



### 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

### On receipt of these instructions please note that:

The mung beans for the plant extract must be soaked for **at least 24 hours** and tested for activity of enzymes, see below. The plant extract may be prepared at any time before the examination and then frozen, although it must be at room temperature for the examination.

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 and reagents should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **P**, **H**, **W** and **D** are 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	volume / cm <sup>3</sup>
<b>P</b>	plant extract solution	none	at least 15
<b>H</b>	6% (20 vol) hydrogen peroxide solution	[H] harmful irritant	at least 50
<b>W</b>	distilled water	none	at least 100
<b>D</b>	liquid detergent	none	at least 15

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

Preparation of solutions and reagents:

- (i) **P**, at least 15 cm<sup>3</sup> of plant extract solution, in a beaker or container, labelled **P**. This is sufficient for 3 candidates.

The plant extract solution can be prepared using 15 g of dried mung bean seeds (these should not have been stored for more than six months). The seeds should be placed in a beaker or container with 100 cm<sup>3</sup> distilled water and kept covered.

**Leave the seeds to soak for at least 24 hours.**

The seeds need to be ground up to release the enzymes. To do this, put the seeds and water into a pestle and mortar and grind well.

*For larger quantities*, put the seeds and water into a liquidiser/blender/food processor on full power for 30 to 60 seconds.

Strain the mixture through a fine sieve and retain the liquid plant extract. When the extract is left in a container, then further sediment will sink to the bottom and the plant extract solution for the candidates can be poured off into a separate container.

This should produce approximately 50 cm<sup>3</sup> of plant extract solution.

**To test the suitability of your mung beans:**

You need to test the activity of the plant extract by:

- putting 5 cm<sup>3</sup> of 6% (20 vol) hydrogen peroxide solution with a few drops of liquid detergent in a test-tube (which would hold at least 25 cm<sup>3</sup>)
- stirring and then adding 1 cm<sup>3</sup> of the plant extract solution and stirring again.

The mixture should fizz and foam should rise up the test-tube.

If the foam rises and flows over the top of the test-tube within three minutes, then dilute the plant extract so that the foam rises up the test-tube but does not overflow.

If the foam does not rise at least 50 mm above the mixture then the plant extract solution needs to be adjusted by either using more mung beans or soaking a new batch of mung beans.

**The plant extract may be prepared at any time before the examination and then frozen.** The mixture must be at **room** temperature for the examination.

- [H] (ii) **H**, at least 30 cm<sup>3</sup> of 6% (20 vol) hydrogen peroxide solution in a covered beaker or container, labelled **H**.

Alternatively, the concentration provided by your supplier may need to be diluted to 6% (20 vol).

**H** must be put out within an hour of the candidates starting **Question 1**.

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

This is sufficient for 1 candidate.

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

This is sufficient for 1 candidate.

- (iv) **D**, at least 15 cm<sup>3</sup> of liquid detergent in a beaker or container, labelled **D**.  
This should be of a type which is used for hand washing apparatus and **not** that used in a dishwasher. Using a pipette it should be easy to release the detergent as separate drops.

This is sufficient for 1 candidate.

Apparatus for each group of candidates should be clean.

Apparatus for each candidate	Quantity	✓
10cm <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	
2cm <sup>3</sup> or 3cm <sup>3</sup> or 5cm <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 rod	1	
Container with tap water, (about 200 cm <sup>3</sup> ) labelled <b>For washing</b>	1	
Container, labelled <b>For waste</b>	1	
Pipette, plastic or with teat (to remove <b>D</b> from container)	1	
Paper towels	8	
Graph paper scale at least 2 cm wide and at least 2 cm longer than the test-tube provided (this may be prepared by sticking an A4 sheet of 2 mm grid graph paper onto a piece of card. The strip should be cut approximately 1 mm each side of the thicker vertical lines showing the 2 cm width and can be provided the length of the A4 sheet).	1	
Test-tubes – at least 140 mm long and with an internal diameter between 11 mm and 14 mm	4	
Beakers or containers to hold at least 50 cm <sup>3</sup>	3	
Test-tube rack or container to hold four test-tubes	1	
Scissors	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 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 and reagents 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 L1 (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 L1 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 L1.

## 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**.

