



### 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, Security of Question Papers and Examination Materials, as well as 3.4.1, Practical Examinations in Science Syllabuses.

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.

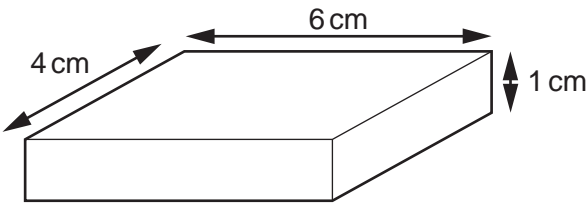
Each candidate will require:

**Question 1**

- 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 solution **H** and agar blocks should be available if requested by candidates.
- Fresh **H** and **A** is 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	concentration / mol dm <sup>-3</sup>	volume / cm <sup>3</sup>
<b>H</b>	hydrochloric acid	[H] irritant	0.25	60 or enough to give a depth of 1.5 cm in the shallow container provided

labelled	contents	hazard	details	quantity
<b>A</b>	agar block	[C] corrosive [H] irritant	<p>one block at least 6 cm × 4 cm of 1 cm depth</p>  <p>containing 0.01 mol dm<sup>-3</sup> sodium hydroxide and an indicator, see instructions.</p>	1

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

## Preparation of solutions and reagents

**[H]** (i) **H**, at least 60 cm<sup>3</sup> or enough to give a depth of 1.5 cm in the shallow container provided, of dilute hydrochloric acid (0.25 mol dm<sup>-3</sup>) in a beaker or container, labelled **H**.

**[H], [C]** (ii) **A**, one block of agar, containing 0.01 mol dm<sup>-3</sup> sodium hydroxide and universal indicator, on a white tile or chopping board, labelled **A**.

**You are reminded that this contains sodium hydroxide so do not touch the reagents or the agar blocks.**

0.01 mol dm<sup>-3</sup> sodium hydroxide is prepared by dissolving 0.2 g of sodium hydroxide in 100 cm<sup>3</sup> distilled water and making up to 500 cm<sup>3</sup> with distilled water. Add 15 g of agar ('technical' **not** 'nutrient') to 500 cm<sup>3</sup> of 0.01 mol dm<sup>-3</sup> sodium hydroxide and boil to dissolve the agar. Remove from the heat.

5 cm<sup>3</sup> of universal indicator is added to 500 cm<sup>3</sup> of the hot agar to produce a blue-green colour.

Pour the agar into shallow, flat containers that are at least 1 cm in depth. Keep the agar in cool conditions in order to set firmly. These containers must be placed on a horizontal flat surface so that the agar sets to an even depth of 1 cm.

It is **essential** that the agar does not dry out after it has set. To prevent drying out the containers may be wrapped in a plastic bag or similar.

Just before the examination, cut the agar into blocks measuring at least 6 cm × 4 cm × 1 cm. Cut enough blocks so that each candidate has 1 block at least 6 cm × 4 cm × 1 cm, on a white tile or chopping board, covered by a damp paper towel, labelled **A**.

Apparatus for each candidate:

Apparatus	Quantity	✓
Container, labelled <b>For waste</b>	1	
Paper towels	8	
400 cm <sup>3</sup> beaker or clear container of similar size	1	
White tile or chopping board with agar block covered with damp paper towel	1	
Ruler in mm	1	
Sharp blade or scalpel or knife	1	
Blunt forceps	1	
Stop clock, stop watch or sight of a clock with a second hand	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 (**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**.

**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. **Centres are advised to keep these for future use as they will not be supplied in 2012.**

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 – if the Centre has its own eyepiece graticules these can be used.

**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 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

October/November Session 2011

*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** 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 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. 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 (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**.

