



# Cambridge International AS & A Level

---

**BIOLOGY**

**9700/33**

Paper 3 Advanced Practical Skills 1

**May/June 2021**

CONFIDENTIAL INSTRUCTIONS

**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](mailto:info@cambridgeinternational.org)  
phone +44 1223 553554

---

This document has **8** pages.

## 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:

<b>C</b>	corrosive	<b>MH</b>	moderate hazard
<b>HH</b>	health hazard	<b>T</b>	acutely toxic
<b>F</b>	flammable	<b>O</b>	oxidising
<b>N</b>	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.

## Specific information for this practical exam

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

### Organisation of the exam

- Half the candidates should start on Question 1 and the other candidates should start on Question 2.
- For Question 2, each candidate must have uninterrupted use of a microscope for at least 55 minutes.

### Materials to be supplied by Cambridge International

- Slide **L1**

On receipt of the slides, check that they are labelled **L1** and that no slides are broken. The slides should **not** be viewed in advance of the exam. The material on the slides is confidential and must **not** be disclosed to candidates.

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

### Return of slides to Cambridge International

Immediately after the exam, the slides must be:

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

or

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

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

### Materials and apparatus for Question 1

Each candidate will need:

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

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

### Preparation of materials

**P, C, S1, S4** and the stock solution of **iodine** may be prepared the day before the exam.

All solutions should be kept in a covered container in a refrigerator overnight and should be at room temperature before the start of the exam.

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

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

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

This is prepared by putting 0.3g of copper sulfate pentahydrate (CuSO<sub>4</sub>•5H<sub>2</sub>O) **[C][MH][N]** in 80 cm<sup>3</sup> of distilled water and making up to 100 cm<sup>3</sup> with distilled water. Mix well. This is the stock solution of 0.3%.

0.15% copper sulfate pentahydrate (CuSO<sub>4</sub>•5H<sub>2</sub>O), **C**, is prepared by putting 50 cm<sup>3</sup> of the stock solution into a beaker and making up to 100 cm<sup>3</sup> with distilled water.

- [MH]**
- **iodine**, 0.01 mol dm<sup>-3</sup> iodine in potassium iodide solution

**Stock solution of iodine: 0.1 mol dm<sup>-3</sup>**

This is prepared by putting 8.0g of potassium iodide in a beaker. Add 2 cm<sup>3</sup> of distilled water to moisten the potassium iodide. Add 2.5g of iodine **[MH][N]** (if necessary, crush to small pieces) to the moist potassium iodide, add 15 cm<sup>3</sup> of distilled water and stir well. When no more iodine dissolves, add another 15 cm<sup>3</sup> of distilled water and stir well.

Repeat with two more volumes of 15 cm<sup>3</sup> of distilled water and then make up to a total volume of 100 cm<sup>3</sup>. It is not essential that all the iodine dissolves.

This gives a red-brown coloured 0.1 mol dm<sup>-3</sup> iodine solution.

Put 10 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> iodine solution into a beaker and make up to 100 cm<sup>3</sup> with distilled water. Mix well. This makes the 0.01 mol dm<sup>-3</sup> iodine solution and is a yellow-orange colour.

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

- **S2**, 10.0% glucose solution

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

**Stock solution for protein solution: 2.0% albumen solution**

This must be prepared on the day of the exam. This is prepared by putting 2g of albumen into a small volume of distilled water and mixing to make a paste. Make up to 100 cm<sup>3</sup> with distilled water. Mix well.

- **S3**, 1.0% protein solution

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

**Stock solution for starch solution: 0.2% starch solution**

This is used to make **S4** and **U**. This is prepared by putting 0.2g of starch into a small volume of warm distilled water in a beaker. Mix to a paste. Make up to 100 cm<sup>3</sup> with warm distilled water. Heat to boiling for 1 to 2 minutes, stirring well. Allow to cool.

- **S4**, 0.1% starch solution

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

- **U**, starch and protein solution

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

**Materials and apparatus for Question 2**

Each candidate will need:

materials and apparatus for each candidate	quantity	✓
Microscope with: <ul style="list-style-type: none"> <li>● an eyepiece lens, ×10 magnification</li> <li>● a low-power objective lens, ×10 magnification</li> <li>● a high-power objective lens, ×40 magnification</li> </ul>	1 between 2	
Slide <b>L1</b>	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](http://www.cambridgeinternational.org) after the live examination series.

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

Temperature of exam room ..... °C

Results for Question 1(a)(iii)

Results for Question 1(a)(v)

### Declaration

- 1 Each packet that I am returning to Cambridge International contains the following items:
  - the scripts of the candidates specified on the bar code label provided
  - the supervisor's results relevant to these candidates
  - the supervisor's reports relevant to these candidates
  - seating plans for each practical session, referring to each candidate by candidate number
  - the attendance register.
- 2 Where the practical exam has taken place in more than one session, I have clearly labelled the supervisor's results, supervisor's reports and seating plans with the time and laboratory name/number for each practical session.
- 3 I have included details of difficulties relating to each practical session experienced by the centre or by candidates.
- 4 I have reported any other adverse circumstances affecting candidates, e.g. illness, bereavement or temporary injury, directly to Cambridge International on a *special consideration form*.

Signed ..... (supervisor)

Name (in block capitals) .....