



**Cambridge Assessment International Education**  
Cambridge International General Certificate of Secondary Education (9–1)

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**BIOLOGY**

**0970/51**

Paper 5 Practical Test

**May/June 2019**

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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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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This document consists of **7** printed pages and **1** blank page.

## 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 (NOT the invigilator) must do the experiment in Question 1 and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

### Question 1

Each candidate should be provided with:

hazard	materials and apparatus	quantity per candidate
	standard Petri dish base containing agar mixed with Universal Indicator, on a piece of white paper labelled <b>agar plate</b> A lid is not required.	1
	plastic drinking straws approximately 100 mm long, 4–5 mm diameter	2
	standard test-tubes	3
	test-tube rack or other means of supporting three test-tubes	1
	disposable 1 cm <sup>3</sup> plastic pipettes or very fine Pasteur pipettes Dropping pipettes are not suitable.	3
	30 cm <sup>3</sup> of 5% citric acid in a container labelled <b>5% citric acid</b>	1
	30 cm <sup>3</sup> of distilled water in a container labelled <b>distilled water</b>	1
	5 cm <sup>3</sup> syringes	2
	a means of writing on glass e.g. marker pen	1
	paper towels	4
	stop-clock	1
	suitable eye protection	1
	gloves	1 pair
	hand lens	1
	30 cm ruler marked in mm (also required for Question 2)	1

## Preparation of materials

### Agar

Agar can be obtained from a chemical supplier or from a shop that sells agar for cooking.

Add 40 g of agar powder to 1 dm<sup>3</sup> of distilled water in a large container suitable for boiling the liquid. Bring the mixture to the boil stirring until all the agar dissolves. A microwave can be used, but great care is needed to increase the time by small increments as agar boils over very quickly.

Add 10 cm<sup>3</sup> of Universal Indicator (**F**) to the agar solution and stir. The agar should appear **green** but may appear yellow or orange or blue depending on the pH of the water used. If it is yellow or orange add drops of dilute alkali until it is green. If it is blue, add drops of dilute acid until it is green. Allow the mixture to cool to approximately 50 °C before pouring into the Petri dishes.

### Preparation of agar plates

Pour the hot agar mixture into each Petri dish to a depth of 5 mm. Ensure that the agar spreads evenly and does not contain air bubbles. The volume of agar required for each Petri dish will be approximately 20 mm<sup>3</sup> to 30 mm<sup>3</sup> depending on the diameter of the Petri dish used. Standard Petri dishes with a diameter of 90 mm or 100 mm are suitable. Leave the agar to set. Lids are not required by candidates but the Petri dishes should be covered once prepared to prevent contamination.

The agar sets very quickly at 20 °C but may take longer at higher environmental temperatures. If the environmental temperature is higher than 40 °C the Petri dishes should be left in a cool place or refrigerator to set.

The agar plates can be made 24 to 48 hours before the examination and should be covered and stored in a refrigerator.

Additional agar plates should be prepared so that they are available if requested by candidates.

### 5% citric acid solution

Dissolve 5 g of citric acid in 50 cm<sup>3</sup> of distilled water. Make up to 100 cm<sup>3</sup> with distilled water. This solution can be made 24 hours before the examination and stored in a refrigerator.

Before the examination the Supervisor should test the rate of diffusion of citric acid. Prepare an agar plate as described on page 4. Cut two holes in the agar with a 4–5 mm diameter drinking straw. The holes should each be 20 mm from the centre and 40 mm apart.

Use a disposable pipette or a fine Pasteur pipette to add 3 drops of 5% citric acid solution to one of the holes and 3 drops of 0.5% citric acid solution to the other hole. Care is needed to prevent the citric acid solutions dropping onto the surface of the agar.

After 30 minutes, use a ruler to measure the distance moved by the citric acid. The 5% citric acid solution should have moved 6–8 mm and the 0.5% citric acid solution approximately 4–6 mm from the edge of the holes in the agar. If the distances moved are very small, dilute the agar by approximately 10% and retest.

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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.

Record the colour of the agar dispensed to candidates for question 1.

### Declaration

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

Signed ..... (supervisor)

Name (in block capitals) .....