

READ THESE INSTRUCTIONS FIRST

These Confidential 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 in the Supervisor's Report.

Supervisors are advised to remind candidates that **all** substances in the examination should be treated with caution. Pipette fillers and eye protection 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	MH moderate hazard
HH health hazard	T acutely toxic
F flammable	O oxidising
N hazardous to the aquatic 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 Cambridge as soon as possible by **email** to info@cie.org.uk, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

Question 1

Each candidate should be provided with:

- (i) six test-tubes
- (ii) one test-tube rack
- (iii) one 250 cm³ beaker labelled **water-bath**
- (iv) a supply of warm water at 40 °C. Candidates will raise their hands when they are ready for warm water to fill their water-bath.
- (v) one glassware marker pen
- (vi) one 5 cm³ syringe without needle
- (vii) one 1 cm³ syringe without needle
- (viii) stop-clock
- (ix) 25 cm³ of fresh whole milk in a container labelled **milk**
- (x) 10 cm³ of 0.4 mol dm⁻³ hydrochloric acid in a container labelled **acid**
- (xi) 40 cm³ of distilled water in a container labelled **distilled water**
- HH, MH, C (xii)** 10 cm³ of 0.1% rennin solution in a container labelled **0.1% rennin**
- MH (xiii)** 10 cm³ of 0.4 mol dm⁻³ sodium hydroxide in a container labelled **alkali**
- (xiv) three dropping pipettes, graduations are not required
- (xv) paper towels
- (xvi) disposable gloves
- (xvii) eye protection

Preparation of solutions**HH, MH, C 0.1% rennin solution**

This can be made up using dried rennin, rennet essence or vege-rennin. It can be purchased from science providers, dairy industry providers and some food stores. The enzyme should be refrigerated but should not be frozen prior to use.

Dissolve 1 g of dried rennin in (or add 1 cm³, if in liquid form, to) 500 cm³ of distilled water. Add more distilled water to make up to a total volume of 1 dm³.

Milk

The milk should be fresh whole cow's milk. Skimmed or semi-skimmed milk is unsuitable. Before the examination the Supervisor should trial the enzyme reaction of the milk and rennin solution. Warm separate samples of the milk and the 0.1% rennin solution to 40 °C. Add two drops of 0.4 mol dm⁻³ hydrochloric acid to 5 cm³ of warmed fresh whole milk. Add 1 cm³ of warmed 0.1% rennin to the milk and acid mixture.

The milk should form visible clots (small lumps) within one minute and should be partially solid within three minutes. If these times are longer or shorter adjust the concentration of the rennin enzyme accordingly.

MH Add two drops of 0.4 mol dm⁻³ sodium hydroxide to 5 cm³ of fresh whole milk, which has been warmed to 40 °C. Add 1 cm³ of warmed rennin solution to the milk and alkali mixture. There should be little or no clotting with this mixture within 5 minutes. Increase the strength of the alkali if the milk is clotting but note that sodium hydroxide is classified as **C** at concentrations equal to or greater than 0.5 mol dm⁻³.

Question 2

- (i) ruler with a mm scale

The Supervisor (**not** the Invigilator) should 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 the candidates.

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This form should be completed and sent to Cambridge with the scripts.

SUPERVISOR'S REPORT

The Supervisor or Teacher responsible for the subject should provide the following information.

- 1 Was any difficulty experienced in providing the 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;

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- (b) accidents to apparatus or materials;

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

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- (d) any other information that is likely to assist the Examiner, especially if this cannot be discovered from the scripts.

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Other cases of individual hardship, e.g. illness or disability, should be reported direct to Cambridge 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 the practical aspects of **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). Attach extra sheets if necessary.

The Invigilator should **not** carry out **Question 1**.

Question 1 results:

- 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 Supervisor)

The preparation of this practical 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**.