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

BIOLOGY **9700/31**

Advanced Practical Skills 1 **May/June 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.

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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.

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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.**

Centres are reminded that candidates are expected to follow the instructions on the question paper and record all their results. They will not be penalised if these results are not what they expect.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

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.

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

To avoid confusion, CIE request that only the lenses specified above are fitted in the microscopes used in the examination. Any lenses which are **not** × 10 or × 40 should be removed or replaced.

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

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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 should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh solutions of **S1**, **S2**, **S3**, **S4** and **S5** 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
S1	distilled water	none	at least 25
S2	10% sucrose solution	none	at least 25
S3	1% protein solution	none	at least 25
S4	1% starch solution	none	at least 25
S5	1% glucose solution	none	at least 25

Reagents to test for:

- starch
- reducing sugar
- non-reducing sugar
- protein.

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

Preparation of solutions and reagents:

(i) **S1**, at least 25 cm^3 of distilled water in a small beaker or container (so that a syringe can be used), labelled **S1**.

This is sufficient for 1 candidate.

(ii) **S2**, at least 25 cm^3 of 10% sucrose solution in a beaker or container, labelled **S2**.

This is prepared by dissolving 10 g of sucrose in 80 cm^3 of distilled water in a beaker or container. Make up to 100 cm^3 with distilled water.

This is sufficient for 4 candidates.

Before the examination the test for reducing sugar should give a negative result.
Analar sucrose should be used if available. Some types of granulated (table) sugar may also be suitable.

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(iii) **S3**, at least 25 cm^3 of 1% egg albumen protein in a beaker or container, labelled **S3**.

This is prepared by dissolving 1 g of egg albumen protein in 80 cm^3 of distilled water in a beaker or container and mixing to a paste. Make up to 100 cm^3 with distilled water.

This is sufficient for 4 candidates.

(iv) **S4**, at least 25 cm^3 of 1% starch solution, in a beaker or container, labelled **S4**.

This is prepared by putting 1 g of starch into 5 cm^3 of warm distilled water, in a beaker or container and mixing to a paste. Make up to 100 cm^3 with hot distilled water, mix well and allow to cool.

It may be necessary to heat the starch suspension to dissolve the starch.

This is sufficient for 4 candidates.

(v) **S5**, at least 25 cm^3 of 1% glucose solution, in a beaker or container, labelled **S5**.

This is prepared by sprinkling 1 g of anhydrous glucose onto the surface of 80 cm^3 of distilled water stirring continuously while you sprinkle until dissolved. Make up to 100 cm^3 with distilled water.

This is sufficient for 4 candidates.

(vi) **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 at least 6 tests for each molecule.
The containers should be labelled appropriately with the contents and appropriate hazard warnings. The containers should be supplied with the means to add the reagents into large test-tubes.
The biological molecule being tested should **not** be on the label, for example 'Iodine solution for starch test' should have only the word '**Iodine**'.
These reagents should be **fresh** for each candidate.

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Apparatus for each candidate:

Syringes, pipettes, water in container '**for washing**', beakers and test-tubes should be clean.

Apparatus	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	
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)	2	
Pipettes, teat	2	
Container (at least 400 cm^3) with tap water, labelled **For washing**	1	
Container (at least 400 cm^3), labelled **For waste**	1	
Paper towels	8	
Beakers or containers to hold 20 cm^3 volume	3	
Test-tubes – large and suitable for heating to hold up to 40 cm^3 volume of solution	5	
Spotting tile or white tile	1	
Test-tube rack or container to hold 5 large test-tubes	1	
Test-tube holder to hold hot test-tubes	1	
Water-bath equipment (for each candidate for Question 1) Bunsen burner, tripod, gauze, bench mat, at least a 400 cm^3 clear beaker with warm water, 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 a 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 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 table** provided in the Supervisor's Report and **not** on a spare question paper. The Supervisor's Report should be enclosed with the candidates' scripts with the seating plan for the examination room. Please ensure that if the scripts are in several packets that a copy of the Supervisor's Report and seating plan is enclosed with each packet of scripts.
The Invigilator should **not** carry out **Question 1**.

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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.

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 of 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. They 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

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 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.

A copy of the seating plan for the examination room must also be enclosed in each script packet.

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

REPORT ON PRACTICAL BIOLOGY

A Level

May/June 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. Please ensure that, if the scripts are in several packets, a copy of the Supervisor's Report is enclosed with each packet of scripts. The invigilator should **not** carry out **Question 1**.

Temperature of examination room ..... °C

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(a) *Results of Question 1:*

Reagent(s) used					
Solution	Observation of colour				
S1					
S2					
S3					
S4					
S5					

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 on a separate piece of paper.

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**.

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

BIOLOGY **9700/32**

Advanced Practical Skills 2 **May/June 2013**

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Instructions for preparing apparatus

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Centres are reminded that candidates are expected to follow the instructions on the question paper and record all their results. They will not be penalised if these results are not what they expect.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

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:

- Eye piece 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.

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

To avoid confusion, CIE request that only the lenses specified above are fitted in the microscopes used in the examination. Any lenses which are **not** ×10 or ×40 should be removed or replaced.

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.

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F = highly flammable substance

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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 should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **Y** and **H** 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
Y	3% yeast cell suspension	none	at least 20
H	3% hydrogen peroxide solution	[H] harmful irritant	at least 20

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

Preparation of solutions and reagents:

(i) **Y**, at least 20 cm^3 of 3% yeast suspension, in a beaker or container, labelled **Y**.

This must be prepared within an hour of the candidates starting **Question 1**.

This is prepared by putting 3 g of dried yeast (Baker's) into 40 cm^3 of warm (35 °C to 45 °C) distilled water. Stir and make up to 100 cm^3 with warm distilled water. The yeast suspension needs to be mixed well before putting into the beakers for the candidates. **Note**: the yeast does not need to be active.

This is sufficient for 5 candidates.

[H] (ii) **H**, at least 20 cm^3 of 3% (10 vols) hydrogen peroxide solution in a beaker or container, labelled **H**.

Alternatively, the concentration provided by your supplier may need to be diluted to 3%.

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

This is sufficient for 5 candidates.

Delivery tube: so that the

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

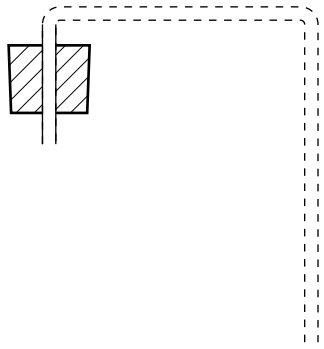


Fig. 1.1

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Apparatus for each candidate

Syringes, pipettes, water in container '**for washing**', beakers and test-tubes should be clean.

Apparatus	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	
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)	2	
Glass rod	1	
Container with tap water, (about 200 cm^3) labelled **For washing**	1	
Container, labelled **For waste**	1	
Clear container to hold test-tube	1	
Paper towels	8	
Test-tube – small – to hold at least 20 cm^3 volume of solution	1	
Test-tube – large, with a bung and delivery tube that must be airtight, without using too much force, so that the bung fits into the large test-tube to a depth of at least 0.5 cm. The length of the delivery tube must be longer than half the length of the test-tube (small). See Fig. 1.1 for guidance.	1	
Test-tube rack or container to hold large test-tube	1	
Water-bath equipment • empty large beaker (to hold the container **Y,** so that container **Y** cannot tip over), labelled **W** • thermometer –10 °C to 110 °C • separate beaker or container with tap water (at least three-quarters the volume of the large beaker) between 45 °C and 55 °C, labelled **Hot** • separate beaker or container with tap water (at least three-quarters the volume of the large beaker) between 25 °C and 30 °C, labelled **Cold**. Candidates may ask for further supplies of Hot and Cold water.	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 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 and **not** on a spare question paper.
The Supervisor's Report should be enclosed with the candidates' scripts with a seating plan for the examination room.
Please ensure that if the scripts are in several packets that a copy of the Supervisor's Report is enclosed with each packet of scripts.
The Invigilator should **not** carry out **Question 1**.

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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.

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.

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(ii) Slide **M1**.

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Or

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[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 on a separate piece of paper.

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 .....

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BIOLOGY **9700/33**

Advanced Practical Skills 1 **May/June 2013**

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- Low-power objective lens, ×10 (equal to 16 mm or $\frac{2}{3}$″)
- High-power objective lens, ×40 (equal to 4 mm or $\frac{1}{6}$″)
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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 should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **E**, **S1**, **S2**, and **S3** 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
E	1% fungal amylase solution	[H] irritant	at least 15
S1	1% sucrose solution	none	at least 25
S2	1% starch solution	none	at least 25
S3	1% glucose solution	none	at least 25

Reagents to test for:

- starch
- reducing sugars
- non-reducing sugars
- protein.

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

Preparation of solutions and reagents:

[H] (i) **E**, at least 15 cm^3 of 1% amylase solution, in a beaker or container, labelled **E**.

This is prepared by putting 1 cm^3 of fungal amylase solution (supplied by Cambridge) into 80 cm^3 of distilled water, mixing and making up to 100 cm^3 with distilled water.

(ii) **S1**, at least 25 cm^3 of 1% sucrose solution, in a beaker or container, labelled **S1**.

This is prepared by putting 1 g of sucrose in 80 cm^3 of distilled water and making up to 100 cm^3 with distilled water.

Before the examination, the test for reducing sugar should give a negative result.
Analar sucrose should be used if available. Some types of granulated (table) sugar may also be suitable.

(iii) **S2**, at least 25 cm^3 of 1% starch solution, in a beaker or container, labelled **S2**.

This is prepared by putting 1 g of soluble starch into 5 cm^3 of warm distilled water, in a beaker or container and mixing to a paste. Make up to 100 cm^3 with hot distilled water, mix well and allow to cool.

It may be necessary to heat the starch suspension to dissolve the starch.

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(iv) **S3**, at least 25 cm^3 of 1% glucose solution, in a beaker or container, labelled **S3**.

This is prepared by sprinkling 1 g of anhydrous glucose onto the surface of 80 cm^3 of distilled water, stirring continuously while you sprinkle until dissolved. Make up to 100 cm^3 with distilled water.

(v) **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 appropriate hazard warnings. The containers should be supplied with the means to add the reagents into large test-tubes.
The biological molecule being tested should **not** be on the label, for example 'Iodine solution for starch test' should have only the word '**Iodine**' on the label.
These reagents should be **fresh** for each candidate.

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Apparatus for each candidate:

Syringes, pipettes, water in container '**for washing**', beakers and test-tubes should be clean.

Apparatus	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	
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)	2	
Pipettes, teat	2	
Glass rod	1	
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	3	
Test-tubes – large and suitable for heating to hold up to 40 cm^3 volume of solution	6	
Spotting tile or white tile	1	
Test-tube rack or container to hold 6 large 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 on the Supervisor's Report	1	
Glass marker pen	1	
Safety goggles/glasses	1	

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 in the table provided, **not** on a spare question paper. The Supervisor's Report should be enclosed with the candidates' scripts with the seating plan.
Please ensure that if the scripts are in several packets that a copy of the Supervisor's Report is enclosed with each packet of scripts.
The Invigilator should **not** carry out **Question 1**.

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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.

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 of 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) Fungal amylase solution (no reducing sugars).

(iii) Slide **K1**.

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. They 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

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 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.

A copy of the seating plan for the examination room must also be enclosed in each script packet.

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

REPORT ON PRACTICAL BIOLOGY

A Level

May/June 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 candidate. 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**.

Temperature of examination room ..... ° C

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Results of Question 1:

Reagent(s) used					
Solution	Observation of colour				
S1					
S2					
S3					
S4					

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 on a separate piece of paper.

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**.

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

BIOLOGY **9700/34**

Advanced Practical Skills 2 **May/June 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.

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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.

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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.**

Centres are reminded that candidates are expected to follow the instructions on the question paper and record all their results. They will not be penalised if these results are not what they expect.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

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:

- Eye piece 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.

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

To avoid confusion, CIE request that only the lenses specified above are fitted in the microscopes used in the examination. Any lenses which are **not** × 10 or × 40 should be removed or replaced.

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.

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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.

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 should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **Y**, **P**, **A** and **W** 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
Y	7% yeast cell suspension	none	at least 20
P	0.1% phenolphthalein indicator solution	[F] flammable	at least 10
A	0.01 mol dm^{-3} sodium hydroxide solution	[H] irritant	at least 20
W	distilled water	none	at least 100

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

Preparation of solutions and reagents:

(i) **Y**, at least 20 cm^3 of 7.0% yeast cell suspension, in a beaker or container, labelled **Y.** This volume should not include any froth.

Y should be prepared one hour before the candidates start **Question 1**. In a large container add 7.0 g of dried yeast (for baking) to 40 cm^3 of warm distilled water. Stir and make up to 100 cm^3 with warm distilled water. This should be kept for approximately 30 minutes at a temperature of 35 °C to 40 °C.
Approximately 15 minutes before candidates start **Question 1**, sprinkle 20 g of glucose over the surface of the suspension and stir thoroughly and keep at a temperature of 35 °C to 40 °C.

It is suggested that preparation of the yeast cell suspension should be tried out before the examination as some yeast will require more time, after the glucose is added, to become active (with froth on the top).
To make it easier to put the 20 cm^3 of **Y** into the beaker for the candidates, it is suggested that the yeast suspension is poured into a second beaker leaving the froth behind.

This is sufficient for 5 candidates.

[F] (ii) **P**, at least 10 cm^3 of 0.1% phenolphthalein indicator solution in a covered beaker or container, labelled **P**. This is to prevent evaporation of the solution.

The phenolphthalein indicator solution provided by your supplier may need to be diluted with ethanol to obtain a 0.1% solution.

This is sufficient for 1 candidate.

[H] (iii) **A**, at least 20 cm^3 of 0.01M sodium hydroxide solution in a beaker or container, labelled **A**.
This is prepared in **two** stages:
Sodium hydroxide is corrosive and the pellets should be handled with forceps.

[C]

- Firstly, dissolve 4 g of sodium hydroxide (dissolve one pellet at a time) in 80 cm^3 of distilled water and make up to 100 cm^3 with distilled water. This makes a 1 mol dm^{-3} solution and this is **corrosive**. You are advised to prepare this solution in small quantities, no more than 300 cm^3 at a time.

- Secondly, make the solution for the candidates by taking 1 cm^3 of this 1 mol dm^{-3} solution, and adding 99 cm^3 of distilled water. This makes the 0.01 mol dm^{-3} solution of sodium hydroxide.

This is sufficient for 5 candidates.

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

This is sufficient for 1 candidate.

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Apparatus for each candidate:

Syringes, pipettes, water in container '**for washing**', beakers and test-tubes should be clean.

Apparatus	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	
10 cm^3 syringe (new or airtight plunger) with tubing (plastic or rubber) 21 to 23 cm length which makes an airtight fit with the nozzle of the syringe, labelled '**for Y**' (note: needles are **not** required and should **not** be given to candidates)	1	
Container (about 250 cm^3) with at least 200 cm^3 tap water, labelled **For washing**	1	
Container, labelled **For waste**	1	
Paper towels	8	
Pipette, plastic or glass with teat	2	
Test-tubes – to hold at least 20 cm^3 volume of solution	6	
Test-tube – labelled **E** – containing about 5 cm^3 water	1	
Bung to fit the test-tubes	1	
Glass rod	1	
Beaker or container to hold an upright 10 cm^3 syringe	1	
Test-tube rack or container to hold 6 test-tubes	1	
White card or paper or tile – approximately 10 cm by 10 cm	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	

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. The Supervisor's Report should be enclosed with the candidates' scripts with the seating plan.
Please ensure that if the scripts are in several packets that a copy of the Supervisor's Report is enclosed with each packet of scripts.
The Invigilator should **not** carry out **Question 1**.

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.

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 of 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 **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. 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. They 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

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 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.

A copy of the seating plan for the examination room must also be enclosed in each script packet.

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

REPORT ON PRACTICAL BIOLOGY

A Level

May/June 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 Part 6 of 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**.

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*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 on a separate piece of paper.

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**.

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

BIOLOGY **9700/35**

Advanced Practical Skills 1 **May/June 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.

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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.

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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.**

Centres are reminded that candidates are expected to follow the instructions on the question paper and record all their results. They will not be penalised if these results are not what they expect.

The Supervisor should make sure the Supervisor's Report is fully completed and a copy is enclosed with each packet of scripts.

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.

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

To avoid confusion, CIE request that only the lenses specified above are fitted in the microscopes used in the examination. Any lenses which are **not** ×10 or ×40 should be removed or replaced.

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.

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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 should be available if requested by candidates.
- Fresh test-tubes and syringes are needed for each candidate.
- Fresh **G**, **S**, **PM**, **W**, **U1** and **U2** 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
G	20% glucose solution	none	at least 100
U1	2% glucose solution	none	at least 20
U2	25% glucose solution	none	at least 20
S	1 mol dm^{-3} sulfuric acid	[H] harmful	at least 40
PM	0.05% potassium manganate(VII) solution	[H] harmful	at least 20
W	distilled water	none	at least 200

Sulfuric acid and potassium manganate(VII) solution are harmful.

If any comes into contact with your skin, wash immediately under cold water.

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

Preparation of solutions and reagents:

- **G**, **U1**, **U2** and **S** can be made the day before the examination. They should be placed in covered containers and placed in a refrigerator. They should be at room temperature for the examination.
- **PM must** be prepared within an hour of the start of the examination. It must be kept in the dark or in a clean brown glass bottle. It should **not** be exposed to sunlight. At the end of the examination, **PM** should be disposed of according to local safety regulations.

(i) **G**, at least 100 cm^3 of 20% glucose solution in a beaker or container (so that a syringe can be used), labelled **G**.

This is prepared by sprinkling 50 g of anhydrous glucose onto the surface of 200 cm^3 of distilled water, stirring continuously as you sprinkle. Make up to 250 cm^3 with distilled water.

This is sufficient for 2 candidates.

(ii) **U1**, at least 20 cm^3 of 2% glucose solution in a beaker or container (so that a syringe can be used), labelled **U1**.

This is prepared by sprinkling 2 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 5 candidates.

(iii) **U2**, at least 20 cm^3 of 25% glucose solution in a beaker or container (so that a syringe can be used), labelled **U2**.

This is prepared by sprinkling 25 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 5 candidates.

[H] (iv) **S**, at least 40 cm^3 of 1 mol dm^{-3} sulfuric acid solution in a beaker or container, labelled **S**.

This is sufficient for 1 candidate.

[H] (v) **PM**, at least 20 cm^3 of 0.05% potassium manganate(VII) ($KMnO_4$) solution in a beaker or container, labelled **PM**.

This is prepared in **two** stages:

- Firstly, dissolve 5 g of potassium manganate(VII) in 80 cm^3 of distilled water, stir until dissolved and make up to 100 cm^3 with distilled water.
  This is a **5%** solution.

- Secondly, make the solution for the candidates by taking 1 cm^3 of this **5%** solution and adding 99 cm^3 of distilled water.
  This makes the **0.05%** solution of potassium manganate(VII) ($KMnO_4$) solution.

This is sufficient for 5 candidates.

(vi) **W**, at least 200 cm^3 of distilled water in a beaker or container, labelled **W**.

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Apparatus for each candidate for **Question 1:**

Syringes, pipettes, water in container '**for washing**', beakers and test-tubes should be clean.

Apparatus	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	
10 cm^3 syringe, labelled **S** (note: needles are **not** required and should **not** be given to candidates)	1	
3 cm^3 or 5 cm^3 syringe, labelled **PM** (note: needles are **not** required and should **not** be given to candidates)	1	
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	4	
Test-tubes – large – to hold up to at least 20 cm^3 volume of solution	6	
Bung, to fit all the test-tubes provided	1	
Test-tube rack or container to hold 6 test-tubes	1	
White card or paper – approximately 10 cm by 10 cm	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 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 table** provided on the Supervisor's Report, **not** on a spare question paper. The Supervisor's Report should be enclosed with the candidates' scripts with a seating plan for the examination room. Please ensure that if the scripts are in several packets that a copy of the Supervisor's Report is enclosed with each packet of scripts.
The Invigilator should **not** carry out **Question 1**.

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.

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 of the candidates should start on **Question 1** and the other half should start on **Question 2**.

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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. They 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

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 package is used, there must be a copy of the completed Report Form in each script package.

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.

A copy of the seating plan for the examination room must also be enclosed in each script package.

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

REPORT ON PRACTICAL BIOLOGY

A Level

May/June 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 Part 6 of 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**.

Temperature of examination room ..... °C

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[Turn over

*Results for **Question 1**:*

percentage concentration	time taken to reach end-point/seconds
6	
8	
10	
12	
U1	
U2	

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 on a separate piece of paper.

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 (for 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**.

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