Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **May/June 2021**

CONFIDENTIAL INSTRUCTIONS

2942671718

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

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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.
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  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**

  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	✓
Cylinders of potato covered by distilled water in a small beaker, labelled **P**, provided at room temperature (see **Preparation of materials**)	4	
[MH] 20 vols (6%) hydrogen peroxide solution in a covered beaker or container, labelled **H**, provided at room temperature	at least 40 cm^3	
10 cm^3 syringes	4	
Beaker, capacity approximately 200 cm^3, labelled **B**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
White tile	1	
Blunt forceps	1	
Ruler in mm	1	
Scalpel or single edged razor blade	1	
Paper towels	8	
Stop-clock or timer showing seconds	1	
Gloves	2	
Suitable eye protection	1	

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Preparation of materials

- **P**, pieces of plant tissue, in water, in a beaker with a suitable cover to prevent evaporation.

  The plant tissue you may use is any variety of the potato, *Solanum tuberosum*.

  The potato should be as fresh as possible to avoid the effects of storage.

  Each candidate needs 4 cylinders of potato. However, a candidate can request further samples of potato.

  To prepare the potato:

  - Use a cork borer to cut cylinders of potato that are approximately 6–8 mm in diameter.
  - Remove the outer skin at each end of the cylinders.
  - Cut the cylinders into lengths of 30–40 mm long.

  Put the prepared cylinders of potato into a beaker and cover with distilled water.

  For each candidate put 4 of the cylinders into a small beaker covered 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 **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

Diameter of cork borer used to prepare cylinders of potato .....

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 2021**

CONFIDENTIAL INSTRUCTIONS

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INSTRUCTIONS

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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:
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    - 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

- Amylase, bacterial

- Slide **K1**

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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

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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	✓
1% starch solution in a small beaker, labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
[MH][HH][C] 1% amylase solution in a small beaker, labelled **E**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
[MH][N] Iodine solution in a beaker, labelled **iodine**, provided with a teat pipette (see **Preparation of materials**)	at least 20 cm^3	
100% tea extract in a small beaker, labelled **T**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
Distilled water, in a beaker, labelled **W**, provided at room temperature	at least 150 cm^3	
10 cm^3 syringe	1	
5 cm^3 syringes	3	
1 cm^3 syringe	1	
Test-tubes, small, capacity approximately 20–30 cm^3	5	
Beakers, capacity 50–100 cm^3	5	
Beaker or container, capacity 400 cm^3, labelled **water-bath**	1	
Beaker, capacity approximately 400 cm^3, with approximately 200 cm^3 water at 40—50 °C and labelled **hot water**	1	
Beaker, capacity approximately 400 cm^3, with approximately 200 cm^3 of cold tap water, labelled **cold water**	1	
White tile, 15 cm × 15 cm	1	
Test-tube rack to hold 5 small test-tubes	1	
Pipettes	5	
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 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

S and the stock solution of **iodine** may be prepared the day before the exam and kept in a covered container in a refrigerator overnight.

All solutions should be at room temperature before the start of the exam.

- **S**, 1% starch solution

This is prepared by adding a few drops of distilled water to 1 g of soluble starch in a beaker and mixing to make a smooth paste. Add 80 cm^3 distilled water and heat until the solution clears. Make up to 100 cm^3 with distilled water. Allow to cool to room temperature.

[MH][HH][C]

- **E**, 1% amylase solution

This is prepared by putting 1 cm^3 of 1% amylase 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.

- **T**, 100% tea extract

This is prepared by adding 200 cm^3 of recently boiled distilled water to 5 g of black tea. Leave to infuse for 10 minutes, stir and then filter to remove the solid tea.

T should be prepared immediately before the exam and be at room temperature.

[MH]

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

This is prepared by making up a stock solution of iodine, which is then diluted to make the 0.01 mol dm^{-3} solution for candidates.

Stock solution of iodine: 0.1 mol dm^{-3}

- Put 8.0 g of potassium iodide in a beaker.
- 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 and then make up to a total volume of 100 cm^3. It is not essential that all the iodine dissolves.
- This gives a red-brown coloured 0.1 mol dm^{-3} iodine solution.

Put 10 cm^3 of 0.1 mol dm^{-3} iodine solution into a beaker 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.

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 **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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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 .....

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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 International AS & A Level

BIOLOGY **9700/33**

Paper 3 Advanced Practical Skills 1 **May/June 2021**

CONFIDENTIAL INSTRUCTIONS

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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 **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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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] 5.0% potassium hydroxide solution in a beaker, labelled **P**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
0.15% copper sulfate solution in a beaker, labelled **C**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
[MH] Benedict's solution (qualitative) in a beaker, labelled **B**, provided at room temperature	at least 20 cm^3	
[MH] Iodine solution in a beaker, labelled **iodine**, provided at room temperature, with a teat pipette (see **Preparation of materials**)	at least 5 cm^3	
Distilled water, in a beaker, labelled **S1**, provided at room temperature	at least 10 cm^3	
10.0% glucose solution in a beaker, labelled **S2**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
1.0% protein solution in a beaker, labelled **S3**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
0.1% starch solution in a beaker, labelled **S4**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
Starch and protein solution in a beaker, labelled **U**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
Syringes, 2 cm^3 or 3 cm^3 or 5 cm^3	5	
Test-tubes, small, capacity 20–30 cm^3	7	
Test-tube rack to hold 7 test-tubes	1	
Bunsen burner, bench mat, gauze and tripod to support water-bath	1	
Beaker (capacity approximately 400 cm^3), with approximately 200 cm^3 water at 40–50 °C, suitable for heating as a water-bath and large enough to hold 3 test-tubes, labelled **water-bath**.	1	
Container with approximately 400 cm^3 tap water, labelled **For washing**	1	
Container, (capacity approximately 400 cm^3), labelled **For waste**	1	
Test-tube holder	1	
Thermometer, –10 °C to +110 °C	1	
White card or white paper approximately 10 cm × 10 cm	1	
Paper towels	8	
Glass marker pen (permanent)	1	
Suitable eye protection	1	

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It is advisable to wear suitable eye protection when handling chemicals.

Preparation of materials

P, **C**, **S1**, **S4** and the stock solution of **iodine** may be prepared the day before the exam. All solutions should be kept in a covered container in a refrigerator overnight and should be at room temperature before the start of the exam.

[MH] ● **P**, 5.0% potassium hydroxide solution

This is prepared by putting 5 g of potassium hydroxide **[C][MH]** in 80 cm^3 of distilled water in a beaker and making up to 100 cm^3 with distilled water. Mix well.

● **C**, 0.15% copper sulfate solution

This is prepared by putting 0.3 g of copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$) **[C][MH][N]** in 80 cm^3 of distilled water and making up to 100 cm^3 with distilled water. Mix well. This is the stock solution of 0.3%.

0.15% copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$), **C**, is prepared by putting 50 cm^3 of the stock solution into a beaker and making up to 100 cm^3 with distilled water.

[MH] ● **iodine**, 0.01 mol dm^{-3} iodine in potassium iodide solution

Stock solution of iodine: 0.1 mol dm^{-3}
This is prepared by putting 8.0 g of potassium iodide in a beaker. 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 and then make up to a total volume of 100 cm^3. It is not essential that all the iodine dissolves.
This gives a red-brown coloured 0.1 mol dm^{-3} iodine solution.

Put 10 cm^3 of 0.1 mol dm^{-3} iodine solution into a beaker 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.

Keep the solution away from direct sunlight, for example in a brown glass bottle.

● **S2**,10.0% glucose solution

This must be prepared on the day of the exam. This is prepared by putting 10 g of glucose into 80 cm^3 of warm distilled water. Make up to 100 cm^3 with distilled water. Mix well.

Stock solution for protein solution: 2.0% albumen solution
This must be prepared on the day of the exam. This is prepared by putting 2 g of albumen into a small volume of distilled water and mixing to make a paste. Make up to 100 cm^3 with distilled water. Mix well.

● **S3**, 1.0% protein solution

This is prepared by putting 50 cm^3 of the 2.0% albumen stock solution in a beaker. Make up to 100 cm^3 with distilled water. Mix well.

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Stock solution for starch solution: 0.2% starch solution
This is used to make **S4** and **U**. This is prepared by putting 0.2 g of starch into a small volume of warm distilled water in a beaker. 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.

- **S4**, 0.1% starch solution

  This is prepared by putting 50 cm^3 of the 0.2% starch stock solution in a beaker. Make up to 100 cm^3 with distilled water. Mix well.

- **U**, starch and protein solution

  This is prepared by putting 50 cm^3 of the 2.0% albumen stock solution into a beaker and putting 50 cm^3 of the 0.2% starch solution into the same beaker. Mix well.

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	3

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 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 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 **9700/34**

Paper 3 Advanced Practical Skills 2 **May/June 2021**

CONFIDENTIAL INSTRUCTIONS

2131765707

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.
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  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 **M1**

  On receipt of the slides, check that they are labelled **M1** 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	✓
Yeast suspension in a beaker, labelled **Y**, provided at room temperature (see **Preparation of materials**)	at least 40 cm^3	
[MH] 10 vols (3%) hydrogen peroxide solution in a covered beaker, labelled **H**, provided at room temperature (see **Preparation of materials**)	at least 25 cm^3	
pH 3 buffer in a beaker, labelled **B3**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
pH 4 buffer in a beaker, labelled **B4**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
pH 5 buffer in a beaker, labelled **B5**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
pH 6 buffer in a beaker, labelled **B6**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
pH 7 buffer in a beaker, labelled **B7**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
pH 3 buffer in a beaker, labelled **U**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
10 cm^3 syringes	2	
Clear plastic tubing, approximately 20 cm, to give an airtight fit with the nozzle of the 10 cm^3 syringe	1	
Glass rod	1	
Container with approximately 200 cm^3 tap water, labelled **For washing**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
Ruler in mm	1	
Paper towels	12	
Glass marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Gloves	2	
Suitable eye protection	1	

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Preparation of materials

- **Y**, 3% yeast suspension

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

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

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

This is prepared on the day of the exam. Put 50 cm^3 of 6% (20 vol) hydrogen peroxide into 50 cm^3 of distilled water. Mix well.

[MH] ● **B3**, **B4**, **B5**, **B6**, buffers at pH 3, pH 4, pH 5 and pH 6

The buffers should be prepared using stock solutions of citric acid and trisodium citrate.

1 dm^3 of 0.1 mol dm^{-3} citric acid

Put 21.0 g of citric acid monohydrate ($C_6H_8O_7 \cdot H_2O$) **[MH]** in 500 cm^3 of distilled water and make up to 1 dm^3 with distilled water. Mix well.

1 dm^3 of 0.1 mol dm^{-3} trisodium citrate

Put 29.4 g of trisodium citrate dihydrate ($C_6H_5O_7Na_3 \cdot 2H_2O$) in 500 cm^3 of distilled water and make up to 1 dm^3 with distilled water. Mix well.

100 cm^3 of each buffer is prepared using the volumes shown in the table.

buffer	**pH**	**0.1 mol dm^{-3} citric acid / cm^3**	**0.1 mol dm^{-3} trisodium citrate / cm^3**	**distilled water / cm^3**
B3	3.0	46.4	3.6	50
B4	4.0	33.0	17.0	50
B5	5.0	20.6	29.4	50
B6	6.0	10.0	40.0	50

- **B7, buffer at pH 7**

  This buffer should be prepared using stock solutions of sodium hydroxide and potassium dihydrogen phosphate.

1 dm^3 of 0.1 mol dm^{-3} sodium hydroxide

Put 4.0 g of sodium hydroxide **[MH]** in 500 cm^3 of distilled water and make up to 1 dm^3 with distilled water. Mix well.

1 dm^3 of 0.1 mol dm^{-3} potassium dihydrogen phosphate

Put 13.6 g of potassium dihydrogen phosphate (KH_2PO_4) **[MH]** in 500 cm^3 of distilled water and make up to 1 dm^3 with distilled water. Mix well.

100 cm^3 of this buffer is prepared using the volumes shown in the table.

buffer	**pH**	**0.1 mol dm^{-3} NaOH / cm^3**	**0.1 mol dm^{-3} potassium dihydrogen phosphate / cm^3**	**distilled water / cm^3**
B7	7.0	18.5	31.5	50

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:
  - 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:

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- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
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Temperature of exam room ..... °C

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

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

Declaration

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Signed ..... (supervisor)

Name (in block capitals) .....

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Cambridge International AS & A Level

BIOLOGY **9700/35**

Paper 3 Advanced Practical Skills 1 **May/June 2021**

CONFIDENTIAL INSTRUCTIONS

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INSTRUCTIONS

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General information about practical exams

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Safety

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C	corrosive	**MH**	moderate hazard
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- Any assistance provided to candidates must be recorded in the supervisor's report.
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After 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 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:

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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	✓
0.5% glucose solution in a beaker, labelled **R** (see **Preparation of materials**) (Note this is intentionally not the same as the contents described on the question paper)	at least 50 cm^3	
0.1% glucose solution in a beaker, labelled **U2** (see **Preparation of materials**)	at least 20 cm^3	
0.05% glucose solution in a beaker, labelled **U1** (see **Preparation of materials**)	at least 20 cm^3	
Distilled water in a beaker, labelled **U3**	at least 20 cm^3	
[MH][N] Benedict's solution (qualitative) in a beaker, labelled **B**	at least 50 cm^3	
Distilled water, in a beaker, labelled **W**, provided at room temperature	at least 100 cm^3	
10 cm^3 syringes	3	
Test-tubes, small, capacity 20–30 cm^3	9	
Test-tube holder	1	
Test-tube rack to hold 9 small test-tubes	1	
Beakers, capacity 50–100 cm^3	5	
Bunsen burner, bench mat, gauze and tripod to support water-bath	1	
Beaker, capacity approximately 400 cm^3, with approximately 200 cm^3 water at 40–50 °C, suitable for heating as a water-bath, labelled **water-bath**	1	
Container with approximately 200 cm^3 tap water, labelled **For washing**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
Glass rod	1	
Paper towels	12	
Glass marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Thermometer, –10 °C to +110 °C	1	
Suitable eye protection	1	

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Preparation of materials

R, **U2** and **U1** may be prepared the day before the exam.

R, **U2** and **U1** should be kept in a covered container in a refrigerator overnight and should be at room temperature before the start of the exam.

- **R**, 0.5% glucose solution

  This is prepared by putting 0.5 g of glucose into 80 cm^3 of distilled water stirring continuously. Make up to 100 cm^3 with distilled water.

- **U2**, 0.1% glucose solution

  This is prepared by putting 0.1 g of glucose into 80 cm^3 of distilled water stirring continuously. Make up to 100 cm^3 with distilled water.

- **U1**, 0.05% glucose solution

  Put 50 cm^3 of **U2** into a beaker and 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 **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	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:

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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)(ii)**

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

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

Declaration

1 Each packet that I am returning to Cambridge International contains 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.

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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