



### 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

**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, 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**

**Plant tissue must be prepared the day before the examination.**

Fresh **C**, **W**, **P** and water for washing both plant tissue and apparatus 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, allowing removal of the solution using a syringe.

Summary of solutions and reagents

labelled	contents	hazard	concentration / %	volume / cm <sup>3</sup>
<b>C</b>	copper sulfate	[H] harmful irritant [N] harmful to environment	0.3	at least 60
<b>W</b>	distilled water	none	–	100
<b>methylene blue</b>	used to stain plant tissue	stains	0.1	–

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

Preparation of solutions and reagents

- (i) **C**, at least 60 cm<sup>3</sup> of 0.3% copper sulfate in a beaker or container, labelled **C**.

This is prepared by dissolving 3g of copper sulfate into 80 cm<sup>3</sup> of distilled water and make up to 1000 cm<sup>3</sup>.

This is sufficient quantity for six candidates.

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

- (iii) **P**, five pieces of plant tissue in a beaker or container, with enough tap water to cover the plant tissue, labelled **P**.

**Two pieces of 4 cm, one of 3.5 cm and two of 3 cm lengths.**

**Plant tissue may be prepared the day before the examination.**

Suitable plant tissue is (Irish) potato or sweet potato or cassava. The plant tissue should be as fresh as possible. The plant tissue should not have been stored or refrigerated for a long period of time.

The outer skin should be removed.

Each piece should have the same cross-sectional area, 0.5 cm × 0.5 cm.

Slices of plant tissue can be cut with a large kitchen knife and pieces produced using a scalpel. Please do not use cork borers as this may compress the tissues.

The test-tubes provided must be large enough to allow the pieces to fit.

Put the prepared plant tissue into a shallow tray so that the pieces do not overlap and cover with 0.1% methylene blue solution. Leave for approximately 30 minutes. Remove plant tissue and place in a beaker and cover with tapwater. The methylene blue solution can be re-used for further plant samples.

This is prepared by dissolving 1.0g of methylene blue into 80cm<sup>3</sup> of distilled water in a beaker and making up to 100cm<sup>3</sup> with distilled water.

Put 10cm<sup>3</sup> of this 1.0% methylene blue solution into a beaker or container and making up to 100cm<sup>3</sup> with distilled water. This makes 0.1% methylene blue solution.

**If any methylene blue comes into contact with your skin wash off immediately with water.**

Before the examination wash the pieces of plant tissue and put them into a beaker or container with tap water. Rinse the plant tissue by pouring out the water and then adding fresh tap water. Repeat four times. Add enough tap water to cover the plant tissue ready to put out for the candidate in container, labelled **P**.

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

Apparatus for each candidate

Apparatus	Quantity	✓
10cm <sup>3</sup> syringes or one with the means to wash it out	2	
5cm <sup>3</sup> syringe with the means to wash it out	1	
Container with tap water, labelled <b>For washing plant tissue</b>	1	
Container with tap water, labelled <b>For washing apparatus</b>	1	
Container, labelled <b>For waste</b>	1	
Paper towels	4	
Beakers or containers, to hold 50cm <sup>3</sup>	5	
Test-tubes	6	
Bung to fit test-tubes	1	
Test-tube rack or container to hold 6 test-tubes	1	
Ruler, mm	1	
White tile	1	
Scalpel or sharp blade	1	
Blunt forceps	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 2**.

**Question 2**

- (i) Slide **K1** (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 **K1** 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 **K1**
- (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 complete 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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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**.

