
BIOLOGY

9700/35

Advanced Practical Skills 1

October/November 2014

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.



If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: info@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.

This document consists of **11** printed pages and **1** blank page.

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

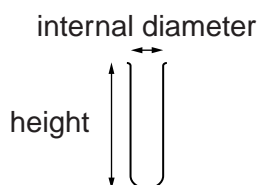
F = highly flammable substance

H = harmful or irritating substance

O = oxidising substance

T = toxic substance

N = harmful to environment



When small test-tubes are provided, it is expected that these are approximately 150 mm in height.

If other dimensions of apparatus are required, these will be specified 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, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

Confidential Instructions

No access to the Question Paper is permitted in advance of 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 solutions and reagents using a syringe. More of the solutions and reagents should be available if requested by candidates.
- All solutions should be provided to candidates at **room temperature**.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **Y**, **W**, **G**, and **M** 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 ³ |
|----------|---------------------------------------|--------|------------------------|
| Y | 10% yeast cell suspension | none | at least 100 |
| W | distilled water | none | at least 150 |
| G | 20% glucose solution | none | at least 80 |
| M | 0.01% methylene blue aqueous solution | stains | at least 20 |

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

Yeast

It is **essential** to try the yeast well **before** the examination to make sure that it **will become** active. Do not use Brewer's yeast as this does not always work actively enough in the time.

To test the activity of the yeast cell suspension put 10 cm³ of **Y**, 1 cm³ of **M** and 10 cm³ of **G** into a test-tube, at a temperature of about 40 °C.

M should change colour within five minutes.

If the blue colour remains then either increase the concentration of the yeast cell suspension or try a new source of yeast.

Preparation of solutions and reagents:

- (i) **Y**, at least 100 cm³ of a 10% yeast cell suspension, in a beaker or container, labelled **Y**.

The yeast must not be active when given to the candidates so this must be prepared **within one hour** of use by candidates, including those candidates who start with **Question 2**.

This is prepared by putting 10 g of dried yeast (**for baking**) into 80 cm³ of distilled water, stirring and making up to 100 cm³ with distilled water.

This is sufficient for 1 candidate.

- (ii) **W**, at least 150 cm³ of distilled water in a beaker or container, labelled **W**.

This is sufficient for 1 candidate.

- (iii) **G**, at least 80 cm³ of 20% glucose solution in a beaker or container, labelled **G**.

This is prepared by sprinkling 20 g of glucose, a little at a time, onto the surface of 80 cm³ of distilled water, stirring continuously, and making up to 100 cm³ with distilled water.

This is sufficient for 1 candidate.

You will need the following stock solution:

1% methylene blue solution.

This is prepared by dissolving 1.0 g of methylene blue in 80 cm³ of distilled water in a beaker or container and making up to 100 cm³ with distilled water.

- (iv) **M**, at least 20 cm³ of 0.01% methylene blue solution in a beaker or container, labelled **M**.

This is prepared by putting 1 cm³ of the 1% stock solution into a beaker or container and making up to 100 cm³ with distilled water.

This is sufficient for 5 candidates.

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 | ✓ |
|--|----------|---|
| 10 cm ³ syringe with the means to wash it out | 3 | |
| 2 cm ³ or 3 cm ³ or 5 cm ³ syringe with the means to wash it out | 1 | |
| Beaker or container, (approximately 200 cm ³) with tap water, labelled For washing | 1 | |
| Beaker or container, (approximately 200 cm ³) labelled For waste | 1 | |
| Paper towels | 8 | |
| Beakers or containers to hold at least 30 cm ³ to allow the small syringe to remove liquid | 5 | |
| Test-tubes – to hold a volume more than 25 cm ³ and less than 50 cm ³ | 5 | |
| Test-tube rack or container to hold 5 large test-tubes at one time | 1 | |
| Thermometer –10 °C to 110 °C | 1 | |
| Container with hot water between 50 °C to 60 °C labelled Hot water . Only the Supervisor may use a thermostatically-controlled water-bath, to provide additional hot water if requested by candidates. | 1 | |
| Container with cold water below 30 °C labelled Cold water . | 1 | |
| 400 cm ³ beaker or container, labelled Water-bath , to act as a water-bath to contain five large test-tubes at a time. | 1 | |
| Glass rod | 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, reagents and materials 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.

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

Question 2

- Solutions provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solutions using a teat pipette. More of the solutions and materials should be available if requested by candidates.
- All solutions and materials should be provided to candidates at **room temperature**.
- Clean microscope slides, coverslips and teat pipettes are needed for each candidate.
- Fresh **I**, **M**, **DW**, and **S** are needed for each candidate.
- All solutions should be disposed of according to local safety regulations.

Summary of solutions:

| labelled | contents | hazard | volume/cm ³ |
|-----------|-------------------------------------|-----------------|------------------------|
| I | iodine in potassium iodide solution | [H] irritant | at least 25 |
| M | 0.01% methylene blue solution | stains | at least 25 |
| DW | distilled water | none | at least 25 |

Materials:

| labelled | contents | hazard | quantity |
|----------|--------------|--------|--|
| S | onion pieces | none | at least three pieces of onion wrapped in a damp paper towel, in a dish. These can be prepared the day before. See instructions on page 7. |

- [H]** (i) **I**, iodine in potassium iodide, at least 25 cm³ in a bottle or container, with a pipette (teat), labelled **I**.

This is the same concentration as used when testing for starch.

This is sufficient for one candidate.

- (ii) **M**, at least 25 cm³ of 0.01% methylene blue solution in a bottle or container, with a pipette (teat), labelled **M**.
(See instructions for preparation in Question 1.)

This is sufficient for one candidate.

- (iii) **DW**, at least 25 cm³ of distilled water in a bottle or container, with a pipette (teat), labelled **DW**.

This is sufficient for one candidate.

- (iv) 3 pieces of onion covered with damp paper towel in a dish, labelled **S**.
The three pieces are cut from an onion as shown in Fig. 2.1.

This is sufficient for one candidate.

Preparation of pieces of onion:

- Candidates should **not** be given red onion. Onions with white flesh should be used, either with dry brown scales (yellow onion) or with dry white scales (white onion).
- The onions should be as fresh as possible to avoid the effects of storage.
 - Cut off the top and bottom of the onion.
 - Remove the outer dry scales.
 - Cut the onion into pieces as in Fig. 2.1.

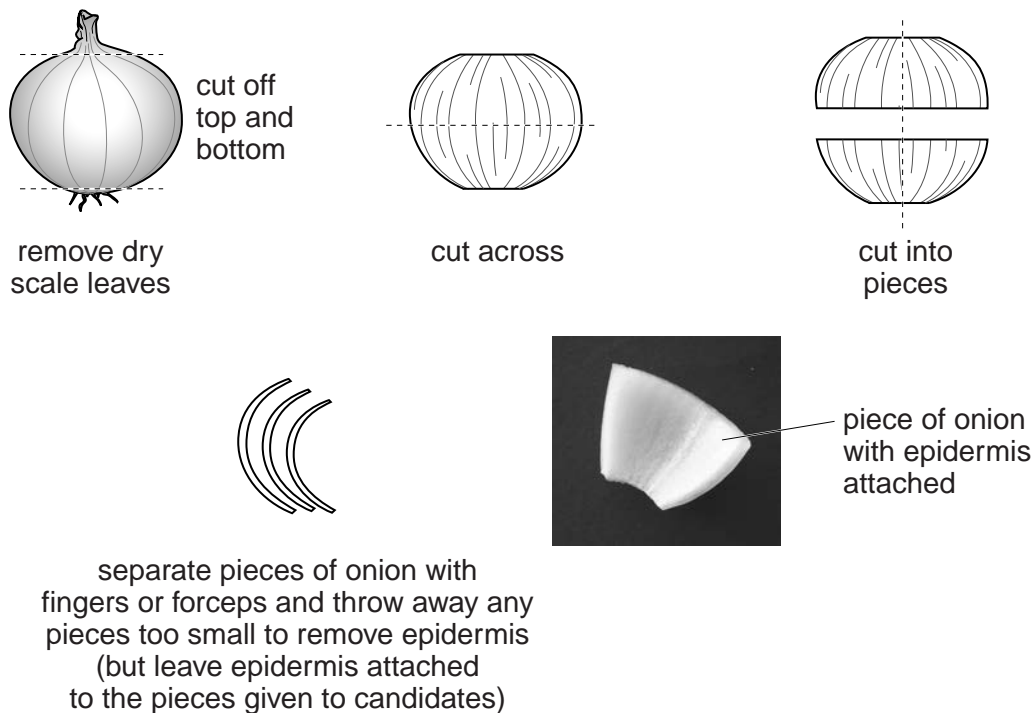


Fig. 2.1

- Put three pieces of onion into a dish, covered with a damp paper towel, labelled **S**.

This is sufficient for one candidate.

(You are reminded to prepare spare pieces of onion to supply to the candidates as requested.)

The pieces of onion may be prepared before the examination and left overnight, at room temperature, in large containers with enough water to submerge the onion pieces. Cover the containers.

Apparatus for each group of candidates should be clean.

| Apparatus for each candidate | Quantity | ✓ |
|---|----------|---|
| Clean microscope slides | 3 | |
| Glass coverslips, e.g. 2 cm × 1 cm | 3 | |
| Glass marker pen | 1 | |
| Mounted needle or seeker or other means to position coverslip on microscope slide | 1 | |
| White tile | 1 | |
| Pipette, teat | 3 | |
| Forceps | 1 | |
| Sharp blade or scalpel | 1 | |
| Container, to hold about 250 cm ³ , labelled For waste | 1 | |
| Paper towels | 8 | |
| Microscope with: <ul style="list-style-type: none"> • Low-power objective lens, ×10 (equal to 16 mm or $\frac{2}{3}$") • High-power objective lens, ×40 (equal to 4 mm or $\frac{1}{6}$") • Eyepiece lens, ×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. For each candidate the microscope must be set up on low power. | 1 | |

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

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** ×10 or ×40 should be removed or replaced.

MATERIALS TO BE SUPPLIED BY CAMBRIDGE

- (i) Question papers.

Note: No slide is required.

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

October/November Session 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 and Question 2** 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 and Question 2**.
4. Enclose a seating plan of work benches with the scripts, giving details of the candidate numbers for the places occupied by the candidates for each session. Use separate paper for this.



Temperature of examination room °C

Results for **Question 1(a)(ii)**:

Drawings for **Question 2(a)(i)**:

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**.

