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

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills **May/June 2008**

CONFIDENTIAL INSTRUCTIONS

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

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If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: International@ucles.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 **6** printed pages and **2** blank pages.

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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. × 10 (equal to 16 mm or $\frac{2}{3}''$)
- High-power objective lens, e.g. × 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

F = highly flammable substance

H = harmful or irritating substance

O = oxidising substance

T = toxic 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.

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Confidential Instructions

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

Question 1

Each candidate will require:

[H] **(i)** at least 20 cm^3 Benedict's solution in bottle with pipette, labelled as Benedict's.

[H] **(ii)** at least 20 cm^3 Iodine in potassium iodide in bottle with pipette labelled as Iodine in KI.

[H] **(iii)** at least 20 cm^3 Biuret reagent in bottle with pipette labelled Biuret (or 1.0 $mol\,dm^{-3}$ potassium hydroxide and 1% copper sulphate solution).

[H] **(iv)** at least 20 cm^3 1.0 $mol\,dm^{-3}$ hydrochloric acid labelled hydrochloric acid.

(v) 5 g sodium bicarbonate powder labelled sodium bicarbonate with spatula.

(vi) 10 cm^3 of each of the following solutions in small beakers/containers

1% (1 g in 100 cm^3 distilled water) glucose solution labelled **S1**.

1% (1 g in 100 cm^3 distilled water) albumen solution made by dissolving dried albumen in 90°C distilled water. This may need filtering. (Alternatively a 10% (10 g in 100 cm^3 distilled water) solution of egg white that will then contain 1% albumen) labelled **S2**.

1% (1 g in 100 cm^3 distilled water) sucrose solution labelled **S3**. We recommend you use fresh analar sucrose. Well in advance of the examination, test the sucrose solution by heating with Benedict's solution. A blue colour should be obtained. If any other colour is obtained please replace the sucrose with analar sucrose.

(vii) 8 boiling tubes or test tubes which can be heated, in a test tube rack or beaker. A smaller number could be supplied with the means to wash them out.

(viii) graduated pipette or syringe graduated to 10 cm^3 and means of washing it out

(ix) waterbath at 90°C and a Bunsen burner OR means to make a waterbath from beaker, tripod, gauze and Bunsen burner

(x) matches or means to light the Bunsen if needed

(xi) glass marker pen

(xii) test tube holder

(xiii) safety goggles/glasses

(xiv) spotting tile

(xv) stop clock or sight of a clock

Fresh S1, S2 and S3 must be provided for each candidate.

The Supervisor should, out of sight of the candidates, test S1, S2 and S3 and record the results on the Supervisor's report which should be sent with the scripts.

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Question 2

Each candidate will require:

(i) Slide **J1** (from Cambridge).

(ii) Microscope with:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}''$)
- High-power objective lens, e.g. × 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.

(iii) A stage micrometer.

At the start of the examination the Supervisor should tell the candidates the length of the smallest division on the stage micrometer scale – candidates should write this in the box provided on the front cover of the examination paper.

This information should also be recorded on the Supervisor's report form.

On stage micrometer scales provided by CIE the smallest division is 0.1 mm.

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University of Cambridge International Examinations is part of the University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

This form should be completed and sent to the examiner with the scripts.

REPORT ON PRACTICAL BIOLOGY

A Level

May/June Session 2008

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

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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 'Special Consideration Form' as detailed in Part 6 of the Handbook for Centres.

3. Results for question **1 (a)**.

4. The smallest division on the stage micrometer scale

.....

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[Turn over

5. 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. The space below can be used for this, or it may be on separate paper.

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 .....

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Confidential Instructions

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Question 1

EACH CANDIDATE WILL NEED EITHER two 3 cm lengths of fresh spring onion leaf or two 5 cm lengths of celery stalk. At the start of the examination make sure candidates are aware of which material they have been given and make sure they tick the correct material in the box on the front cover of the exam paper.

The supervisor should, out of sight of the candidates, carry out the experiment in question 1(a), during the examination, and record the results on the Supervisor's Report.

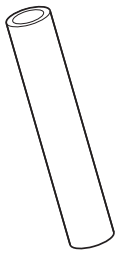


Fig. 1.1

Each candidate will require:

(i) EITHER two 3 cm lengths of fresh, hollow green onion leaf, labelled **P1** as shown in **Fig. 1.1**. The lengths of leaf may be prepared up to 24 hours before the examination. They should be stored in a plastic bag and kept cool (**but not frozen**) to avoid any loss of water.

OR two 5 cm lengths of celery labelled **P1**. The lengths of celery may be prepared up to 24 hours before the examination. They should be stored in a plastic bag and kept cool **(but not frozen)** to avoid any loss of water.

(ii) A large test-tube (also known as a boiling tube) containing 10 cm^3 of a 0.1 mol dm^{-3} solution of sucrose solution labelled **X1**. The solution should be prepared by dissolving 3.4 g of sucrose in 100 cm^3 of distilled water.

(iii) Five empty large test-tubes (boiling tubes) and means of labelling them.

(iv) A beaker containing 50 cm^3 of 0.6 mol dm^{-3} sucrose solution, labelled **T1**.
The solution should be prepared by dissolving 20.5 g of sucrose in 100 cm^3 of distilled water.

(v) A beaker containing 50 cm^3 of distilled water, labelled **distilled water**.

(vi) Measuring cylinder and syringe to measure 10 cm^3.

(vii) Paper towel.

(viii) A ruler, measuring in mm.

(ix) A scalpel or sharp knife.

(x) A white tile or cutting board.

(xi) Stopclock or stopwatch or sight of a clock.

(xii) Petri dish.

(xiii) Forceps.

(xiv) Means to wash measuring cylinder/syringe.

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Question 2

Each candidate will require:

(i) Slide **K1** (from Cambridge).

(ii) Microscope with:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}$″)
- High-power objective lens, e.g. × 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.

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