



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

BIOLOGY

9700/36

Advanced Practical Skills 2

October/November 2013

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: 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.

This document consists of **8** printed pages.



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:

- Eyepiece lens, $\times 10$ (equal to 16 mm or $\frac{2}{3}$ ")
- Low-power objective lens, $\times 10$ (equal to 16 mm or $\frac{2}{3}$ ")
- High-power objective lens, $\times 40$ (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.

To avoid confusion, Cambridge request that only the lenses specified above are fitted in the microscopes to be used in the examination. Any lenses which are **not** $\times 10$ or $\times 40$ should be removed or replaced.

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 should also refer to the Handbook for Centres.

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 info@cie.org.uk, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

Confidential Instructions

Each candidate will require:

For both Questions

- mm ruler.

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 and reagents should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **E1**, **E2**, **S**, **G**, **W** and **Benedict's solution** 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	volume / cm ³
E1	1.0% fungal amylase	[H] harmful irritant	at least 20
E2	0.1% fungal amylase	[H] harmful irritant	at least 20
S	1.0% starch solution	none	at least 50
G	0.4% glucose solution	none	at least 20
W	distilled water	none	at least 100
Benedict's	Benedict's solution	[H] harmful irritant	at least 50

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

Preparation of solutions and reagents:

[H] (i) **E1**, at least 20 cm³ of 1% fungal amylase solution in a beaker or container, labelled **E1**.

This is prepared by putting 1 cm³ of amylase enzyme (supplied by Cambridge) into a beaker or container and making up to 100 cm³ with distilled water and mixing well.
This is sufficient for 5 candidates,

[H] (ii) **E2** at least 20 cm³ of 0.1% fungal amylase solution in a beaker or container, labelled **E2**.

This is prepared by putting 10 cm³ of 1% amylase enzyme (from (i)) into a beaker or container and making up to 100 cm³ with distilled water and mixing well.
This is sufficient for 5 candidates,

Test the activity of the enzyme by putting drops of iodine solution onto a spotting tile and adding drops of **E1** mixed with **S** at intervals. The colour should stay yellow-brown within 5 minutes.

(iii) **S**, at least 50 cm³ of 1% starch solution in a beaker or container, labelled **S**.

This is prepared by putting 1 g of starch into 25 cm³ of warm distilled water in a beaker or container and mixing to a paste. Make up to 100 cm³ by adding boiling distilled water, mix well and then allow to cool.

This is sufficient for 2 candidates.

(iv) **G**, at least 50 cm³ of 0.4% glucose solution in a beaker or container, labelled **G**.

This is prepared by sprinkling 0.4 g of anhydrous glucose onto the surface of 80 cm³ of distilled water, stirring continuously as you sprinkle. Make up to 100 cm³ with distilled water.

This is sufficient for 2 candidates.

(v) **W**, at least 100 cm³ of distilled water in a beaker or container, labelled **W**.

[H] (vi) **Fresh Benedict's solution**, at least 50 cm³ in a beaker or container, labelled **Benedict's**.

This must be **qualitative Benedict's solution** as provided by your supplier or made up by the technician. Please note it is important to use hydrated copper sulfate crystals copper(II) sulfate(VI)-5-water when making up the Benedict's solution.

Apparatus for each group of candidates should be clean.

Apparatus for each candidate	Quantity	✓
10 cm ³ syringe with the means to wash it out (note: needles are not required and should not be given to candidates)	1	
5 cm ³ syringes, one to be only used for S and one to be only used for G (note: needles are not required and should not be given to candidates)	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	6	
Test-tubes – large, to hold up to 20 cm ³ volume of solution	6	
Test-tube rack or container to hold 6 test-tubes	1	
Test-tube holder to hold hot test-tube	1	
white card or paper – approximately 10 cm by 10 cm	1	
Water-bath equipment for each candidate: Bunsen burner, tripod, gauze, bench mat, at least 250 cm ³ clear beaker with warm water, to start between 45 °C and 50 °C, matches and a thermometer –10 °C to 110 °C	1	
A stop-clock or a stopwatch with a second hand . If sight of a clock with second hand is the only means of timing available to candidates, please report this as part of the Supervisor's Report.	1	
Glass rod	1	
Glass marker pen	1	
Safety goggles/glasses	1	

During the examination, the Supervisor (**not** the Invigilator) 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.

The Supervisor's Report and the candidates' seating plan should be enclosed with the candidates' scripts.

Please ensure that, if the scripts are in several packets, a copy of the Supervisor's Report and the candidates' seating plan are enclosed with each packet of scripts.

Question 2

- (i) Slide **N1** (supplied by Cambridge).
- (ii) Microscope with:
- Low-power objective lens, $\times 10$ (equal to 16 mm or $\frac{2}{3}$ ")
 - High-power objective lens, $\times 40$ (equal to 4 mm or $\frac{1}{6}$ ")
 - Eyepiece lens, $\times 10$ (equal to 16 mm or $\frac{2}{3}$ ")
 - Eyepiece graticule fitted within the eyepiece and visible in focus at the same time as the specimen.

To avoid confusion, Cambridge request that only the lenses specified above are fitted in the microscopes to be used in the examination. Any lenses, which are **not** $\times 10$ or $\times 40$, should be removed or replaced.

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 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) Enzyme fungal amylase – refrigerate on receipt.
- (iii) Slide **N1**.

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. The order form 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 and SEATING PLAN

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 and the candidates' seating plan 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.

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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 2013

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, eg illness or disability, should be reported direct to CIE on the normal 'Special Consideration Form' as detailed in 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 or the Examinations Officer)

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**.

