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**BIOLOGY**

**9700/33**

Advanced Practical Skills 1

**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 **10** printed pages and **2** 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

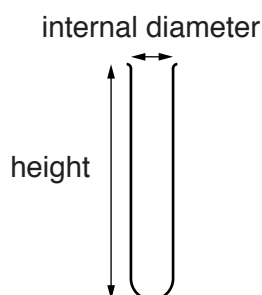
**H** = harmful or irritating substance

**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**

The **day** before the examination, put the pieces of onion tissue into each solution **S1**, **S2** and **S3** and **W**.

- 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 **S1**, **S2**, **S3** and **W** with onion tissue are needed for each candidate.
- Fresh reagents are needed to test for carbohydrates for each candidate.
- All solutions and reagents should be disposed of according to local safety regulations.

Summary of solutions and reagents:

labelled	contents	hazard
<b>S1</b>	10% sodium chloride solution	none
<b>S2</b>	15% sucrose solution with 1 g glucose	none
<b>S3</b>	0.5% starch solution	none
<b>W</b>	distilled water	none

Reagents to test for the carbohydrates:

- starch
- reducing sugars
- non-reducing sugars.

Summary of materials:

material	details	quantity
<b>onion tissue</b>	pieces of onion tissue should be pre-soaked the day before the examination in each of <b>S1</b> , <b>S2</b> , <b>S3</b> and <b>W</b>	1 in each of <b>S1</b> , <b>S2</b> , <b>S3</b> and <b>W</b> (more should be available if requested by candidates). Each piece must be covered by liquid

note: the volume of **S1**, **S2**, **S3** and **W** needs to be enough to cover the pieces of onion tissue in the container.

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

### Preparation of solutions and reagents:

Solutions and onion tissue must be prepared the day before and should be kept in covered containers in a refrigerator. However, they should be supplied to candidates at **room temperature** for the examination.

- (i) **S1**, 10% sodium chloride solution to cover one piece of onion, in a beaker or container, labelled **S1**.

This is prepared by dissolving 10g of sodium chloride in 80 cm<sup>3</sup> of distilled water and making up to 100 cm<sup>3</sup> with distilled water.

- (ii) **S2**, 15% sucrose and glucose solution to cover one piece of onion, in a beaker or container labelled **S2**.

This is prepared by dissolving 15g of sucrose in 80 cm<sup>3</sup> of distilled water and making up to 100 cm<sup>3</sup> with distilled water. Stir well to dissolve the sucrose then sprinkle 1 g of glucose into the 15% sucrose solution and stir well to dissolve the glucose.

You will need to prepare the following stock solution which will then be used to make **S3**:

#### 1% starch solution

This is prepared by putting 1 g of starch (soluble) into 25 cm<sup>3</sup> of warm distilled water in a beaker or container and mixing to a paste. Make up to 100 cm<sup>3</sup> with boiling distilled water, mix well and then allow to cool.

- (iii) **S3**, 0.5% starch solution to cover one piece of onion, in a beaker or container, labelled **S3**.

This is prepared by taking 50 cm<sup>3</sup> of the 1% stock solution and making it up to 100 cm<sup>3</sup> with distilled water.

- (iv) **W**, distilled water to cover one piece of onion in a beaker or container, labelled **W**.

- (v) **Reagents** which candidates would normally use to test for the following carbohydrates:

- starch
- reducing sugar
- non-reducing sugar – the acid provided must be labelled '**acid harmful**' and the alkali provided must be labelled '**alkali harmful**'.

The containers should be labelled with the contents and the relevant hazard warnings. The biological molecule being tested should **not** be on the label, for example the iodine solution for starch test should have only the word '**iodine**'. The hazard warning **must** be included on the label, either as the word e.g. "harmful" or as the pictogram/symbol.

The volumes supplied should be enough to carry out a minimum of 6 tests for each molecule. The containers should be supplied with the means to add reagents into the test-tubes.

These reagents should be **fresh** for each candidate.

## Preparation of pieces of onion:

- Candidates should **not** be given red onion. Onions with white flesh should be used, either with dry brown scales (yellow onion) or with dry white scales (white onion).
- The onions must be as fresh as possible to avoid the effects of storage.
- The pieces of onion must be prepared the day before and left in **S1**, **S2**, **S3** and **W** with the containers covered to prevent evaporation.

1. Cut off the top and bottom of the onion.
2. Remove the outer dry scales.
3. Cut the onion into pieces as in Fig. 1.1.

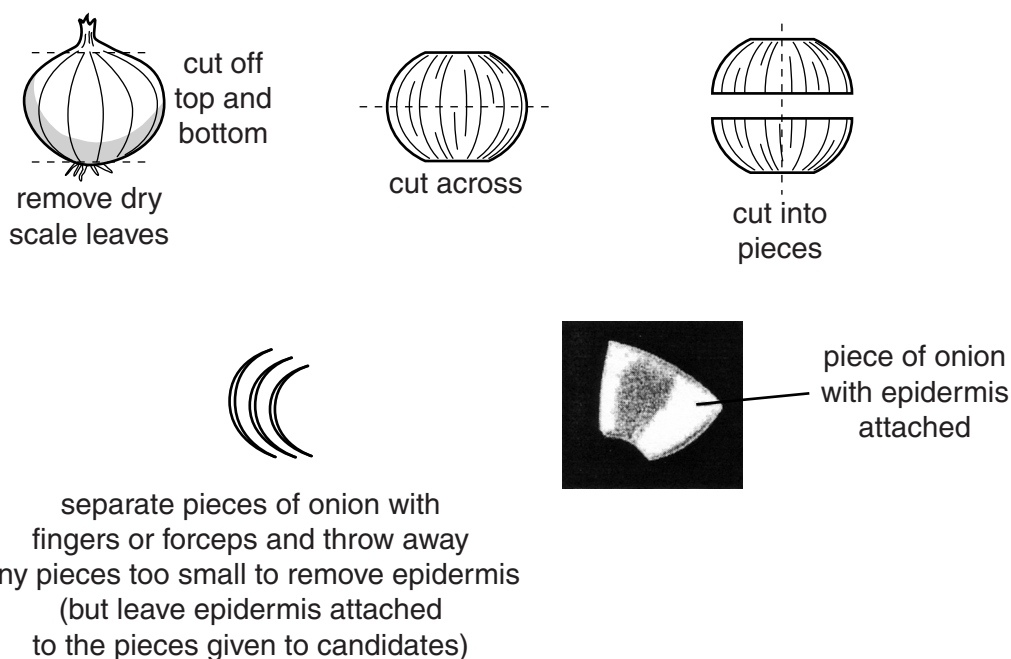


Fig. 1.1

4. Place the number of pieces of onion required for all the candidates with some spares into large containers with enough of each liquid (**S1** or **S2** or **S3** or **W**) to submerge the onion pieces. Cover the containers and keep in a refrigerator or cool place.

Before the examination, ensure that solutions containing the piece of onion for each candidate are at room temperature.

Apparatus for each candidate should be clean.

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

Apparatus for each candidate	Quantity	✓
2 cm <sup>3</sup> , 3 cm <sup>3</sup> or 5 cm <sup>3</sup> syringe with the means to wash it out	2	
Pipette, plastic or glass with teat	1	
Beaker or container (capacity at least 400 cm <sup>3</sup> ), containing approximately 300 cm <sup>3</sup> tap water for pouring into test-tubes, labelled <b>For washing</b>	2	
Container (capacity at least 400 cm <sup>3</sup> ), labelled <b>For waste</b>	2	
Paper towels	8	
Test-tube, suitable for heating, to hold a volume more than 15 cm <sup>3</sup> and less than 20 cm <sup>3</sup>	3	
Test-tube rack or container to hold three test-tubes	1	
Test-tube holder to handle hot test-tubes	1	
Water-bath equipment for <b>each</b> candidate Bunsen burner, tripod, gauze, bench mat, at least a 250 cm <sup>3</sup> clear beaker with water suitable for a water-bath (at a starting temperature between 45°C and 50°C), matches and a thermometer, –10°C to 110°C	1	
Forceps (blunt)	1	
Glass rod	1	
Scalpel or sharp blade	1	
Seeker or mounted needle	1	
Spotting tile or white tile	1	
Stopclock or timer showing seconds	1	
Glass marker pen	1	
Safety goggles/glasses	1	
Microscope slides and coverslips	4	
Microscope as described on page 2 For each candidate: <ul style="list-style-type: none"> <li>the microscope must be set up on low power</li> <li>no slides must be on the stage of the microscope.</li> </ul>	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(a)(iii)** and **1(b)(ii)**. 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

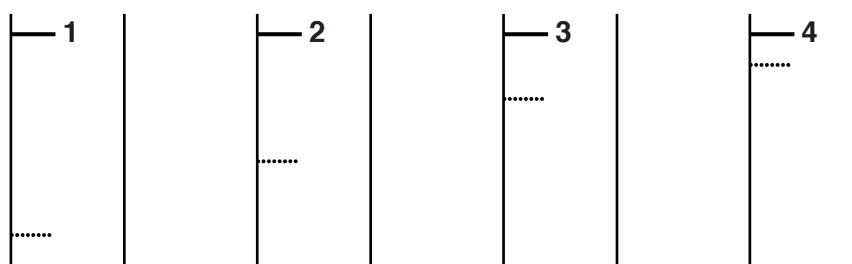
Apparatus for each candidate should be clean.

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

Apparatus for each candidate	Quantity	✓
5 cm <sup>3</sup> or 10 cm <sup>3</sup> syringe with the means to wash it out	1	
Beaker or container (capacity about 400 cm <sup>3</sup> ), containing about 300 cm <sup>3</sup> tap water for pouring into the specimen tubes	1	
Container(s), to hold about 400 cm <sup>3</sup> , labelled <b>For waste</b>	1	
Paper towels	8	
Specimen tubes, clear, no more than 50 cm <sup>3</sup> , labelled <b>1 or 2 or 3 or 4</b> (see Fig. 2.1)	4	

Preparation of specimen tubes:

For each candidate, set up the specimen tubes by adding short marker lines as shown in Fig. 2.1.



**Key:**

- line approximately 5 mm from top of tube
- ..... additional line

**Fig. 2.1**

1. Each tube must have a short line approximately 5 mm from the top of the tube.
2. Each tube has one additional line so that each line is at a different height on the tube in the pattern as shown.
3. The actual heights of the additional lines are not critical as long as the pattern is maintained as shown in Fig. 2.1
4. Label the tubes, **1, 2, 3** or **4** as shown.

During the examination, the Supervisor (**not** the Invigilator) should, **out of the sight of the candidates**, carry out **Question 2** using the same apparatus as the candidates, in order to obtain results for **2(a)(ii)**. 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 that 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 2**.

## **MATERIALS TO BE SUPPLIED BY CAMBRIDGE**

- (i) Question papers.

**note:** No slide is required

## **RETURN OF EXAMINATION MATERIALS TO CAMBRIDGE**

There is no material to return to Cambridge.

## **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 and Question 2** using the same solutions and reagents as the candidates. The results for **Questions 1(a)(iii), 1(b)(ii) and 2(a)(ii)** 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 and Question 2**.
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(a)(iii) and 1(b)(ii)**

Results for **Question 2(a)(ii)**

