



### 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

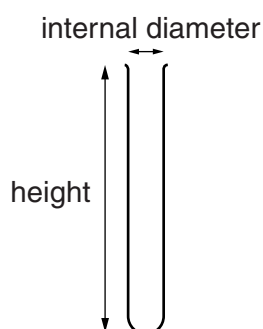
**F** = highly flammable substance

**H** = harmful or irritating substance

**O** = oxidising substance

**T** = toxic substance

**N** = harmful to environment



It is expected that the test-tubes provided are approximately 150 mm in height. Other dimensions will be specified if needed in the Apparatus list.

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 and reagents should be available if requested by candidates.
- Clean test-tubes and syringes are needed for each candidate.
- Fresh **G1**, **G2**, **S1**, **S2** and **S3** 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	percentage concentration	volume/cm <sup>3</sup>
<b>G1</b>	glucose solution	none	0.1	at least 20
<b>G2</b>	glucose solution	none	1.0	at least 20
<b>S1</b>	starch solution	none	0.05	at least 20
<b>S2</b>	starch solution	none	1.0	at least 20
<b>S3</b>	mixture of 0.01% starch solution and 4% glucose solution	none	–	at least 20

Reagents to test for

- starch
- reducing sugars
- non-reducing sugars
- protein

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

Preparation of solutions and reagents:

You will need the following **stock** solutions:

**4% glucose stock solution**

This is prepared by sprinkling 4g of glucose, a little at a time, onto the surface of 50 cm<sup>3</sup> of distilled water, stirring continuously, and making it up to 100 cm<sup>3</sup> with distilled water.

**1% glucose stock solution**

This is prepared by adding 25 cm<sup>3</sup> of the 4% glucose stock solution to 75 cm<sup>3</sup> of distilled water and stirring well.

**1% starch stock solution**

This is prepared by putting 1g of starch into 10 cm<sup>3</sup> of warm distilled water in a beaker or container and stirring well. Make up to 100 cm<sup>3</sup> with boiling distilled water, stir well and then cool to room temperature.

- (i) **G1**, at least 20 cm<sup>3</sup> of 0.1% glucose solution, in a beaker or container, labelled **G1**.

This is prepared by adding 10 cm<sup>3</sup> of the 1% glucose stock solution to 90 cm<sup>3</sup> of distilled water and stirring well.

This is sufficient for 5 candidates.

- (ii) **G2**, at least 20 cm<sup>3</sup> of 1% glucose stock solution, in a beaker or container, labelled **G2**.

This is sufficient for 1 candidate.

- (iii) **S1**, at least 20 cm<sup>3</sup> of 0.05% starch solution, in a beaker or container, labelled **S1**.

This is prepared by adding 5 cm<sup>3</sup> of 1% starch stock solution to 95 cm<sup>3</sup> of distilled water and stirring well.

This is sufficient for 5 candidates.

- (iv) **S2**, at least 20 cm<sup>3</sup> of 1% starch stock solution, in a beaker or container, labelled **S2**.

This is sufficient for 1 candidate.

- (v) **S3**, at least 20 cm<sup>3</sup> of a solution, in a beaker or container, labelled **S3**, made up of 10 cm<sup>3</sup> of 0.01% starch solution and 10 cm<sup>3</sup> of 4% glucose stock solution.

The 0.01% starch solution is prepared by adding 1 cm<sup>3</sup> of the 1% starch stock solution to 99 cm<sup>3</sup> of distilled water and stirring well.

This is sufficient for 5 candidates.

- (vi) **Reagents** to test for the biological molecules:

- starch
- reducing sugar
- non-reducing sugar
- protein

The volumes supplied should be enough to carry out a minimum of 6 tests for each molecule. The containers, with the means to add the reagents into large test-tubes, should be labelled appropriately with the contents.

The biological molecule being tested **must not** be on the label, for example 'Benedict's solution for reducing sugar test' should only have the word '**Benedict's**'.

The reagents should be fresh for each candidate.

Apparatus for each group of candidates should be clean.

Syringe needles are **not** required and must **not** be given to candidates.

Apparatus for each candidate	Quantity	✓
5 cm <sup>3</sup> or 10 cm <sup>3</sup> syringe with the means to wash it out	2	
Beaker or container with tap water, (about 200 cm <sup>3</sup> ) labelled <b>For washing</b>	1	
Beaker or container, labelled <b>For waste</b>	1	
Glass rod	1	
Pipette, plastic or with teat	3	
Spotting tile or white tile	1	
Paper towels	4	
Water-bath equipment: Bunsen burner, tripod, gauze, bench mat, at least a 400 cm <sup>3</sup> <b>clear</b> beaker with water, between 45 °C – 50 °C, suitable for a water-bath, matches and a thermometer –10 °C to 110 °C	1	
Test-tubes – suitable for heating, to hold not less than 20 cm <sup>3</sup> and not more than 50 cm <sup>3</sup>	6	
Test-tube holder to handle hot test-tubes	1	
Test-tube rack(s) or container(s) to hold six test-tubes	1	
Stop-clock or timer showing seconds	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. The results for **1(a)(iii)** and for **1(a)(v)** should be written in the Supervisor's Report (on pages 7 and 8), 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 that a copy of the Supervisor's Report and the candidates' seating plan are enclosed with each packet of scripts.

The Invigilator should **not** carry out **Question 1**.

## Question 2

On receipt of the slides, please check that they are labelled **K1** and **K2** and that none of the slides are broken. The material is **confidential** (so must not be disclosed to candidates) and the slides should **not** be viewed in advance of the examination.

The number of each slide, **K1** and **K2**, 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**.

For each candidate:

- the microscope must be set up on low power
- the slide must **not** be on the stage of the microscope.

Each candidate must have sole, uninterrupted use of the microscope for 55 minutes.

(i) Slide **K1** and slide **K2** (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 for the examination. Any lenses which are **not**  $\times 10$  or  $\times 40$  should be removed or replaced.

### MATERIALS TO BE SUPPLIED BY CAMBRIDGE

- (i) Question papers
- (ii) Slides **K1** and **K2**

### 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.

### SUPERVISOR'S REPORT and SEATING PLAN

The Teacher responsible for the examination is asked to fill in the Supervisor's Report in these Confidential Instructions. For Centres where more than one script packet is used, there must be a copy of the completed Supervisor's Report and the candidates' seating plan in each script packet.

These Supervisors' Reports are essential 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.**

**SUPERVISOR'S REPORT ON PRACTICAL BIOLOGY A LEVEL**

**May/June 2014**

*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. The results for **1(a)(iii)** and for **1(a)(v)** 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(a)(iii)** and for **1(a)(v)**

Temperature of examination room ..... °C

- 4. Enclose a seating 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**.

