UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

BIOLOGY **9700/31**

Advanced Practical Skills 1 **October/November 2013**

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.

8920116774

If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: 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.

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

DC (LEO/CGW) 57939/6
© UCLES 2013

UNIVERSITY of CAMBRIDGE
International Examinations

[Turn over

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, × 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, Cambridge request that only the lenses specified above are 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 sole, uninterrupted, use of the microscope for at least 55 minutes.

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

F = highly flammable substance

H = harmful or irritating substance

O = oxidising substance

T = toxic substance

N = harmful to environment

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, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

© UCLES 2013

Confidential Instructions

Each candidate will require:

For both Questions

- mm ruler.

Question 1

- Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solution using a syringe. More of the solutions, reagents and materials should be available if requested by candidates.
- Fresh beakers and syringes are needed for each candidate.
- Fresh **A**, **W** and **U** are needed for each candidate.
- All solutions and reagents should be disposed of according to local safety regulations.

Summary of solutions, reagents and materials:

labelled	contents	hazard	volume / cm^3
A	0.10% ascorbic acid	[H] harmful irritant	at least 100
W	distilled water	none	at least 100

labelled	contents	details	quantity
U	agar block containing DCPIP	at least 60 mm × 40 mm of a 5 mm depth, containing DCPIP	1

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

Preparation of solutions, reagents and materials:

[H] (i) **A**, at least 100 cm^3 of 0.10% ascorbic acid in a covered beaker or container, labelled **A**.

This is prepared by dissolving 0.5 g of ascorbic acid in 400 cm^3 of distilled water in a beaker and making up to 500 cm^3 with distilled water.

A should be prepared within two hours of the candidates starting **Question 1**.
A should be kept covered to prevent evaporation and out of direct sunlight to prevent decomposition.

This is sufficient for 5 candidates.

(ii) **W**, at least 100 cm^3 of distilled water in a beaker or container, labelled **W**.

This is sufficient for 1 candidate.

© UCLES 2013

(iii) **U**, one block of agar ('technical' or 'agar agar' **not** 'nutrient'), containing 0.1% DCPIP, on a white tile, labelled **U**, covered by a damp paper towel.

Please note that agar powder may cause an allergic reaction or other respiratory problem if inhaled.

The agar is prepared by:
- adding 10 g of agar to 100 cm^3 of distilled water and stirring to make a paste
- making up to 500 cm^3 with distilled water
- heating to a temperature of approximately 95 °C (do not boil)
- stirring and allowing to cool to approximately 60 °C
- pouring the agar to a depth of 5 mm into shallow, flat containers that are at least 1 cm in depth
- covering these containers so that the agar does not dry out by covering e.g. with a lid or wrapped in a plastic bag and keeping out of direct sunlight
- placing on a horizontal flat surface so that the agar sets to an even depth of 5 mm.

Allow the agar to set.

The 0.1% DCPIP is prepared by dissolving 0.5 g of DCPIP in 500 cm^3 of distilled water in a beaker or container.

Staining the agar with DCPIP
DCPIP will be used to colour a thin layer of the set agar as shown in Fig. 1.1.

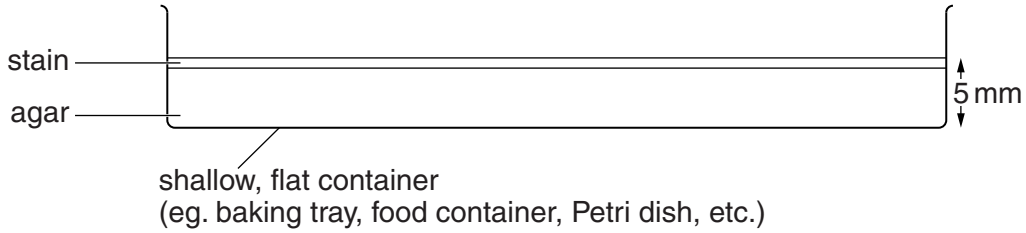


Fig. 1.1

So that the DCPIP does not colour all the set agar:
- within **one hour** of the start of **Question 1** for each group of candidates, flood the surface of the agar with 0. 1% DCPIP solution
- leave for a few minutes to allow the DCPIP to stain a thin layer of agar. The depth of the stained layer is not critical but should be up to a quarter of the depth of agar. This should take no more than 5 minutes. Candidates will not be disadvantaged by variations in the staining.
- pour off the DCPIP solution
- wash off the excess with distilled water
- cut the agar into blocks measuring at least 60 mm × 40 mm × 5 mm
- cover the agar blocks with damp paper towels.

Cut enough blocks so that each candidate has 1 block of at least 60 mm × 40 mm × 5 mm, on a white tile, labelled **U**. Keep the agar blocks covered with damp paper towels.

Extra agar blocks should be prepared in case additional agar blocks are requested by candidates.

© UCLES 2013

Apparatus for each group of candidates should be clean.

Apparatus for each candidate	Quantity	✓
10 cm^3 syringe with the means to wash it out (note: needles are **not** required and should **not** be given to candidates)	2	
Container with tap water, labelled **For washing**	1	
Container, labelled **For waste**	1	
Paper towels	8	
Beakers or containers to hold 20 cm^3 volume (these must be transparent)	5	
Sharp scalpel or blade	1	
Blunt forceps	1	
White tile	1	
Stop-clock or stopwatch with a **second hand**. If sight of a clock with second hand is the only means of timing available to candidates, please report this as part of the Supervisor's Report.	1	
Glass rod	1	
Glass marker pen	1	
Safety goggles/glasses	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, reagents and materials as the candidates. 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.

© UCLES 2013

Question 2

(i) Slide **J1** (supplied by Cambridge).

(ii) Microscope with:

- 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 lens, ×10 (equal to 16 mm or $\frac{2}{3}''$)
- 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** ×10 or ×40 should be removed or replaced.

On receipt of the slides, please check that they are labelled **J1** and that all the slides are intact. The identity of material on the slides is **confidential** and must **not** be disclosed to candidates.

Each candidate must have sole, uninterrupted use of the microscope for 55 minutes.

The number of slides supplied by Cambridge will be equal to half the candidate entry.
Therefore, half the candidates should start on **Question 1** and the other half should start on **Question 2**.

MATERIALS TO BE SUPPLIED BY CAMBRIDGE

(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. They 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.

REPORT FORM and SEATING PLAN

The teacher responsible for the examination is asked to fill in the Report Form in these Confidential Instructions. For Centres where more than one script packet is used, there must be a copy of the completed Report Form and the candidates' seating plan in each script packet.

These report forms are vital in order to allow the examiners to assess all candidates as fairly as possible and should always be completed by every Centre.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

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

REPORT ON PRACTICAL BIOLOGY

A Level

October/November Session 2013

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. These results 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**.

© UCLES 2013

[Turn over

*Results for question **1***.

Temperature of examination room ..... °C

4. Enclose a 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 fully 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**.

© UCLES 2013

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

BIOLOGY **9700/33**

Advanced Practical Skills 1 **October/November 2013**

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.

0217856520

If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: 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.

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

© UCLES 2013

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, × 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, Cambridge request that only the lenses specified above are 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 sole, uninterrupted, use of the microscope for at least 55 minutes.

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

F = highly flammable substance

H = harmful or irritating substance

O = oxidising substance

T = toxic substance

N = harmful to environment

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, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

© UCLES 2013

Confidential Instructions

Each candidate will require:

For both Questions

- mm ruler.

Question 1

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

Summary of solutions and reagents:

labelled	contents	hazard	volume /cm^3
M	milk	none	at least 100
W	distilled water	none	at least 100
A	0.3% sodium carbonate solution	[H] irritant	at least 100
P	0.1% phenolphthalein solution	[F] flammable	at least 10
E	5% lipase solution	[H] irritant	at least 20

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

Preparation of solutions and reagents:

(i) **M**, at least 100 cm^3 of whole milk (full fat/no fat removed, e.g. cow or goat milk) in a beaker or container, labelled **M**.

This is sufficient for 1 candidate.

(ii) **W**, at least 100 cm^3 of distilled water in a beaker or container, labelled **W**.

This is sufficient for 1 candidate.

[H] (iii) **A**, at least 100 cm^3 of 0.3% sodium carbonate solution in a beaker or container, labelled **A**.

This is prepared by dissolving 0.3 g of anhydrous sodium carbonate in 80 cm^3 of distilled water in a beaker and stirring to dissolve. Make up to 100 cm^3 with distilled water.

This is sufficient for 1 candidate.

[F] (iv) **P**, at least 10 cm^3 of 0.1% phenolphthalein solution in a beaker or container, labelled **P**.

The phenolphthalein solution from a supplier should be diluted to make a 0.1% solution.

This is sufficient for 1 candidate.

© UCLES 2013

[H] (v) **E**, at least 20 cm^3 of 5% Lipase (Lipex) solution (supplied by Cambridge) in a beaker or container, labelled **E**.

This is prepared by putting 5 cm^3 of the Lipase enzyme solution into 70 cm^3 of distilled water in a beaker while stirring. Make up to 100 cm^3 with distilled water.

This must be prepared within **one hour** of the start of **Question 1** and be at room temperature for use by the candidates.

This is sufficient for 5 candidates.

Test the suitability of the milk and the activity of the enzyme supplied by Cambridge:

You need to test this as follows:

- dilute the milk by half with distilled water
- warm 20 cm^3 of the diluted milk to 45 °C
- add 20 cm^3 of **A** to the milk
- take 3 cm^3 of the mixture of the milk and **A**
- add 5 drops of **P**
- add 2 cm^3 of 5% Lipase
- time how long it takes for the pink colour to disappear.

This time needs to be at least 60 seconds.
If this time is less than 60 seconds dilute the milk accordingly or try an alternative source of milk.
If the pink colour does not go within 5 minutes, first try milk with a higher fat content. If this continues to be a problem contact CIE to ask for assistance.

Apparatus for each group of candidates should be clean.

Apparatus for each candidate	Quantity	✓
10 cm^3 syringe with the means to wash it out (note: needles are **not** required and should **not** be given to candidates)	3	
Pipette-plastic or teat	1	
Container with tap water, labelled **For washing**	1	
Container, labelled **For waste**	2	
Paper towels	8	
Beakers or containers to hold 50 cm^3 volume	4	
Test-tubes – to hold up to 25 cm^3 volume of solution	5	
Test-tube rack or container to hold 5 test-tubes	1	
Water-bath beakers: Please see below for full instructions about the three beakers/containers which **must be** supplied for each candidate	3	
Thermometer –10 °C to 110 °C	1	
A stop-clock or stopwatch with a **second hand**. If sight of a clock with second hand is the only means of timing available to candidates, please report this as part of the Supervisor's Report.	1	
Glass rod	1	
Glass marker pen	1	
Safety goggles/glasses	1	

© UCLES 2013

Instructions for the water-bath beakers/containers:

- One empty 400 cm^3 **clear** beaker or **clear** container labelled, **for water-bath**
- One 400 cm^3 beaker or container containing cold water labelled, **cold water for water-bath**
- One 400 cm^3 beaker or container containing water between 60 °C and 65 °C labelled, **hot water for water-bath**
- The Supervisor should have a supply of cold water and hot water between 60 °C and 65 °C to supply more cold and hot water during the examination
- Candidates should not leave their work station to collect water for their water-baths.

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. 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.

Question 2

(i) Slide **K1** (supplied by Cambridge).
(ii) Microscope with:
- 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 lens, ×10 (equal to 16 mm or $\frac{2}{3}$")
- 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** ×10 or ×40, should be removed or replaced.

On receipt of the slides, please check that they are labelled **K1** and that all the slides are intact. The identity of material on the slides is **confidential** and must **not** be disclosed to candidates.

Each candidate must have sole, uninterrupted use of the microscope for 55 minutes.

The number of slides supplied by Cambridge will be equal to half the candidate entry. Therefore, half the candidates should start on **Question 1** and the other half should start on **Question 2**.

MATERIALS TO BE SUPPLIED BY CAMBRIDGE

(i) Question papers.

(ii) Enzyme Lipase (Lipex) – refrigerate on receipt.

(iii) Slide **K1**.

© UCLES 2013

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. They 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.

REPORT FORM and SEATING PLAN

The teacher responsible for the examination is asked to fill in the Report Form in these Confidential Instructions. For Centres where more than one script packet is used, there must be a copy of the completed Report Form and the candidates' seating plan in each script packet.

These Report Forms are vital in order to allow the examiners to assess all candidates as fairly as possible and should always be completed by every Centre.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

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

REPORT ON PRACTICAL BIOLOGY

A Level

October/November Session 2013

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 sight of the candidates**, carry out **Question 1**, using the same solutions and reagents as the candidates. These results 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**.

© UCLES 2013

[Turn over

*Results of **Question 1**:*

Temperature of examination room ..... °C

4. Enclose a plan of work benches with the scripts, giving details of the candidate numbers of the places occupied by the candidates for each session. Separate paper can be used 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 fully 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**.

© UCLES 2013

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

BIOLOGY **9700/34**

Advanced Practical Skills 2 **October/November 2013**

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.

3046167019

If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: 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.

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

© UCLES 2013

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, ×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, Cambridge request that only the lenses specified above are 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 sole, uninterrupted, use of the microscope for at least 55 minutes.

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

F = highly flammable substance

H = harmful or irritating substance

O = oxidising substance

T = toxic substance

N = harmful to environment

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, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

© UCLES 2013

Confidential Instructions

Each candidate will require:

For both Questions

- mm ruler.

Question 1

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

Summary of solutions, reagents and materials:

Solutions:

labelled	contents	hazard	volume / cm^3
P	fruit juice	none	at least 15
W	distilled water	none	at least 100

Fresh reagents to test for:
- starch
- reducing sugars
- non-reducing sugars
- protein.

Materials:

labelled	contents	details
V	Visking tubing (or local equivalent) Put in a small beaker or container and covered with distilled water.	At least 15 cm length with an open diameter which allows a syringe to release liquid into the tubing.

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

Preparation of solutions and reagents:

(i) **P**, at least 15 cm^3 of concentrated fruit juice, in a beaker or container, labelled **P**.

This can be purchased as the concentrate and should contain at least 9% to 10% sugars. Examples of suitable fruit juices are apple, pineapple or orange.

This is sufficient for 1 candidate.

Alternatively, put 10 g of glucose into a beaker or container and make up to 100 cm^3 with fruit juice.

This is sufficient for 6 candidates.

(ii) **Fresh reagents** which candidates would normally use to test for the biological molecules:
- starch
- reducing sugar
- non-reducing sugar
- protein.

The volumes supplied should be enough to carry out a minimum of 6 tests for each molecule.
The containers should be labelled appropriately with the contents and with the means to add the reagents into large test-tubes. The container should be labelled only with the reagent, for example '**Iodine**'.
The biological molecule being tested must **not** be on the label, for example **not** 'Iodine for starch test'.
These reagents should be **fresh** for each candidate.

Apparatus for each group of candidates should be clean.

Apparatus for each candidate	Quantity	✓
Clear beaker or container to hold up to 100 cm^3 as shown in Fig. 1.1	1	
Paper clip – to hold the end of the Visking tubing over the rim of a beaker as shown in Fig. 1.1	1	
10 cm^3 syringe with the means to wash it out (note: needles are **not** required and should **not** be given to candidates)	2	
5 cm^3 or 10 cm^3 syringe with the means to wash it out (note: needles are **not** required and should **not** be given to candidates)	1	
Container to hold up to 10 cm^3 so that a syringe can be used to remove liquids e.g. specimen tubes or beakers or clean plastic cups	4	
Glass rod	1	
Container with tap water, labelled **For washing**	1	
Container, labelled **For waste**	1	
Paper towels	8	
Test-tubes – to hold up to 20 cm^3	8	
Test-tubes – large and suitable for heating to hold up to 40 cm^3 volume of solution	4	
Spotting tile or white tile	1	
Test-tube rack or container to hold 8 test-tubes	1	
Test-tube holder to hold hot test-tubes	1	
Water-bath equipment for each candidate: Bunsen burner, tripod, gauze, bench mat, at least a 250 cm^3 clear beaker with warm water, to start between 45 °C and 50 °C, matches and a thermometer –10 °C to 110 °C	1	
Stop-clock or stopwatch with a **second hand**. If sight of a clock with second hand is the only means of timing available to candidates, please report this as part of the Supervisor's Report.	1	
Glass marker pen	1	
Safety goggles/glasses	1	

© UCLES 2013

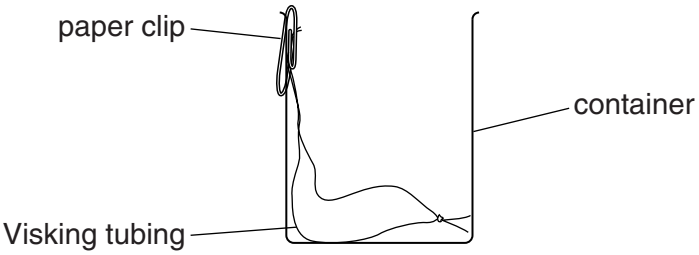


Fig. 1.1

During the examination, the Supervisor (**not** the Invigilator) should, **out of the sight of the candidates**, carry out **Question 1** using the same solutions, reagents and materials as the candidates. 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 is enclosed with each packet of scripts.

Question 2

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

(ii) Microscope with:
- 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 lens, ×10 (equal to 16 mm or $\frac{2}{3}$")
- 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** ×10 or ×40 should be removed or replaced.

On receipt of the slides, please check that they are labelled **M1** and that all the slides are intact. The identity of material on the slides is **confidential** and must **not** be disclosed to candidates.

Each candidate must have sole, uninterrupted use of the microscope for 55 minutes.

The number of slides supplied by Cambridge will be equal to half the candidate entry. Therefore, half the candidates should start on **Question 1** and the other half should start on **Question 2**.

MATERIALS TO BE SUPPLIED BY CAMBRIDGE

(i) Question papers.

(ii) Slide **M1**.

© UCLES 2013

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. They 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.

REPORT FORM and SEATING PLAN

The teacher responsible for the examination is asked to fill in the Report Form in these Confidential Instructions. For Centres where more than one script packet is used, there must be a copy of the completed Report Form and the candidates' seating plan in each script packet.

These Report Forms are vital in order to allow the examiners to assess all candidates as fairly as possible and should always be completed by every Centre.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

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

REPORT ON PRACTICAL BIOLOGY

A Level

October/November Session 2013

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 sight of the candidates**, carry out **Question 1** using the same solutions and reagents as the candidates. These results 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**.

© UCLES 2013

[Turn over

Please complete the table to show the names of reagents supplied to candidates and whether Visking tubing or an alternative has been supplied.

Reagent(s) supplied						
Visking tubing	Or local equivalent					

Results for Question 1:

Temperature of examination room ..... °C

4. Enclose a 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 fully 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**.

© UCLES 2013

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

BIOLOGY **9700/35**

Advanced Practical Skills 1 **October/November 2013**

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.

4533130055

If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: 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.

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

© UCLES 2013

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, × 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, Cambridge request that only the lenses specified above are 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 sole, uninterrupted, use of the microscope for at least 55 minutes.

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

F = highly flammable substance

H = harmful or irritating substance

O = oxidising substance

T = toxic substance

N = harmful to environment

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, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

© UCLES 2013

Confidential Instructions

On receipt of these instructions please note that:

The mung beans for the plant extract must be soaked for **at least 24 hours** and tested for activity of enzymes, see below. The plant extract may be prepared at any time before the examination and then frozen, although it must be at room temperature for the examination.

Each candidate will require:

For both Questions

- mm ruler.

Question 1

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

Summary of solutions and reagents:

labelled	contents	hazard	volume / cm^3
P	plant extract solution	none	at least 15
H	6% (20 vol) hydrogen peroxide solution	[H] harmful irritant	at least 50
W	distilled water	none	at least 100
D	liquid detergent	none	at least 15

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

Preparation of solutions and reagents:

(i) **P**, at least 15 cm^3 of plant extract solution, in a beaker or container, labelled **P**.
This is sufficient for 3 candidates.

The plant extract solution can be prepared using 15 g of dried mung bean seeds (these should not have been stored for more than six months). The seeds should be placed in a beaker or container with 100 cm^3 distilled water and kept covered.
Leave the seeds to soak for at least 24 hours.

The seeds need to be ground up to release the enzymes. To do this, put the seeds and water into a pestle and mortar and grind well.
For larger quantities, put the seeds and water into a liquidiser/blender/food processor on full power for 30 to 60 seconds.
Strain the mixture through a fine sieve and retain the liquid plant extract. When the extract is left in a container, then further sediment will sink to the bottom and the plant extract solution for the candidates can be poured off into a separate container.
This should produce approximately 50 cm^3 of plant extract solution.

© UCLES 2013

To test the suitability of your mung beans:

You need to test the activity of the plant extract by:
- putting 5 cm^3 of 6% (20 vol) hydrogen peroxide solution with a few drops of liquid detergent in a test-tube (which would hold at least 25 cm^3)
- stirring and then adding 1 cm^3 of the plant extract solution and stirring again.

The mixture should fizz and foam should rise up the test-tube.
If the foam rises and flows over the top of the test-tube within three minutes, then dilute the plant extract so that the foam rises up the test-tube but does not overflow.
If the foam does not rise at least 50 mm above the mixture then the plant extract solution needs to be adjusted by either using more mung beans or soaking a new batch of mung beans.

The plant extract may be prepared at any time before the examination and then frozen. The mixture must be at **room** temperature for the examination.

[H] **(ii)** **H**, at least 30 cm^3 of 6% (20 vol) hydrogen peroxide solution in a covered beaker or container, labelled **H**.

Alternatively, the concentration provided by your supplier may need to be diluted to 6% (20 vol).

H must be put out within an hour of the candidates starting **Question 1**.
H should be kept covered to prevent evaporation and out of direct sunlight to prevent decomposition.

This is sufficient for 1 candidate.

(iii) **W**, at least 100 cm^3 of distilled water in a beaker or container, labelled **W**.

This is sufficient for 1 candidate.

(iv) **D**, at least 15 cm^3 of liquid detergent in a beaker or container, labelled **D**.
This should be of a type which is used for hand washing apparatus and **not** that used in a dishwasher. Using a pipette it should be easy to release the detergent as separate drops.

This is sufficient for 1 candidate.

© UCLES 2013

Apparatus for each group of candidates should be clean.

Apparatus for each candidate	Quantity	✓
10 cm^3 syringe with the means to wash it out (note: needles are **not** required and should **not** be given to candidates)	2	
2 cm^3 or 3 cm^3 or 5 cm^3 syringe with the means to wash it out (note: needles are **not** required and should **not** be given to candidates)	1	
Glass rod	1	
Container with tap water, (about 200 cm^3) labelled **For washing**	1	
Container, labelled **For waste**	1	
Pipette, plastic or with teat (to remove **D** from container)	1	
Paper towels	8	
Graph paper scale at least 2 cm wide and at least 2 cm longer than the test-tube provided (this may be prepared by sticking an A4 sheet of 2 mm grid graph paper onto a piece of card. The strip should be cut approximately 1 mm each side of the thicker vertical lines showing the 2 cm width and can be provided the length of the A4 sheet).	1	
Test-tubes – at least 140 mm long and with an internal diameter between 11 mm and 14 mm	4	
Beakers or containers to hold at least 50 cm^3	3	
Test-tube rack or container to hold four test-tubes	1	
Scissors	1	
Stop-clock or stopwatch with a **second hand**. If sight of a clock with second hand is the only means of timing available to candidates, please report this as part of the Supervisor's Report.	1	
Glass marker pen	1	
Safety goggles/glasses	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. 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.

© UCLES 2013

Question 2

(i) Slide **L1** (supplied by Cambridge).

(ii) Microscope with:

- 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 lens, ×10 (equal to 16 mm or $\frac{2}{3}''$)
- 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** ×10 or ×40 should be removed or replaced.

On receipt of the slides, please check that they are labelled **L1** and that all the slides are intact. The identity of material on the slides is **confidential** and must **not** be disclosed to candidates.

Each candidate must have sole, uninterrupted use of the microscope for 55 minutes.

The number of slides supplied by Cambridge will be equal to half the candidate entry.
Therefore, half the candidates should start on **Question 1** and the other half should start on **Question 2**.

MATERIALS TO BE SUPPLIED BY CAMBRIDGE

(i) Question papers.

(ii) 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. They 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.

REPORT FORM and SEATING PLAN

The teacher responsible for the examination is asked to fill in the Report Form in these Confidential Instructions. For Centres where more than one script packet is used, there must be a copy of the completed Report Form and the candidates' seating plan in each script packet.

These report forms are vital in order to allow the examiners to assess all candidates as fairly as possible and should always be completed by every Centre.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

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

REPORT ON PRACTICAL BIOLOGY

A Level

October/November Session 2013

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. These results 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**.

© UCLES 2013

*Results for question **1***.

Temperature of examination room ..... °C

4. Enclose a 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 fully 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**.

© UCLES 2013

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

BIOLOGY **9700/36**

Advanced Practical Skills 2 **October/November 2013**

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.

2127638562

If you have any problems or queries regarding these Instructions, please contact CIE
by e-mail: 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.

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

© UCLES 2013

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, × 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, Cambridge request that only the lenses specified above are 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 sole, uninterrupted, use of the microscope for at least 55 minutes.

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

F = highly flammable substance

H = harmful or irritating substance

O = oxidising substance

T = toxic substance

N = harmful to environment

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, by **fax** to +44 1223 553558 or by **phone** to +44 1223 553554.

© UCLES 2013

Confidential Instructions

Each candidate will require:

For both Questions

- mm ruler.

Question 1

- Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solution using a syringe. More of the solutions and reagents should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **E1**, **E2**, **S**, **G**, **W** and **Benedict's solution** are needed for each candidate.
- All solutions and reagents should be disposed of according to local safety regulations.

Summary of solutions and reagents:

labelled	contents	hazard	volume / cm^3
E1	1.0% fungal amylase	[H] harmful irritant	at least 20
E2	0.1% fungal amylase	[H] harmful irritant	at least 20
S	1.0% starch solution	none	at least 50
G	0.4% glucose solution	none	at least 20
W	distilled water	none	at least 100
Benedict's	Benedict's solution	[H] harmful irritant	at least 50

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

Preparation of solutions and reagents:

[H] (i) **E1**, at least 20 cm^3 of 1% fungal amylase solution in a beaker or container, labelled **E1**.

This is prepared by putting 1 cm^3 of amylase enzyme (supplied by Cambridge) into a beaker or container and making up to 100 cm^3 with distilled water and mixing well.
This is sufficient for 5 candidates,

[H] (ii) **E2** at least 20 cm^3 of 0.1% fungal amylase solution in a beaker or container, labelled **E2**.

This is prepared by putting 10 cm^3 of 1% amylase enzyme (from **(i)**) into a beaker or container and making up to 100 cm^3 with distilled water and mixing well.
This is sufficient for 5 candidates,

Test the activity of the enzyme by putting drops of iodine solution onto a spotting tile and adding drops of **E1** mixed with **S** at intervals. The colour should stay yellow-brown within 5 minutes.

© UCLES 2013

(iii) **S**, at least 50 cm ^{3} of 1% starch solution in a beaker or container, labelled **S**.

This is prepared by putting 1 g of starch into 25 cm^3 of warm distilled water in a beaker or container and mixing to a paste. Make up to 100 cm^3 by adding boiling distilled water, mix well and then allow to cool.

This is sufficient for 2 candidates.

(iv) **G**, at least 50 cm^3 of 0.4% glucose solution in a beaker or container, labelled **G**.

This is prepared by sprinkling 0.4 g of anhydrous glucose onto the surface of 80 cm^3 of distilled water, stirring continuously as you sprinkle. Make up to 100 cm^3 with distilled water.

This is sufficient for 2 candidates.

(v) **W**, at least 100 cm^3 of distilled water in a beaker or container, labelled **W**.

[H] **(vi)** **Fresh Benedict's solution**, at least 50 cm^3 in a beaker or container, labelled **Benedict's**.

This must be **qualitative Benedict's solution** as provided by your supplier or made up by the technician. Please note it is important to use hydrated copper sulfate crystals copper(II) sulfate(VI)-5-water when making up the Benedict's solution.

Apparatus for each group of candidates should be clean.

Apparatus for each candidate	Quantity	✓
10 cm^3 syringe with the means to wash it out (note: needles are **not** required and should **not** be given to candidates)	1	
5 cm^3 syringes, one to be only used for **S** and one to be only used for **G** (note: needles are **not** required and should **not** be given to candidates)	2	
Container with tap water, labelled **For washing**	1	
Container, labelled **For waste**	1	
Paper towels	8	
Beakers or containers to hold 20 cm^3 volume	6	
Test-tubes – large, to hold up to 20 cm^3 volume of solution	6	
Test-tube rack or container to hold 6 test-tubes	1	
Test-tube holder to hold hot test-tube	1	
white card or paper – approximately 10 cm by 10 cm	1	
Water-bath equipment for each candidate: Bunsen burner, tripod, gauze, bench mat, at least 250 cm^3 clear beaker with warm water, to start between 45 °C and 50 °C, matches and a thermometer –10 °C to 110 °C	1	
A stop-clock or a stopwatch with a **second hand**. If sight of a clock with second hand is the only means of timing available to candidates, please report this as part of the Supervisor's Report.	1	
Glass rod	1	
Glass marker pen	1	
Safety goggles/glasses	1	

© UCLES 2013

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. 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.

Question 2

(i) Slide **N1** (supplied by Cambridge).

(ii) Microscope with:
- 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 lens, ×10 (equal to 16 mm or $\frac{2}{3}$")
- 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** ×10 or ×40, should be removed or replaced.

On receipt of the slides, please check that they are labelled **N1** and that all the slides are intact. The identity of material on the slides is **confidential** and must **not** be disclosed to candidates.

Each candidate must have sole, uninterrupted use of the microscope for 55 minutes.

The number of slides supplied by Cambridge will be equal to half the candidate entry. Therefore, half the candidates should start on **Question 1** and the other half should start on **Question 2**.

MATERIALS TO BE SUPPLIED BY CAMBRIDGE

(i) Question papers.

(ii) Enzyme fungal amylase – refrigerate on receipt.

(iii) Slide **N1**.

© UCLES 2013

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. They 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.

REPORT FORM and SEATING PLAN

The teacher responsible for the examination is asked to fill in the Report Form in these Confidential Instructions. For Centres where more than one script packet is used, there must be a copy of the completed Report Form and the candidates' seating plan in each script packet.

These Report Forms are vital in order to allow the examiners to assess all candidates as fairly as possible and should always be completed by every Centre.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

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

REPORT ON PRACTICAL BIOLOGY

A Level

October/November Session 2013

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, eg 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. These results should be written in the Supervisor's Report (**not** on a spare Question paper), 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**.

© UCLES 2013

*Results of Question **1***

Temperature of examination room .....°C

4. Enclose a plan of work benches with the scripts, giving details of the candidate numbers of the places occupied by the candidates for each session. Separate paper can be used 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 fully 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**.

© UCLES 2013