Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **October/November 2023**

CONFIDENTIAL INSTRUCTIONS

9373520400

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.
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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 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

- All candidates must have access to the materials required for Question 1 throughout the whole period of the exam.
- Half of the candidates will have access to the microscope and slide for a maximum time of one hour from the start of the examination. These candidates should start with Question 2. After one hour, or sooner if candidates have finished Question 2, they should move on to Question 1.
- For Question 2, two candidates are **not** permitted to share the same microscope and slide at the same time.
- The other candidates should start with Question 1. After one hour, these candidates should be given access to the microscope and slide. They should then move on to Question 2 as soon as they are ready.
- Candidates will only have access to the microscope and slide for one hour. They should be advised that they can answer any part of the examination paper not requiring the microscope and slide throughout the whole period of the examination.
- Access arrangements to microscopes and slides, including instructions on which question to start with and timings, must be explained to candidates before the start of the examination.

Materials to be supplied by Cambridge International

- Slide **J1**

  On receipt of the slides, check that they are labelled **J1** and that no slides are broken. The slides must **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% yeast suspension in a beaker, labelled **Y** (see **Preparation of materials**)	at least 100 cm^3	
10% glucose solution in a beaker, labelled **G** (see **Preparation of materials**)	20 cm^3	
hydrogencarbonate indicator solution in a small test-tube, labelled **H** (see **Preparation of materials**)	15 cm^3	
10 cm^3 syringe	1	
1 cm^3 syringe	1	
Test-tube, large, capacity 50–60 cm^3	1	
Test-tube, small, capacity 20–30 cm^3	1	
Test-tube rack to hold 1 large test-tube and 1 small test-tube	1	
Beaker, capacity approximately 250 cm^3, labelled **water-bath**	1	
Beaker, containing approximately 200 cm^3 of hot water, at approximately 70 °C, labelled **hot water**	1	
Beaker, containing approximately 200 cm^3 of cold water, labelled **cold water**	1	
Bung with flexible delivery tube attached, to fit large test-tube	1	
Container, with approximately 200 cm^3 of distilled water, labelled **For washing**	1	
Container, capacity at least 400 cm^3, labelled **For waste**	1	
Paper towels	8	
Glass marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Glass rod	1	
Suitable eye protection	1	
Thermometer, –10 °C to +110 °C	1	

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Preparation of materials

Y must be prepared immediately before the start of the exam.

G can be prepared the day before the exam. This should be kept in a covered container in a refrigerator and be at room temperature before the start of the exam.

- **Y**, 10% yeast suspension

  This is prepared by putting 10 g of **fast-acting** yeast into a beaker and making up to 100 cm^3 with warm distilled water (approximately 30 °C). Mix well. This must be prepared immediately before the start of the exam and should be slightly above room temperature when presented to candidates. If preparing large batches, mix well before distributing into beakers for individual candidates.

- **G**, 10% glucose solution

  This is prepared by putting 10 g of glucose into a beaker and making up to 100 cm^3 with distilled water. Mix well. This can be prepared the day before the exam and stored covered in a refrigerator. It must be at room temperature when presented to candidates.

- **H**, hydrogencarbonate indicator

  This is prepared by putting 10 cm^3 of the hydrogencarbonate indicator in a beaker or container and adding 90 cm^3 of distilled water. This should be kept covered.

  The indicator should be a red/brown colour at the start of the exam.

  The supervisor should test the indicator before the start of the exam by gently blowing through a straw into a small sample of indicator. The indicator should turn yellow.

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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 **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

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

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

Declaration

1 Each packet that I am returning to Cambridge International contains all of 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 **9700/33**

Paper 3 Advanced Practical Skills 1 **October/November 2023**

CONFIDENTIAL INSTRUCTIONS

1984444536

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INSTRUCTIONS

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  email info@cambridgeinternational.org
  phone +44 1223 553554

This document has **8** pages.

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- Access arrangements to microscopes and slides, including instructions on which question to start with and timings, must be explained to candidates before the start of the exam.

Materials to be supplied by Cambridge International

- Slide **K1**

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
7.0% yeast cell suspension in a beaker, labelled **Y** (see **Preparation of materials**)	at least 30 cm^3	
[MH] 2.0% sodium alginate solution in a beaker, labelled **A**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
[MH] 1.5% calcium chloride solution in a beaker, labelled **C**, provided at room temperature (see **Preparation of materials**)	at least 30 cm^3	
4.0% sucrose solution in a beaker, labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 100 cm^3	
[MH][N] Benedict's solution (qualitative) in a beaker, labelled **B**, provided at room temperature	at least 30 cm^3	
10 cm^3 syringes	4	
5 cm^3 syringes	2	
Beakers, capacity 50–100 cm^3	7	
Test-tubes, small, capacity 20–30 cm^3	5	
Test-tube rack, to hold 5 small test-tubes	1	
Test-tube holder, to hold hot test-tubes	1	
Petri dish	1	
Glass rod	1	
Beaker, capacity approximately 400 cm^3, with water at 45–50 °C, suitable for heating as a water-bath, labelled **water-bath**	1	
Bunsen burner, tripod, gauze, bench mat and lighter or matches	1	
Thermometer, –10 °C to +110 °C	1	
Container, with approximately 200 cm^3 of tap water, labelled **For washing**	1	
Container, capacity at least 400 cm^3, labelled **For waste**	1	
Paper towels	8	
Glass marker pen, permanent	1	
Blunt forceps	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

A, **C** and **S** may be prepared the day before the exam and kept in a covered container in a refrigerator. They should be at room temperature before the start of the exam.

- **Y**, 7.0% yeast cell suspension

  This is prepared on the day of the exam. Put 7 g of yeast into a beaker and make up to 100 cm^3 with distilled water. Mix well.

  If preparing large batches, mix well before distributing into beakers for individual candidates.

[MH]

- **A**, 2.0% sodium alginate solution

  This is prepared by putting 2 g of sodium alginate into a beaker with 50 cm^3 of warm distilled water, stirring well and making up to 100 cm^3 with warm distilled water. Continue stirring until dissolved. Cool to room temperature.

[MH]

- **C**, 1.5% calcium chloride solution

  This is prepared by putting 1.5 g of calcium chloride into a beaker and making up to 100 cm^3 with distilled water. Mix well.

- **S**, 4.0% sucrose solution

  This is prepared by sprinkling 4 g of sucrose, a little at a time, onto the surface of 50 cm^3 of warm distilled water, stirring continuously as you sprinkle. Make up to 100 cm^3 with distilled water.

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

Centre name .....

Time of the practical session .....

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Temperature of exam room ..... °C

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

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Signed ..... (supervisor)

Name (in block capitals) .....

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Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/34**

Paper 3 Advanced Practical Skills 2 **October/November 2023**

CONFIDENTIAL INSTRUCTIONS

8045301984

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- Candidates will only have access to the microscope and slide for one hour. They should be advised that they can answer any part of the exam paper not requiring the microscope and slide throughout the whole period of the exam.
- Access arrangements to microscopes and slides, including instructions on which question to start with and timings, must be explained to candidates before the start of the exam.

Materials to be supplied by Cambridge International

- Slide **M1**
- Amylase (bacterial)

On receipt of the slides, check that they are labelled **M1** and that no slides are broken. The slides must **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

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or

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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	✓
[MH][HH][C] 2.0% bacterial amylase solution in a beaker, labelled **E**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
1.0% starch solution in a beaker, labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
[MH][HH][C] 1.6% bacterial amylase solution in a beaker, labelled **U**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
[MH][N] 0.01 mol dm^{-3} iodine solution in a beaker, labelled **iodine**, provided at room temperature with a teat pipette (see **Preparation of materials**)	at least 25 cm^3	
Distilled water, in a beaker, labelled **W**, provided at room temperature	at least 100 cm^3	
10 cm^3 syringes	2	
2 cm^3 or 3 cm^3 syringes	2	
Beakers, capacity 50–100 cm^3	5	
Test-tubes, small, capacity 20–30 cm^3	6	
Test-tube rack to hold 6 test-tubes	1	
White tile	1	
Glass rod	1	
Container with approximately 200 cm^3 of tap water, labelled **For washing**	1	
Container, capacity at least 400 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

0.1 mol dm^{-3} iodine solution should be prepared the day before the exam and kept in a covered container in a refrigerator. 0.1 mol dm^{-3} iodine solution needs to be diluted to make the 0.01 mol dm^{-3} iodine solution no more than **one hour** before the start of the exam. This needs to be at room temperature at the start of the exam.

[MH][HH][C]

- **E**, 2.0% bacterial amylase solution

  This is prepared by putting 2.0 cm^3 of bacterial amylase solution (supplied by Cambridge International) in a beaker and making up to 100 cm^3 with distilled water.

[MH][HH][C]

- **U**, 1.6% bacterial amylase solution

  This is prepared by putting 1.6 cm^3 of bacterial amylase solution (supplied by Cambridge International) in a beaker and making up to 100 cm^3 with distilled water.

- **S**, 1.0% starch solution

  This is prepared by putting 1.0 g of soluble starch into about 25 cm^3 of warm distilled water in a beaker or container. Mix to a paste. Make up to 100 cm^3 with warm distilled water. Heat to boiling for 1 to 2 minutes, stirring well. Allow to cool.

[MH][N]

- **iodine**, 0.01 mol dm^{-3} iodine solution

  Prepare a 0.1 mol dm^{-3} iodine solution the day before the exam:
  - put 8.0 g of potassium iodide in a beaker or container
  - add 2 cm^3 of distilled water to moisten the potassium iodide
  - add 2.5 g of iodine **[MH][N]** (if necessary, crush to small pieces) to the moist potassium iodide
  - add 15 cm^3 of distilled water and stir well.

  When no more iodine dissolves:
  - add another 15 cm^3 of distilled water and stir well
  - repeat with two more volumes of 15 cm^3 of distilled water
  - make up to a total volume of 100 cm^3.

  It is **not** essential that all the iodine dissolves.
  This forms a red-brown coloured, 0.1 mol dm^{-3} iodine solution.

  On the day of the exam, dilute the 0.1 mol dm^{-3} iodine solution to make the 0.01 mol dm^{-3} iodine solution:
  - put 10 cm^3 of 0.1 mol dm^{-3} iodine solution into a beaker or container
  - make up to 100 cm^3 with distilled water
  - mix well.

  This forms a yellow-orange solution.

  Prepare the 0.01 mol dm^{-3} iodine solution no more than **one hour** before the exam.
  Keep the solution away from direct sunlight, for example in a brown glass bottle.

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 **M1**	1 between 2	

Preparation of materials

- Microscope

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

  For each candidate:
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  – 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)(v)**

Declaration

1 Each packet that I am returning to Cambridge International contains all of 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 **October/November 2023**

CONFIDENTIAL INSTRUCTIONS

4493032968

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 **12** pages. Any 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:
  - 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 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

- All candidates must have access to the materials required for Question 1 throughout the whole period of the exam.
- Half of the candidates will have access to the microscope and slide for a maximum time of one hour from the start of the exam. These candidates should start with Question 2. After one hour, or sooner if candidates have finished Question 2, they should move on to Question 1.
- For Question 2, two candidates are **not** permitted to share the same microscope and slide at the same time.
- The other candidates should start with Question 1. After one hour, these candidates should be given access to the microscope and slide. They should then move on to Question 2 as soon as they are ready.
- Candidates will only have access to the microscope and slide for one hour. They should be advised that they can answer any part of the exam paper not requiring the microscope and slide throughout the whole period of the exam.
- Access arrangements to microscopes and slides, including instructions on which question to start with and timings, must be explained to candidates before the start of the exam.

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 must **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	✓
10.0% sodium chloride solution in a beaker, labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 200 cm^3	
9.0% sodium chloride solution in a beaker, labelled **U1**, provided at room temperature (see **Preparation of materials**)	50 cm^3	
1.0% sodium chloride solution in a beaker, labelled **U2**, provided at room temperature (see **Preparation of materials**)	50 cm^3	
Petri-dish with 7 pieces of potato, labelled **P**, covered by a damp paper towel (see **Preparation of materials**)	1	
Distilled water, in a beaker, labelled **W**, provided at room temperature	at least 200 cm^3	
10 cm^3 syringes	2	
50 cm^3 measuring cylinders	2	
Beakers, capacity 200–400 cm^3, with an internal diameter of at least 7 cm	5	
A4 sheets of protractors (see **Preparation of materials**)	2	
Glass rod	1	
Blunt forceps	1	
Container with approximately 200 cm^3 of tap water, labelled **For washing**	1	
Container, capacity at least 400 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

S, **U1** and **U2** may be prepared the day before the exam and kept in a covered container in a refrigerator. They should be at room temperature before the start of the exam.
P must be prepared on the day of the exam. Spare pieces of potato tissue should be available on request.

- **Protractors**, one sheet of 4 protractors

  Photocopy page 6 of the confidential instructions (protractors) onto A4 paper. Laminate each sheet or put into a clear plastic wallet.

  Spare copies should be available on request. Do **not** cut into individual protractors.

- **S**, 10.0% 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.

- **U1**, 9.0% sodium chloride solution

  This is prepared by putting 9 g of sodium chloride into 80 cm^3 of distilled water. Mix well. Make up to 100 cm^3 with distilled water.

- **U2**, 1.0% sodium chloride solution

  This is prepared by putting 1 g of sodium chloride into 80 cm^3 of distilled water. Mix well. Make up to 100 cm^3 with distilled water.

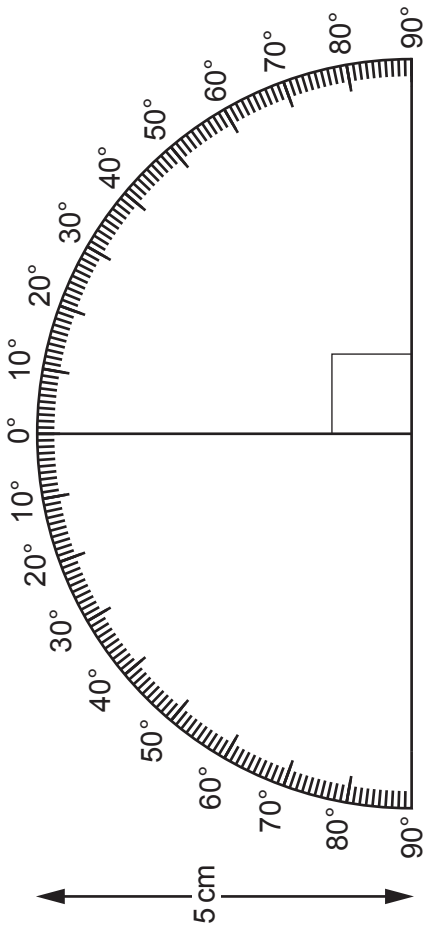
- **P**, pieces of potato tissue

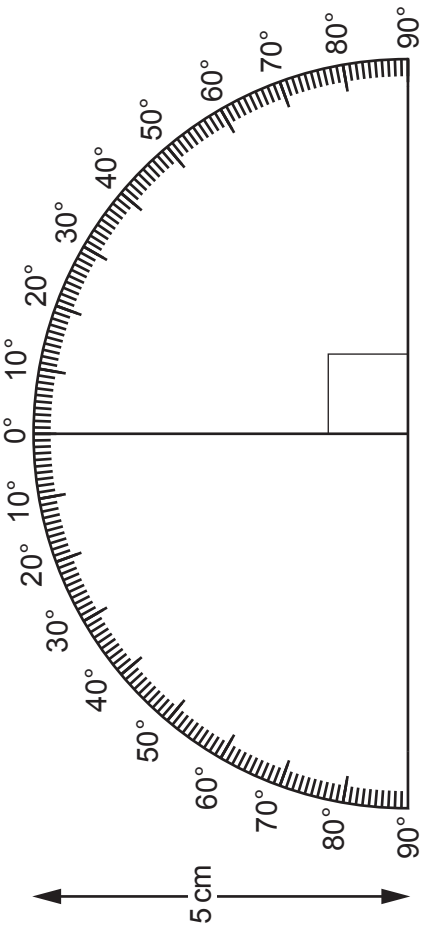
  This is prepared just before the exam. Peel the potatoes and cut them into pieces that are approximately 1 cm × 6 cm × 1 cm.

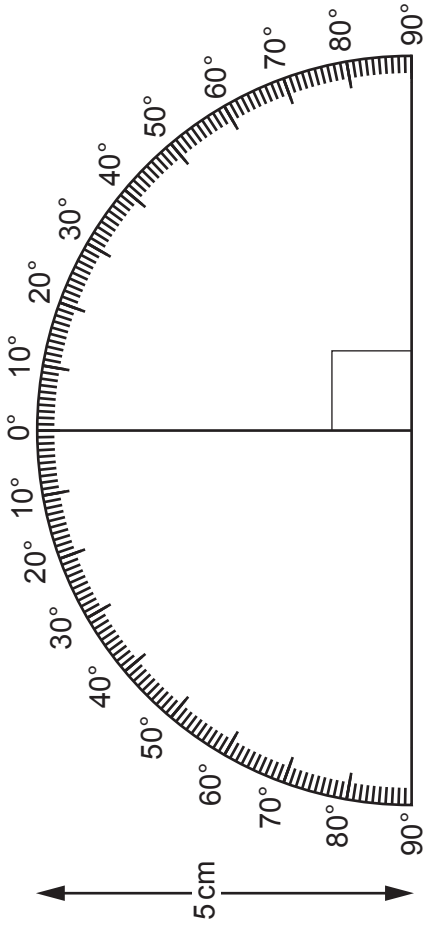
  Put 7 pieces of potato into a Petri dish for each candidate and cover with a damp paper towel.

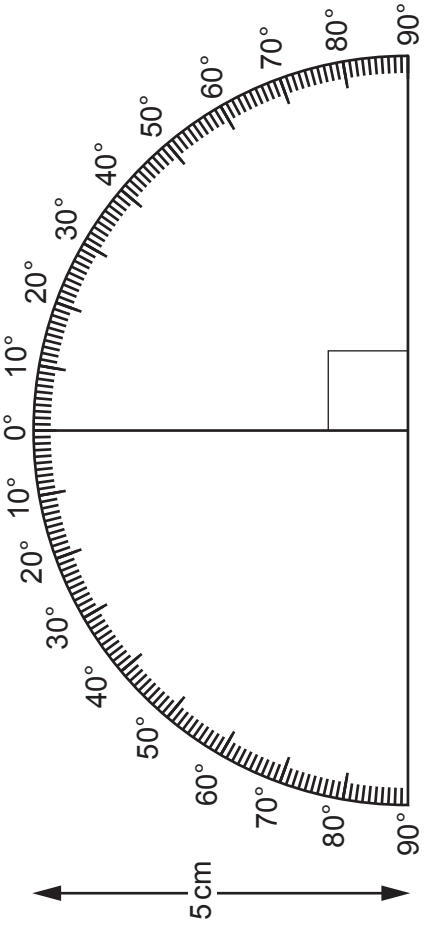
  Do **not** use cork borers as this may compress the tissues.

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0° 10° 20° 30° 40° 50° 60° 70° 80° 90°
5 cm


0° 10° 20° 30° 40° 50° 60° 70° 80° 90°
5 cm


0° 10° 20° 30° 40° 50° 60° 70° 80° 90°
5 cm


0° 10° 20° 30° 40° 50° 60° 70° 80° 90°
5 cm

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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 **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
  – 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	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).

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)(ii)**

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

Declaration

1 Each packet that I am returning to Cambridge International contains all of the following items:
- the scripts of the candidates specified on the bar code label provided
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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.

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 **9700/36**

Paper 3 Advanced Practical Skills 2 **October/November 2023**

CONFIDENTIAL INSTRUCTIONS

4207309343

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 **12** pages. Any 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:
  - 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 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

- All candidates must have access to the materials required for Question 1 throughout the whole period of the exam.
- Half of the candidates will have access to the microscope and slide for a maximum time of one hour from the start of the exam. These candidates should start with Question 2. After one hour, or sooner if candidates have finished Question 2, they should move on to Question 1.
- For Question 2, two candidates are **not** permitted to share the same microscope and slide at the same time.
- The other candidates should start with Question 1. After one hour, these candidates should be given access to the microscope and slide. They should then move on to Question 2 as soon as they are ready.
- Candidates will only have access to the microscope and slide for one hour. They should be advised that they can answer any part of the exam paper not requiring the microscope and slide throughout the whole period of the exam.
- Access arrangements to microscopes and slides, including instructions on which question to start with and timings, must be explained to candidates before the start of the exam.

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 must **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.

Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
[MH] 2.0 mol dm^{-3} hydrochloric acid in a beaker, labelled **H**, provided at room temperature	at least 20 cm^3	
Agar containing 0.01 mol dm^{-3} sodium hydroxide solution and universal indicator solution, in a 9 cm diameter Petri dish (see **Preparation of materials**)	2	
A4 sheet for Petri dishes, labelled **T** (see **Preparation of materials**)	1	
Distilled water in a beaker, labelled **W**, provided at room temperature	at least 30 cm^3	
10 cm^3 syringes	2	
Teat pipette	1	
Beakers, capacity 50–100 cm^3	5	
Container with approximately 200 cm^3 tap water, labelled **For washing**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
Paper straws, diameter approximately 5 mm	2	
Ruler, marked in mm	1	
Scalpel	1	
Mounted needle	1	
Paper towels	8	
Water-resistant marker pen (for labelling glassware)	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

The agar may be prepared the day before the exam.
It is essential that the agar does **not** dry out after it has set. To prevent drying out, the containers may be wrapped in a plastic bag or similar.

The agar may be used cold but **H** must be at room temperature.

- Agar, containing 0.01 mol dm^{-3} sodium hydroxide solution and universal indicator solution

  0.01 mol dm^{-3} sodium hydroxide solution is prepared by dissolving 0.2 g of sodium hydroxide **[C]** in 100 cm^3 distilled water and making up to 500 cm^3 with distilled water.

  Put 15 g of agar powder ('technical' **not** 'nutrient') into 500 cm^3 0.01 mol dm^{-3} sodium hydroxide solution and boil to dissolve the agar. Remove from the heat.

  Put 5 cm^3 of universal indicator solution **[F]** into 500 cm^3 of the hot agar.

  Pour the agar into the Petri dishes to a depth of 0.5 cm. Keep the agar in cool conditions to set firmly. The Petri dishes must be placed on a horizontal flat surface so that the agar sets to an even depth.

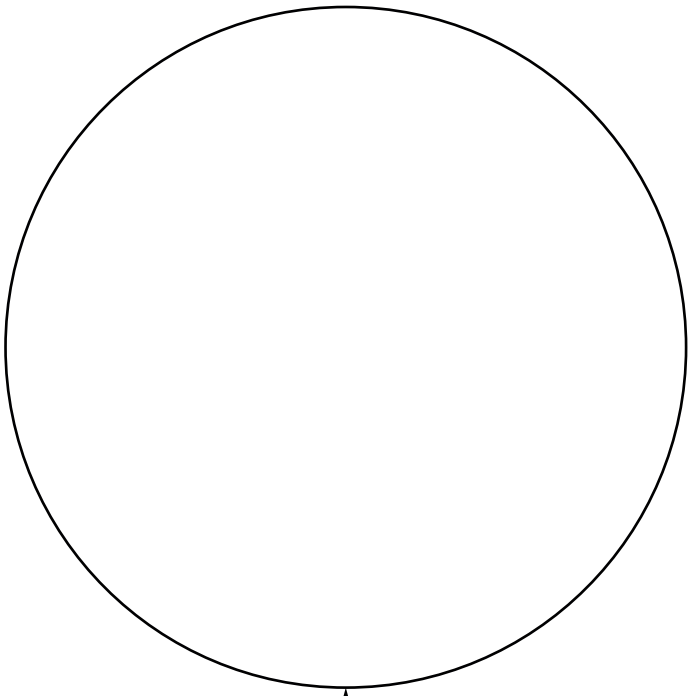
- **T**, A4 sheet for the Petri dishes

  Photocopy page 6 of the Confidential Instructions onto A4 paper. Spare copies should be available on request.

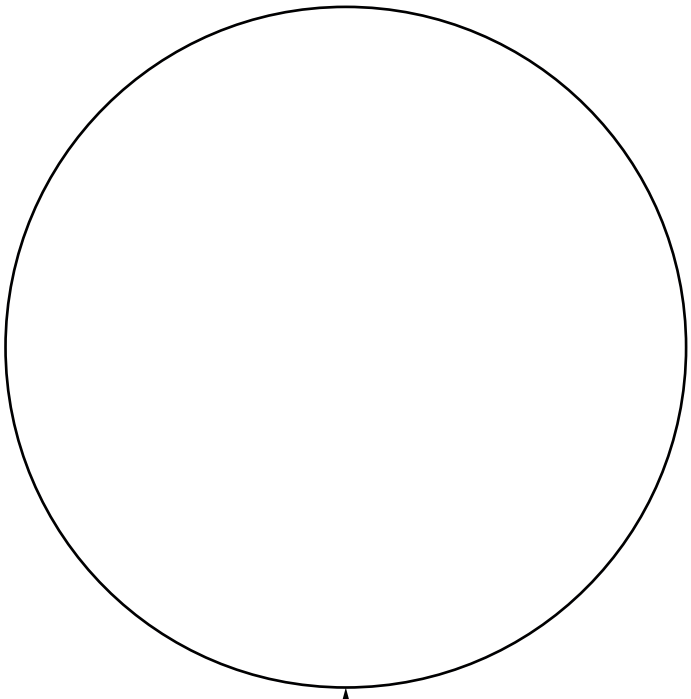
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sheet T

A



B



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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	6

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)**

Declaration

1 Each packet that I am returning to Cambridge International contains all of 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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