

CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**BIOLOGY**

**5090/03**

Paper 3 Practical Test

May/June 2003

**1 hour 15 minutes**

CONFIDENTIAL INSTRUCTIONS

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

**Instructions for preparing apparatus**

These instructions give details of the apparatus required by each candidate for each experiment in this 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. **No access to the question paper is permitted in advance of the examination session.**

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.

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.**

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

In accordance with the 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** = oxidising substance

**T** = toxic substance

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

by e-mail: [International@ucles.org.uk](mailto:International@ucles.org.uk),

by phone: +44 1223 553554,

by fax: +44 1223 553558,

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

This document consists of 3 printed pages and 1 blank page.

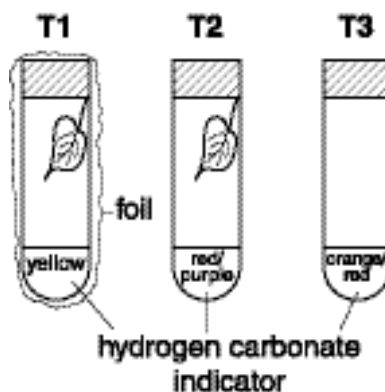


Each candidate must be provided with the following apparatus and materials.

**To be supplied by the Centre**

**Question 1**

- (i) Three large test-tubes, 2.5 cm in diameter, labelled **T1**, **T2** and **T3**, set up as shown in the diagram.



**T1** to contain 2 cm depth of hydrogencarbonate indicator solution that has been acidified by the addition of 1 drop of 1M hydrochloric acid. The solution should turn yellow. A fresh leaf should be suspended above the solution by trapping the petiole with a rubber bung. The test-tube should then be covered with aluminium foil and labelled **T1**.

[C]

**T2** to contain 2 cm depth of hydrogencarbonate indicator solution that has been made alkaline by the addition of 1 drop of 1M sodium hydroxide. The solution should turn red/purple. A fresh leaf should be suspended above the solution by trapping the petiole with a rubber bung. The test-tube should be labelled **T2**.

The leaves in tubes **T1** and **T2** should be of the same species and similar size, shape and colour.

**T3** to contain 2 cm depth of hydrogencarbonate indicator solution. The solution should be orange/red.

Hydrogencarbonate indicator solution may be purchased ready-made or made up as follows.

- Dissolve 0.2 g thymol blue and 0.1 g cresol red powders in 20 cm<sup>3</sup> of ethanol.
- Dissolve 0.84 g of sodium hydrogencarbonate in 900 cm<sup>3</sup> of deionised water.
- Add the alcoholic solution to the hydrogencarbonate solution and make up the volume to 1 litre with deionised water.
- Shortly before use, dilute the appropriate amount of this solution 10 times i.e. add nine times its volume of deionised water.

**Note** Before use, the solution must be brought into equilibrium by bubbling atmospheric air through the solution until it has turned orange/red. This should be done using a filter pump or an aquarium pump. This may take several hours.

- (ii) A large test-tube, 2.5 cm in diameter, with a rack or means of support.
- (iii) A drinking straw.

- (iv) Two leaves, labelled **L1** and **L2**.  
**L1** should be taken from a healthy, well watered plant that has been kept in complete darkness for at least 5 days to ensure complete de-starching. The leaf should then be immediately prepared for a starch test by being placed in boiling water and then in hot alcohol to decolourise it. Once white, the leaf should be labelled **L1**.  
**L2** should be taken from a healthy, well watered plant, that has been kept in bright light for at least 12 hours in order to produce starch. The leaf should then be immediately prepared for a starch test by being placed in boiling water and then in hot alcohol to decolourise it. Once white, the leaf should be labelled **L2**.
- [F] **Note** These leaves can be prepared in advance and stored in 70% alcohol. You are advised to carry out sample starch tests with some of the leaves well in advance of the examination session.
- (v) Iodine solution with dropper, labelled as such.
- (vi) A white tile.

## Question 2

- (i) Fruit **S1** which should be a winged fruit from a tree such as *Acer* (maple), *Fraxinus* (ash), *Ailanthus* (tree of heaven) or *Tipuana* (tipu). Please ensure that the winged fruit used is identified on the back page of the first candidate's script.
- (ii) A hand lens.
- (iii) A ruler.
- (iv) A microscope slide with cover slip and a mounted needle.
- (v) A grape, **not** seedless variety, labelled **S2**. If grapes cannot be obtained, substitute a similar fruit, with **sweet** flesh enclosing one or a few seeds.
- (vi) Benedict's solution with dropper, labelled as such.
- (vii) A test-tube with a rack or a means of support.
- (viii) A water-bath for Benedict's test.
- (ix) Access to water.
- (x) A paper towel.

**The Supervisor's Report is to be filled in on the back page of the first candidate's script. Please ensure that this is done.**

