



# Cambridge International AS & A Level

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**BIOLOGY****9700/36**

Paper 3 Advanced Practical Skills 2

**October/November 2022**

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.**

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**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

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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 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 examination. 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 examination paper not requiring the microscope and slide throughout the whole period of the examination.
- 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 examination.

### 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.

**Materials and apparatus for Question 1**

Each candidate will need:

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

### 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 10.0g of glucose a little at a time onto 80cm<sup>3</sup> of distilled water, stirring continuously. Make up to 100cm<sup>3</sup> 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<sup>3</sup> of ethanol (IMS) into the same beaker or container and mix well to dissolve the bromothymol blue powder
- make up to 250 cm<sup>3</sup> 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 0.3g of **anhydrous** sodium carbonate in 100 cm<sup>3</sup> 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.

**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, <math>\times 10</math> magnification</li> <li>● a low-power objective lens, <math>\times 10</math> magnification</li> <li>● a high-power objective lens, <math>\times 40</math> magnification</li> </ul>	1 between 2	
Slide N1	1 between 2	

**Preparation of materials**

- Microscope

Any lenses which are **not**  $\times 10$  or  $\times 40$  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

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Centre number

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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)(ii)**

### 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) .....