope slides **must** be:

- returned to Cambridge in the containers in which they were received, using the self-adhesive label. They must **not** be included in the package of scripts.

Or

- purchased using the order form enclosed with the slides, which should be completed and returned to Cambridge. This must **not** be included in the package of scripts.

Slides and boxes will be charged at the rate of £3 per slide and £1 per box.

If the items are not returned or purchased by the deadline stated on the order form they will be charged at £3.50 per slide plus £1 per box.

The address for the return of slides is:

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

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3. Results for question 1.

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**.

