Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **October/November 2024**

CONFIDENTIAL INSTRUCTIONS

9961784176

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

DC (WW) 336160/5
© UCLES 2024

[Turn over

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.

© UCLES 2024

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 **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.

© UCLES 2024

Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
1.0% starch solution in milk in a beaker labelled **SM** (see **Preparation of materials**)	at least 20 cm^3	
0.02% starch solution in milk in a beaker labelled **CM** (see **Preparation of materials**)	at least 20 cm^3	
Milk in a beaker or container, labelled **M**, provided at room temperature	at least 50 cm^3	
[MH][N] 0.01 mol dm^{-3} iodine solution in a beaker labelled **iodine** (see **Preparation of materials**)	20 cm^3	
10 cm^3 syringe	1	
5 cm^3 syringe	1	
1 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 small test-tubes	1	
Container, capacity approximately 200 cm^3, with tap water, labelled **For washing**	1	
Container, capacity approximately 400 cm^3, labelled **For waste**	1	
Paper towels	8	
Marker pen, permanent	1	
Glass rod	1	
Suitable eye protection	1	

© UCLES 2024

Preparation of materials

SM and **CM** should be prepared on the day of the exam.

Each solution should be kept in a covered container until required. Solutions should be at room temperature before the start of the exam.

The iodine solution can be prepared the day before the exam and stored in the dark until required.

- **SM**, 1.0% starch solution in milk

  Add 1 g of soluble starch to 5 cm^3 of warmed milk to make a paste. Stir the paste into 80 cm^3 of warmed milk and make up to 100 cm^3 using more milk. Heat the milk to almost boiling (at least 75–80 °C), stirring constantly to fully dissolve the starch.

- **CM**, 0.02% starch solution in milk

  This is prepared by diluting 2 cm^3 of the 1.0% starch solution, **SM**, with 98 cm^3 of milk. Mix well.

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

  To prepare a 0.01 mol dm^{-3} iodine solution:
  - 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
  - put 10 cm^3 of this 0.1 mol dm^{-3} iodine solution into a beaker or container
  - make up to 100 cm^3 with distilled water
  - mix well.

© UCLES 2024

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.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2024

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.

© UCLES 2024

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
- 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) .....

© UCLES 2024

Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/33**

Paper 3 Advanced Practical Skills 1 **October/November 2024**

CONFIDENTIAL INSTRUCTIONS

8608015463

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

The information in this document and the identity of any materials supplied by Cambridge International are confidential and must NOT reach candidates either directly or indirectly.

The supervisor must complete the report at the end of this document and return it with the scripts.

INSTRUCTIONS

- If you have any queries regarding these confidential instructions, contact Cambridge International stating the centre number, the syllabus and component number and the nature of the query.
  email info@cambridgeinternational.org
  phone +44 1223 553554

This document has **8** pages.

© UCLES 2024

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.

© UCLES 2024

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 **K1**

On receipt of the slides, check that they are labelled **K1** 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.

© UCLES 2024

Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Petri dish with 5 cylinders of potato tissue, length approximately 5 cm, labelled **P**, covered with a damp paper towel (see **Preparation of materials**)	1	
[MH] 6% hydrogen peroxide solution in a beaker labelled **H**, provided at room temperature	at least 40 cm^3	
[F][MH][HH] 99% ethanol in a beaker labelled **E**, provided at room temperature	at least 80 cm^3	
Distilled water in a beaker or container labelled **W**, provided at room temperature	at least 200 cm^3	
10 cm^3 syringes	2	
5 cm^3 syringe	1	
Beakers, capacity 50–100 cm^3	5	
Test-tubes, small, capacity 20–30 cm^3	5	
Test-tube rack to hold 5 small test-tubes	1	
Forceps, blunt	1	
White tile or cutting surface	1	
Scalpel or a single-edged blade	1	
Ruler in mm (ideally clear plastic)	1	
Glass rod	1	
Container, capacity approximately 200 cm^3 with tap water, labelled **For washing**	1	
Container, capacity approximately 300 cm^3, labelled **For waste**	1	
Paper towels	10	
Marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

© UCLES 2024

Preparation of materials

The potato cylinders for each candidate must be prepared on the day of the exam.

- **P**, cylinders of potato tissue

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

  To prepare the potato:

  - Remove the outer skin.
  - Use a cork borer of approximately 6–10 mm diameter to cut cylinders of potato that are approximately 5 cm long.
  - For each candidate, put 5 cylinders of potato into a Petri dish or shallow dish and cover with a damp paper towel. These 5 cylinders must have the same diameter.

  Test the activity of the potato tissue:

  Put one cylinder into a test-tube and add 6% hydrogen peroxide solution **[MH]**, **H**, to cover the cylinder. There should be active release of gas bubbles within 15 seconds. If there are no bubbles within 15 seconds, change the potato or change the hydrogen peroxide.

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
  – the slide must **not** be on the stage of the microscope.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

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.

© UCLES 2024

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) .....

© UCLES 2024

Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/34**

Paper 3 Advanced Practical Skills 2 **October/November 2024**

CONFIDENTIAL INSTRUCTIONS

6882472307

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

DC (WW) 336176/4
© UCLES 2024

[Turn over

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.

© UCLES 2024

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.

© UCLES 2024

Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
1.0 mol dm^{-3} glucose solution in a beaker labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 40 cm^3	
0.5 mol dm^{-3} glucose solution in a beaker labelled **C**, provided at room temperature (see **Preparation of materials**)	at least 10 cm^3	
[MH] 1.0 mol dm^{-3} sulfuric acid in a beaker labelled **A**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
0.01% potassium manganate(VII) solution in a beaker labelled **K**, 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 40 cm^3	
10 cm^3 syringes	2	
2 cm^3 or 3 cm^3 syringes	3	
Beakers, capacity 50–100 cm^3	5	
Test-tubes, small, capacity 20–30 cm^3	6	
Test-tube rack to hold 6 small test-tubes	1	
Container, capacity approximately 200 cm^3, with tap water, labelled **For washing**	1	
Container, capacity approximately 400 cm^3, labelled **For waste**	1	
White paper or card approximately 10 cm × 10 cm	1	
Paper towels	8	
Marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	
Gloves, pair	1	

© UCLES 2024

Preparation of materials

K must be prepared on the day of the exam. **S** and **C** may be prepared the day before the exam and kept in covered containers in a refrigerator. Solutions should be at room temperature before the start of the exam.

- **S**, 1.0 mol dm^{-3} glucose solution

  This is prepared by sprinkling 18 g of glucose, a little at a time, onto the surface of 80 cm^3 of distilled water, stirring continuously as you sprinkle. Make up to 100 cm^3 with distilled water.

- **C**, 0.5 mol dm^{-3} glucose solution

  This is prepared by sprinkling 9 g of glucose, a little at a time, onto the surface of 80 cm^3 of distilled water, stirring continuously as you sprinkle. Make up to 100 cm^3 with distilled water.

  This solution is intentionally described as carrot extract in the question paper.

[MH]

- **A**, 1.0 mol dm^{-3} sulfuric acid

  This is prepared from (98%) sulfuric acid **[C]** by putting 55 cm^3 of this sulfuric acid into 500 cm^3 of distilled water and making up to 1 dm^3 with distilled water.

  This is an exothermic reaction, so **add the acid to the water**.

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

  This is prepared by putting 1.0 g of potassium manganate(VII) **[O][MH][HH][N]** into a beaker and making up to 100 cm^3 with distilled water. This makes a 1.0% solution **[MH][N]**.

  Then put 1 cm^3 of this 1.0% solution **[MH][N]** into a beaker and make up to 100 cm^3 with distilled water. This makes the 0.01% potassium manganate(VII) solution.

  This solution must be made up **immediately before** the start of the exam and kept out of direct sunlight.

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.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

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.

© UCLES 2024

Temperature of exam room ..... °C

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

Result 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) .....

© UCLES 2024

Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/35**

Paper 3 Advanced Practical Skills 1 **October/November 2024**

CONFIDENTIAL INSTRUCTIONS

7476154417

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

DC (WW) 336179/2
© UCLES 2024

[Turn over

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.

© UCLES 2024

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 **M1**

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.

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.

© UCLES 2024

Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
[MH][N] Benedict's solution (qualitative) in a beaker labelled **B**, provided at room temperature	at least 30 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 15 cm^3	
Solution of 0.5% starch and 1.0% glucose in a beaker labelled **S1**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
10.0% glucose solution in a beaker labelled **S2**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
1.0% starch solution in a beaker labelled **S3**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
Solution of 0.5% starch and 3.0% glucose in a beaker labelled **U**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
5 cm^3 syringes	5	
Beaker, capacity approximately 400 cm^3, with tap water at room temperature, labelled **Water-bath**	1	
Test-tubes, small, capacity 20–30 cm^3	8	
Test-tube rack to hold 8 small test-tubes	1	
Bunsen burner, tripod, gauze, bench mat and lighter or matches	1	
Thermometer, –10°C to +110°C	1	
Container, capacity approximately 200 cm^3, with tap water, labelled **For washing**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
Paper towels	8	
Marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

© UCLES 2024

Preparation of materials

Iodine solution ($0.1\,mol\,dm^{-3}$) 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 before the start of the exam.

S1, **S2**, **S3** and **U** can be prepared the day before the exam. They should be kept in covered containers in a refrigerator. Solutions should be at room temperature before the start of the exam.

- **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
  – 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.

- 10.0% glucose solution

  This is prepared by putting 10.0 g of glucose into $80\,cm^3$ of warm distilled water. Make up to $100\,cm^3$ with distilled water. Mix well.

- 6.0% glucose solution

  This is prepared by putting 6.0 g of glucose into $80\,cm^3$ of warm distilled water. Make up to $100\,cm^3$ with distilled water. Mix well.

- 2.0% glucose solution

  This is prepared by putting 2.0 g of glucose into $80\,cm^3$ of warm distilled water. Make up to $100\,cm^3$ with distilled water. Mix well.

© UCLES 2024

- 1.0% starch solution

  This is prepared by putting 1.0 g of **soluble** starch into about 5 cm^3 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.

- **S1**, solution of 0.5% starch and 1.0% glucose

  This is prepared by putting 10 cm^3 of 1.0% starch solution into a beaker and putting 10 cm^3 of 2.0% glucose solution into the same beaker. Mix well.

- **S2**, 10.0% glucose solution

  This is prepared by putting 20 cm^3 of 10.0% glucose solution into a beaker.

- **S3**, 1.0% starch

  This is prepared by putting 20 cm^3 of 1.0% starch solution into a beaker.

- **U**, solution of 0.5% starch and 3.0% glucose

  This is prepared by putting 10 cm^3 of 1.0% starch solution into a beaker and putting 10 cm^3 of 6.0% glucose 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 **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.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2024

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.

© UCLES 2024

Temperature of exam room ……. °C

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

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

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) .....

© UCLES 2024

Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/36**

Paper 3 Advanced Practical Skills 2 **October/November 2024**

CONFIDENTIAL INSTRUCTIONS

3974390880

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

DC (WW) 336182/2
© UCLES 2024

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.

© UCLES 2024

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.

© UCLES 2024

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 30 cm^3	
2.5% albumin solution in a beaker labelled **P**, provided at room temperature (see **Preparation of materials**)	at least 15 cm^3	
Distilled water in a beaker labelled **W**, provided at room temperature (also used in question 2)	at least 30 cm^3	
5 cm^3 syringes	2	
1 cm^3 syringe	1	
Test-tubes, large, capacity 40–50 cm^3	5	
Test-tube rack, to hold 5 large test-tubes	1	
Black paper or card, 10 cm × 10 cm	1	
Container with approximately 200 cm^3 tap water, labelled **For washing** (also used in question 2)	1	
Container, capacity approximately 200 cm^3, labelled **For waste** (also used in question 2)	1	
Paper towels	8	
Marker pen, permanent	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

Preparation of materials

- **P**, 2.5% albumin solution

  This is prepared by putting 2.5 g of albumin into a beaker and adding a small volume of distilled water to make a paste. Make up to 100 cm^3 with distilled water. Mix well.

© UCLES 2024

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	
Potato cylinder in a Petri dish labelled **C** (see **Preparation of materials**)	1	
Mung bean in a Petri dish labelled **D** (see **Preparation of materials**)	1	
Distilled water in a beaker labelled **W**, provided at room temperature (also used in question 1)	at least 30 cm^3	
Scalpel or single-edged blade	1	
Blunt forceps	1	
Mounted needle	1	
White tile	1	
Microscope slides and glass coverslips	2	
Teat pipette	2	
Container with approximately 200 cm^3 tap water, labelled **For washing** (also used in question 1)	1	
Container, capacity approximately 200 cm^3, labelled **For waste** (also used in question 1)	1	
Paper towels	8	
Marker pen, permanent	1	
Suitable eye protection	1	

© UCLES 2024

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.

- **C**, potato cylinder

  To prepare the potato:
  – remove the skin
  – use a cork borer of approximately 6–10 mm diameter to cut cylinders of potato 20–30 mm long
  – for each candidate put one of the cylinders into a Petri dish and cover with a damp paper towel.

- **D**, mung bean

  Mung beans should be immersed in water for 24 hours before use.

  For each candidate put one of the mung beans into a Petri dish and cover with a damp paper towel.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2024

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.

© UCLES 2024

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) .....

© UCLES 2024