Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **May/June 2020**

CONFIDENTIAL INSTRUCTIONS

8651280386

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.

INSTRUCTIONS

- 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.
  email info@cambridgeinternational.org
  phone +44 1223 553554

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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 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.

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Specific information for this practical exam

During the exam, the supervisor or other competent biologist (**not** the invigilator) should obtain the results specified on the supervisor's report by following the relevant steps in the question paper. The results should be recorded in the space provided on 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 2, each candidate must have uninterrupted use of a microscope for at least 55 minutes.

Materials to be supplied by Cambridge International

- Slide **J1**
- Invertase

  On receipt of the slides, check that they are labelled **J1** and that no slides are broken. The slides should **not** be viewed in advance of the exam. The material on the slides is confidential and must **not** be disclosed to candidates.

  The number of slides supplied by Cambridge International will be equal to half 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 £3.25 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 £3.75 per slide plus £1 per box.

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
[MH][HH][C] 1.0% invertase solution in a small beaker, labelled **E**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
[MH][HH][C] 0.1% invertase solution in a small beaker, labelled **H**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
[MH][N] Benedict's solution (qualitative) in a beaker or container, labelled **B**, provided at room temperature	at least 30 cm^3	
5% sucrose solution in a small beaker, labelled **S**, provided at room temperature	at least 25 cm^3	
Distilled water, in a beaker or container, labelled **W**, provided at room temperature	at least 150 cm^3	
10 cm^3 syringe, with the means to wash it out	1	
5 cm^3 syringes, with the means to wash them out	3	
1 cm^3 syringe, with the means to wash it out	1	
Beakers, capacity 50–100 cm^3	5	
Bunsen burner, tripod, gauze, bench mat and lighter or matches	1	
Beaker, capacity approximately 400 cm^3, with approximately 200 cm^3 of water at 30–40 °C, suitable for heating as a water-bath	1	
Test-tubes, small, capacity approximately 20–30 cm^3	6	
Test-tube holder	1	
Test-tube rack to hold 6 small test-tubes	1	
Glass rod	1	
Thermometer, –10 °C to +110 °C	1	
Container with approximately 200 cm^3 tap water, labelled **For washing**	1	
Container, capacity approximately 300 cm^3, labelled **For waste**	1	
Paper towels	8	
Glass marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

Sucrose solution, **S**, may be prepared the day before the exam.

The container should be covered and put in a refrigerator overnight but removed to reach room temperature before the start of the exam.

[MH][HH][C] ● **E**, 1.0% invertase solution

This is prepared by putting 1 cm^3 of invertase solution (supplied by Cambridge International) into a beaker and making up to 100 cm^3 with distilled water. Mix well.

E must be prepared immediately before the exam and be at room temperature.

[MH][HH][C] ● **H**, 0.1% invertase solution

This is prepared by putting 10 cm^3 of 1.0% invertase solution, **E**, into a beaker and making up to 100 cm^3 with distilled water. Mix well.

● **S**, 5% sucrose solution

This is prepared by putting 5 g of sucrose into 80 cm^3 of warm distilled water and mixing well. Make up to 100 cm^3 with distilled water.

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[Turn over

Materials and apparatus for Question 2

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Microscope with: ● an eyepiece lens, ×10 magnification ● a low-power objective lens, ×10 magnification ● a high-power objective lens, ×40 magnification	1 between 2	
Slide **J1**	1 between 2	

Preparation of materials

- Microscope

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

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

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Supervisor's report

Syllabus and component number	9	7	0	0	/	3	1
Centre number							

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.

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Temperature of exam room ..... °C

Result for Question **1(a)(iii)**

Results for Question **1(a)(iv)**

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) .....

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Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/32**

Paper 3 Advanced Practical Skills 2 **May/June 2020**

CONFIDENTIAL INSTRUCTIONS

9289842700

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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

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
2 pieces of onion in a beaker or container covered with distilled water, labelled **X**, provided at room temperature (see **Preparation of materials**)	1	
4.0% sodium chloride solution in a beaker or container, labelled **S**, provided at room temperature (see **Preparation of materials**)	50 cm^3	
Distilled water in a beaker or container, labelled **W**, provided at room temperature	50 cm^3	
Beaker, maximum capacity 100 cm^3	5	
Measuring cylinder, 10 cm^3	2	
Beaker or container, capacity approximately 100 cm^3, labelled **For waste**	1	
Glass pipette with teat or plastic pipette	5	
Microscope slide and coverslip	1	
Scalpel	1	
Forceps	1	
Mounted needle	1	
White tile	1	
Paper towels	10	
Glass marker pen, permanent	1	
Suitable eye protection	1	
Microscope with: ● an eyepiece lens, ×10 magnification ● a low-power objective lens, ×10 magnification ● a high-power objective lens, ×40 magnification	1 between 2	

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Preparation of materials

All materials must be made up on the day of the exam.

- **X**, two pieces of white onion in distilled water.

  This must be prepared at least one hour before the exam.

  White onion pieces are prepared as in Fig. 1.1.

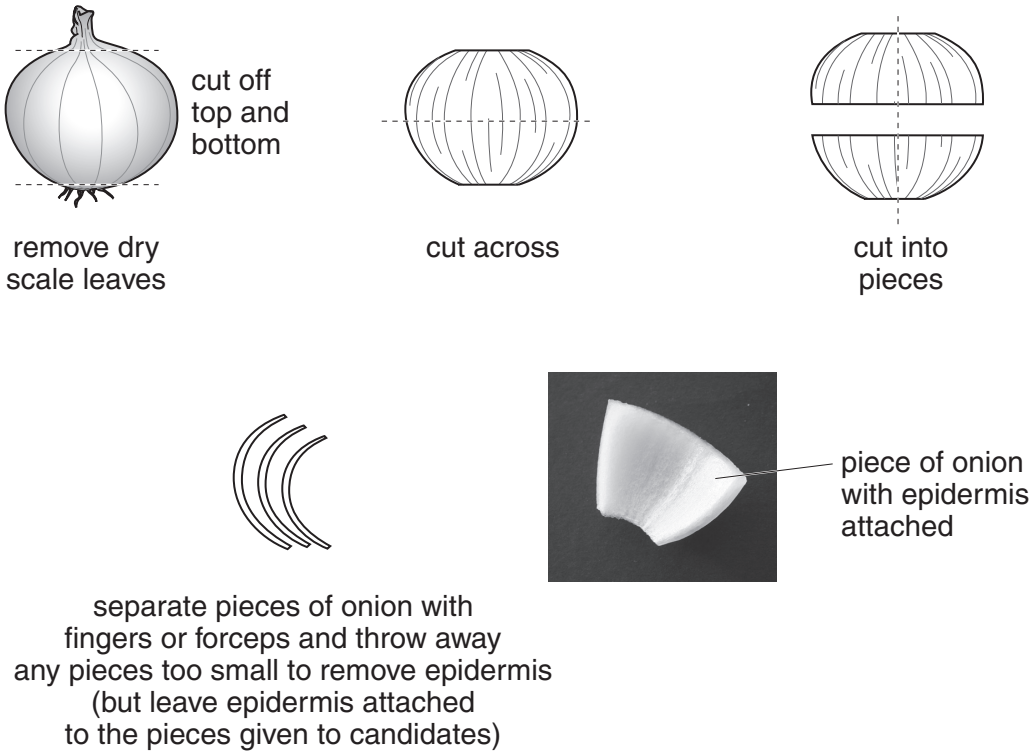


Fig. 1.1

- **S**, 4.0% sodium chloride solution.

  This is prepared by putting 4 g of sodium chloride into 80 cm^3 of distilled water and making up to 100 cm^3 with distilled water.

- Microscope

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

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

Materials and apparatus for Question 2

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Transparent ruler showing mm	1	
Clean, dry microscope slides	4	
Pieces of paper in a dry container, labelled **P** (see **Preparation of materials**)	6	
Adhesive tape, at least 10 cm in length	2 pieces	
Water coloured with food dye, in a beaker of maximum capacity 100 cm^3, labelled **R**, provided at room temperature (see **Preparation of materials**)	1	
Beaker or container, maximum capacity 100 cm^3	1	
Stop-clock or timer showing seconds	1	

Preparation of materials

- **P**, 6 pieces of paper in a dry container.
  - Each piece of paper can be cut from any type of plain paper, e.g. printer paper, writing paper.
  - Each piece of paper must be cut, so it is narrower than the width **and** longer than the length of the microscope slides provided, as shown in Fig. 1.2.

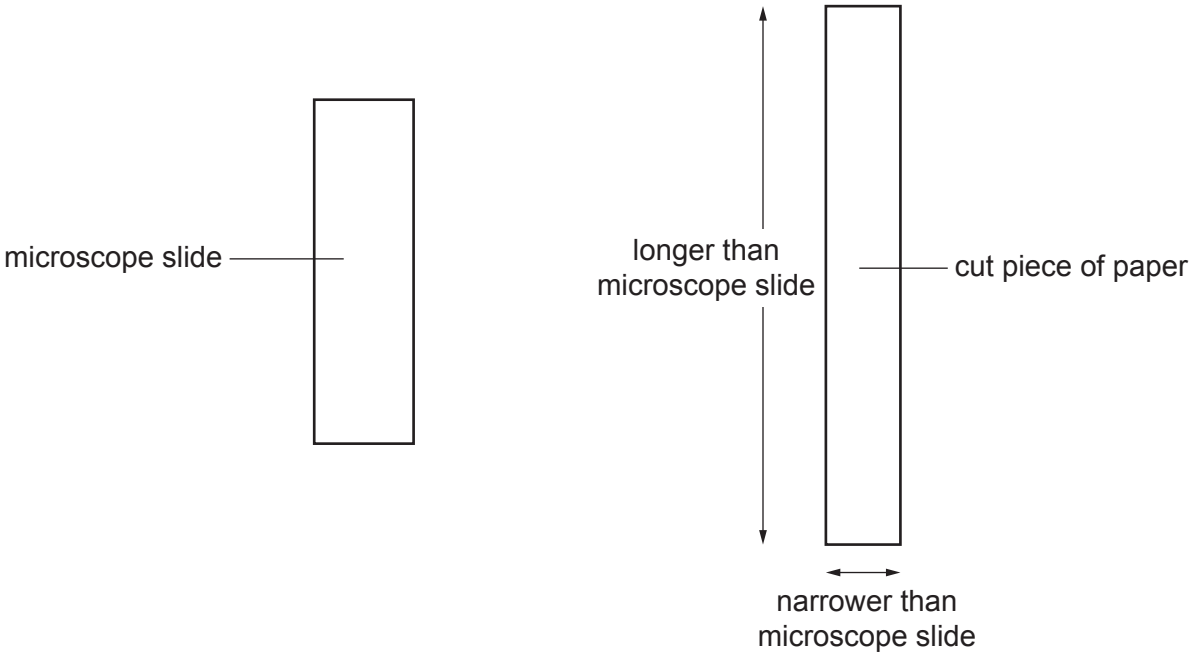


Fig. 1.2

- **R**, water coloured with food dye.

  This is prepared by putting enough food dye into water to produce an intense colour.
  Any colour of food dye may be used.
  Put the coloured water into a 100 cm^3 beaker to a depth of approximately 1 cm.

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Supervisor's report

Syllabus and component number	9	7	0	0	/	3	2
Centre number							

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:

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Temperature of exam room ..... °C

Result for Question **1(a)(ii)**

Results for Question **1(a)(iii)**

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Signed ..... (supervisor)

Name (in block capitals) .....

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Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/33**

Paper 3 Advanced Practical Skills 1 **May/June 2020**

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Organisation of the exam

- Half the candidates should start on Question 1 and the other candidates should start on Question 2.

- For Question 2, each candidate must have uninterrupted use of a microscope for at least 55 minutes.

Materials to be supplied by Cambridge International

- Slide **K1**

  On receipt of the slides, check that they are labelled **K1** and that no slides are broken. The slides should not be viewed in advance of the exam. The material on the slides is confidential and must not be disclosed to candidates.

  The number of slides supplied by Cambridge International will be equal to half 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 £3.25 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 £3.75 per slide plus £1 per box.

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
20% glucose solution in a beaker or container, labelled **G**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
20% glucose solution in a beaker or container, labelled **U**, provided at room temperature (see **Preparation of materials**) Note: this item is described differently in the question paper. This is intentional. Candidates should **not** be informed.	at least 10 cm^3	
Distilled water in a beaker or container, labelled **W**, provided at room temperature	at least 20 cm^3	
[MH] 1 mol dm^{-3} sulfuric acid solution in a beaker or container, labelled **A**, provided at room temperature	at least 20 cm^3	
[MH][N] 0.01% potassium manganate(VII) solution in a beaker or container, labelled **P**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
10 cm^3 syringes, with the means to wash them out	3	
5 cm^3 syringes, with the means to wash them out	2	
Beakers, capacity 50–100 cm^3	5	
Test-tubes, small, capacity 20–30 cm^3	6	
Test-tube rack, to hold 6 small test-tubes	1	
Container, capacity approximately 200 cm^3, with tap water labelled **For washing**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
White card, approximately 10 cm × 10 cm	1	
Glass marker pen, permanent	1	
Paper towels	8	
Stop-clock or timer, showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

P must be prepared on the day of the exam.
G and **U** may be prepared the day before the exam and kept in covered containers in a refrigerator.
G, **U** and **P** should be at room temperature before the start of the exam.

- **G** and **U**, 20% glucose solution

  This is prepared by sprinkling 20 g of glucose, a little at a time, onto the surface of 80 cm^3 of distilled water stirring continuously as you sprinkle. Make up to 100 cm^3 with distilled water.

[MH][N]

- **P**, 0.01% potassium manganate(VII) solution

  This is prepared by putting 1 g of potassium manganate(VII) **[O][MH][N]** into 80 cm^3 of distilled water. Mix well. Make up to 100 cm^3 with distilled water. This makes a 1% solution.

  Then put 1 cm^3 of the 1% solution into a container and make up to 100 cm^3 with distilled water. This makes the 0.01% solution, **P**.

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Materials and apparatus for Question 2

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Microscope with: ● an eyepiece lens, ×10 magnification ● a low-power objective lens, ×10 magnification ● a high-power objective lens, ×40 magnification	1 between 2	
Slide **K1**	1 between 2	

Preparation of materials

- Microscope

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

  For each candidate:

  - the microscope must be set up on low power
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Temperature of exam room ..... °C

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

Results for **Question 1(a)(iii)**

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Name (in block capitals) .....

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Cambridge International AS & A Level

BIOLOGY **9700/34**

Paper 3 Advanced Practical Skills 2 **May/June 2020**

CONFIDENTIAL INSTRUCTIONS

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- 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.

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Specific information for this practical exam

During the exam, the supervisor or other competent biologist (**not** the invigilator) should obtain the results specified on the supervisor's report by following the relevant steps in the question paper. The results should be recorded in the space provided on 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 2, each candidate must have uninterrupted use of a microscope for at least 55 minutes.

Materials to be supplied by Cambridge International

- Slide **N1**

  On receipt of the slides, check that they are labelled **N1** and that no slides are broken. The slides should not be viewed in advance of the exam. The material on the slides is confidential and must not be disclosed to candidates.

  The number of slides supplied by Cambridge International will be equal to half 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 £3.25 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 £3.75 per slide plus £1 per box.

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
10% sodium chloride solution in a beaker or container, labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 200 cm^3	
5% sodium chloride solution in a beaker or container, labelled **U**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
Petri dish, labelled **P**, with 7 pieces of potato in a damp paper towel (see **Preparation of materials**)	1	
Distilled water, in a beaker or container, labelled **W**, provided at room temperature	at least 200 cm^3	
10 cm^3 syringes, with the means to wash them out	2	
Beakers or containers, capacity 50 – 100 cm^3	6	
Petri dishes, 90–100 mm in diameter	7	
A4 sheet of graph paper	1	
Ruler	1	
Glass rod	1	
Forceps	1	
Container with approximately 200 cm^3 tap water, labelled **For washing**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
Paper towels	10	
Glass marker pen, permanent	1	
Stop-clock or timer, showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

S and **U** may be prepared the day before the exam and kept overnight in covered containers in a refrigerator.
Pieces of potato tissue must be prepared on the day of the exam.

S and **U** should be at room temperature before the start of the exam.

- **S**, 10% sodium chloride solution

  This is prepared by putting 20 g of sodium chloride into 160 cm^3 of distilled water. Mix well. Make up to 200 cm^3 with distilled water.

- **U**, 5% sodium chloride solution

  This is prepared by putting 5 g of sodium chloride into 80 cm^3 of distilled water. Mix well. Make up to 100 cm^3 with distilled water.

- **P**, pieces of potato tissue

  This is prepared just before the exam.

  - Cut the potato into pieces that are approximately 1 cm × 6 cm × 0.5 cm, e.g. with a large kitchen knife.
  - The potato pieces must not have skin on them.
  - Do **not** use cork borers as this may compress the tissues.
  - Cut enough for 7 per candidate plus some spares.
  - Put 7 pieces of potato into a Petri dish for each candidate and cover with a damp paper towel.

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Materials and apparatus for Question 2

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Microscope with: ● an eyepiece lens, ×10 magnification ● a low-power objective lens, ×10 magnification ● a high-power objective lens, ×40 magnification	1 between 2	
Slide **N1**	1 between 2	

Preparation of materials

- Microscope

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

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

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Supervisor's report

Syllabus and component number	9	7	0	0	/	3	4
Centre number							

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.

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Temperature of exam room ..... °C

Results for Question **1(a)(iii)**

Results for Question **1(a)(iv)**

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) .....

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Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/35**

Paper 3 Advanced Practical Skills 1 **May/June 2020**

CONFIDENTIAL INSTRUCTIONS

2107337840

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.

INSTRUCTIONS

- 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.
  email info@cambridgeinternational.org
  phone +44 1223 553554

This document has **8** pages. Blank pages are indicated.

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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:
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    - the supervisor's reports relevant to these candidates
    - seating plans for each practical session, referring to each candidate by candidate number
    - the attendance register.

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Specific information for this practical exam

During the exam, the supervisor or other competent biologist (**not** the invigilator) should obtain the results specified on the supervisor's report by following the relevant steps in the question paper. The results should be recorded in the space provided on 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 2, each candidate must have uninterrupted use of a microscope for at least 55 minutes.

Materials to be supplied by Cambridge International

- Slide **L1**

  On receipt of the slides, check that they are labelled **L1** and that no slides are broken. The slides should not be viewed in advance of the exam. The material on the slides is confidential and must not be disclosed to candidates.

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Return of slides to Cambridge International

Immediately after the exam, the slides must be:

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If the slides are not returned or purchased by the deadline stated on the order form, the charge will be £3.75 per slide plus £1 per box.

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
3% yeast suspension in a beaker or container labelled **Y**, provided at approximately 30 °C (see **Preparation of materials**)	at least 40 cm^3	
[MH] 3% hydrogen peroxide solution in a beaker or container labelled **H**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
[MH] 1% copper sulfate solution in a beaker or container, labelled **C**, provided at room temperature (see **Preparation of materials**)	at least 40 cm^3	
Distilled water, in a beaker or container, labelled **W**, provided at room temperature	at least 100 cm^3	
10 cm^3 syringes, with the means to wash them out	2	
2 cm^3 or 3 cm^3 syringe, with the means to wash it out	1	
Beakers, capacity 50–100 cm^3	5	
Test-tube, small, capacity approximately 20–30 cm^3	1	
Test-tubes, large, capacity approximately 40–55 cm^3	6	
Test-tube rack to hold 6 large test-tubes	1	
Beaker, capacity approximately 400 cm^3, with approximately 200 cm^3 water at 40–50 °C, labelled **water-bath**	1	
Beaker, capacity approximately 400 cm^3, with approximately 150 cm^3 of cold tap water, labelled **cold water**	1	
Beaker, capacity approximately 400 cm^3, with approximately 150 cm^3 of hot water, labelled **hot water**	1	
Bung with delivery tube, to fit large test-tubes provided for the candidate The delivery tube must be long enough to connect an upright large test-tube to the small test-tube in container **T** (see Fig. 1.1).	1	
Tap water in a container, labelled **T**, provided at room temperature (see **Preparation of materials** and Fig. 1.1)	1	
Glass rods	2	
Thermometer, –10 °C to +110 °C	1	
Container with approximately 200 cm^3 tap water, labelled **For washing**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
Paper towels	12	
Glass marker pen, permanent	1	
Stop-clock or timer, showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

C may be prepared the day before the exam and kept in covered containers in a refrigerator. **Y** must be prepared approximately one hour before the exam and kept at approximately 30 °C. The dried yeast needs to be suitable for use in baking and be within the 'use by' date.

[MH] ● **C**, 1% copper sulfate solution

This is prepared by putting 1 g of copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$) **[MH]** into 80 cm^3 of distilled water and making up to 100 cm^3 with distilled water. Mix well.

● **Y**, 3% yeast suspension

This is prepared by putting 3.0 g of dried yeast into 50 cm^3 of warm distilled water (approximately 30 °C) and making up to 100 cm^3 with warm distilled water. Stir well.

Y should be prepared **one** hour before the examination and kept at approximately 30 °C.

Stir well before **Y** is put into the beakers used by the candidates.

[MH] ● **H**, 3% hydrogen peroxide solution

This is prepared by putting 50 cm^3 of 6% hydrogen peroxide solution **[MH]** in a beaker and making up to 100 cm^3 with distilled water.

The beaker should be covered to prevent evaporation.

● **T**, tap water in a container

The container can be glass or plastic and must be at least 20 cm across, or to allow a small test-tube to fit in it, as shown in Fig. 1.1 (the test-tube in Fig. 1.1 is shown for size comparison only and should **not** be included in **T** for the candidate). Label the container **T**. Put tap water into the container, as shown in Fig. 1.1.

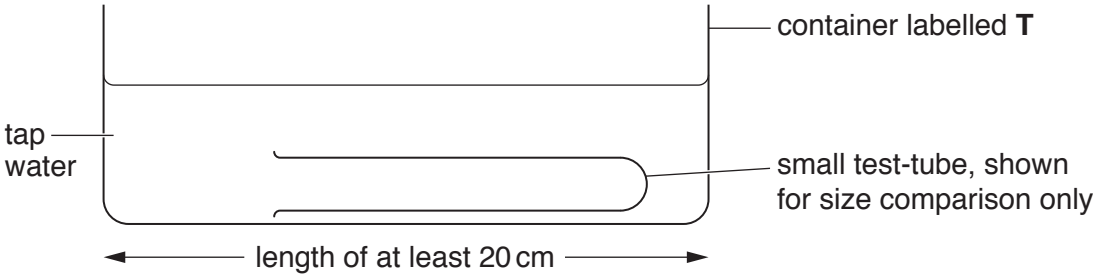


Fig. 1.1

Materials and apparatus for Question 2

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Microscope with: ● an eyepiece lens, ×10 magnification ● a low-power objective lens, ×10 magnification ● a high-power objective lens, ×40 magnification	1 between 2	
Slide **L1**	1 between 2	

Preparation of materials

- Microscope

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

  For each candidate:
  - the microscope must be set up on low power
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Supervisor's report

Syllabus and component number	9	7	0	0	/	3	5
Centre number							

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).

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Temperature of exam room ..... °C

Results for Question **1(a)(iii)**

Declaration

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Signed ..... (supervisor)

Name (in block capitals) .....

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