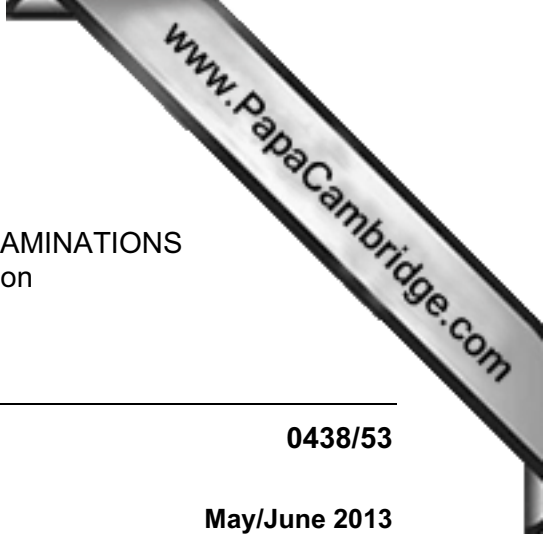




UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education



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**BIOLOGY (US)**

**0438/53**

Paper 5 Practical Test

**May/June 2013**

CONFIDENTIAL INSTRUCTIONS

**Great care should be taken to ensure that any confidential information given does not reach the candidates either directly or indirectly.**

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If you have any problems or queries regarding these Confidential Instructions, please contact CIE

by email [Info@cie.org.uk](mailto:Info@cie.org.uk)

by phone +44 1223 553554

by fax +44 1223 553558

stating the Center number, the nature of the query and the syllabus number quoted above.

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



**READ THESE INSTRUCTIONS FIRST**

These instructions give details of the apparatus required by each candidate for each experiment on the question paper. A summary of the questions that will be presented to the candidates is included, where appropriate, to allow the Biology teacher to test the apparatus appropriately. **Testing must be done out of sight of the candidates. No access to the question paper is permitted in advance of the examination.** Centres are reminded that candidates are expected to follow the instructions on the question paper and record all their results. They will not be penalized if these results are not what they expect.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

It is assumed that the ordinary apparatus of a science laboratory will be available, including a supply of purified water (distilled or deionized).

If arrangements are made for different sessions for different groups of candidates, care must be taken to ensure that the different groups of candidates are effectively isolated so that **no information passes between them.**

**All specimens should carry only the code letters and numbers as indicated and their identity should not be revealed to the candidates.**

Supervisors should ensure that all specimens have the correct identity attached to the specimen and that these are **not** removed during the examination.

If a candidate breaks any of the apparatus, or loses any of the material supplied, the matter should be rectified and a note made in the Supervisor's Report.

Supervisors are advised to remind candidates that **all** substances in the examination should be treated with caution. Droppers and safety glasses should be used where necessary.

In accordance with COSHH (Control of Substances Hazardous to Health) Regulations, operative in the UK, a hazard appraisal of the examination has been carried out.

The following codes are used where relevant:

**C** = corrosive substance

**F** = highly flammable substance

**H** = harmful or irritating substance

**O** = oxidizing substance

**T** = toxic substance

**N** = harmful to the environment

Centers are reminded that they are **not** permitted to open the question paper envelopes before the examination.

If there are any difficulties with any aspect of setting up this practical examination that the Center is not able to resolve, it is essential for Centers to contact the Product Manager as soon as possible by **email** to [info@cie.org.uk](mailto:info@cie.org.uk), by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

**Question 1**

Each candidate should be provided with:

- (i) one standard Petri dish [90 mm diameter plastic or glass] containing starch agar to a depth of 5 mm, with three holes cut in the starch agar and labeled as shown in Fig. 1.1

This should be presented with the lid in place. Ideally this should be sterile.

**Preparation of starch agar**

This can be prepared the day before the examination as long as it is not allowed to dry out. To prevent drying out the containers may be wrapped in a plastic bag or similar and kept cool in a refrigerator.

This agar is prepared by dissolving 2.0 g of starch in a small volume of distilled water and mixing to make a paste. Make the paste up to 100 cm<sup>3</sup> with hot distilled water. It will be necessary to heat the starch solution to dissolve the starch. Gently bring the starch solution to the boil, stirring continuously.

When the starch is dissolved, sprinkle 2 g of plain (not nutrient) agar powder, a little at a time, onto the starch solution, stirring continuously until dissolved. Let the mixture cool to about 55 °C.

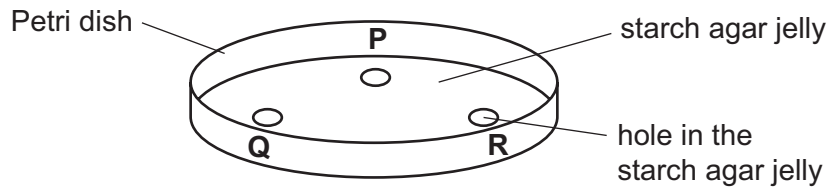
Pour the agar into the clean Petri dishes to a depth of 5 mm in each container. This depth can be marked on a wooden splint for easy reference to ensure an even 5 mm depth. Approximately 30 cm<sup>3</sup> of molten agar is needed to fill one Petri dish to this depth. Replace the lids of the Petri dishes.

Keep the agar in cool conditions to set firmly. The Petri dishes must be kept horizontal so that the agar sets to a uniform depth.

Three holes, 5 mm in diameter should be made in the starch agar, and labeled on the edge of the dish **P**, **Q** and **R** as shown in Fig. 1.1.

### Removal of cylinders

Just before the examination, holding the plate upside down, use a 5 mm diameter borer (or drinking straw) to carefully remove three cylinders from the starch agar. The holes in the starch agar should be left as clean and uniform as possible. The holes should be spaced regularly around the dish as shown in Fig. 1.1. Place the cylinders on a white tile and cover with plastic film to prevent them from drying out.



**Fig. 1.1**

- (ii) white tile, with the three cylinders of starch agar that have been removed placed in the center, covered with film to prevent drying
- [H]** (iii) 5 cm<sup>3</sup> dilute iodine solution, presented in a small beaker with a plastic dropper with a teat, labeled **dilute iodine solution**

The dilute iodine solution should be prepared by diluting stock solution to 1% iodine in potassium iodide solution (Lugol's iodine solution can be used as the stock solution). The dilution should be carried out by taking 1 cm<sup>3</sup> of the stock solution and making it up to 100 cm<sup>3</sup> with distilled water. The resultant **dilute iodine solution** should be a pale yellow-brown color. This is enough for 20 candidates. This may be prepared in advance of the examination but it is important that it is stored away from direct sunlight, for example in a dark bottle.

- (iv) amylase solution – approximately 5 cm<sup>3</sup> of two different dilutions are required and should be presented in two separate small containers with a plastic dropper, labeled as enzyme solution **1** and enzyme solution **2**

The enzyme solutions must be made up no more than one hour before the start of the examination and should be kept at less than 25 °C. The solutions should be prepared as follows.

Enzyme solution **1** is a 1% solution of fungal or bacterial amylase or diastase. If commercially available sources are used, the enzyme may be in powdered form or solution.

Enzyme solution **2** is a 0.1 % solution of fungal or bacterial amylase or diastase. This must be prepared via dilution of enzyme solution **1** by taking 10 cm<sup>3</sup> of enzyme solution **1** and making it up to 100 cm<sup>3</sup> with distilled water.

- (v) means of labeling the Petri dish

- (vi) 50 cm<sup>3</sup> of distilled water in a small beaker with a plastic dropper with a **water**
- (vii) an empty container, labeled **waste**
- (viii) ruler (mm)
- (ix) access to paper towels (in case of spillages)
- (x) timing device or view of a clock (with a second hand)
- (xi) a pea seedling, approximately five days old wrapped with plastic film to prevent it from drying out

Fig. 1.2 indicates the stage of development that the seedling should have reached by the day of the examination. It is recommended that centers germinate the seedlings in advance of the examination in order to trial how many days are required for the seedling to reach the stage of development shown in Fig. 1.2.

The testa should be left on the seedling for the candidates to observe.



**Fig. 1.2**

The Supervisor should include a photograph (or detailed line drawing) of a typical pea seedling given to the candidates in the Supervisor's Report.

- (xii) hand lens (at least  $\times 6$ )

The Supervisor (**not** the Invigilator) is expected to carry out the practical aspects of **Question 1** and record their results in the space provided in the Supervisor's Report. This must be done during the examination, using the same apparatus and reagents as the candidates but out of sight of the candidates.



This form should be completed and sent to the Examiner with the scripts.

**SUPERVISOR'S REPORT ON PRACTICAL BIOLOGY**

**IGCSE**

**May/June Session 2013**

*The Supervisor or Teacher responsible for the subject should provide the following information.*

- 1** Was any difficulty experienced in providing necessary materials? If so, give brief details.

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- 2** Give details of any difficulties experienced by particular candidates, giving names and candidate numbers. Reference should be made to:

- (a)** difficulties with specimens or materials;

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- (b)** accidents to apparatus or materials;

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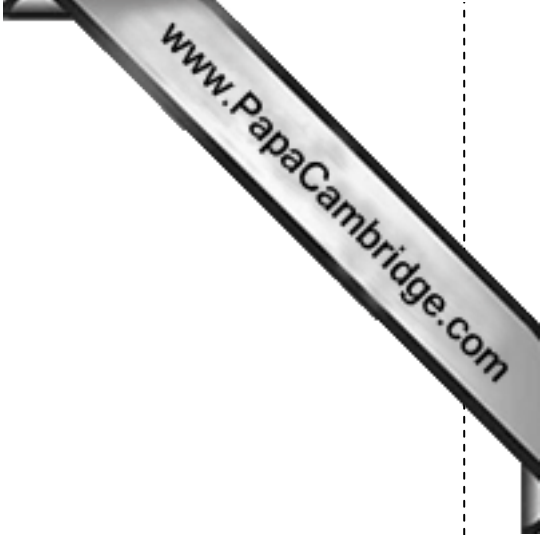
- (c)** any other information that is likely to assist the Examiner, especially if this cannot be discovered from the scripts.

.....

Other cases of individual hardship, e.g. illness or disability, should be reported direct to Cambridge on the normal 'Special Consideration Form' as detailed in the Handbook for Centres.

- 3** During the examination, the Supervisor should, **out of sight of the candidates**, carry out **Question 1**, using the same apparatus and reagents as the candidates. Results should be recorded in the space on page **8** (**not** on a spare Question Paper). The Invigilator should **not** carry out **Question 1**.





Please attach a photograph (or detailed line drawing) to show the stage of development of a typical seedling given to candidates.

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- 4 A plan of work benches, giving details of the candidate numbers for the places occupied by the candidates for each session must be enclosed with the scripts.

**Declaration** (to be signed by the Principal or the Examinations Officer)

The preparation of this practical examination has been carried out so as to maintain fully the security of the examination.

Signed .....

Name (in block capitals) .....

Center number .....

Center name .....

If scripts are required to be despatched in more than one packet, it is essential that a copy of the Supervisor's Report and the appropriate seating plan(s) are inside **each packet**.

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