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**BIOLOGY**

**9700/03**

Paper 3 Advanced Practical Skills

**For Examination from 2016**

SPECIMEN 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.**

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

**2 hours**

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If you have any problems or queries regarding these Instructions, please contact CIE  
by e-mail: [info@cie.org.uk](mailto:info@cie.org.uk)  
by phone: +44 1223 553554  
by fax: +44 1223 553558  
stating the Centre number, the nature of the query and the syllabus number quoted above.

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This document consists of **8** printed pages.

### Instructions for preparing apparatus

These instructions give details of the apparatus required by each candidate for each question 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, Cambridge request that only the lenses specified above are 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.

### Safety

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 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 substance

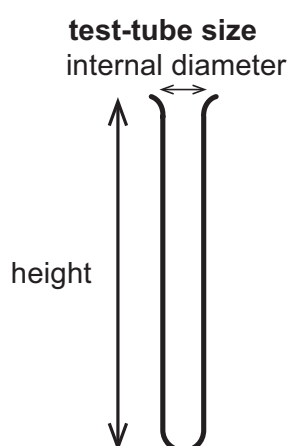
**H** = harmful or irritating substance

**T** = toxic substance

**F** = highly flammable substance

**O** = oxidising substance

**N** = harmful to 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 in the Apparatus list.

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 **email** to [info@cie.org.uk](mailto:info@cie.org.uk), **fax** to +44 1223 553558 or **phone** to +44 1223 553554.

**Confidential Instructions**

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

**In advance of the examination:**

Test the activity of the yeast by preparing the yeast cell suspension as instructed below.

**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 a suitable beaker or container for removal of the solution using a syringe
- 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 material supplied, the matter should be rectified and a note made in the Supervisor's Report.

**Question 1**

Apparatus required:

apparatus and solutions for each candidate	quantity	✓
7% yeast cell suspension in a beaker or container, labelled <b>Y</b> , provided at a temperature of 35 °C–45 °C (see instructions for preparation). This volume should not include any froth.	at least 100 cm <sup>3</sup>	
10 cm <sup>3</sup> syringe with the means to wash it out	1	
Glass rod	1	
Container with clean tap water (about 200 cm <sup>3</sup> ), labelled <b>For washing</b>	1	
Container, labelled <b>For waste</b>	1	
Clear container to hold smaller test-tube	1	
Paper towels	8	
Test-tube – small, to hold between 15 cm <sup>3</sup> and 20 cm <sup>3</sup> volume of solution	1	
Test-tube – large, with a bung and delivery tube that must be airtight, without using too much force, so that the bung fits into the large test-tube to a depth of at least 0.5 cm. The length of the delivery tube must be longer than half the length of the small test-tube	1	
Test-tube rack or container to hold large test-tube	1	
Delivery tube – see Fig. 1.1 on page 5	1	

Water-bath equipment (not thermostatically controlled water-bath)	1	
<ul style="list-style-type: none"> <li>• large empty beaker (to hold the container <b>Y</b>, so that container <b>Y</b> cannot tip over), labelled <b>W</b></li> <li>• thermometer, <math>-10^{\circ}\text{C}</math> to <math>110^{\circ}\text{C}</math></li> <li>• separate beaker or container with tap water (at least three-quarters the volume of the large beaker) between <math>60^{\circ}\text{C}</math> and <math>65^{\circ}\text{C}</math>, labelled <b>Hot</b></li> <li>• separate beaker or container with tap water (at least three-quarters the volume of the large beaker) between <math>25^{\circ}\text{C}</math> and <math>30^{\circ}\text{C}</math>, labelled <b>Cold</b> (<i>iced water may be provided if room temperature is above <math>25^{\circ}\text{C}</math></i>)</li> </ul>		
Stop-clock or stopwatch	1	
Glass marker pen	1	
Safety goggles / glasses	1	

**It is advisable to wear safety glasses/goggles when handling chemicals.**

### Preparation of **Y** and apparatus

(i) **Y**, 7.0 % yeast cell suspension.

**Y** should be prepared one hour before the candidates start **Question 1**. In a large container add 7.0g of dried yeast (for baking) to  $40\text{cm}^3$  of warm distilled water. Stir and make up to  $100\text{cm}^3$  with warm distilled water. This should be kept for approximately 30 minutes at a temperature of  $35^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ .

Approximately 15 minutes before candidates start **Question 1**, sprinkle 20g of glucose over the surface of the suspension and stir thoroughly and keep at a temperature of  $35^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ .

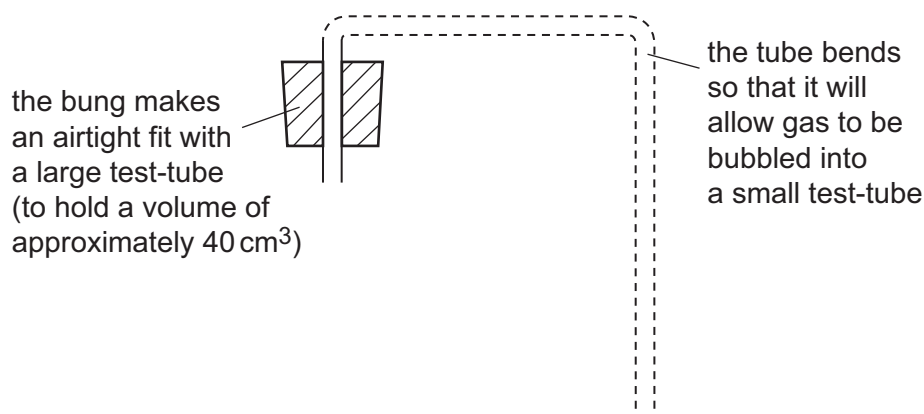
It is suggested that preparation of the yeast cell suspension should be tried before the examination as some yeast will require more time, after the glucose is added, to become active (with froth on the top).

To help put the  $100\text{cm}^3$  of **Y** into the beaker for the candidates, it is suggested that the yeast suspension is poured into a second beaker leaving the froth behind.

**(ii) Delivery tube:**

The delivery tube should be prepared so that:

- the bung makes an airtight fit with a large test-tube (to hold a volume of approximately 40 cm<sup>3</sup>)
- the tube bends so that it will allow gas to be bubbled into a small test-tube as in Fig. 1.1.



**Fig. 1.1**

**Question 2**

Apparatus required:

**(i) Slide J1** (for example, TS Ranunculus root)

On receipt of the slides, please check that they are labelled **J1** 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 half should start on **Question 1**.

**(ii) 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, Cambridge request that only the lenses specified above are 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.

For each candidate:

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

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

## **SUPERVISOR'S REPORT and SEATING PLAN**

The Supervisor's 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 (teacher responsible for the Invigilator) should, **out of the sight of the candidates**, carry out **Question 1** using the same **Y** (yeast cell suspension) as the candidates, in order to obtain results for **1(a)(v)**. The results should be written in the Supervisor's Report, **not** on a spare question paper.

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

Seating plan: on separate paper, provide a **seating plan** of work benches, 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 (for examination)**

- (i) Question papers
- (ii) Slide J1

## **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 and £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 and £1 per box.

## SUPERVISOR'S REPORT ON PRACTICAL BIOLOGY

## Specimen 2016

*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 CIE on the normal 'Special Consideration Form' as detailed in the Handbook for Centres.

- 3 During the examination, the Supervisor should, **out of the sight of the candidates**, carry out **Question 1(a)(v)** using the same solutions and reagents as the candidates. These results should be written on page 8 of the Supervisor's Report, 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. The Invigilator should **not** carry out **Question 1(a)(v)**.
- 4 Enclose a **seating plan** of work benches with the scripts, giving details of the candidate numbers of the places occupied by the candidates for **EACH question**. Use **separate** paper for this.

**Declaration** (to be signed by the Principal or the Examinations Officer)

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 required by CIE to be 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) (v)*