
BIOLOGY

9700/34

Paper 3 Advanced Practical Skills 2

October/November 2017

CONFIDENTIAL INSTRUCTIONS

Great care should be taken to ensure that any confidential information given, including the identity of material on microscope slides where appropriate, does not reach the candidates either directly or indirectly.



If you have any queries regarding these Confidential Instructions, please contact Cambridge stating the Centre number, the nature of the query and the syllabus number quoted above.

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This document consists of **9** printed pages and **3** blank pages.

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 appropriately.

No access to the Question Paper is permitted in advance of the examination.

Candidates must be provided with a microscope with:

- eyepiece lens, $\times 10$ (equal to 16 mm or $\frac{2}{3}$ ")
- low-power objective lens, $\times 10$ (equal to 16 mm or $\frac{2}{3}$ ")
- high-power objective lens, $\times 40$ (equal to 4 mm or $\frac{1}{6}$ ")
- eyepiece graticule fitted within the eyepiece and visible in focus at the same time as the specimen.

To avoid confusion, only the lenses specified above should be fitted in the microscopes to be used in the examination. Any lenses which are **not** $\times 10$ or $\times 40$ should be removed or replaced.

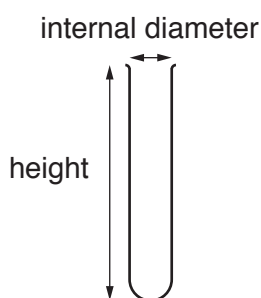
Each candidate must have uninterrupted use of the microscope for at least one hour.

Supervisors are advised to remind candidates that **all** substances in the examination should be treated with caution. Pipette fillers and suitable eye protection 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	MH moderate hazard
HH health hazard	T acutely toxic
F flammable	O oxidising
N hazardous to the aquatic environment	



When small test-tubes are provided, it is expected that these are approximately 150 mm in height.

If other dimensions of apparatus are required, these will be specified.

Confidential Instructions**For both Questions**

Each candidate will require:

- ruler, marked in mm
- clean and dry apparatus, e.g. glassware and syringes (without a needle)
- solutions supplied in suitable beakers or containers for removal of the solutions using syringes
- fresh solutions, materials and rinsing water where appropriate.

More of the solutions should be available if requested by candidates.

If a candidate breaks any of the apparatus or loses any of the materials supplied, the matter should be rectified and a note made in the Supervisor's Report.

Solutions should be disposed of in accordance with local safety regulations.

Question 1

Each candidate will require:

materials and apparatus for each candidate	quantity	✓
Visking tubing, in a beaker or container (capacity approximately 250 cm ³), in at least 100 cm ³ of distilled water, labelled V . A few extra pieces should be available on request.	one at least 15 cm in length	
Paperclip	1	
7% yeast in 2% sucrose solution in a beaker or container, labelled Y , provided at room temperature (see Preparation of materials)	at least 20 cm ³	
Distilled water in a beaker or container, labelled W , provided at room temperature	at least 100 cm ³	
[F][MH][HH] 0.04% bromothymol blue solution in a beaker or container with a means of removing drops (e.g. pipette, plastic or glass with teat), labelled B , provided at room temperature (see Preparation of materials). This indicator evaporates so should be kept covered.	at least 10 cm ³	
10 cm ³ syringes	2	
Beaker or container (capacity 75 cm ³ to 100 cm ³), labelled A	1	
Spotting tile or white tile	1	
Glass rods	2	
Container with tap water (capacity approximately 200 cm ³), labelled For washing	1	
Container (capacity approximately 400 cm ³), labelled For waste	1	
Paper towels	8	
Glass marker pen	1	
Stop-clock or timer showing seconds	1	
Suitable eye protection	1	

It is advisable to wear suitable eye protection when handling chemicals.

Preparation of materials

In advance of the examination check that the yeast will become active (with froth on the top). Some yeast will require more time to become active.

Do **not** use brewer's yeast as this does not always work actively enough in the time.

The 2% sucrose solution may be prepared the day before the examination and kept in covered containers in a refrigerator.

The 0.04% bromothymol blue solution may be prepared the day before the examination and kept in covered containers.

The 7% yeast in 2% sucrose solution should be prepared 30 minutes before the candidates start **Question 1**. It will have cooled down before the candidates use it but it may still be warm.

(i) Y, 7% yeast in 2% sucrose solution

The 2% sucrose solution is prepared by sprinkling 2g of sucrose, a little at a time, onto the surface of 80 cm³ of distilled water, stirring continuously as you sprinkle. Make up to 100 cm³ with distilled water.

Start preparing the 7% yeast in 2% sucrose solution 30 minutes before the candidates start **Question 1**:

In a large container add 7g of dried yeast to 40 cm³ of warm 2% sucrose solution.

Stir and make up to 100 cm³ with warm sucrose solution. This should be kept at a temperature of 35 °C to 40 °C for approximately 30 minutes.

To help put the 20 cm³ of **Y** into the beaker for the candidate, it is suggested that the yeast suspension is poured into a second beaker, leaving the froth behind.

[F] (ii) B, 0.04% bromothymol blue solution
[MH][HH]

To prepare bromothymol blue indicator:

- put 0.1 g of bromothymol blue powder into a beaker or container
- put 50 cm³ of ethanol (IMS) into the same beaker and mix well to dissolve the bromothymol blue indicator
- make up to 250 cm³ with distilled water.

If the indicator is **not blue** then add as few drops as possible of 0.3% sodium carbonate solution, until the indicator turns blue.

To prepare the 0.3% sodium carbonate put 0.3g of anhydrous sodium carbonate in 80 cm³ of distilled water. Make up to 100 cm³ with distilled water.

The indicator should be kept in covered containers to prevent evaporation.

Question 2

Each candidate will require:

- (i) Microscope with an eyepiece graticule fitted into the eyepiece lens (as described on page 2)

For each candidate:

- the microscope **must** be set up on low power
- the slide must **not** be left on the stage of the microscope.

- (ii) Slide L1

On receipt of the slides, please check that they are labelled **L1** and that no slides are broken. The material is **confidential** (so **must not** be disclosed to candidates) and the slides should **not** be viewed in advance of the examination.

The number of slides supplied by Cambridge will be equal to half the candidate entry.

Therefore, half the candidates should start on **Question 2** and the other candidates should start on **Question 1**.

- (iii) Clear plastic ruler, marked in mm (see page 3)

SUPERVISOR'S REPORT

The Supervisors' Report is essential in order to allow the Examiners to assess all candidates as fairly as possible and should always be completed by every Centre.

During the examination, the Supervisor or competent biologist (not the Invigilator), should follow the steps in **Question 1**, in order to obtain results for **1(a)(iii)**.

The Supervisor should use the same solutions as those provided to the candidates and work **out of the sight of the candidates**.

These results should be written in the Supervisor's Report, **not** on a spare Question Paper.

SEATING PLAN

Provide a **seating plan** of work benches, on separate paper, giving details of the places occupied by the candidates for **each question** using each candidate's number.

The Supervisor's Report and the candidates' seating plan should be enclosed with each packet of scripts.

MATERIALS TO BE SUPPLIED BY CAMBRIDGE

- Slide L1

RETURN OF EXAMINATION MATERIALS TO CAMBRIDGE

Immediately after the examination the microscope slides **must** be:

- returned to Cambridge in the containers in which they were received, using the self-adhesive label. The slides must **not** be included in the packet of scripts.

or

- purchased using the order form enclosed with the slides, which should be completed and returned to Cambridge. The order form must **not** be included in the packet of scripts.

Slides and boxes will be charged at the rate of £3 per slide plus £1 per box.

If the items are not returned or purchased by the deadline stated on the order form, they will be charged at £3.50 per slide plus £1 per box.

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This form should be completed and sent with the scripts.

SUPERVISOR'S REPORT

October/November 2017

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.

- 2 Give details of any difficulties experienced by particular candidates, giving names and candidate numbers. Reference should be made to:
 - (a) difficulties arising from faulty specimens or microscopes;
 - (b) accidents to apparatus or materials;
 - (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.

All 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 or competent biologist should follow the steps in **Question 1** in order to obtain results for **1(a)(iii)**. The Supervisor should use the same solutions as those provided to the candidates, and work **out of the sight of the candidates**. These results should be written on page 12, which should be enclosed with the candidates' scripts. If the scripts are in several packets, please ensure that a copy of the Supervisor's Report is enclosed with each packet of scripts.

- 4 Enclosed a **seating plan** of work benches with the scripts, giving details of the candidate numbers for the places occupied by the candidates for **each question**.

Declaration (to be signed by the Supervisor)

The preparation of this practical examination has been carried out so as to maintain the security of the examination.

Signed

Name (in block capitals)

Centre number (of enclosed scripts)

Centre name

If scripts are despatched in more than one envelope, it is essential that **each envelope** includes a copy of the:

- relevant Supervisor's Report
- appropriate seating plan(s).

Temperature of examination room °C

Results for **Question 1(a)(iii)**