

READ THESE INSTRUCTIONS FIRST

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. **Testing must be done out of sight of all 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 penalised 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 deionised).

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 on the Supervisor's report.

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 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

H = harmful or irritating substance

T = toxic substance

F = highly flammable substance

O = oxidising substance

N = harmful to the environment

Centres 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 Centre is not able to resolve, it is essential for Centres to contact the Product Manager as soon as possible by **e-mail** to info@cie.org.uk, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

Confidential Instructions

Each candidate should be provided with:

Question 1

- (i) half of a citrus fruit to be cut horizontally and presented in a shallow container such as a Petri dish or on a white tile, covered with plastic film to prevent drying

Suitable examples include half of a small orange, mandarin, tangerine, clementine, satsuma or lemon.

The Supervisor should identify the fruit provided and include a detailed line drawing or photograph with the Supervisor's Report. The Supervisor should also indicate the approximate size of the fruits.

- (ii) two strips of Universal Indicator paper and colour chart to determine pH
- (iii) forceps
- (iv) hand lens (at least $\times 6$ magnification)
- (v) 200 g of crushed fruit in a beaker, labelled **crushed fruit**

The fruit can be prepared in bulk using a blender. Use 150 g of fresh fruit (after any skin/stones/ seeds/hard structures have been removed) with 50 cm^3 of water.

The fruit should be ripe but not mouldy. Suitable fruits to use include oranges, pears or watermelons, or a mixture of fruit is acceptable. Note that lemons should **not** be used.

- (vi) eight similar cups (capable of holding at least 40 cm^3 of mixture)
- (vii) means to label cups, such as a marker that is not going to be removed by water
- (viii) means of measuring 25 cm^3 of crushed fruit e.g. small beaker or 50 cm^3 measuring cylinder
- (ix) plastic spoon
- (x) approximately 10 cm^3 of 5% pectinase or pectolase in a beaker, labelled **enzyme**, with a syringe [without a needle] to measure 2 cm^3

This solution needs to be freshly prepared just before the start of the examination.

- (xi) approximately 20 cm^3 of pH5 buffer solution in a beaker, labelled **buffer X**, with a syringe [without a needle] to measure 5 cm^3
- (xii) approximately 20 cm^3 of pH8 buffer solution in a beaker, labelled **buffer Y**, with a syringe [without a needle] to measure 5 cm^3

Buffers can be purchased in tablet form with full instructions for use or alternatively can be freshly made up and tested prior to use.

To make up the buffer solutions, use 0.1 mol dm^{-3} citric acid and 0.2 mol dm^{-3} sodium hydrogen phosphate solution and mix the appropriate volume of each as shown in Table 1.1.

Table 1.1

to prepare 100 cm^3 of citric acid-phosphate buffers		
pH	volume of 0.1 mol dm^{-3} citric acid, $\text{C}_6\text{H}_8\text{O}_7 / \text{cm}^3$	volume of 0.2 mol dm^{-3} sodium hydrogen phosphate, $\text{Na}_2\text{HPO}_4 / \text{cm}^3$
5.0	48	52
8.0	3	97

- (xiii) approximately 10 cm^3 of water in a beaker, labelled **water**, with a syringe [without a needle] to measure 2 cm^3
- (xiv) four coffee filter papers (usual type used for filtering) that will fit into the cups

Candidates will set up the apparatus as shown in Fig. 1.1. It is important therefore that the size of the filter papers provided are appropriate.

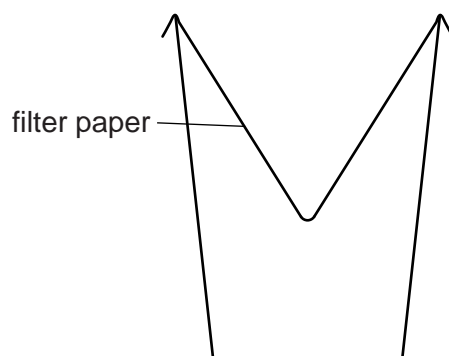


Fig. 1.1

- (xv) means of measuring 25 cm^3 of solution e.g. measuring cylinder or syringe [without a needle]
- (xvi) paper towels (in case of spillages)
- (xvii) view of a clock or timer

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 candidates.

This form should be completed and returned to CIE with the scripts.

SUPERVISOR’S REPORT ON PRACTICAL BIOLOGY

The Supervisor 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;

.....

(b) accidents to apparatus or materials;

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(c) assistance provided in case of colour-blindness;

.....

(d) 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 CIE 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**.

Type of citrus fruit used for Question 1(a).

.....

Approximate size of fruit provided.

Please attach a detailed line drawing or photograph to show the cut surface of the fruit as presented to the candidates.

Type of fruit used to produce the crushed fruit for Question 1(b).

.....

pH of crushed fruit.

- 4 A plan of work benches, giving details of the candidate numbers of 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 examination has been carried out so as to maintain fully the security of the examination.

Signed

Name (in block capitals)

Centre number

Centre name

If scripts are required to be dispatched 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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