

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:

C	corrosive	MH	moderate hazard
HH	health hazard	T	acutely toxic
F	flammable	O	oxidising
N	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 barcode 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.

Organisation of the exam

- Half the candidates should start on Question 1 and the other candidates should start on Question 2.
- For Question 1, each candidate must have uninterrupted use of a microscope for at least 55 minutes.

Materials to be supplied by Cambridge International

- None

Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Piece of onion tissue covered by 1.00 mol dm ⁻³ sodium chloride solution in a beaker or container, labelled S4 , provided at room temperature (see Preparation of materials)	at least 50 cm ³	
Piece of onion tissue covered by 0.50 mol dm ⁻³ sodium chloride solution in a beaker or container, labelled S1 , provided at room temperature (see Preparation of materials)	at least 50 cm ³	
Piece of onion tissue covered by 0.25 mol dm ⁻³ sodium chloride solution in a beaker or container, labelled S3 , provided at room temperature (see Preparation of materials)	at least 50 cm ³	
Piece of onion tissue covered by distilled water in a beaker or container, labelled S2 , provided at room temperature (see Preparation of materials)	at least 50 cm ³	
Microscope with: <ul style="list-style-type: none"> • an eyepiece lens, ×10 magnification • a low-power objective lens, ×10 magnification • a high-power objective lens, ×40 magnification • an eyepiece graticule fitted into the eyepiece lens 	1 between 2	
Microscope slides	4	
Coverslips	4	
Forceps (blunt)	1	
Pipette, plastic or glass with teat	1	
Scalpel or sharp blade	1	
Seeker or mounted needle	1	
White tile or surface for cutting	1	
Container with approximately 300 cm ³ of tap water, labelled For washing	1	
Container, capacity approximately 300 cm ³ , labelled For waste	1	
Paper towels	8	
Glass marker pen (permanent)	1	
Suitable eye protection	1	

Preparation of materials

The sodium chloride solutions may be prepared the day before the examination and kept covered to prevent evaporation.

Onion tissue may be prepared the day before the examination or **at least one hour** before the start of the examination and put into the sodium chloride solutions.

These should be put into a refrigerator in covered containers overnight but removed to reach room temperature before the start of the examination.

- **S4**, 1.00 mol dm⁻³ sodium chloride solution

This is prepared by putting 11.7 g of sodium chloride in 100 cm³ of distilled water and making up to 200 cm³ with distilled water.

This solution is needed to soak the pieces of onion and is also used as a stock solution to make **S1** and **S3**.

- **S1**, 0.50 mol dm⁻³ sodium chloride solution

This is prepared by adding 50 cm³ of distilled water to 50 cm³ of the 1.00 mol dm⁻³ sodium chloride solution.

This solution is needed to soak the pieces of onion.

- **S3**, 0.25 mol dm⁻³ sodium chloride solution

This is prepared by adding 75 cm³ of distilled water to 25 cm³ of the 1.00 mol dm⁻³ sodium chloride solution.

This solution is needed to soak the pieces of onion.

- **S2**, distilled water

- **Pieces of onion tissue**

- 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 must be as fresh as possible to avoid the effects of storage.
- The pieces of onion must be prepared at least one hour before the start of the examination and left in the sodium chloride solutions with the containers covered to prevent evaporation. Alternatively, they may be prepared the day before the examination as stated above.
- The pieces of onion are prepared as described on page 6.

- **Microscope**

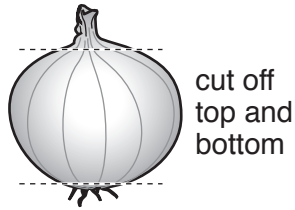
Any lenses which are **not** ×10 or ×40 should be removed or replaced.

The eyepiece graticule must be visible and in focus at the same time as the specimen.

For each candidate:

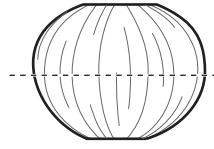
- the microscope must be set up on low power
- slides must **not** be on the stage of the microscope.

Preparation of pieces of onion:

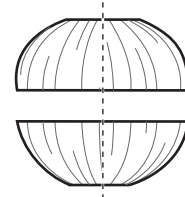


cut off
top and
bottom

remove dry
scale leaves



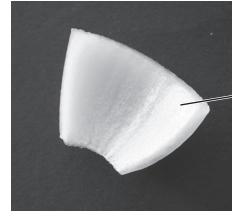
cut across



cut into
pieces



separate pieces of onion with
fingers or forceps and throw away any
pieces too small to remove epidermis
(but leave epidermis attached
to the pieces given to candidates)



piece of onion
with epidermis
attached

- The inner epidermis may start to separate or may have become separated from the rest of the onion tissue and may be floating.
- Put the number of pieces of onion required for all candidates, with some spares, into large containers with enough of each solution to submerge the onion pieces.
- Cover the containers.
- Before the examination, ensure that each solution containing the piece of onion for each candidate is at room temperature.

Materials and apparatus for Question 2

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Beaker, capacity approximately 100 cm ³ , labelled P1 , containing 30–40 cm ³ of tap water (but not on any marked volume on the beaker)	1	
Beaker, capacity approximately 100 cm ³ , labelled P2 , containing 50–60 cm ³ of tap water (but not on any marked volume on the beaker)	1	
Beaker, capacity approximately 100 cm ³ , labelled P3 , containing 60–70 cm ³ of tap water (but not on any marked volume on the beaker)	1	
Beaker, capacity approximately 100 cm ³	1	
Measuring cylinder, capacity 100 cm ³	1	
5 cm ³ syringe	1	
1 cm ³ or 2 cm ³ or 3 cm ³ syringe	1	
Paper towels	8	
Suitable eye protection	1	

Note: the level of water in **P1**, **P2** and **P3** must **not** lie on any marked volume on the beakers and the volume of water **must** be in the stated range.

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Supervisor's report

Syllabus and component number

9	7	0	0	/	3	4
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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(a)(ii)

Declaration

- 1 Each packet that I am returning to Cambridge International contains the following items:
 - the scripts of the candidates specified on the barcode 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)