Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **October/November 2022**

CONFIDENTIAL INSTRUCTIONS

0153677482

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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[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.

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Specific information for this practical exam

During the exam, the supervisor or other competent biologist (**not** the invigilator) should obtain the results needed for the supervisor's report by following the relevant steps in the question paper. The results should be recorded in the supervisor's report.

Organisation of the exam

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

Materials to be supplied by Cambridge International

- Slide **J1**

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

  The number of slides supplied by Cambridge International will be equal to half the candidate entry.

Return of slides to Cambridge International

Immediately after the exam, the slides must be:

- returned to Cambridge International in the boxes in which they were received, using the self-adhesive label supplied. The slides must **not** be included in the packet of scripts.

or

- purchased using the order form enclosed with the slides, which should be completed and returned to Cambridge International. The order form must **not** be included in the packet of scripts. Slides and boxes will be charged at the rate of £3.25 per slide plus £1 per box.

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

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
2 g dm^{-3} ascorbic acid solution in a small beaker, labelled **A** (see **Preparation of materials**)	at least 80 cm^3	
1% starch suspension in a small beaker, labelled **S** (see **Preparation of materials**)	at least 20 cm^3	
Iodine solution in a small beaker, labelled **I** (see **Preparation of materials**)	at least 25 cm^3	
20 cm length of dialysis (Visking) tubing supplied in a small beaker, labelled **D**, covered with distilled water	1	
Distilled water, in a beaker or container, labelled **W**, provided at room temperature	at least 200 cm^3	
10 cm^3 syringes	2	
2 cm^3 or 3 cm^3 syringes	2	
Beakers, capacity 50–100 cm^3	6	
Test-tubes, small, capacity 20–30 cm^3	6	
Test-tube, large, capacity 40–50 cm^3	1	
Test-tube rack to hold 1 large test-tube and 6 small test-tubes	1	
Container with approximately 200 cm^3 distilled 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	
Glass rod	1	
Elastic band	1	

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Preparation of materials

The iodine and **S** may be prepared the day before the examination. They should be kept in a covered container in a refrigerator.
The iodine and **S** should be at room temperature before the start of the examination.

[MH]

- **A**, 2 g dm^{-3} ascorbic acid solution

  This is prepared by dissolving 0.2 g ascorbic acid in 80 cm^3 distilled water and making up to 100 cm^3 with distilled water.

- **S**, 1% starch solution

  This is prepared by dissolving 1 g soluble starch in 80 cm^3 distilled water and making up to 100 cm^3 with distilled water. It will be necessary to heat the starch to dissolve it.

- **I**, iodine solution

  This is prepared by dissolving 1 g of potassium iodide in 80 cm^3 of distilled water in a beaker and making up to 100 cm^3 with distilled water. Then dissolve 0.5 g of iodine in 100 cm^3 of the potassium iodide. The iodine needs to be mixed well to make sure it dissolves.

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Materials and apparatus for Question 2

Each candidate will need:

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

Preparation of materials

- Microscope

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

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

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Supervisor's report

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

Centre name .....

Time of the practical session .....

Laboratory name/number .....

Give details of any difficulties experienced by the centre or by candidates (include the relevant candidate names and candidate numbers).

You must include:
- any difficulties experienced by the centre in the preparation of materials
- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
- any specific assistance given to candidates.

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Temperature of exam room ..... °C

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

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) .....

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Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/33**

Paper 3 Advanced Practical Skills 1 **October/November 2022**

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3215226947

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Specific information for this practical exam

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

Materials to be supplied by Cambridge International

- Slide **K1**
- Enzyme rennet

  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.

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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	✓
Milk, in a beaker, labelled **M**, provided at room temperature (see **Preparation of materials**)	at least 150 cm^3	
[MH] 10% calcium chloride solution, in a beaker, labelled **C**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
[MH] 1% rennet solution, in a beaker, labelled **E**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
10 cm^3 syringe	1	
1 cm^3 syringes	2	
Test-tubes, large, capacity 40–50 cm^3	10	
Test-tube rack(s) to hold 10 large test-tubes	1	
Test-tube holder to hold hot test-tubes	1	
Beaker, capacity approximately 400 cm^3, with tap water at room temperature, labelled **water-bath**	1	
Beaker, capacity approximately 400 cm^3, labelled **cold water**	1	
Bunsen burner, tripod, gauze, bench mat and lighter or matches	1	
Thermometer, –10 °C to +110 °C	1	
Container, capacity approximately 400 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	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

All the materials may be prepared the day before the exam.
Each solution should be kept in a covered container in a refrigerator. Solutions should be at room temperature before the start of the exam.

- **M**, fresh milk

  Any source of fresh milk may be used. UHT milk is also acceptable.

[MH]

- **E**, 1% rennet solution

  This is prepared by putting 1 cm^3 of rennet solution (supplied by Cambridge International) into 99 cm^3 of distilled water. Mix well.

[MH]

- **C**, 10% calcium chloride solution

  This is prepared by dissolving 10 g of calcium chloride-6-water in 70 cm^3 of distilled water and making up to 100 cm^3 with distilled water. Mix well.

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[Turn over

Materials and apparatus for Question 2

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Microscope with: ● an eyepiece lens, ×10 magnification ● a low-power objective lens, ×10 magnification ● a high-power objective lens, ×40 magnification	1 between 2	
Slide **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	3
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)(iii)**

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Signed ..... (supervisor)

Name (in block capitals) .....

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Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/34**

Paper 3 Advanced Practical Skills 2 **October/November 2022**

CONFIDENTIAL INSTRUCTIONS

4880036430

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

Materials to be supplied by Cambridge International

- Slide **L1**

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Return of slides to Cambridge International

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- purchased using the order form enclosed with the slides, which should be completed and returned to Cambridge International. The order form must **not** be included in the packet of scripts. Slides and boxes will be charged at the rate of £3.25 per slide plus £1 per box.

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

Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
0.1% ascorbic acid solution in a beaker or container, labelled **A**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
Distilled water in a beaker or container, labelled **W**, provided at room temperature	at least 100 cm^3	
Iodine solution in a beaker or container, labelled **iodine**, provided at room temperature and kept out of direct sunlight (see **Preparation of materials**)	at least 20 cm^3	
0.1% starch solution in a beaker or container, labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
0.05% ascorbic acid solution in a beaker or container, labelled **U**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
Distilled water in a beaker or container, labelled **C**, provided at room temperature	at least 20 cm^3	
10 cm^3 syringes	2	
1 cm^3 syringes	2	
Beakers or containers, capacity 50–100 cm^3	5	
Test-tubes, small, capacity 20–30 cm^3	8	
Test-tube rack or container to hold 8 small test-tubes	1	
White card, approximately 10 cm × 10 cm	1	
Container, capacity approximately 400 cm^3, with tap water, labelled **For washing**	1	
Container, capacity approximately 400 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	

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

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Preparation of materials

The **iodine** and **S** may be prepared the day before the exam.
Each solution should be kept in a covered container in a refrigerator. Solutions should be at room temperature before the start of the exam.

You will need to make the following stock solutions:

1.0% ascorbic acid stock solution

This is prepared by putting 1 g of ascorbic acid into 80 cm^3 of distilled water in a beaker and making up to 100 cm^3 with distilled water. Mix well.

1.0% starch stock solution

This is prepared by putting 1 g of **soluble** starch into a small volume of distilled water and mixing to make a paste. Make it up to 100 cm^3 with hot distilled water. Mix well. It will be necessary to heat the starch to dissolve it. The starch solution must be at room temperature for the exam.

- **A**, 0.1% ascorbic acid solution

  Put 10 cm^3 of the 1.0% ascorbic acid stock solution into a beaker and make up to 100 cm^3 with distilled water. Mix well.

- **U**, 0.05% ascorbic acid solution

  Put 5 cm^3 of the 1.0% ascorbic acid stock solution into a beaker and make up to 100 cm^3 with distilled water. Mix well.

- **S**, 0.1% starch solution

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

- **iodine**, iodine solution

  This is prepared by dissolving 1 g of potassium iodide in 80 cm^3 of distilled water in a beaker and making up to 100 cm^3 with distilled water. Then dissolve 0.5 g of iodine in 100 cm^3 of the potassium iodide. The iodine needs to be mixed well to make sure it dissolves.
  Note: this is not the same as the iodine solution used in testing biological molecules.

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Materials and apparatus for Question 2

Each candidate will need:

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

Preparation of materials

- Microscope

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

  For each candidate:
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Temperature of exam room ..... °C

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

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

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Name (in block capitals) .....

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Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/35**

Paper 3 Advanced Practical Skills 1 **October/November 2022**

CONFIDENTIAL INSTRUCTIONS

6206072621

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 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.

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
7.0% yeast cell suspension in a beaker, labelled **Y**, provided at room temperature (see **Preparation of materials**)	at least 15 cm^3	
[MH] 6.0% (20 vol) hydrogen peroxide solution in a beaker, labelled **H**, provided at room temperature	at least 30 cm^3	
2.0% sodium alginate solution in a beaker, labelled **S**, provided at room temperature (see **Preparation of materials**)	at least 30 cm^3	
Distilled water in a beaker, labelled **W**, provided at room temperature	at least 100 cm^3	
1.5% calcium chloride solution in a beaker, labelled **C**, provided at room temperature (see **Preparation of materials**)	at least 30 cm^3	
1.5% hydrogen peroxide solution in a beaker, labelled **U** (see **Preparation of materials**)	at least 30 cm^3	
10 cm^3 syringes	2	
5 cm^3 syringes	2	
Test-tubes, small, capacity 20–30 cm^3	6	
Test-tube, large, capacity 40–50 cm^3	1	
Test-tube rack to hold 6 small test-tubes	1	
Test-tube rack to hold 1 large test-tube	1	
Beakers, capacity 50–100 cm^3	6	
Petri dish, at least 1 cm depth	1	
Blunt forceps	1	
Container with approximately 200 cm^3 tap water, labelled **For washing**	1	
Container, capacity at least 400 cm^3, labelled **For waste**	1	
Paper towels	12	
Glass marker pen (permanent)	1	
Glass rod	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

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Preparation of materials

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

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

  This is prepared by putting 7 g of yeast into a beaker and making up to 100 cm^3 with distilled water. Mix well.

[MH]

- **U**, 1.5% hydrogen peroxide

  This is prepared by putting 25 cm^3 of 6% (20 vol) hydrogen peroxide into a beaker and making up to 100 cm^3 with distilled water. Mix well.

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

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

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

  This is prepared by putting 1.5 g of calcium chloride into a beaker with 80 cm^3 of distilled water and making up to 100 cm^3 with distilled water. Mix well.

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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 **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	5
Centre number							

Centre name .....

Time of the practical session .....

Laboratory name/number .....

Give details of any difficulties experienced by the centre or by candidates (include the relevant candidate names and candidate numbers).

You must include:

- any difficulties experienced by the centre in the preparation of materials
- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
- any specific assistance given to candidates.

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Temperature of exam room …….°C

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

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

Declaration

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

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4 I have reported any other adverse circumstances affecting candidates, e.g. illness, bereavement or temporary injury, directly to Cambridge International on a *special consideration form*.

Signed ..... (supervisor)

Name (in block capitals) .....

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Cambridge Assessment International Education

Cambridge International AS & A Level

BIOLOGY **9700/36**

Paper 3 Advanced Practical Skills 2 **October/November 2022**

CONFIDENTIAL INSTRUCTIONS

6861453958

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Materials and apparatus for Question 1

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
1 g dried yeast in a large test-tube, labelled **Y**	1	
10.0% warm glucose solution in a beaker or container, labelled **G** (see **Preparation of materials**)	at least 20 cm^3	
Distilled water in a beaker or container, labelled **W**, provided at room temperature (see **Preparation of materials**)	at least 50 cm^3	
20 cm length of dialysis (Visking) tubing in a beaker or container of distilled water, labelled **D**	1	
[F] [MH] [HH] 0.04% Bromothymol blue indicator solution in a covered beaker or container, labelled **B** (see **Preparation of materials**)	approx. 10 cm^3	
Test-tubes, large, capacity 40–50 cm^3	2	
Test-tube rack to hold 2 large test-tubes	1	
Beaker or container, capacity 50–100 cm^3	1	
10 cm^3 syringes	3	
Teat pipette	2	
Beaker or container, capacity 400 cm^3, labelled **water-bath**	1	
Beaker, capacity approximately 400 cm^3, with approximately 200 cm^3 water at 50–60 °C and labelled **hot water**. The Supervisor may use a thermostatically controlled water-bath to provide this hot water for candidates.	1	
Beaker, capacity approximately 400 cm^3, with approximately 200 cm^3 of cold tap water, labelled **cold water**	1	
Container, capacity approximately 200 cm^3, with tap water, labelled **For washing**	1	
Container, capacity approximately 200 cm^3, labelled **For waste**	1	
Thermometer, –10 °C to +110 °C	1	
Glass rod	1	
Spotting tile (dimple tile) with at least 12 wells	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

The glucose solution, **G**, may be prepared the day before the exam and kept in a covered container in a refrigerator overnight.

G should be at approximately 45 °C at the start of the exam.

B may be prepared the day before the exam and kept in a covered container.

It is essential to check the yeast well before the examination to make sure that it will become active. (Do **not** use yeast used for brewing as this does not always work actively enough in the time.)

- **G**, 10.0% glucose solution

  This is prepared by sprinkling 10.0 g of glucose a little at a time onto 80 cm^3 of distilled water, stirring continuously. Make up to 100 cm^3 with distilled water.

  G should be at approximately 45 °C at the start of the exam.

[F] [MH] [HH]

- **B**, 0.04% bromothymol blue indicator solution

  To prepare bromothymol blue indicator solution you need to dissolve bromothymol blue powder using ethanol:
  – put 0.1 g of bromothymol blue powder into a beaker or container
  – put 50 cm^3 of ethanol (IMS) into the same beaker or container and mix well to dissolve the bromothymol blue powder
  – make up to 250 cm^3 with distilled water.

  If the indicator is **not blue** then add a few drops of 0.3% sodium carbonate solution, until the indicator turns blue.

  To prepare the 0.3% sodium carbonate solution, put 0.3 g of **anhydrous** sodium carbonate in 100 cm^3 of distilled water.

  The indicator should be kept in covered containers to prevent evaporation.

- **W**, distilled water

  On the day of the exam, you must test **W**:
  – put 3 drops of **B** onto a spotting tile
  – put 3 drops of **W** onto **B** and mix.

  The colour of this mixture should be blue.

  If the colour of the mixture is **not** blue, add a few drops of 0.3% sodium carbonate solution to the distilled water, **W**. Repeat the test.
  If the colour of the mixture is still **not** blue add a few more drops of 0.3% sodium carbonate solution and repeat the test.
  Continue to add drops of 0.3% sodium carbonate solution and test, until the colour of the mixture is blue.

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Materials and apparatus for Question 2

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Microscope with: ● an eyepiece lens, ×10 magnification ● a low-power objective lens, ×10 magnification ● a high-power objective lens, ×40 magnification	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
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Supervisor's report

Syllabus and component number	9	7	0	0	/	3	6
Centre number							

Centre name .....

Time of the practical session .....

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Temperature of exam room ..... °C

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

Declaration

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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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