Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

8941135520

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.

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

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phone +44 1223 553554
fax +44 1223 553558

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Cambridge Assessment International Education

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.

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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**

  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	✓
Small beaker, labelled **B**, containing 2 cylinders of beetroot covered by distilled water, provided at room temperature (see **Preparation of materials**)	1	
[F][MH][HH] 99% ethanol in a beaker or container, labelled **A**, provided at room temperature	at least 100 cm^3	
Distilled water, in a beaker or container, labelled **W**, provided at room temperature	at least 300 cm^3	
10 cm^3 syringes, with the means to wash them out	2	
Beakers, capacity 50–100 cm^3	6	
Test-tubes, large, capacity approximately 40–55 cm^3	6	
Test-tubes, small, capacity approximately 20–30 cm^3	6	
Test-tube rack(s) to hold 6 large test-tubes and 6 small test-tubes	1	
Glass rod	1	
White card, approximately 10 cm × 10 cm	1	
Forceps, blunt	1	
Ruler, mm	1	
Scalpel or single-edged razor blade	1	
White tile or cutting surface	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	10	
Glass marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

B must be prepared the day before the exam. The container should be covered and put in a refrigerator overnight but must be at room temperature before the start of the examination.

- **B**, cylinders of beetroot in distilled water, in a beaker or container and covered to prevent evaporation.

  You may use any purple variety of beetroot, *Beta vulgaris*.

  The beetroot should be uncooked and as fresh as possible to avoid the effects of storage.

  Each candidate needs 2 cylinders of beetroot.

  To prepare the beetroot:

  - Use a cork borer of approximately 8–10 mm diameter to cut cylinders of beetroot 35–40 mm long.
  - Remove the outer skin at each end of the cylinder.
  - Put the prepared beetroot into a beaker or container and cover with distilled water.
  - Leave the beetroot cylinders soaking in the distilled water overnight.
  - For each candidate put 2 of the cylinders into a small beaker covered with fresh 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 ● an eyepiece graticule fitted into the eyepiece lens	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.
  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
  - 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)**

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) .....

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Cambridge International AS & A Level

Cambridge Assessment International Education
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BIOLOGY **9700/33**

Paper 3 Advanced Practical Skills 1 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

5648268427

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Cambridge Assessment International Education

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Safety

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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

- Amylase (bacterial)
- 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

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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] 1% bacterial amylase solution in a beaker or container, labelled **E**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
1% starch solution in a beaker or container, labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
[MH] 2% copper sulfate solution in a beaker or container, labelled **C**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
0.02% copper sulfate solution in a beaker or container, labelled **U**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
[MH] Iodine solution in a beaker or container, labelled **iodine**, provided at room temperature with a teat pipette (see **Preparation of materials**)	at least 25 cm^3	
Distilled water, in a beaker or container, labelled **W**, provided at room temperature	at least 100 cm^3	
10 cm^3 syringe, with the means to wash it out	2	
2 cm^3 or 3 cm^3 syringes, with the means to wash them out	2	
Beakers or containers, capacity 50–100 cm^3	5	
Test-tubes, small, capacity 20–30 cm^3	7	
Test-tube rack or container to hold 7 small test-tubes	1	
Glass rod	2	
Spotting tile or white tile	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, **U** and the 0.1 mol dm^{-3} iodine solution may be prepared the day before the exam.

The containers should be covered and kept in a refrigerator overnight but must be at room temperature before the start of the exam.

The 0.01 mol dm^{-3} iodine solution must be made up from the 0.1 mol dm^{-3} solution on the day of the exam.

[MH][HH][C]

- **E**, 1% bacterial amylase solution

  This is prepared by putting 1 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% starch solution

  This is prepared by putting 1.0 g of 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]

- **C**, 2% copper sulfate solution

  This is prepared by putting 2 g of copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$) **[MH]** in 80 cm^3 of distilled water and making up to 100 cm^3 with distilled water. Mix well.

  This is also used as the stock solution for **U**.

- **U**, 0.02% copper sulfate solution

  This is prepared by putting 1 cm^3 of the 2% stock solution into a beaker and making up to 100 cm^3 with distilled water. Mix well.

[MH]

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

  This is prepared by putting 8.0 g of potassium iodide **[MH]** in a beaker or container. Add 2 cm^3 of distilled water to moisten the potassium iodide. Add 2.5 g of iodine **[MH]** (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 and then make up to a total volume of 100 cm^3.
  This makes a 0.1 mol dm^{-3} iodine solution and is a red-brown colour. It is not essential that all the iodine dissolves.

  Put 10 cm^3 of 0.1 mol dm^{-3} iodine solution into a beaker or container and make up to 100 cm^3 with distilled water. Mix well. This makes the 0.01 mol dm^{-3} iodine solution and is a yellow-orange colour.

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

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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 ● an eyepiece graticule fitted into the eyepiece lens	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.
  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
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Supervisor's report

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

Centre name .....

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Temperature of exam room .....°C
Results for Question **1(a)(iii)**

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

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Signed ..... (supervisor)

Name (in block capitals) .....

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BIOLOGY **9700/34**

Paper 3 Advanced Practical Skills 2 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

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    - the supervisor's reports relevant to these candidates
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Organisation of the exam

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- 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 **M1**

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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	✓
Small beaker, labelled **B**, containing 3 potato cylinders stained with 0.1% methylene blue and covered by distilled water, provided at room temperature (see **Preparation of materials**)	1	
pH2 buffer solution, in a beaker or container, labelled **P2**, provided at room temperature (see **Preparation of materials**)	at least 25 cm^3	
pH3 buffer solution, in a beaker or container, labelled **P3**, provided at room temperature (see **Preparation of materials**)	at least 25 cm^3	
pH4 buffer solution, in a beaker or container, labelled **P4**, provided at room temperature (see **Preparation of materials**)	at least 25 cm^3	
pH5 buffer solution, in a beaker or container, labelled **P5**, provided at room temperature (see **Preparation of materials**)	at least 25 cm^3	
pH6 buffer solution, in a beaker or container, labelled **P6**, provided at room temperature (see **Preparation of materials**)	at least 25 cm^3	
pH2 buffer solution, in a beaker or container, labelled **PU**, provided at room temperature (see **Preparation of materials**)	at least 25 cm^3	
Distilled water, in a beaker or container, labelled **W**, provided at room temperature	at least 200 cm^3	
10 cm^3 syringe, with the means to wash it out	1	
Test-tubes, small, capacity 20–30 cm^3 Test-tubes provided to a candidate must all have the same dimensions	12	
Test-tube racks to hold 6 test-tubes	2	
Bung or cork to fit test-tubes	1	
Glass rod	1	
White card, approximately 10 cm × 10 cm	1	
Forceps, blunt	1	
Ruler, mm	1	
Scalpel or single-edged blade	1	
White tile or cutting surface	1	
Container, with approximately 200 cm^3 of tap water, labelled **For washing**	1	
Container, capacity at least 250 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

The potato cylinders **must** be prepared the day before the exam and left to soak in 0.1% methylene blue solution overnight.

The buffer solutions, **P2**, **P3**, **P4**, **P5**, **P6**, **PU** can be prepared the day before the exam. They should be kept covered in a refrigerator overnight.

P2, **P3**, **P4**, **P5**, **P6**, **PU** and the **potato cylinders** should be at room temperature before the start of the exam.

- **P2/PU**, **P3**, **P4**, **P5**, **P6** buffer solutions at approximately pH2, pH3, pH4, pH5 and pH6.

  The buffers should be prepared using the following stock solutions:

  1 dm^3 of 0.1 mol dm^{-3} citric acid
  This is prepared by putting 21.0 g of citric acid monohydrate ($C_6H_8O_7 \cdot H_2O$) **[MH]** in 500 cm^3 of distilled water and making up to 1 dm^3 with distilled water. Mix well.

  1 dm^3 of 0.1 mol dm^{-3} sodium citrate
  This is prepared by putting 29.4 g of sodium citrate dihydrate ($C_6H_5O_7Na_3 \cdot 2H_2O$) in 500 cm^3 of distilled water and making up to 1 dm^3 with distilled water. Mix well.

  Then 100 cm^3 of each buffer can be prepared as in the table below:

pH	0.1 mol dm^{-3} citric acid / cm^3	0.1 mol dm^{-3} sodium citrate / cm^3	distilled water / cm^3
2.0	50.0	0.0	50
3.0	46.4	3.6	50
4.0	33.0	17.0	50
5.0	20.6	29.4	50
6.0	10.0	40.0	50

- **0.1% methylene blue solution**

  This is prepared by putting 0.1 g of methylene blue into 80 cm^3 of distilled water in a beaker and making up to 100 cm^3 with distilled water.

  If any methylene blue comes into contact with your skin, wash off immediately with water.

- **B**, potato cylinders

  You may use any variety of the white (or Irish) potato, *Solanum tuberosum*. The potato should be as fresh as possible to avoid the effects of storage.

  3 potato cylinders are needed per candidate. However, a candidate can request more.

  The potato cylinders are prepared the day before the exam and as described on page 6.

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The day before the exam:

- Remove the outer skin from the potatoes.
- Use a cork borer to produce cylinders of potato that are approximately 8–10 mm in diameter.
- Cut the potato cylinders into lengths of 4–5 cm. Each candidate should be given 3 potato cylinders of **different** lengths.
- Put the potato cylinders into a container so that the pieces do not overlap and cover with freshly prepared 0.1% methylene blue solution.
- Leave to soak overnight.

On the day of the exam:

- Pour off the methylene blue solution.
- Add tap water to cover the potato cylinders.
- Pour off the water and then add fresh tap water.
- Repeat four times.
- For each candidate put 3 potato cylinders (of different length) into a beaker labelled **B**.
- Add enough fresh tap water to cover the 3 potato cylinders. The tap water in **B** may become blue.

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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 ● an eyepiece graticule fitted into the eyepiece lens	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.
  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
  - 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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[Turn over

Temperature of exam room……°C

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

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

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) .....

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Cambridge International AS & A Level

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Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/35**

Paper 3 Advanced Practical Skills 1 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

1428121965

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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.

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

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phone +44 1223 553554
fax +44 1223 553558

This document consists of **8** printed pages.

DC (NH) 165137/5
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Cambridge Assessment International Education

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.

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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.

  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% ascorbic acid solution in a beaker or container, labelled **A**, provided at room temperature (see **Preparation of materials**)	at least 120 cm^3	
A block of agar, containing 0.1% DCPIP, in a Petri dish, labelled **B** (see **Preparation of materials**)	1	
10 cm^3 syringe	1	
Beakers, capacity 50–100 cm^3	5	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
Blunt forceps	1	
Single-edged blade	1	
White tile	1	
A4 sheet of 2 mm graph paper	1	
A4 plastic wallet, clear	1	
Ruler, mm	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

The agar, **B**, may be prepared the day before the exam and wrapped in a plastic bag or similar and kept in a refrigerator overnight.

The agar should be at room temperature before the start of the exam.

- **A**, 10% ascorbic acid solution

  This is prepared by putting 10 g of ascorbic acid in 80 cm^3 of distilled water in a beaker and making up to 100 cm^3 with distilled water. Mix well.

- 0.1% DCPIP, 2,6-dichlorophenolindophenol

  This is prepared by putting 1 g of DCPIP **[HH][MH][N]** into 80 cm^3 of distilled water in a beaker and making up to 100 cm^3 with distilled water. Mix well. This is 1% DCPIP.

  Put 10 cm^3 of the 1% DCPIP solution in a beaker and make up to 100 cm^3 with distilled water. Mix well.

- **B**, agar block, containing 0.1% DCPIP

  Put 15 g of technical agar (**not** nutrient agar) into 500 cm^3 of distilled water and heat to dissolve the agar. Mix well and remove from the heat.

  Put 30 cm^3 of 0.1% DCPIP into 500 cm^3 of hot agar and mix gently to produce an even blue colour.

  Pour the agar into shallow, flat containers that are at least 2 cm in depth. Keep the agar in cool conditions to set firmly. These containers must be placed on a horizontal flat surface so that the agar sets to an even depth of greater than 1 cm.

  Just before the exam, cut the agar into blocks measuring at least 6 cm × 4 cm × depth. For each candidate, put one block (6 cm × 4 cm × depth) in a Petri dish, covered with a lid, labelled **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 ● an eyepiece graticule fitted into the eyepiece lens	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.
  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
  - 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)**

Declaration

1 Each packet that I am returning to Cambridge International contains the following items:

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- ☐ the attendance register

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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 International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/36**

Paper 3 Advanced Practical Skills 2 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

6876054973

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This document consists of **8** printed pages.

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Cambridge Assessment International Education

General information about practical exams

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Safety

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C	corrosive	**MH**	moderate hazard
HH	health hazard	**T**	acutely toxic
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Hazard data sheets relating to substances used in this exam should be available from your chemical supplier.

Before the exam

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During the exam

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- 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

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- 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**

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  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] 1.5% hydrogen peroxide solution in a small beaker, labelled **H**, provided at room temperature (see **Preparation of materials**)	60 cm^3	
Plant extract solution in a beaker or container, labelled **P**, provided at room temperature (see **Preparation of materials**)	50 cm^3	
Distilled water in a beaker or container, labelled **W**, provided at room temperature	At least 80 cm^3	
Filter paper discs, in a shallow dish (see **Preparation of materials**)	approx. 25	
Forceps	1	
10 cm^3 syringe with means to wash it out	2	
Beakers or containers, capacity at least 50 cm^3	6	
Glass rod	1	
Container, with approximately 200 cm^3 of tap water, labelled **For washing**	1	
Container, capacity approximately 200 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

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

[MH]

- **H**, 1.5% hydrogen peroxide solution

  This is prepared by putting 25 cm^3 of 6% (20 volumes) hydrogen peroxide solution **[MH]** in a beaker and making up to 100 cm^3 with distilled water.

  For each candidate put 50 cm^3 of 1.5% hydrogen peroxide solution into a 100 cm^3 beaker, labelled **H**.

  This should be put out immediately before the examination and kept covered.

- **P**, plant extract solution

  This is prepared by using approximately 40 g of peeled potato. Cut the potato into small pieces then grind in a pestle and mortar, or liquidise, with 100 cm^3 water. Strain the mixture through a fine sieve or piece of muslin and retain the liquid plant extract.

  The activity of the plant extract solution should be tested before the exam:

  - Using forceps, put a filter paper disc into the plant extract, **P**.
  - Fill a large test tube with 1.5% hydrogen peroxide solution, **H**, to within 2 cm of the top.
  - Pick up the disc of filter paper using forceps.
  - Remove excess **P** by briefly blotting the disc on a paper towel.
  - Drop the filter paper disc into the hydrogen peroxide solution. Start timing.
  - Note the time taken for the disc to return to the surface.

    The time should be between 10–40 seconds. If the time is less than 10 seconds, decrease the concentration of the plant extract by diluting with water. If the time is more than 40 seconds, increase the mass of plant material used to make the extract.

- Filter paper discs

  These are prepared by cutting small discs from a piece of filter paper, using a hole punch. The diameter of the discs is not critical but should be approximately 0.5 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 ● an eyepiece graticule fitted into the eyepiece lens	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.
  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
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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:

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- 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 the following items:

- ☐ the scripts of the candidates specified on the barcode label provided
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- ☐ the supervisor's reports relevant to these candidates
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Signed ..... (supervisor)

Name (in block capitals) .....

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