



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

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**BIOLOGY**

**9700/34**

Advanced Practical Skills 2

**October/November 2010**

**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.**

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

**F** = highly flammable substance

**H** = harmful or irritating substance

**O** = oxidising substance

**T** = toxic 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 (c) (i), Security of Question Papers and Examination Materials, as well as 3.3.11.1, Practical Examinations in Science Subjects.

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 will require

### Question 1

Fresh pH3, pH4, pH5, pH6, Y and C and graph paper scale are needed for each candidate. More of the solutions 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 syringe.

Summary of solutions and reagents

labelled	contents	hazard	concentration	volume /cm <sup>3</sup>
<b>pH3</b>	citric acid/sodium citrate buffer	[H] irritant	see instructions	at least 30
<b>pH4</b>	citric acid/sodium citrate buffer	[H] irritant	see instructions	at least 30
<b>pH5</b>	citric acid/sodium citrate buffer	[H] irritant	see instructions	at least 30
<b>pH6</b>	citric acid/sodium citrate buffer	[H] irritant	see instructions	at least 30
<b>Y</b>	yeast suspension	none	10%	at least 60
<b>C</b>	calcium chloride	[H] irritant	0.001 mol dm <sup>-3</sup>	at least 15

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

Preparation of solutions and reagents

- (i) **pH3**, at least 30 cm<sup>3</sup> of buffer pH3 in a beaker or container, labelled **pH3**.
- (ii) **pH4**, at least 30 cm<sup>3</sup> of buffer pH4 in a beaker or container, labelled **pH4**.
- (iii) **pH5**, at least 30 cm<sup>3</sup> of buffer pH5 in a beaker or container, labelled **pH5**.
- (iv) **pH6**, at least 30 cm<sup>3</sup> of buffer pH6 in a beaker or container, labelled **pH6**.

**The buffers should be prepared using the following stock solutions:**

1 dm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> citric acid. This is prepared by dissolving 19.2 g of citric acid in 500 cm<sup>3</sup> of distilled water in a beaker and make up to 1 dm<sup>3</sup> with distilled water.

1 dm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> sodium citrate. This is prepared by dissolving 29.4 g of sodium citrate in 500 cm<sup>3</sup> of distilled water in a beaker and make it up to 1 dm<sup>3</sup> with distilled water.

Then  $100\text{ cm}^3$  of each buffer can be prepared as in the table below:

pH	$0.1\text{ mol dm}^{-3}$ citric acid $/\text{cm}^3$	$0.1\text{ mol dm}^{-3}$ sodium citrate $/\text{cm}^3$	distilled water $/\text{cm}^3$
3	46.4	3.6	50
4	33.0	17.0	50
5	20.6	29.4	50
6	10.0	40.0	50

This is sufficient quantity for 3 candidates.

- (v) **Y**, at least  $60\text{ cm}^3$  of 10% yeast suspension, in a beaker or container, labelled **Y**. (There is no need for the yeast to be active so this is best made up just before the candidates need to use it.) This is prepared by putting 10g of dried yeast (Baker's) into a container and adding distilled water up to  $100\text{ cm}^3$ . The yeast suspension needs to be mixed well. This is sufficient quantity for 1 candidate.
- (vi) **C**, at least  $15\text{ cm}^3$  of  $0.001\text{ mol dm}^{-3}$  calcium chloride solution, in a beaker or container, labelled **C**. This is prepared by dissolving 1g of calcium chloride ( $\text{CaCl}_2$ ) in  $500\text{ cm}^3$  of distilled water in a beaker and make up to  $1\text{ dm}^3$  with distilled water. This is the stock solution of  $0.01\text{ mol dm}^{-3}$ .  $0.001\text{ mol dm}^{-3}$  calcium chloride solution required by the candidate is prepared by putting  $10\text{ cm}^3$  of the stock solution into a beaker or container, make up to  $100\text{ cm}^3$  with distilled water. This is sufficient quantity for 4 or 5 candidates.
- (vii) A piece of 2mm square graph paper cut 10cm by 1 cm and glued to a piece of black card 15 cm by 1.5 cm so there is an area of black card around the piece of graph paper.

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

## Apparatus for each candidate

Apparatus	Quantity	✓
1 cm <sup>3</sup> syringe	1	
10cm <sup>3</sup> syringes or one with the means to wash it out	2	
Container with tap water, labelled <b>For washing</b>	1	
Container, labelled <b>For waste</b>	1	
Paper towels	4	
Test-tubes	4	
Test-tube, labelled <b>T</b>	1	
Test-tube rack	1	
Cork or bung to fit the test-tubes	1	
Graph paper scale on black card	1	
Glass rod	1	
Ruler, mm	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 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

- (i) Slide **M1** (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 by Cambridge) 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 **M1** 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 **M1**
- (iii) Eyepiece graticule

## 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 package 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 package 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 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**

**October/November Session 2010**

*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. Results for question 1.

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)

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 .....

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**.

