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**BIOLOGY**

**9700/34**

Advanced Practical Skills 2

**May/June 2015**

**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.**

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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 **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.**

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.

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.

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

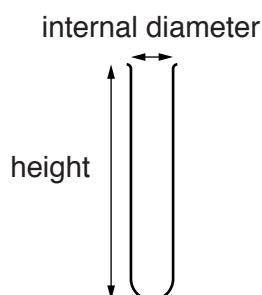
**H** = harmful or irritating substance

**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.

Centres are reminded that they are **not** permitted to open the question paper envelopes before the examination. Centres should also refer to the Handbook for Centres.

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

**Confidential Instructions**

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

Each candidate will require:

**For both Questions**

- mm ruler.

**Question 1**

**Before** the examination, prepare the plant extract and test its activity using the instructions below.

- Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solutions and reagents using a syringe. More of the solutions and reagents should be available if requested by candidates.
- All solutions should be provided to candidates at **room temperature**.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **P**, **X**, **H** and **W** are needed for each candidate.
- All solutions and reagents should be disposed of according to local safety regulations.

**Well before the examination** prepare the plant extract and test its activity as below. The active mung bean plant extract can be frozen in advance, then defrosted to reach room temperature before the examination.

Put approximately 40 g of dried mung beans into a beaker or container and make up to 500 cm<sup>3</sup> with distilled water. Cover the container and leave to soak for at least **12 hours**.

Liquidise all the soaked mung beans with all the liquid until ground into small pieces, or grind in a pestle and mortar.

Allow the larger solid pieces to settle and decant off the cloudy solution. Do **not** filter. The solution will contain small pieces of plant material and should be cloudy.

**Test for activity of P:**

The activity of the plant extract solution should be tested before the examination by putting 10 cm<sup>3</sup> of **H** into a test-tube. Stir the plant extract solution **P** and add 10 cm<sup>3</sup> of **P** to the test-tube containing **H**. The mixture should produce rapid bubbles and foam within 2 minutes.

If the reaction is too fast decrease the concentration of **H**. It is not necessary to tell the candidates of any change in the concentration of **H**.

If the reaction is too slow then soak a larger mass of mung beans in the same volume of water or change the source of the mung beans.

Summary of solutions and reagents:

labelled	contents	hazard	volume / cm <sup>3</sup>
<b>P</b>	plant extract solution	none	at least 90
<b>X</b>	0.3% copper sulfate solution	[H] harmful	at least 20
<b>H</b>	6% hydrogen peroxide solution	[H] harmful [H] irritant	at least 90
<b>W</b>	distilled water	none	at least 100

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

Preparation of solutions and reagents:

(i) **P**, at least 90 cm<sup>3</sup> of plant extract solution in a beaker or container, labelled, **P**.

You will need to prepare the following stock solution which will then be used to make **X**:

### **3% copper sulfate solution**

This is prepared by putting 3g of copper sulfate pentahydrate (CuSO<sub>4</sub>.5H<sub>2</sub>O) in 80 cm<sup>3</sup> distilled water, stirring to dissolve and making up to 100 cm<sup>3</sup> with distilled water. This makes a pale blue solution.

[H] (ii) **X**, at least 20 cm<sup>3</sup> of 0.3% copper sulfate solution in a beaker or container, labelled **X**.

The 0.3% copper sulfate solution for candidates is prepared by putting 10 cm<sup>3</sup> of the 3% stock solution in a beaker or container and making up to 100 cm<sup>3</sup> with distilled water. This makes a very pale blue solution.

[H] (iii) **H**, at least 90 cm<sup>3</sup> of 6% (20 vols) hydrogen peroxide solution, in a beaker or container, labelled **H**.

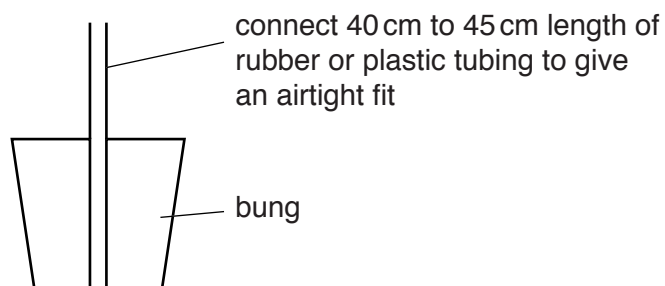
**H** must be put out immediately before the examination and kept covered to prevent evaporation.

(iv) **W**, at least 100 cm<sup>3</sup> of distilled water in a beaker or container, labelled **W**.

Apparatus for each candidate should be clean.

Syringe needles are **not** required and must **not** be given to candidates.

Apparatus for each candidate	Quantity	✓
10 cm <sup>3</sup> syringe with the means to wash it out	2	
10 cm <sup>3</sup> syringe, labelled <b>X</b>	1	
5 cm <sup>3</sup> syringe (without the plunger)  The nozzle needs to be sealed by sucking up a very small quantity of melted wax (e.g. candle). Put the plunger in to the 5 cm <sup>3</sup> mark and suck up less than 0.2 cm <sup>3</sup> . Leave the plunger in until the wax has cooled. Remove the plunger.	1	
Beaker or container (capacity at least 300 cm <sup>3</sup> ), containing approximately 200 cm <sup>3</sup> tap water for pouring into test-tubes, labelled <b>For washing</b>	1	
Container (capacity at least 300 cm <sup>3</sup> ), labelled <b>For waste</b>	1	
Paper towels	8	
Beakers or containers to hold at least 50 cm <sup>3</sup> to allow a 10 cm <sup>3</sup> syringe to remove liquid	6	
Beaker or container (capacity at least 400 cm <sup>3</sup> ) filled to two-thirds full with tap water, labelled <b>T</b>	1	
Test-tubes – to hold more than 40 cm <sup>3</sup> but no more than 50 cm <sup>3</sup> and to fit the bung being provided to each candidate	6	
Bung with a plastic or rubber delivery tube connected as described in Fig. 1.1 to fit <b>each</b> of the test-tubes to give an airtight seal	1	
Test-tube rack to hold 6 test-tubes <b>or</b> a test-tube rack to hold 1 test-tube with a container to hold the other 5 test-tubes	1	
Glass rod	1	
Stopclock or timer showing seconds	1	
Glass marker pen	1	
Safety goggles/glasses	1	
Petroleum jelly available on request for a candidate to make the apparatus air tight as needed	–	



**Fig. 1.1**

During the examination, the Supervisor (**not** the Invigilator) should, **out of the sight of the candidates**, carry out **Question 1** using the same solutions and reagents as the candidates in order to obtain results for **1(b)(ii)** and **1(b)(iii)**. These results should be written in the Supervisor's Report, **not** on a spare question paper.

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

Please ensure that, if the scripts are in several packets, a copy of the Supervisor's Report and the candidates' seating plan are enclosed with each packet of scripts.

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

## Question 2

### (i) Slide **M1** (supplied by Cambridge)

On receipt of the slides, please check that they are labelled **M1** and that none of the 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 as described on page 2

For each candidate:

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

**MATERIALS TO BE SUPPLIED BY CAMBRIDGE**

- (i) Question papers
- (ii) Slide M1

**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 plus £1 per box.

**SUPERVISOR'S REPORT and SEATING PLAN**

The teacher responsible for the examination is asked to fill in the Supervisor's Report in these Confidential Instructions.

For Centres where more than one script packet is used, there must be a copy of the completed Supervisor's Report and the candidates' seating plan in each script packet. These Supervisors' Reports are essential in order to allow the Examiners to assess all candidates as fairly as possible and should always be completed by every Centre.





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

### **SUPERVISOR'S REPORT**

**May/June 2015**

*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** using the same solutions and reagents as the candidates. The results for **Questions 1(b)(ii) and 1(b)(iii)** should be written in 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**.
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 session. 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 a copy of the relevant Supervisor's Report and the appropriate seating plan(s) are sent inside **each envelope**.



Temperature of examination room ..... °C

Results for **Questions 1(b)(ii) and 1(b)(iii)**

