



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

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**BIOLOGY**

9700/31

Advanced Practical Skills 1

May/June 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.**



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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.

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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.**

Centres are reminded that candidates are expected to follow the instructions on the question paper and record all their results. They will not be penalised if these results are not what they expect.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

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.

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

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

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](mailto: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 should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh solutions of **S1**, **S2**, **S3**, **S4** and **S5** are needed for each candidate.
- All solutions and reagents should be disposed of according to local safety regulations.

Summary of solutions, reagents and materials:

labelled	contents	hazard	volume / cm <sup>3</sup>
<b>S1</b>	distilled water	none	at least 25
<b>S2</b>	10% sucrose solution	none	at least 25
<b>S3</b>	1% protein solution	none	at least 25
<b>S4</b>	1% starch solution	none	at least 25
<b>S5</b>	1% glucose solution	none	at least 25

Reagents to test for:

- starch
- reducing sugar
- non-reducing sugar
- protein.

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

Preparation of solutions and reagents:

- (i) **S1**, at least 25 cm<sup>3</sup> of distilled water in a small beaker or container (so that a syringe can be used), labelled **S1**.

This is sufficient for 1 candidate.

- (ii) **S2**, at least 25 cm<sup>3</sup> of 10% sucrose solution in a beaker or container, labelled **S2**.

This is prepared by dissolving 10g of sucrose in 80 cm<sup>3</sup> of distilled water in a beaker or container. Make up to 100 cm<sup>3</sup> with distilled water.

This is sufficient for 4 candidates.

Before the examination the test for reducing sugar should give a negative result.

Analar sucrose should be used if available. Some types of granulated (table) sugar may also be suitable.

- (iii) **S3**, at least 25 cm<sup>3</sup> of 1% egg albumen protein in a beaker or container, labelled **S3**.

This is prepared by dissolving 1 g of egg albumen protein in 80 cm<sup>3</sup> of distilled water in a beaker or container and mixing to a paste. Make up to 100 cm<sup>3</sup> with distilled water.

This is sufficient for 4 candidates.

- (iv) **S4**, at least 25 cm<sup>3</sup> of 1% starch solution, in a beaker or container, labelled **S4**.

This is prepared by putting 1 g of starch into 5 cm<sup>3</sup> of warm distilled water, in a beaker or container and mixing to a paste. Make up to 100 cm<sup>3</sup> with hot distilled water, mix well and allow to cool.

It may be necessary to heat the starch suspension to dissolve the starch.

This is sufficient for 4 candidates.

- (v) **S5**, at least 25 cm<sup>3</sup> of 1% glucose solution, in a beaker or container, labelled **S5**.

This is prepared by sprinkling 1 g of anhydrous glucose onto the surface of 80 cm<sup>3</sup> of distilled water stirring continuously while you sprinkle until dissolved. Make up to 100 cm<sup>3</sup> with distilled water.

This is sufficient for 4 candidates.

- (vi) **Reagents** which candidates would normally use to test for the biological molecules:

- **starch**
- **reducing sugar**
- **non-reducing sugar**
- **protein.**

The volumes supplied should be enough to carry out at least 6 tests for each molecule.

The containers should be labelled appropriately with the contents and appropriate hazard warnings. The containers should be supplied with the means to add the reagents into large test-tubes.

The biological molecule being tested should **not** be on the label, for example 'Iodine solution for starch test' should have only the word '**Iodine**'.

These reagents should be **fresh** for each candidate.

Apparatus for each candidate:

Syringes, pipettes, water in container '**for washing**', beakers and test-tubes should be clean.

Apparatus	Quantity	✓
10 cm <sup>3</sup> syringe with the means to wash it out (note: needles are <b>not</b> required and should <b>not</b> be given to candidates)	1	
2 cm <sup>3</sup> or 3 cm <sup>3</sup> or 5 cm <sup>3</sup> syringe with the means to wash it out (note: needles are <b>not</b> required and should <b>not</b> be given to candidates)	2	
Pipettes, teat	2	
Container (at least 400 cm <sup>3</sup> ) with tap water, labelled <b>For washing</b>	1	
Container (at least 400 cm <sup>3</sup> ), labelled <b>For waste</b>	1	
Paper towels	8	
Beakers or containers to hold 20 cm <sup>3</sup> volume	3	
Test-tubes – large and suitable for heating to hold up to 40 cm <sup>3</sup> volume of solution	5	
Spotting tile or white tile	1	
Test-tube rack or container to hold 5 large test-tubes	1	
Test-tube holder to hold hot test-tubes	1	
Water-bath equipment (for each candidate for Question 1) Bunsen burner, tripod, gauze, bench mat, at least a 400 cm <sup>3</sup> clear beaker with warm water, between 45 °C and 50 °C, matches and a thermometer –10 °C to 110 °C	1	
Stop-clock or stopwatch with a <b>second hand</b> '. If 'sight of a clock with a second hand' is the only means of timing available to candidates, please report this as part of the Supervisor's Report	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 table** provided in the Supervisor's Report and **not** on a spare question paper. The Supervisor's Report should be enclosed with the candidates' scripts with the seating plan for the examination room. Please ensure that if the scripts are in several packets that a copy of the Supervisor's Report and seating plan is enclosed with each packet of scripts.

The Invigilator should **not** carry out **Question 1**.

**Question 2**

- (i) Slide **J1** (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.

On receipt of the slides, please check that they are labelled **J1** 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) Slide **J1**.

**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 and 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.

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**

**May/June 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, e.g. 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 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, which should be enclosed with the candidates' scripts. Please ensure that, if the scripts are in several packets, a copy of the Supervisor's Report is enclosed with each packet of scripts. The invigilator should **not** carry out **Question 1**.

*Temperature of examination room ..... °C*



## (a) Results of Question 1:

Reagent(s) used					
Solution	Observation of colour				
<b>S1</b>					
<b>S2</b>					
<b>S3</b>					
<b>S4</b>					
<b>S5</b>					

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 on a separate piece of paper.

**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**.

