



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

**BIOLOGY**

**9700/31**

Advanced Practical Skills 1

**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](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, reagents and materials should be available if requested by candidates.
- Fresh beakers and syringes are needed for each candidate.
- Fresh **A**, **W** and **U** 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>A</b>	0.10% ascorbic acid	[H] harmful irritant	at least 100
<b>W</b>	distilled water	none	at least 100

labelled	contents	details	quantity
<b>U</b>	agar block containing DCPIP	at least 60 mm × 40 mm of a 5 mm depth, containing DCPIP	1

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

Preparation of solutions, reagents and materials:

[H] (i) **A**, at least 100 cm<sup>3</sup> of 0.10% ascorbic acid in a covered beaker or container, labelled **A**.

This is prepared by dissolving 0.5 g of ascorbic acid in 400 cm<sup>3</sup> of distilled water in a beaker and making up to 500 cm<sup>3</sup> with distilled water.

**A** should be prepared within two hours of the candidates starting **Question 1**.

**A** should be kept covered to prevent evaporation and out of direct sunlight to prevent decomposition.

This is sufficient for 5 candidates.

(ii) **W**, at least 100 cm<sup>3</sup> of distilled water in a beaker or container, labelled **W**.

This is sufficient for 1 candidate.

- (iii) **U**, one block of agar ('technical' or 'agar agar' **not** 'nutrient'), containing 0.1% DCPIP, on a white tile, labelled **U**, covered by a damp paper towel.

**Please note** that agar powder may cause an allergic reaction or other respiratory problem if inhaled.

The agar is prepared by:

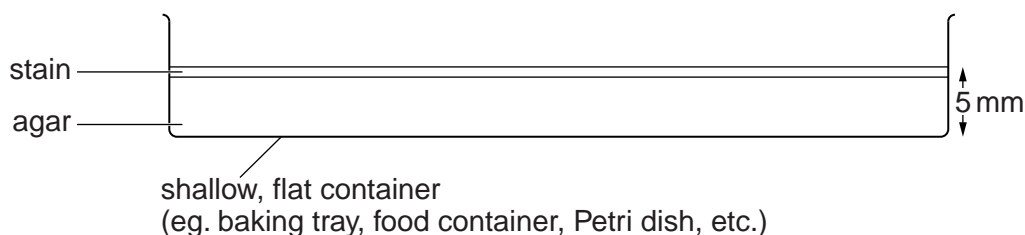
- adding 10 g of agar to 100 cm<sup>3</sup> of distilled water and stirring to make a paste
- making up to 500 cm<sup>3</sup> with distilled water
- heating to a temperature of approximately 95 °C (do not boil)
- stirring and allowing to cool to approximately 60 °C
- pouring the agar to a depth of 5 mm into shallow, flat containers that are at least 1 cm in depth
- covering these containers so that the agar does not dry out by covering e.g. with a lid or wrapped in a plastic bag and keeping out of direct sunlight
- placing on a horizontal flat surface so that the agar sets to an even depth of 5 mm.

Allow the agar to set.

The 0.1% DCPIP is prepared by dissolving 0.5 g of DCPIP in 500 cm<sup>3</sup> of distilled water in a beaker or container.

#### Staining the agar with DCPIP

DCPIP will be used to colour a thin layer of the set agar as shown in Fig. 1.1.



**Fig. 1.1**

So that the DCPIP does not colour all the set agar:

- within **one hour** of the start of **Question 1** for each group of candidates, flood the surface of the agar with 0.1% DCPIP solution
- leave for a few minutes to allow the DCPIP to stain a thin layer of agar. The depth of the stained layer is not critical but should be up to a quarter of the depth of agar. This should take no more than 5 minutes. Candidates will not be disadvantaged by variations in the staining.
- pour off the DCPIP solution
- wash off the excess with distilled water
- cut the agar into blocks measuring at least 60 mm × 40 mm × 5 mm
- cover the agar blocks with damp paper towels.

Cut enough blocks so that each candidate has 1 block of at least 60 mm × 40 mm × 5 mm, on a white tile, labelled **U**. Keep the agar blocks covered with damp paper towels.

Extra agar blocks should be prepared in case additional agar blocks are requested by candidates.

Apparatus for each group of candidates should be clean.

Apparatus for each candidate	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)	2	
Container with tap water, labelled <b>For washing</b>	1	
Container, labelled <b>For waste</b>	1	
Paper towels	8	
Beakers or containers to hold 20 cm <sup>3</sup> volume (these must be transparent)	5	
Sharp scalpel or blade	1	
Blunt forceps	1	
White tile	1	
Stop-clock or stopwatch with a <b>second hand</b> . 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, reagents and materials 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 **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.

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 **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 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. 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, 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 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 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 for 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. Use separate paper 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**.

