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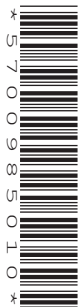
**BIOLOGY (PRINCIPAL)**

**9790/04**

Paper 4 Practical

**May/June 2019**

CONFIDENTIAL INSTRUCTIONS



**This document gives details of how to prepare for and administer the practical exam.**

**The information in this document and the identity of any materials supplied by Cambridge International are confidential and must NOT reach candidates either directly or indirectly.**

**The supervisor must complete the report at the end of this document and return it with the scripts.**

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If you have any queries regarding these confidential instructions, contact Cambridge International stating the centre number, the syllabus and component number and the nature of the query.

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This document consists of **7** printed pages and **1** blank page.

## General information about practical exams

Centres must follow the guidance on science practical exams given in the *Cambridge Handbook*.

### Safety

Supervisors must follow national and local regulations relating to safety and first aid.

Only those procedures described in the question paper should be attempted.

Supervisors must inform candidates that materials and apparatus used in the exam should be treated with caution. Suitable eye protection should be used where necessary.

The following hazard codes are used in these confidential instructions, where relevant:

<b>C</b>	corrosive	<b>MH</b>	moderate hazard
<b>HH</b>	health hazard	<b>T</b>	acutely toxic
<b>F</b>	flammable	<b>O</b>	oxidising
<b>N</b>	hazardous to the aquatic environment		

Hazard data sheets relating to substances used in this exam should be available from your chemical supplier.

### Before the exam

- The packets containing the question papers must **not** be opened before the exam.
- It is assumed that standard school laboratory facilities, as indicated in the *Guide to Planning Practical Science*, will be available.
- Spare materials and apparatus for the tasks set must be available for candidates, if required.

### During the exam

- It must be made clear to candidates at the start of the exam that they may request spare materials and apparatus for the tasks set.
- Where specified, the supervisor **must** perform the experiments and record the results as instructed. This must be done **out of sight** of the candidates, using the same materials and apparatus as the candidates.
- Any assistance provided to candidates must be recorded in the supervisor's report.
- If any materials or apparatus need to be replaced, for example, in the event of breakage or loss, this must be recorded in the supervisor's report.

### After the exam

- The supervisor must complete a report for each practical session held and each laboratory used.
- Each packet of scripts returned to Cambridge International must contain the following items:
  - the scripts of the candidates specified on the bar code label provided
  - the supervisor's results relevant to these candidates
  - the supervisor's reports relevant to these candidates
  - seating plans for each practical session, referring to each candidate by candidate number
  - the attendance register.

## Specific information for this practical exam

During the exam, the supervisor or other competent biologist (**not** the invigilator) should obtain the results needed for the supervisor's report by following the relevant steps in the question paper. The results should be recorded in the supervisor's report.

Extra supplies of all of the materials and apparatus listed below should be available if candidates request them. No other materials or apparatus should be provided.

### To be supplied by the centre

Candidates must have access to a microscope with:

- low-power objective lens, e.g.  $\times 10$  (equal to 16 mm or 2/3")
- high-power objective lens, e.g.  $\times 40$  (equal to 4 mm or 1/6")
- eyepiece graticule fitted within the eyepiece and visible in focus at the same time as the specimen.

Each candidate should have sole, uninterrupted use of the microscope for at least 75 minutes. Microscopes are required for part of Question 1 and for Question 2.

### Question 1

Candidates should have access to a balance that measures to a precision of 0.01 g. It is recommended that there is at least one balance between two candidates.

Each candidate will require, for a period of 90 minutes:

- (i) quarter of a large red onion bulb, with the outer papery leaves removed

The material must be provided fresh and should not be allowed to dry out. It may be supplied to the candidates wrapped in damp paper towel or given to the candidates as they require it.

- [MH] (ii) 10 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> solution of potassium nitrate (KNO<sub>3</sub>) in a suitable glass container, labelled **potassium nitrate**

The solution should be prepared by dissolving 50.5 g of potassium nitrate [O] in 250 cm<sup>3</sup> of water and making up to 500 cm<sup>3</sup>.

- (iii) 100 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> solution of mannitol in a suitable container, labelled **1.0 mol dm<sup>-3</sup> mannitol**

The solution should be prepared by dissolving 182.2 g in 800 cm<sup>3</sup> of warm distilled water (approximately 50 °C) and making up to 1 dm<sup>3</sup> with cool distilled water. The solution should be made no sooner than the day before the examination. The beaker should be covered to prevent contamination.

- (iv) 20 cylinders of potato, at least 55 mm in length, cut with a No. 3 cork borer and any 'skin' left in place

The cylinders should be cut on the morning of the examination and placed into Petri dishes lined with damp paper towel. Distilled water should be used to dampen the paper towels. Replace the lids on the Petri dishes. Do **not** remove any 'skin' from the cylinders.

- (v) at least six small beakers, e.g. 100 cm<sup>3</sup>
- (vi) two teat pipettes
- (vii) two clean microscope slides and several cover slips
- (viii) 250 cm<sup>3</sup> beaker containing at least 200 cm<sup>3</sup> distilled water, labelled **distilled water**
- (ix) 250 cm<sup>3</sup> beaker containing at least 200 cm<sup>3</sup> distilled water, labelled **washing water**
- (x) empty beaker, labelled **waste**
- (xi) 1 cm<sup>3</sup> syringe, 5 cm<sup>3</sup> syringe, 10 cm<sup>3</sup> syringe and 20 cm<sup>3</sup> syringe
- (xii) 12 test-tubes (15 mm × 150 mm)
- (xiii) rack or racks to contain at least 12 test-tubes
- (xiv) sharp scalpel (e.g. Swann Morton handle No. 3 fitted with blade No. 11) or single-edged razor blade or small, sharp knife
- (xv) pair of forceps
- (xvi) pair of small, sharp dissection scissors
- (xvii) white tile
- (xviii) two bungs to fit test-tubes
- (xix) transparent ruler (cm and mm)
- (xx) water-resistant marker pen
- (xxi) one piece of filter paper, e.g. 90 mm in diameter
- (xxii) paper towels
- (xxiii) thermometer (−10 °C to 110 °C)
- (xxiv) suitable eye protection
- (xxv) stop clock or timer
- (xxvi) mounted needle
- (xxvii) access to a microscope, as described on page 3

**Question 2**

- (i) access to a microscope, as described on page 3
- (ii) transparent ruler (cm and mm)
- (iii) hand lens (at least  $\times 6$ )
- (iv) stage micrometer

**Question 3**

No materials or apparatus are required.

**To be supplied by Cambridge International****Question 2**

- (i) slides L1

The number of slides supplied will be equal to half of the candidate entry.

**Return of slides to Cambridge International**

Immediately after the exam, the slides must be:

- returned to Cambridge International in the boxes in which they were received, using the self-adhesive label supplied. The slides 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 International. 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 plus £1 per box.

If the slides are not returned or purchased by the deadline stated on the order form, the charge will be £3.50 per slide plus £1 per box.

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**Supervisor's report**

Syllabus and component number

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Centre number

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Centre name .....

Time of the practical session .....

Laboratory name/number .....

**Give details of any difficulties experienced by the centre or by candidates (include the relevant candidate names and candidate numbers).**

You must include:

- any difficulties experienced by the centre in the preparation of materials
- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
- any specific assistance given to candidates.

Temperature of exam room .....°C

Results for Question 1(d)

### Declaration

- 1 Each packet that I am returning to Cambridge International contains the following items:
  - the scripts of the candidates specified on the bar code label provided
  - the supervisor's results relevant to these candidates
  - the supervisor's reports relevant to these candidates
  - seating plans for each practical session, referring to each candidate by candidate number
  - the attendance register
- 2 Where the practical exam has taken place in more than one practical session, I have clearly labelled the supervisor's results, supervisor's reports and seating plans with the time and laboratory name/number for each practical session.
- 3 I have included details of difficulties relating to each practical session experienced by the centre or by candidates.
- 4 I have reported any other adverse circumstances affecting candidates, e.g. illness, bereavement or temporary injury, directly to Cambridge International on a *special consideration form*.

Signed ..... (supervisor)

Name (in block capitals) .....