



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

BIOLOGY

9700/33

Paper 3 Advanced Practical Skills

October/November 2009

CONFIDENTIAL INSTRUCTIONS

Great care should be taken to ensure that any confidential information given, including the identity of material on microscope slides where appropriate, does not reach the candidates either directly or indirectly.



If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: International@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 7 printed pages and 1 blank page.



Instructions for preparing apparatus

These instructions give details of the apparatus required by each candidate for each experiment in this paper. A summary of the questions that will be presented to the candidates is included, where appropriate, to allow the Biology teacher to test the apparatus appropriately. **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 in 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 must have sole, uninterrupted, use of the microscope for at least 55 minutes.

Supervisors are advised to remind candidates that **all** substances in the examination should be treated with caution. Pipette fillers and safety goggles should be used where 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.

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 = harmful to environment

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

If there are any difficulties with any aspect of setting up this practical examination that the Centre is not able to sort out, it is essential for Centres to contact the Product Manager, Dr Rick Nelms, as soon as possible by e-mail to international@cie.org.uk, by fax to +44 1223 553558 or by phone to +44 1223 553554.

Confidential Instructions

Question 1

Fresh reagents and **S1**, **S2**, **S3**, **S4** and **S5** are needed for each candidate. More of the solutions should be available if requested by candidates.

All solutions and reagents given to candidates must be in a suitable beaker, or container, to allow the removal of the solution using the appropriate syringe.

You will need the following stock solutions:

1% starch solution

This is prepared by dissolving 1 g of starch in 10 cm³ of distilled water and stirring well. Make up to 100 cm³ with boiling distilled water, stir well and then cool to room temperature.

This starch solution should give a negative result when tested with Benedict's solution.

0.1% starch solution

This is prepared by adding 10 cm³ of the 1% starch solution to 90 cm³ of distilled water and stirring well.

20% glucose solution

This is prepared by dissolving 20 g of glucose in 50 cm³ of distilled water and making it up to 100 cm³ with distilled water.

0.2% glucose solution

This is prepared by dissolving 2 g of glucose in 50 cm³ of distilled water and making it up to 1 dm³ with distilled water.

2% egg albumen solution

This is prepared by dissolving 2 g of egg albumen in 50 cm³ of warm distilled water and stirring well. Make up to 100 cm³ with distilled water.

Each candidate will require:

- (i) **S1**, at least 20 cm³ of 0.1% starch solution, in a beaker or container, labelled **S1**.
S2, at least 20 cm³ of a solution, in a beaker or container, labelled **S2**, made up of 10 cm³ of 2% egg albumen solution and 10 cm³ of 20% glucose solution. Stir well.
S3, at least 20 cm³ of a solution, in a beaker or container, labelled **S3**, made up of 10 cm³ of 1.0% starch solution and 10 cm³ of 0.2% glucose solution. Stir well.
S4, at least 20 cm³ of distilled water, in a beaker or container, labelled **S4**.
S5, at least 20 cm³ of a solution, in a beaker or container, labelled **S5**, made up of 10 cm³ of 2% egg albumen solution and 10 cm³ of 0.1% starch solution. Stir well.
- [H] (ii) At least 20 cm³ of iodine in potassium iodide solution, in a beaker or container, labelled **Iodine solution**.
- [H] (iii) At least 50 cm³ of Benedict's solution, in a beaker or container, labelled **Benedict's solution**.
- (iv) At least 50 cm³ of biuret reagent, in a beaker or container, labelled **biuret reagent**. Alternatively, [C] [H] the Centre should provide the separate chemicals which candidates use to test for protein, suitably labelled. These should be in beakers or containers (so that a syringe can be used).

It is advisable to wear safety glasses/goggles when handling chemicals.

Apparatus:

- (i) Spotting tile.
- (ii) Teat pipette (dropping pipette).
- (iii) One 2 cm³ or 5 cm³ syringe.
- (iv) One 10 cm³ syringe.
- (v) Container with tap water, labelled **For washing**.
- (vi) Container, labelled **Waste**.
- (vii) Five large test-tubes (boiling tubes), or glass test-tubes suitable for heating.
- (viii) Five test-tubes.
- (ix) Test-tube holder.
- (x) Glass rod.
- (xi) Stop clock, stop watch or sight of a clock.
- (xii) Water-bath with water at more than 80 °C or Bunsen burner, tripod, gauze and bench mat plus at least 400 cm³ beaker suitable for water-bath and matches.
- (xiii) Test-tube rack or beaker to hold large test-tubes.
- (xiv) Glass marker pen.
- (xv) Safety goggles/glasses.
- (xvi) Paper towel.
- (xvii) Thermometer –10 °C to 110 °C.

The Supervisor should, **out of the sight of the candidates**, carry out **Q.1** and write the **results** in the Supervisor's report which should be enclosed with the candidates' scripts. Please ensure that if the scripts are in several packets that a copy of the Supervisor's report is enclosed with each packet of scripts. The invigilator should **not** carry out **Q.1**.

Question 2

Each candidate will require:

- (i) Slide **J1** (from Cambridge).
- (ii) A microscope:
 - 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 (from Cambridge) fitted within the eyepiece and visible in focus at the same time as the specimen.

Each candidate must have sole, uninterrupted use of the microscope for 55 minutes.

On receipt of the slides, please check that they are labelled **J1** and that all slides are intact. The identity of material on the slides is **confidential** and must **not** be disclosed to candidates.

Cambridge will supply enough slides for half of the candidates to do **Q.2** first, followed by the other half of the candidates.

RETURN OF EXAMINATION MATERIALS TO CAMBRIDGE

Immediately after the examination, microscope slides **must** be returned to CIE in the containers in which they were received, using the self-adhesive label for the parcel. They must **not** be included in the parcel of scripts. It may be possible to buy the slides, in which case an order form will be enclosed with the slides, and should be returned to CIE using the self-adhesive label for the letter. Slides and containers not returned in good condition will be charged at a rate of £4 per item to which may be added administrative costs.

REPORT FORM

The teacher responsible for the examination is asked to fill in the Report Form on pages 7 and 8 of these Confidential Instructions. For Centres where more than one script envelope is used, there must be a copy of the complete Report Form in each script parcel.

These report forms are vital in order to allow the examiners to assess all candidates as fairly as possible and should always be completed by every Centre.

A copy of the seating plan for the examination room must also be enclosed in each script parcel.

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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 of 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**.

