



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 2012**

**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: [International@cie.org.uk](mailto: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.

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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 are also referred 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 [international@cie.org.uk](mailto: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**

- The pieces of onion must be soaked in the concentrations of sodium chloride solution for at least one hour before the examination. The pieces of onion may be left to soak overnight in covered containers to prevent evaporation. More of the pre-soaked pieces of onion should be available if requested by candidates.
- Fresh **S1**, **S2**, **S3** and **W** are needed for each candidate.
- Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solution using a syringe.

Summary of solutions and reagents:

labelled	contents	hazard	concentration / mol dm <sup>-3</sup>	volume / cm <sup>3</sup>
<b>S1</b>	sodium chloride solution containing one piece of onion	none	1.00	approximately 80 to 90 (enough to cover one piece of onion)
<b>S2</b>	sodium chloride solution containing one piece of onion	none	0.25	approximately 80 to 90 (enough to cover one piece of onion)
<b>S3</b>	sodium chloride solution containing one piece of onion	none	0.50	approximately 80 to 90 (enough to cover one piece of onion)
<b>W</b>	distilled water	none	–	at least 20

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

Preparation of solutions and reagents:

- (i) **S1**, at least 80 cm<sup>3</sup> to 90 cm<sup>3</sup> of 1.00 mol dm<sup>-3</sup> sodium chloride solution in a beaker or container, labelled **S1**.

This is prepared by dissolving 58.5 g of sodium chloride in 500 cm<sup>3</sup> of distilled water and making up to 1 dm<sup>3</sup> with distilled water.  
This is sufficient for 10 candidates.

- (ii) **S2**, at least 80 cm<sup>3</sup> to 90 cm<sup>3</sup> of 0.25 mol dm<sup>-3</sup> sodium chloride solution in a beaker or container, labelled **S2**.

This is prepared by dissolving 14.6 g of sodium chloride in 500 cm<sup>3</sup> of distilled water and making up to 1 dm<sup>3</sup> with distilled water.  
This is sufficient for 10 candidates.

- (iii) **S3**, at least 80 cm<sup>3</sup> to 90 cm<sup>3</sup> of 0.50 mol dm<sup>-3</sup> sodium chloride solution in a beaker or container, labelled **S3**.

This is prepared by dissolving 29.3 g of sodium chloride in 500 cm<sup>3</sup> of distilled water and making up to 1 dm<sup>3</sup> with distilled water.

This is sufficient for 10 candidates.

- (iv) **W**, at least 20 cm<sup>3</sup> of distilled water in a beaker or container, labelled **W**.

All solutions and reagents should be disposed of according to local safety regulations.

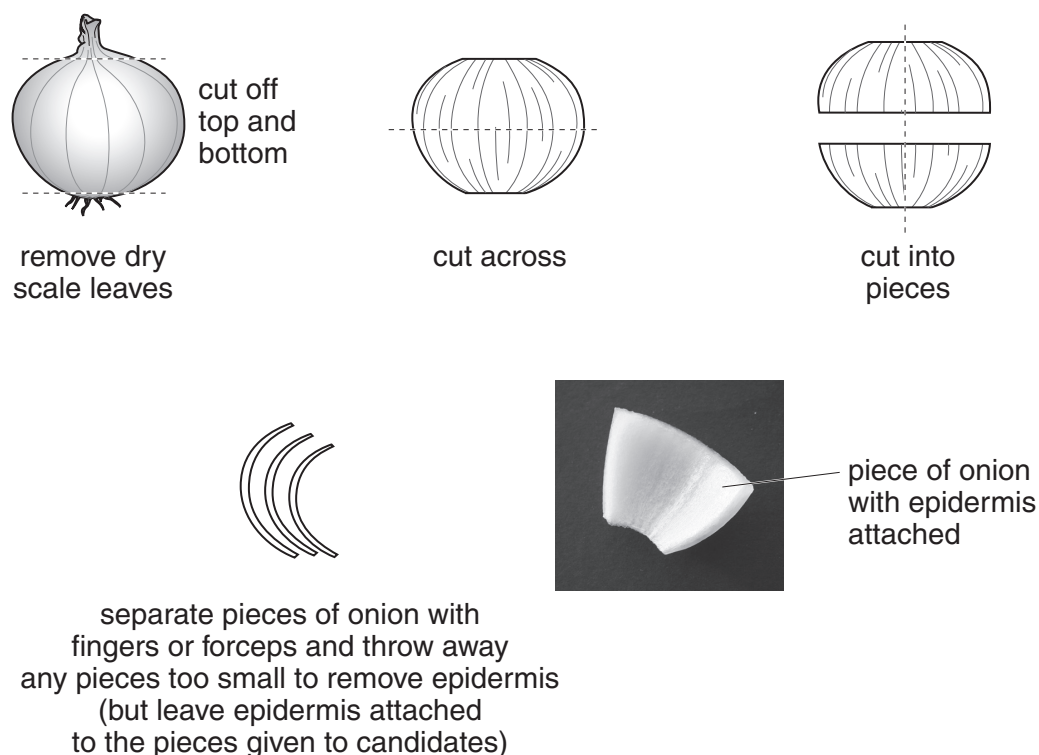
Preparation of pieces of onion:

- Candidates should **not** be given red onion. Onions with white flesh should be used, either with dry brown scales (yellow onion) or with dry white scales (white onion).
- The onions should be as fresh as possible to avoid the effects of storage.
- The pieces of onion must be left in the solutions for at least one hour before the examination. The pieces of onion may be prepared the day before and left overnight in the solutions with the containers covered to prevent evaporation.

- (i) Cut off the top and bottom of the onion.

- (ii) Remove the outer dry scales.

- (iii) Cut the onion into pieces as in Fig. 1.1.



**Fig. 1.1**

- (iv) Place the number of pieces of onion required for all the candidates with some spares into large containers with enough of the sodium chloride solutions, **S1**, **S2** and **S3** to submerge the onion pieces. Cover the containers.

Apparatus for each candidate:

Apparatus	Quantity	✓
2 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)	1	
Glass pipette with teat or plastic pipette	1	
Container with tap water, labelled <b>For washing</b>	1	
Container, labelled <b>For waste</b>	1	
Paper towels	8	
White tile	1	
Scalpel or sharp blade	1	
Blunt forceps	1	
Seeker or mounted needle	2	
Glass marker pen	1	
Safety goggles/glasses	1	
Microscope slides and coverslips	3	
Microscope with: <ul style="list-style-type: none"> <li>• Eyepiece lens, × 10 (equal to 16 mm or <math>\frac{2}{3}</math>" )</li> <li>• Low-power objective lens, × 10 (equal to 16 mm or <math>\frac{2}{3}</math>" )</li> <li>• High-power objective lens, × 40 (equal to 4 mm or <math>\frac{1}{6}</math>" )</li> <li>• Eyepiece graticule fitted in eyepiece lens</li> </ul>	1	

Each candidate must have sole, uninterrupted use of the microscope for 55 minutes. Therefore, half of the candidates should start on **Question 1** and the other half should start on **Question 2**.

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. 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 **Question 1**.

## Question 2

- Fresh sweet banana (*Musa* sp.) and iodine solution are needed for each candidate. More of the pieces of sweet banana should be available if requested by candidates.
- Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solution using a pipette (teat).

Summary of solutions and reagents:

labelled	contents	hazard	concentration / mol dm <sup>-3</sup>	volume / cm <sup>3</sup>
iodine	iodine in potassium iodide solution	[H] irritant	as used for starch test	at least 10

[H] (i) **iodine**, at least 10 cm<sup>3</sup> iodine in potassium iodide solution (as used in starch test) in a bottle or container with a pipette (teat), labelled **iodine**.

- (ii) **banana**, one piece of sweet banana, approximately 4 cm in length in a shallow container or Petri dish, labelled **banana**.

Yellow sweet bananas which are not too ripe and which give a positive test for starch should be selected.

Remove 2 cm at each end of the banana, then cut transversely, including the outer skin to give approximately 4 cm lengths.

The pieces of sweet banana should be cut and put out just before the start of the question for each candidate.

Apparatus for each candidate:

Apparatus	Quantity	✓
Knife or scalpel	1	
Glass rod	1	
Ruler in mm	1	
Paper towel	2	

During the examination, the Supervisor should, **out of the sight of the candidates**, carry out **Question 2** using the same reagent 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. 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 **Question 2**.

## MATERIALS TO BE SUPPLIED BY CAMBRIDGE

- (i) Question papers

**note:** no slide is required.

## RETURN OF EXAMINATION MATERIALS TO CAMBRIDGE

There is no material to return to Cambridge.

## 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 package is used, there must be a copy of the completed Report Form in each script package.

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 package.

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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 2012**

*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 sight of the candidates**, carry out **Question 1** and **Question 2** 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** or **Question 2**.

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



(a) *Results of Question 1:*

(b) *Results of Question 2:*

- 4. Enclose a plan of work benches with the scripts, giving details of the candidate numbers for the places occupied by the candidates for each session on a separate piece of 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 (for 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**.

