

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:

Monday **12 NOVEMBER 2001**

Practical Test:

Friday **25 JANUARY 2002** Afternoon 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.

It should be issued to the Biology teacher immediately it arrives at the Centre, but it **must be kept in a secure place at all times**.

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

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**These instructions consist of 6 printed pages and 2 blank pages.**

## PLANNING EXERCISE

The Planning Exercise should be issued to candidates on or after the date shown on the front of this sheet, and must be collected in on or before the date of the Practical Test. These arrangements may be made at the discretion and convenience of the Centre.

It should be recognised that each Planning Exercise makes only a small contribution to the overall assessment and candidates should therefore be guided to spend an appropriate amount of time on the work. It is suggested that they should be given between 7 and 10 days to complete it.

The mark scheme for the Planning Exercise is based closely on the coursework mark descriptors for Skill P given in the specification and a copy of these descriptors should be made available to candidates to assist them in their work.

Candidates may be given access if they request it, and at the discretion of the Centre, to laboratory space and facilities in order to be able to carry out preliminary work which will help in constructing their plan. However, it should be noted that the responsibility for health and safety during this period rests with the Centre, and the attention of teachers is drawn to the Health and Safety section in the specification. Access to suitable library and other resources may also be required and, while time at home or in private study will be necessary to complete the task to a high standard, sufficient work must be completed under direct supervision to allow the teacher to authenticate the work with confidence as that of the candidates concerned. The supervising teacher should complete the statement of authentication for each candidate on the front cover page of the Plan, and details should be provided on the report form for the Practical Test of any assistance given to candidates.

After candidates' work has been collected, it must be kept securely until the date of the Practical Test (or must be collected on the day of the Practical Test) and must be included with the scripts for the Practical Test when these are despatched to the Examiner. Please tie together *loosely* the Planning Exercise and Practical Test for each candidate (or use a treasury tag), with the Planning Exercise on the top.

### 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 and 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 the report 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 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 *loosely* together, with this sheet on the top, so that the pages turn over freely, or use a treasury tag. Your Centre will give you the date by which it must be handed in.

## To be supplied by the Centre

### PLANNING EXERCISE

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

- (i) A supply of healthy radish seedlings with well-developed cotyledons. Seeds (e.g. the variety French Breakfast) should be sown 14 days prior to use in pots or trays containing a 5 cm depth of compost. The seeds should be sown thinly and just covered with compost. The trays should be placed in warm, well-illuminated conditions and the compost kept moist.
- (ii) Sodium hydrogen carbonate solution prepared as follows. Dissolve 7.0 g of sodium hydrogen carbonate in 400 cm<sup>3</sup> of distilled/deionised water. Add two small drops (e.g. from a Pasteur pipette) of liquid detergent and stir.

### PRACTICAL TEST

Candidates must be provided with a microscope with low power and high power objectives e.g.  $\times 10$  ( $\frac{2}{3}$  in) and  $\times 40$  ( $\frac{1}{6}$  in). Each candidate must have sole use of a microscope for at least 35 minutes.

Since the slides are shared, some candidates must start with Question 2.

Attention is drawn to the section on Health and Safety on pages 107 and 108, in Appendix B, of the specification, which covers 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.

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

#### Question 1

- (i) 4 cm<sup>3</sup> of a leaf extract in a corked specimen tube labelled **leaf extract**. This should stand in a small container with a little crushed ice. The leaf extract is prepared as follows:
  - (a) make up a stock phosphate solution (pH 6.5) buffer from the powders supplied by Cambridge. Dissolve 2.8 g Na<sub>2</sub>HPO<sub>4</sub> (anhydrous M.W. 141.97) and 6.4 g KH<sub>2</sub>PO<sub>4</sub> (anhydrous M.W. 136.09) in 1 dm<sup>3</sup> of cold distilled water.
  - (b) make up a sucrose/phosphate buffer solution. Dissolve 51.4 g sucrose in 500 cm<sup>3</sup> of the phosphate buffer prepared as above. Chill this solution in a refrigerator for several hours.
  - (c) avoiding the midrib, roughly tear about 25 g of fresh cabbage, spinach or leaf beet leaves (lettuce may also be used but 50 g of dark green leaves must be used).
  - (d) place the leaves in a food-blender. Add 100 cm<sup>3</sup> of the chilled sucrose/phosphate buffer. Blend the mixture rapidly for a minute or so until the green tissue is pulped.
  - (e) surround a beaker or other suitable container with crushed ice. Place 2 layers of muslin/gauze over the top of the container. Pour the mixture through the cloth to obtain the leaf extract.

- (ii) 10 cm<sup>3</sup> of DCPIP solution in a corked tube labelled **DCPIP solution**. Dissolve 0.06 g of 2,6-dichlorophenol indophenol (DCPIP) (from Cambridge) in 100 cm<sup>3</sup> of stock phosphate buffer (prepared in **(i)(a)**).
- (iii) 30 cm<sup>3</sup> of chloride/buffer solution in a covered container labelled **buffer solution**. Prepare this by adding 0.38 g of potassium chloride to 500 cm<sup>3</sup> of stock phosphate buffer (prepared in **(i)(a)**).
- (iv) Five test-tubes (about 15 × 1.5 cm); test-tube rack; 5 cm<sup>3</sup> syringe; three 1 cm<sup>3</sup> syringes; bench lamp.
- (v) A small piece (e.g. 15 × 6 cm) of aluminium foil. This should be just large enough to enclose the test-tubes supplied.
- (vi) Two small rubber bands or a short length of transparent, sticky tape; means of marking glassware; clock or watch with clearly visible minutes.

**N.B.** The *solutions* detailed above may be prepared 24 hours before use. They should be kept in a refrigerator at 0 to 4°C. Those used by candidates must be allowed to come to room temperature before being dispensed to them. The *leaf extract* **must** be prepared just prior to the examination. It should be maintained at low temperature by surrounding it with crushed ice. It should be dispensed to the candidates in this way.

## Question 2

- (i) Slides **K1** and **K2** from Cambridge.

## To be supplied by Cambridge

- (i) Answer books that also contain the questions.
- (ii) Powder for buffers, DCPIP.
- (iii) Slides **K1** and **K2** (Question 2), shared between two candidates.

## **RETURN OF EXAMINATION MATERIALS TO CAMBRIDGE**

**Please read the following instructions carefully.**

**Immediately after the examination the slides must be returned to the Syndicate Buildings in the containers in which they were received, using the self-adhesive labels for the parcel; they must not be included in parcels of scripts.** On occasion, it may be possible for the Syndicate 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.

## **QUESTIONNAIRE**

In order to minimise the disadvantage of a practical examination at which the Examiner is not present, 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.