Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY **9700/34**

Paper 3 Advanced Practical Skills 2 **May/June 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.

DC (ST/SG) 124658/3

CAMBRIDGE International Examinations

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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, ×10 (equal to 16 mm or $\frac{2}{3}''$)
- low-power objective lens, ×10 (equal to 16 mm or $\frac{2}{3}''$)
- high-power objective lens, ×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** ×10 or ×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

HH health hazard

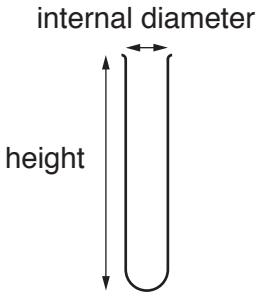
F flammable

N hazardous to the aquatic environment

MH moderate hazard

T acutely toxic

O oxidising



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

In advance of the examination:
At least a week before the examination, prepare the plant extract (**10M**) and carry out the test for its activity.
See Preparation of materials

For both Questions

Each candidate will require:

- ruler, marked in mm (note: for Question 2 this must be a clear plastic ruler)
- clean and dry apparatus, e.g. glassware and syringes (without a needle)
- solutions supplied in a suitable beaker, or container, for removal of the solutions 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 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.

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Question 1

Each candidate will require:

materials and apparatus for each candidate	quantity	✓
Plant extract solution in a beaker or container, labelled **10M**, provided at room temperature (see **Preparation of materials**)	at least 100 cm^3	
Distilled water in a beaker or container, labelled **W**, provided at room temperature	at least 100 cm^3	
50% plant extract solution in a beaker or container, labelled **U**, provided at room temperature (see **Preparation of materials**)	at least 40 cm^3	
[MH] 1 mol dm^{-3} sulfuric acid in a beaker or container, labelled **A**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
Potassium manganate(VII) solution in a beaker or container, labelled **K**, provided at room temperature (see **Preparation of materials**)	at least 20 cm^3	
10 cm^3 syringes, with the means to wash them out	2	
2 cm^3 or 3 cm^3 syringes, with the means to wash them out	2	
Beakers or containers, maximum capacity 100 cm^3	5	
Test-tubes – small, maximum capacity 15 cm^3	6	
Test-tube rack(s) to hold 6 small test-tubes	1	
White paper or card, approximately 10 cm × 10 cm	1	
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

(i) **10M**, plant extract

This is prepared from approximately 15 g of spinach. Tear the leaves into small pieces and put them into a beaker (approximate capacity 400 cm^3). Add boiling distilled water to half fill the beaker. Stir well and allow to cool.

Pour off the liquid into a beaker and test this extract.

Test:
Put 1 cm^3 of 1 mol dm^{-3} sulfuric acid (**A**) and 1 cm^3 of 0.01% potassium manganate(VII) solution (**K**) into a test-tube. Mix well. Add 1 cm^3 of **10M** and time how long it takes for the mixture to turn from pink to colourless.

The time taken should be between 8 and 15 seconds.

If it takes **less time than 8 seconds** then dilute the plant extract.

If it takes **longer than 15 seconds**, then increase the number of leaves used to make the plant extract.

10M can be prepared the day before the examination. It should be stored in a covered container in a refrigerator.

10M should be at room temperature for the examination.

*Please note the Question paper will state that **10M** is a 10% solution.*

(ii) **U**, 50% plant extract solution

This is prepared by putting 50 cm^3 of **10M** into a beaker and making up to 100 cm^3 with distilled water.

*Please note the Question paper will state that **U** is an unknown concentration.*

[MH] **(iii)** **A**, 1.0 mol dm^{-3} sulfuric acid

This is prepared from (98%) sulfuric acid, by adding 55 cm^3 of this sulfuric acid to 500 cm^3 of distilled water and making up to 1 dm^3 with distilled water.

This is an exothermic reaction, so **add the acid to the water**.

(iv) **K**, 0.01% potassium manganate(VII) solution

This is prepared by putting 1.0 g of potassium manganate(VII) into a beaker and making up to 100 cm^3 with distilled water. This makes a 1.0% solution.

Then put 1 cm^3 of this 1.0% solution into a beaker and make up to 100 cm^3 with distilled water. This makes the 0.01% potassium manganate(VII) solution.

This solution must be made up immediately before the start of the examination and kept out of direct sunlight.

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
- **no** slide must be left on the stage of the microscope.

(ii) Slide **N1**

On receipt of the slides, please check that they are labelled **N1** 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**.

SUPERVISOR'S REPORT

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 or other competent biologist (not the Invigilator), should follow the steps in **Question 1**, in order to obtain results for **1(a)(ii)** and **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 **N1**

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

May/June 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 other competent biologist) should follow the steps in **Question 1** in order to obtain results for **1(a)(ii)** and **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).

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Temperature of examination room ..... °C

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