



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

BIOLOGY

9700/36

Advanced Practical Skills 2

October/November 2011

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, Security of Question Papers and Examination Materials, as well as 3.4.1, Practical Examinations in Science Syllabuses.

If there are any difficulties with any aspect of setting up this practical examination that the Centre is not able to resolve, it is essential for Centres to contact the Product Manager 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

Each candidate should have a **mm ruler** for use in both questions.

Each candidate will require:

Question 1

- Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solution using a syringe. More of the solutions should be available if requested by candidates.
- Fresh **E**, **S**, **U**, Benedict's solution and **W** are needed for each candidate.
- All solutions and reagents should be disposed of according to local safety regulations.

Summary of solutions and reagents:

| labelled | contents | hazard | percentage concentration | volume / cm ³ |
|----------------------------|---------------------|----------------------|--------------------------|--------------------------|
| E | invertase solution | [H] irritant | 5 | at least 25 |
| S | sucrose solution | none | 10 | at least 25 |
| U | sucrose solution | none | 3 | at least 10 |
| Benedict's solution | Benedict's solution | [H] harmful irritant | – | at least 60 |
| W | distilled water | none | – | at least 150 |

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

Preparation of solutions and reagents:

- [H] (i) **E**, at least 25 cm³ of 5% invertase solution, in a small beaker or container, labelled **E**. This is prepared by dissolving 5 cm³ of invertase solution (supplied by Cambridge) in 80 cm³ of distilled water and stirring thoroughly. Make up to 100 cm³ with distilled water.
100 cm³ of **E** is sufficient for 4 candidates.
- (ii) **S**, at least 25 cm³ of 10% sucrose solution, in a beaker or container, labelled **S**. This is prepared by dissolving 10g of sucrose in 80 cm³ of distilled water and making up to 100 cm³ with distilled water.
100 cm³ of **S** is sufficient for 4 candidates.

Before the examination the reducing sugar (Benedict's) test with the sucrose solution should give a negative result. Analar sucrose should be used if available. Some types of granulated table (cane) sugar may also be suitable.

- (iii) **U**, at least 10 cm³ of 3% sucrose solution, in a beaker or container, labelled **U**. This is prepared by dissolving 3 g of sucrose in 80 cm³ of distilled water and making up to 100 cm³ with distilled water.
100 cm³ of **U** is sufficient for 10 candidates.

[H] (iv) **Benedict's solution**, at least 60 cm³ of Benedict's solution, in a beaker or container, labelled **Benedict's**.

This should be **qualitative** Benedict's solution as provided by your supplier or made up by the technician. Please note it is important to use copper sulfate pentahydrate (CuSO₄·5H₂O) crystals when making up the Benedict's solution. You must not use anhydrous copper sulfate.

60 cm³ of **Benedict's solution** is sufficient for 1 candidate.

(v) **W**, at least 150 cm³ of distilled water in a beaker or container, labelled **W**.

Apparatus for each candidate:

| Apparatus | Quantity | ✓ |
|---|----------|---|
| 10 cm ³ syringe with the means to wash it out | 2 | |
| 2 cm ³ , 3 cm ³ or 5 cm ³ syringe with the means to wash it out | 2 | |
| Container with tap water, labelled For washing | 1 | |
| Container, labelled For waste | 1 | |
| Paper towels | 8 | |
| Beakers or containers to hold 20 cm ³ volume | 5 | |
| Beakers or containers which should have water with a temperature of at least 50 °C and be able to hold 7 test-tubes. Label next to one beaker for Benedict's test (step 2) and the other beaker for reaction (step 7) | 2 | |
| Test-tubes | 7 | |
| Test-tube rack(s) or container(s) to hold 7 test-tubes | 1 | |
| Test-tube holder to hold hot test-tubes | 1 | |
| Water-bath equipment (note: candidates must set up their own water-bath) Bunsen burner, tripod, gauze, bench mat, matches and a thermometer –10 °C to 110 °C | 1 | |
| White card or paper or tile | 1 | |
| Stop clock, stop watch or sight of a clock with a second hand | 1 | |
| Glass marker pen | 1 | |
| Safety goggles/glasses | 1 | |

During the examination, the Supervisor should, **out of the sight of the candidates**, carry out **Question 1**, using the same solutions and reagents as the candidates. These results should be written in the Supervisor's report (**not** on a spare Question paper), which should be enclosed with the candidates' scripts. If the scripts are in several packets, please ensure that a copy of the Supervisor's report is enclosed with each packet of scripts. The Invigilator should **not** carry out **Question 1**.

Question 2

- (i) Slide **N1** (supplied by Cambridge).
- (ii) 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 (supplied from Cambridge) fitted within the eyepiece and visible in focus at the same time as the specimen. **Centres are advised to keep these for future use as they will not be supplied in 2012.**

On receipt of the slides, please check that they are labelled **N1** and that all the slides are intact. The identity of material on the slides is **confidential** and must **not** be disclosed to candidates.

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

The number of slides supplied by Cambridge will be equal to half the candidate entry. Therefore, half of the candidates should start on **Question 1** and the other half should start on **Question 2**.

MATERIALS TO BE SUPPLIED BY CAMBRIDGE

- (i) Question papers
- (ii) Invertase solution
- (iii) Slide **N1**
- (iv) Eyepiece graticule – if the Centre has its own eyepiece graticules these may be used.

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 packet of scripts.

Or

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

REPORT FORM

The teacher responsible for the examination is asked to fill in the Report Form in these Confidential Instructions. For Centres where more than one script packet is used, there must be a copy of the completed Report Form in each script packet.

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 packet.

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

REPORT ON PRACTICAL BIOLOGY

A Level

October/November Session 2011

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

3. During the examination, the Supervisor should, **out of the sight of the candidates**, carry out **Question 1**, using the same solutions and reagents as the candidates. These results should be written in the Supervisor's report (**not** on a spare Question paper), which should be enclosed with the candidates' scripts. If the scripts are in several packets, please ensure that a copy of the Supervisor's report is enclosed with each packet of scripts. The Invigilator should **not** carry out **Question 1**.



Results of Question 1

Temperature of examination room =°C

- 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. Separate paper can be used for this.

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 (of enclosed scripts)

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**.

