UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level

BIOLOGY **9700/05**

Paper 5 Practical Test A2

May/June 2004

CONFIDENTIAL INSTRUCTIONS

Great care should be taken to ensure 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 and reagents (details on page 2) 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.

Candidates must be provided with a microscope with low-power ($\frac{2}{3}$ in/16 mm/×10) and high-power ($\frac{1}{6}$ in/4 mm/×40) objectives. Each candidate must have the sole use of a microscope for 30 minutes.

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

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,
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.

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

To be supplied by the Centre

Question 1

The candidates will be required to investigate the effect of the adding yeast-alginate beads to hydrogen peroxide solution.

Each candidate will require:

(i) 10 cm^3 of alginate solution in a small beaker or container, labelled 'alginate solution'. The alginate solution should be made by mixing 4 g of sodium alginate in 50 cm^3 of distilled water, making up to 100 cm^3 and stirring until completely dissolved. This can be stored overnight in a refrigerator until required, but should be permitted to warm up to room temperature before use.

(ii) 10 cm^3 of 5% yeast suspension in a small beaker or container, labelled '5% yeast suspension'. This should be made up with 5 g of dried baker's yeast suspended in 50 cm^3 of distilled water and made up to 100 cm^3 with distilled water. Any kind of live dried yeast will be suitable, whether intended for baking or fermentation. Some dried yeast contains sugars or other materials, but these should not affect the outcome of the experiment. The yeast suspension should be freshly prepared less than half an hour before the start of each session of the examination.

(iii) Sufficient 1.4% calcium chloride solution to give 3 cm depth in the small beaker **(viii)** below. This should be made by mixing 1.4 g of calcium chloride (irritant) in 50 cm^3 of distilled water and making up to 100 cm^3, stirring until completely dissolved. This can be made up well in advance of the examination and kept in a dark, cool place. This should be in a beaker or small container labelled 'calcium chloride solution'.

(iv) Distilled water.

(v) 5 test-tubes.

(vi) 10 cm^3 syringe, and a means of washing it.

(vii) Glass rod.

(viii) Small beaker (approximately 100 cm^3).

(ix) Forceps or tweezers.

[H] **(x)** 20 cm^3 of 1 mol dm^{-3} hydrogen peroxide solution in a beaker or other glass container, labelled as '1 mol dm^{-3} hydrogen peroxide solution'. (For those using older units, this is a 3.3 % w/v solution or an 11 volume (11 vol) solution.) This should be prepared by dilution from a more concentrated solution of hydrogen peroxide (corrosive) within 24 hours of the start of the examination, and kept in a cool, dark place.

(xi) Stop clock, stop watch or sight of a clock with a second hand.

(xii) A means of washing test-tubes.

(xiii) A supply of clean water.

(xiv) A wooden splint or spill at least 5 cm longer than the test-tubes supplied in **(v)**, narrow enough to fit into the test-tubes, and strong enough to be used to extract a 5 mm diameter bead from the bottom of the test-tube.

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- Well before the examination, a sample of solutions **(i)**, **(iii)**, **(x)** and suspension **(ii)** should be made up.
- Equal volumes of **(i)** and **(ii)** should be thoroughly mixed, and then a glass rod used to drop the mixture into solution **(iii)** to produce rounded beads approximately 5 mm in diameter that sink.
- If the beads are smaller than 3 mm or larger than 7 mm, or highly irregular, or float, try dropping them from a different height above solution **(iii)** until a few beads of appropriate form have been made.
- Drop the beads into solution **(x)** and time how long they take to float to the surface. This should take less than 2 minutes. If it takes more time than this, make up fresh solutions / suspensions and try again. Both the dried yeast and the hydrogen peroxide may 'go off' and should be replaced with fresh materials if there is any doubt.

Question 2

Each candidate will require:

(i) Slide **K1** (from Cambridge).

To be supplied by Cambridge

(i) Answer books, which also contain the questions.

(ii) Slide **K1** (Question 2 and shared between two candidates).

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RETURN OF EXAMINATION MATERIALS TO CAMBRIDGE

Please read the following instructions carefully.

Immediately after the examination, the slides must be returned to UCLES in the containers in which they were received, using the self-adhesive label for the parcel; they must not be included in parcels of scripts. On occasion, it may be possible for UCLES to offer certain slides or materials, used in the examination, for sale to Centres. In this case, an Order Form will be enclosed with the materials sent from Cambridge for the examination. Slides and containers not returned in good condition will be charged at the rate of £3 per item.

REPORT FORM

The teacher responsible for the examination is asked to complete the Report Form on the back cover of the script of the candidate whose name appears first on the attendance register. Further comments by teachers need only be made on those scripts where difficulties are encountered.

The teacher present in the examination room at the start of the test should carry out question 1 (a) (i) and (b) (i) and (ii) and enter their results on a spare copy of the examination paper, clearly marked 'Teacher's Results' and showing the Centre Number. This should be returned with the scripts.

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