OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced GCE

BIOLOGY 2806/03/INST

Instructions for the Planning Exercise and Practical Test

To be opened immediately

Planning Exercise – for issue on or after:

Wednesday **17 NOVEMBER 2004**

Practical Test:

Thursday **27 JANUARY 2005** Morning 1 hour 30 minutes

This document is for the **Head of Centre** and for the use of the **Biology teacher and/or technician** who prepares the apparatus and materials for the examination.

A packet containing **two** copies of the Biology Practical Test, 2806/03/TEST, accompanies the packet containing these Instructions.

These documents should be issued to the Biology teacher immediately they arrive at the Centre, but they **must be kept in a secure place at all times.**

These documents are provided so that the Biology teacher and/or technician can ensure that the Centre's apparatus and chemicals are suitable for carrying out the Biology Practical Test.

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

These instructions consist of 7 printed pages and 1 blank page.

SP (MML 7867 2/04) S78182/4

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Before authenticating work, the teacher/tutor should ask themselves the following basic questions.

- Has the **Declaration by candidate** been signed by the candidate?
- Was at least part of the work done under your direct supervision?
- Did you check the work during its production?
- Is the standard of finished work consistent with your professional judgement of the candidate's ability?

If you have answered 'YES' to the above questions you may authenticate the work.

The following notes for guidance are issued to candidates

1 Your Plan should have a clear and helpful structure and should be illustrated by diagrams, tables, charts, graphs etc. as appropriate. Remember that these can often be used to replace words in the text. Diagrams should be relevant to the content of your Plan and positioned appropriately. Labels on diagrams, flow charts or tables should be clear and concise. Large blocks of text should be included in the word count.

2 You should take care to use technical and scientific terms correctly and to write in clear and correct English.

3 Your Plan should be hand-written or word-processed on A4 paper, which should have a hole punched at the top left hand corner. Pages should be numbered and should have a clear margin on the right hand side. You should write (or print) on one side of the paper only and each sheet should be marked with your Centre number and Candidate number.

4 You should show that you have consulted an appropriate range and variety of sources. At the end of your Plan you should list clearly the sources you have used. You should refer to these references in your Plan where appropriate. Where you have incorporated material which has been copied directly from a source such as a book or the Internet, this must be acknowledged in your Plan and details included in the references at the end. However, it should be noted that the inclusion of copied material will not in itself gain credit. The list of references should not be included in the word count.

5 Your Plan should be based on the use of standard equipment, apparatus, chemicals and other materials available in a school or college science laboratory.

6 Your Plan should be of between 500 and 1000 words. A plan which is in excess of 1000 words is likely to have poor structure and unselective choice of material, so that full credit may not be available. You should indicate the number of words in the margin of the Plan at approximately 200 word intervals.

7 When you have finished, tie the pages together **loosely** (or use a treasury tag), with this sheet on the top, so that the pages turn over freely. Your Centre will give you the date by which your Plan must be handed in.

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PLANNING EXERCISE

Centres are reminded that candidates only need to appreciate how to carry out an investigation in sufficient detail for them to write a plan.
They do not need to carry out the investigation for themselves.

If candidates wish to try out the procedure they may be provided with the following:

1 Shade leaves and sun leaves taken from ivy plants. Shade leaves, which grow at the base of ivy plants, are rounded and have a single point. Sun leaves have three points and are found further away from the base. Do not use leaves from ornamental variegated species.

2 Hydrogen carbonate indicator solution. This may be ordered ready prepared from suppliers. Alternatively, it may be prepared from thymol blue, cresol red and sodium hydrogen carbonate (**ANALAR reagent**, AR).

To prepare a stock solution proceed as follows:

Solution A: dissolve 0.2 g of thymol blue powder and 0.1 g of cresol red powder in 20 cm^3 of ethanol.

Solution B: dissolve 0.8 g of sodium hydrogen carbonate (AR) in 900 cm^3 distilled water.

Add solution A to solution B and make up the total volume to 1 dm^3.
Shortly before use, dilute the stock solution by adding 1 part stock solution to 9 parts distilled water.

To bring the solution into equilibrium with atmospheric air, bubble air from outside the laboratory or prep room through the diluted indicator solution using a pump. After about 10 minutes, the indicator solution should be a red colour and suitable for use by the candidates.

Suggested supplier.

hydrogen carbonate indicator solution, also known as bicarbonate indicator (C5A 66289)
thymol blue (C5A 72009)
cresol red (C5A 67374)
sodium hydrogen carbonate (**ANALAR**) (C5F 79592)

from

Philip Harris Ltd., Finchel House, Excelsior Road, Abbey Park, Ashby de la Zouch, Leicestershire, LE65 1NG.
Tel: 0845 120 4520; Fax: 01530 419 492; Web site: www.philipharris.co.uk

PRACTICAL TEST

General Instructions

The attention of teachers is drawn to the details of this examination given in the Specification on page 115 in Appendix E.

The Biology teacher and/or technician must be granted access to the question paper in advance of the Practical Test in order to be satisfied that the apparatus and materials are in accordance with these instructions and are fully suitable for the performance of the experiments. To this end, the Biology teacher and/or technician should perform Questions 1 and 2 of the Practical Test and be satisfied that the candidates will be able to collect suitable results with the apparatus and materials provided. **A sample set of results, clearly labelled, should be sent to the Examiner on top of the candidates' scripts.**

If the apparatus or materials that are provided to candidates differ significantly from these instructions, then full details of the changes must be given on the Report Form. Candidates will not be disadvantaged provided that the nature of the experiments has not been changed. The Biology teacher and/or technician is advised to contact OCR well before the date of the examination if, for example, there are difficulties with obtaining materials or particular pieces of apparatus.

Candidates should be informed that, if they find themselves in real difficulty, they may ask the Supervisor for assistance but the extent of this assistance will be reported to the Examiner, who may make a deduction of marks. If the Supervisor becomes aware that a candidate is having difficulty, then the Supervisor is expected to give the minimum amount of help required to enable the candidate to obtain a set of results from the apparatus. A note of the type of help given should be made on the Report Form on the last page of the candidate's script. **Under no circumstances should help be given to candidates with the presentation or analysis of experimental data.**

In cases of faulty apparatus (not arising from a candidate's mishandling) which prevents the required readings from being taken, extra time must be allowed so that the candidate has a fair opportunity of performing the experiment as though the fault had not been present. Details of such cases of time compensation should be given in the comments section on the Report Form.

Cases of individual hardship, e.g. illness, disability, etc. should be reported direct to OCR on the 'Special Considerations' form and **not** included on the Report Form.

HEALTH AND SAFETY

Attention is drawn to the section on Health and Safety on pages 106 and 107, in Appendix B of the Biology (3381/7881) Specification (second edition). This section covers the Practical Tests as well as coursework. Centres are reminded that, in UK law, the responsibility for Health and Safety lies with the employer.

Materials used in the examination should display appropriate hazard symbols.

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

Question 1

(i) About 10 cm^3 of reaction medium and 6 cm^3 of leaf extract.

Prepare these as follows:
Prepare 500 cm^3 of buffer solution by dissolving 4.48 g of disodium hydrogen phosphate and 1.7 g of potassium dihydrogen phosphate in 450 cm^3 of distilled water. When thoroughly dissolved, make up to a total volume of 500 cm^3 with distilled water.

Reaction medium. Dissolve 0.2 g of 2,6-dichlorophenolindophenol (DCPIP) and 0.93 g of potassium chloride in 250 cm^3 of the buffer solution. Keep at a temperature below 5 °C. Provide to the candidates in a small beaker labelled **reaction medium**.

Leaf extract. Dissolve 34.23 g of sucrose and 0.19 g of potassium chloride in 250 cm^3 of the buffer solution. Keep at a temperature below 5 °C and label as **isolation medium**. Take about 200 cm^2 of spinach leaves. Remove any midrib or large veins with scissors and cut the remaining leaf material into small pieces. Add the leaf material to a small volume of isolation medium and liquidise or place in a mortar and crush with a pestle. This will separate and disrupt the cells. Decant the green liquid obtained into a flat-bottomed tube.

The leaf extract should be provided to the candidates in a flat-bottomed plastic tube labelled **leaf extract.** It should be provided in a beaker of crushed ice.

(ii) Dropping pipette.

(iii) Five 100 mm melting point tubes.

(iv) Aluminium foil, sufficient to wrap the container of leaf extract, make a foil cap for it and wrap one of the melting point tubes.

(v) Scissors to cut foil.

(vi) Red filter and green filters, each about 10 cm × 2 cm and folded longitudinally to form a 'tent'.

(vii) White tile and marker pen.

(viii) Bench lamp.

(ix) Stopclock or stop watch.

Suggested suppliers.

Melting point tubes, catalogue number ME10375, from

Timstar Laboratory Suppliers Ltd., Timstar House, Marshfield Bank, Crewe, Cheshire. CW2 8UY. Tel: 01270 250459; Fax: 01270 250601; e-mail: sales@timstar.co.uk

Filters may be cut from mounted filters – red (C5A 46085) and green (C5A 46059) which are each 53.5 × 31.0 cm. Available from

Philip Harris Ltd., Finchel House, Excelsior Road, Abbey Park, Ashby de la Zouch, Leicestershire, LE65 1NG. Tel: 0845 120 4520; Fax: 01530 419 492; Web site: www.philipharris.co.uk

Question 2

Candidates must be provided with a microscope with low power and high power objectives, e.g. ×10 and ×40. Each candidate must have sole use of a microscope for at least 40 minutes.

(i) Two sun and two shade leaves from ivy.

(ii) Two glass microscope slides with two adhesive labels.

(iii) Two cover slips.

(iv) Nail varnish with means of applying thin film.

(v) Forceps.

To be supplied by OCR

Fig. 1.2 on an insert.