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

**BIOLOGY** **9700/31**

Advanced Practical Skills 1 **October/November 2010**

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: International@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 **7** printed pages and **1** blank page.


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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.**

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:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}$″)
- High-power objective lens, e.g. × 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.

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 are also referred to the Handbook for Centres, and in particular Section 3.1.2 (c) (i), Security of Question Papers and Examination Materials, as well as 3.3.11.1, Practical Examinations in Science Subjects.

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**Confidential Instructions**

Each candidate will require

**Question 1**

**Fresh H and potato pieces are needed for each candidate.**
**More of the solutions should be available if requested by candidates.**
**Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, allowing removal of the solution using a syringe.**

It is important that the hydrogen peroxide is prepared within one hour of the start of Question 1.

Summary of solutions and reagents

| labelled | contents | hazard | measurements / cm | no. of pieces |
|---|---|---|---|---|
| **P** | potato | – | 4 × 0.5 × 0.5 | 4 + 2 spares |

| labelled | contents | hazard | concentration / vol / 6% | volume / $cm^3$ |
|---|---|---|---|---|
| **H** | hydrogen peroxide | [H] irritant<br><br>[O] oxidising substance | 20 | 200 |

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

Preparation of solutions and reagents

**(i)** **P**, four pieces of potato wrapped in a damp paper towel in a covered Petri dish or small plastic bag, labelled **P**.

The potato must be Irish/white potato which is as fresh as possible and reacts quickly with hydrogen peroxide. The potatoes should not have been stored or refrigerated for a long period of time.

The outer skin of the potato should be removed. Cut a piece of potato 1 cm × 0.5 cm × 0.5 cm and drop it into 25 $cm^3$ of 6% hydrogen peroxide in a large test-tube. A lot of bubbles of gas should be observed and the piece of potato should rise within 60 seconds. If this does not happen try different potatoes.

If the piece of potato rises in less than 15 seconds, then repeat with 3% hydrogen peroxide and it should rise within 60 seconds.

The selected potatoes should then be prepared as follows.

Cut the potato into pieces 4 cm × 0.5 cm × 0.5 cm. Slices of potato can be cut with a large kitchen knife and pieces produced using a scalpel. Please do not use cork borers as this may compress the tissues.

Ideally the pieces of potato should be prepared immediately before the examination.

If prepared in advance, the pieces of potato should be stored in a plastic bag and kept cool, to avoid any loss of water or enzymic browning.

**(ii)** **H**, at least 200 $cm^3$ of 20 vol/6% hydrogen peroxide solution in a covered beaker or container, labelled **H**. If preliminary tests indicate that the 10 vol/3% hydrogen peroxide is more appropriate then this concentration should be supplied to the candidates.

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Apparatus for each candidate

| **Apparatus** | **Quantity** | ✓ |
|---|---|---|
| 10 $cm^3$ syringe | 1 | |
| Container with tap water, labelled **For washing** | 1 | |
| Container, labelled **For waste** | 1 | |
| Paper towels | 8 | |
| Test-tubes, large | 4 | |
| Test-tube rack | 1 | |
| White tile | 1 | |
| Scalpel or sharp blade | 1 | |
| Blunt forceps | 1 | |
| Ruler, mm | 1 | |
| Stop clock, stop watch or sight of a clock with a second hand | 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 which should be enclosed with the candidates' scripts. Please ensure that if the scripts are in several packets that a copy of the Supervisor's report 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, e.g. × 10 (equal to 16 mm or $\frac{2}{3}''$)
- High-power objective lens, e.g. × 40 (equal to 4 mm or $\frac{1}{6}''$)
- Eyepiece graticule (supplied by Cambridge) 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**

**(iii)** Eyepiece graticule

**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 package 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 package 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**

**October/November Session 2010**

*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.

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**[Turn over**

**3.** Results for question **1(a)(i)**.

**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)

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 .....

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** **9700/33**

Advanced Practical Skills 1 **October/November 2010**

CONFIDENTIAL INSTRUCTIONS

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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.**

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:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}$″)
- High-power objective lens, e.g. × 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.

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**

**Question 1**

**Plant tissue must be prepared the day before the examination.**

**Fresh C, W, P and water for washing both plant tissue and apparatus are needed for each candidate.**
**More of the solutions should be available if requested by candidates.**
**Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, allowing removal of the solution using a syringe.**

Summary of solutions and reagents

| labelled | contents | hazard | concentration / % | volume / $cm^3$ |
|---|---|---|---|---|
| **C** | copper sulfate | [H] harmful irritant<br>[N] harmful to environment | 0.3 | at least 60 |
| **W** | distilled water | none | – | 100 |
| **methylene blue** | used to stain plant tissue | stains | 0.1 | – |

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

Preparation of solutions and reagents

**(i)** **C**, at least 60 $cm^3$ of 0.3% copper sulfate in a beaker or container, labelled **C**.

This is prepared by dissolving 3 g of copper sulfate into 80 $cm^3$ of distilled water and make up to 1000 $cm^3$.
This is sufficient quantity for six candidates.

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

**(iii)** **P**, five pieces of plant tissue in a beaker or container, with enough tap water to cover the plant tissue, labelled **P**.
**Two pieces of 4 cm, one of 3.5 cm and two of 3 cm lengths.**

**Plant tissue may be prepared the day before the examination.**
Suitable plant tissue is (Irish) potato or sweet potato or cassava. The plant tissue should be as fresh as possible. The plant tissue should not have been stored or refrigerated for a long period of time.

The outer skin should be removed.

Each piece should have the same cross-sectional area, 0.5 cm × 0.5 cm.

Slices of plant tissue can be cut with a large kitchen knife and pieces produced using a scalpel. Please do not use cork borers as this may compress the tissues.

The test-tubes provided must be large enough to allow the pieces to fit.

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Put the prepared plant tissue into a shallow tray so that the pieces do not overlap and cover with 0.1% methylene blue solution. Leave for approximately 30 minutes. Remove plant tissue and place in a beaker and cover with tapwater. The methylene blue solution can be re-used for further plant samples.

This is prepared by dissolving 1.0 g of methylene blue into 80 $cm^3$ of distilled water in a beaker and making up to 100 $cm^3$ with distilled water.

Put 10 $cm^3$ of this 1.0% methylene blue solution into a beaker or container and making up to 100 $cm^3$ with distilled water. This makes 0.1% methylene blue solution.

**If any methylene blue comes into contact with your skin wash off immediately with water.**

Before the examination wash the pieces of plant tissue and put them into a beaker or container with tap water. Rinse the plant tissue by pouring out the water and then adding fresh tap water. Repeat four times. Add enough tap water to cover the plant tissue ready to put out for the candidate in container, labelled **P**.

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

Apparatus for each candidate

| **Apparatus** | **Quantity** | ✓ |
|---|---|---|
| 10 $cm^3$ syringes or one with the means to wash it out | 2 | |
| 5 $cm^3$ syringe with the means to wash it out | 1 | |
| Container with tap water, labelled **For washing plant tissue** | 1 | |
| Container with tap water, labelled **For washing apparatus** | 1 | |
| Container, labelled **For waste** | 1 | |
| Paper towels | 4 | |
| Beakers or containers, to hold 50 $cm^3$ | 5 | |
| Test-tubes | 6 | |
| Bung to fit test-tubes | 1 | |
| Test-tube rack or container to hold 6 test-tubes | 1 | |
| Ruler, mm | 1 | |
| White tile | 1 | |
| Scalpel or sharp blade | 1 | |
| Blunt forceps | 1 | |
| Stop clock, stop watch or sight of a clock with a second hand | 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 which should be enclosed with the candidates' scripts. Please ensure that if the scripts are in several packets that a copy of the Supervisor's report is enclosed with each packet of scripts. The Invigilator should **not** carry out **Question 2**.

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**Question 2**

**(i)** Slide **K1** (supplied by Cambridge).

**(ii)** Microscope with:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}''$)
- High-power objective lens, e.g. × 40 (equal to 4 mm or $\frac{1}{6}''$)
- Eyepiece graticule (supplied by Cambridge) 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)** Slide **K1**

**(iii)** Eyepiece graticule

**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 package 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 package of scripts.

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**REPORT FORM**

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**REPORT ON PRACTICAL BIOLOGY**

**A Level**

**October/November Session 2010**

*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.

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**[Turn over**

**3.** Results for question **1**.

**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)

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 .....

Centre name .....

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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 **October/November 2010**

CONFIDENTIAL INSTRUCTIONS

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## Instructions for preparing apparatus

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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:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}$")
- High-power objective lens, e.g. × 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.

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.

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**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

**Question 1**

**Fresh pH 3, pH 4, pH 5, pH 6, Y and C and graph paper scale are needed for each candidate.**
**More of the solutions should be available if requested by candidates.**
**Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solution using a syringe.**

Summary of solutions and reagents

| labelled | contents | hazard | concentration | volume / $cm^3$ |
|---|---|---|---|---|
| **pH 3** | citric acid/sodium citrate buffer | [H] irritant | see instructions | at least 30 |
| **pH 4** | citric acid/sodium citrate buffer | [H] irritant | see instructions | at least 30 |
| **pH 5** | citric acid/sodium citrate buffer | [H] irritant | see instructions | at least 30 |
| **pH 6** | citric acid/sodium citrate buffer | [H] irritant | see instructions | at least 30 |
| **Y** | yeast suspension | none | 10% | at least 60 |
| **C** | calcium chloride | [H] irritant | 0.001 mol $dm^{-3}$ | at least 15 |

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

Preparation of solutions and reagents

**(i)** **pH 3**, at least 30 $cm^3$ of buffer pH 3 in a beaker or container, labelled **pH 3**.

**(ii)** **pH 4**, at least 30 $cm^3$ of buffer pH 4 in a beaker or container, labelled **pH 4**.

**(iii)** **pH 5**, at least 30 $cm^3$ of buffer pH 5 in a beaker or container, labelled **pH 5**.

**(iv)** **pH 6**, at least 30 $cm^3$ of buffer pH 6 in a beaker or container, labelled **pH 6**.

**The buffers should be prepared using the following stock solutions:**
1 $dm^3$ of 0.1 mol $dm^{-3}$ citric acid. This is prepared by dissolving 19.2 g of citric acid in 500 $cm^3$ of distilled water in a beaker and make up to 1 $dm^3$ with distilled water.

1 $dm^3$ of 0.1 mol $dm^{-3}$ sodium citrate. This is prepared by dissolving 29.4 g of sodium citrate in 500 $cm^3$ of distilled water in a beaker and make it up to 1 $dm^3$ with distilled water.

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Then 100 $cm^3$ of each buffer can be prepared as in the table below:

| pH | 0.1 mol $dm^{-3}$ citric acid / $cm^3$ | 0.1 mol $dm^{-3}$ sodium citrate / $cm^3$ | distilled water / $cm^3$ |
|---|---|---|---|
| 3 | 46.4 | 3.6 | 50 |
| 4 | 33.0 | 17.0 | 50 |
| 5 | 20.6 | 29.4 | 50 |
| 6 | 10.0 | 40.0 | 50 |

This is sufficient quantity for 3 candidates.

**(v)** **Y**, at least 60 $cm^3$ of 10% yeast suspension, in a beaker or container, labelled **Y**. (There is no need for the yeast to be active so this is best made up just before the candidates need to use it.) This is prepared by putting 10 g of dried yeast (Baker's) into a container and adding distilled water up to 100 $cm^3$. The yeast suspension needs to be mixed well.
This is sufficient quantity for 1 candidate.

**(vi)** **C**, at least 15 $cm^3$ of 0.001 mol $dm^{-3}$ calcium chloride solution, in a beaker or container, labelled **C**. This is prepared by dissolving 1 g of calcium chloride ($CaCl_2$) in 500 $cm^3$ of distilled water in a beaker and make up to 1 $dm^3$ with distilled water. This is the stock solution of 0.01 mol $dm^{-3}$.
**0.001 mol $dm^{-3}$** calcium chloride solution required by the candidate is prepared by putting 10 $cm^3$ of the stock solution into a beaker or container, make up to 100 $cm^3$ with distilled water.
This is sufficient quantity for 4 or 5 candidates.

**(vii)** A piece of 2 mm square graph paper cut 10 cm by 1 cm and glued to a piece of black card 15 cm by 1.5 cm so there is an area of black card around the piece of graph paper.

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

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Apparatus for each candidate

| **Apparatus** | **Quantity** | ✓ |
|---|---|---|
| 1 $cm^3$ syringe | 1 | |
| 10 $cm^3$ syringes or one with the means to wash it out | 2 | |
| Container with tap water, labelled **For washing** | 1 | |
| Container, labelled **For waste** | 1 | |
| Paper towels | 4 | |
| Test-tubes | 4 | |
| Test-tube, labelled **T** | 1 | |
| Test-tube rack | 1 | |
| Cork or bung to fit the test-tubes | 1 | |
| Graph paper scale on black card | 1 | |
| Glass rod | 1 | |
| Ruler, mm | 1 | |
| Stop clock, stop watch or sight of a clock with a second hand | 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 which should be enclosed with the candidates' scripts. Please ensure that if the scripts are in several packets that a copy of the Supervisor's report 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, e.g. ×10 (equal to 16 mm or $\frac{2}{3}$")
- High-power objective lens, e.g. ×40 (equal to 4 mm or $\frac{1}{6}$")
- Eyepiece graticule (supplied by Cambridge) 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.

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 **M1**

**(iii)** Eyepiece graticule

## 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 package 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 package 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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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 2010**

*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.

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**[Turn over**

**3.** Results for question **1**.

**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)

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 .....

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 **October/November 2010**

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: International@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 **7** printed pages and **1** blank page.


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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.**

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:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}''$)
- High-power objective lens, e.g. × 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.

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 are also referred to the Handbook for Centres, and in particular Section 3.1.2 (c) (i), Security of Question Papers and Examination Materials, as well as 3.3.11.1, Practical Examinations in Science Subjects.

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 international@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**

**Question 1**

**Fresh A, W, iodine, S, X and Y are needed for each candidate.**
**More of the solutions should be available if requested by candidates.**
**Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solution using a syringe.**

It is important that the ascorbic acid, **A**, and iodine solution are prepared within one hour of the start of Question 1.

Summary of solutions and reagents

| labelled | contents | hazard | concentration / % | volume / $cm^3$ |
|---|---|---|---|---|
| **A** | ascorbic acid | [H] irritant | 0.1 | 100 |
| **W** | distilled water | none | – | 100 |
| **iodine solution** | iodine in potassium iodide | [H] irritant | 0.5 g iodine in 1% potassium iodide | 40 |
| **S** | starch suspension | none | 0.1 | 20 |
| **X** | sample – ascorbic acid | [H] irritant | 0.05 | 20 |
| **Y** | sample – distilled water | none | – | 20 |

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

Preparation of solutions and reagents

**[H] (i)** **A**, at least 100 $cm^3$ of 0.1% ascorbic acid in a covered beaker or container, labelled **A**.
This is prepared by making a 1.0% stock solution by dissolving 1 g of ascorbic acid in 80 $cm^3$ of distilled water in a beaker, make up to 100 $cm^3$ with distilled water and mix well.
To make the 0.1% ascorbic acid add 10 $cm^3$ of this stock solution to a beaker, make up to 100 $cm^3$ with distilled water and mix well.
This is sufficient quantity for 1 candidate.

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

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**[H] (iii)** **Iodine**, at least 40 $cm^3$ of iodine solution in a small beaker or container, labelled **iodine**.
The 1% potassium iodide is prepared by dissolving 1 g of potassium iodide in 80 $cm^3$ of distilled water in a beaker, make up to 100 $cm^3$ with distilled water.
Then dissolve 0.5 g of iodine in 100 $cm^3$ of 1% potassium iodide.
The iodine needs to be mixed well to make sure that it dissolves.
This is sufficient quantity for 2 candidates.

**Please note that this is not the same concentration of iodine solution which is used for the starch test.**

**(iv)** **S**, at least 20 $cm^3$ of 0.1% starch solution in a small beaker or container, labelled **S**.
This is prepared by making a stock solution of 1% starch solution by dissolving 1 g of starch into a small volume of distilled water and mix to make a paste. Make up to 100 $cm^3$ with hot distilled water. It will be necessary to heat the starch solution to dissolve the starch.
To make the 0.1% starch solution add 10 $cm^3$ of this stock solution to a beaker, make up to 100 $cm^3$ with distilled water and mix well. The starch solution must be at room temperature for the examination.
This is sufficient quantity for 4 to 5 candidates.

**[H] (v)** **X**, at least 20 $cm^3$ of 0.05% ascorbic acid in small beaker or container, labelled **X**.
To make the 0.05% ascorbic acid add 10 $cm^3$ of the 0.1% stock solution from **(i)** to a small beaker and add 10 $cm^3$ of distilled water.
This is sufficient quantity for 1 candidate.

**(vi)** **Y**, at least 20 $cm^3$ of distilled water in a small beaker or container, labelled **Y**.

Apparatus for each candidate

| Apparatus | Quantity | ✓ |
|---|---|---|
| 10 $cm^3$ syringes or one with the means to wash it out | 2 | |
| 2 $cm^3$ syringe with the means to wash it out | 1 | |
| Container with tap water, labelled **For washing** | 1 | |
| Container, labelled **For waste** | 1 | |
| Paper towels | 4 | |
| Test-tubes | 8 | |
| Test-tube rack or container to hold 8 test-tubes | 1 | |
| Containers or beakers to hold at least 50 $cm^3$ | 8 | |
| Glass rod | 1 | |
| Stop clock, stop watch or sight of a clock with a second hand | 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 which should be enclosed with the candidates' scripts. Please ensure that if the scripts are in several packets that a copy of the Supervisor's report is enclosed with each packet of scripts. The Invigilator should **not** carry out **Question 1**.

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**Question 2**

**(i)** Slide **L1** (supplied by Cambridge)
**(ii)** Microscope with:
- Low-power objective lens, e.g. ×10 (equal to 16 mm or $\frac{2}{3}$″)
- High-power objective lens, e.g. ×40 (equal to 4 mm or $\frac{1}{6}$″)
- Eyepiece graticule (supplied by Cambridge) 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**.

## MATERIALS TO BE SUPPLIED BY CAMBRIDGE

**(i)** Question papers

**(ii)** Slide **L1**

**(iii)** Eyepiece graticule

## 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 package 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 package 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.

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

**REPORT ON PRACTICAL BIOLOGY**

**A Level**

**October/November Session 2010**

*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.

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**[Turn over**

**3.** Results for question **1**.

**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)

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 .....

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** **9700/36**

Advanced Practical Skills 2 **October/November 2010**

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: International@cie.org.uk
by phone: +44 1223 553554
by fax: +44 1223 553558
stating the Centre number, the nature of the query and the syllabus number quoted above.

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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:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}''$)
- High-power objective lens, e.g. × 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.

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 are also referred to the Handbook for Centres, and in particular Section 3.1.2 (c) (i), Security of Question Papers and Examination Materials, as well as 3.3.11.1, Practical Examinations in Science Subjects.

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**Confidential Instructions**

Each candidate will require

**Question 1**

**Fresh solutions E and C are needed for each candidate.**
**Fresh full-fat/half-fat goats' milk or freshly prepared dried milk (Marvel) solution is needed for each candidate.**
**More of the solutions should be available if requested by candidates.**
**Solutions and reagents provided to the candidates should be supplied in a suitable beaker, or container, for removal of the solution using a syringe.**

Summary of solutions and reagents

| labelled | contents | hazard | concentration | quantity for each candidate |
|---|---|---|---|---|
| **E** | **rennin solution** | **[H] irritant** | **1%** | **at least 20 $cm^3$** |
| **C** | **calcium chloride solution** | **[H] irritant** | **1.0 mol $dm^{-3}$** | **at least 20 $cm^3$** |
| **M** | **milk** | **none** | **n/a** | **at least 100 $cm^3$** |

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

**[H]** **(i)** **E**, at least 20 $cm^3$ of 1% rennin solution, in a beaker or container, labelled **E**.
This is prepared by putting 1 $cm^3$ of rennin solution (supplied by Cambridge) in a beaker or container and making up to 100 $cm^3$ with distilled water, mixing well. This is sufficient quantity for 4 to 5 candidates.

**[H]** **(ii)** **C**, at least 20 $cm^3$ of 1.0 mol $dm^{-3}$ calcium chloride solution, in a beaker or container, labelled **C**.
This is prepared by dissolving 11.0 g of calcium chloride ($CaCl_2$) in 50 $cm^3$ distilled water, stirring and then making up to 100 $cm^3$ with distilled water.
This is sufficient quantity for 4 to 5 candidates.

**(iii)** **M**, 100 $cm^3$ of fresh full/half fat goats' milk in a beaker, labelled **M**.
Or
**M**, 100 $cm^3$ of dried milk solution in a beaker, labelled **M**.
This is prepared by dissolving 10 g of dried milk powder in 50 $cm^3$ distilled water, stirring and then making up to 100 $cm^3$ with distilled water.
This is sufficient quantity for 1 candidate.

**E**, **C** and **M** can be made up the day before the examination and stored in a refrigerator. However, these must be at room temperature for the examination.

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Apparatus for each candidate

| Apparatus | Quantity | ✓ |
|---|---|---|
| 10 $cm^3$ syringe | 1 | |
| 1 $cm^3$ or 2 $cm^3$ syringe (or 1 with the means to wash it out) | 2 | |
| Container with tap water, labelled **For washing** | 1 | |
| Container, labelled **For waste** | 1 | |
| Paper towels | 4 | |
| Test-tubes, large (boiling tubes) | 5 | |
| Test-tube rack | 1 | |
| Thermometer –10 °C to 110 °C | 1 | |
| Container or beaker with water, labelled **For cooling water-bath**, see below | 1 | |
| 500 $cm^3$ beaker or container, labelled **Water-bath**, see below | 1 | |
| Stop clock, stop water or sight of a clock with a second hand | 1 | |
| Glass marker pen | 1 | |
| Safety goggles/glasses | 1 | |

Water-baths

Container with tap water, labelled **For cooling water-bath**
In high room temperatures it may be necessary to provide cold water and/or ice to enable candidates to make a water-bath of approximately 20 °C.

A 500 $cm^3$ beaker or container, labelled **Water-bath**, to act as a water-bath to contain two test-tubes at a time. Candidates should be given water at approximately 50–55 °C as they start this question. They are required to adjust the temperature of the water. They may not use a thermostatically controlled water-bath but may have access to one to collect the water that they need.

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

**(ii)** Microscope with:

- Low-power objective lens, e.g. × 10 (equal to 16 mm or $\frac{2}{3}$″)
- High-power objective lens, e.g. × 40 (equal to 4 mm or $\frac{1}{6}$″)
- Eyepiece graticule (supplied from Cambridge) 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)** Rennin

**(iii)** Slide **N1**

**(iv)** Eyepiece graticule

**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 package 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 package 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.

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**REPORT ON PRACTICAL BIOLOGY**

**A Level**

**October/November Session 2010**

*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.

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. 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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**[Turn over**

**3.** Results for question **1**.

**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)

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 .....

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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