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

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0839973353

BIOLOGY **9700/35**

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

2 hours

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black ink.
You may use a pencil for any diagrams, graphs or rough working.
Do **not** use red ink, staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
Total	

This document consists of **10** printed pages and **2** blank pages.

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You are reminded that you have only one hour for each question in the practical examination. You should read carefully through the whole of each question and then plan your use of the time to make sure that you finish all of the work that you would like to do.

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You will gain marks for recording your results according to the instructions.

1 You are required to test known samples for the presence of ascorbic acid (vitamin C).

You are provided with

labelled	contents	hazard	volume / cm^3
A	0.1% ascorbic acid	irritant	100
W	distilled water	none	100
iodine	iodine in potassium iodide	irritant	40
S	starch	none	20
X	unknown sample	irritant	20
Y	unknown sample	irritant	20

To find the concentration of ascorbic acid in **A** and **W** you are required to find the volume of iodine added to the test samples until the end-point is reached.

The drops of iodine will be added one at a time using a small syringe.

To practise releasing drops from a small syringe:

1. Fill the syringe with 2 cm^3 distilled water.

2. Hold the syringe over an empty test-tube as shown in Fig. 1.1 and push the plunger **gently** to release one drop.

3. Repeat this until you can release one drop at a time.

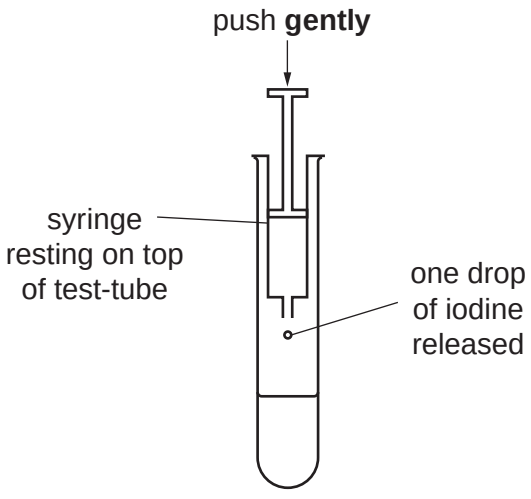


Fig. 1.1

To find the concentration of ascorbic acid in **A** and **W** you will need to add drops of **iodine** until a blue colour appears which lasts for more than 10 seconds. This is the end-point.

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You will be required to record the **volume** of **iodine** added.

Proceed as follows:

4. Put 1 cm^3 of **S** into a test-tube.

5. Add 5 cm^3 of the test sample (e.g. **A**) into the same test-tube.

6. Shake the test-tube gently to mix the contents.

7. Fill a small syringe with 2.0 cm^3 of **iodine**.

8. Wipe off any **iodine** from the outside of the syringe with a paper towel.

9. Add one drop of **iodine** to the mixture of **S** and **A** as shown in Fig. 1.1.

10. Mix gently and if there is no colour change add another drop.

11. When the blue colour first appears, wait 10 seconds to see if the end-point has been reached. If the blue colour disappears then add another drop.

12. Repeat steps 9 to 11 until the mixture stays blue for at least 10 seconds.

13. Record the **volume** of **iodine** added.

14. Repeat steps 4 to 13 with sample **W**.

volume of iodine added for sample

A .....

W .....

Proceed as follows to find the concentration of ascorbic acid in samples **X** and **Y**.

You will need to dilute the 0.10% ascorbic acid to provide a range of known concentrations.

You will need to make up 20 cm^3 of each concentration of ascorbic acid.

Table 1.1 shows how to make up two of the concentrations you should use.

Table 1.1

volume of ascorbic acid / cm^3	volume of distilled water / cm^3	concentration of ascorbic acid / %
20	0	0.10
16	4	0.08

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(i) Decide which other concentrations of ascorbic acid to make and complete Table 1.2, including the concentrations from Table 1.1.

Table 1.2

tube number	volume of ascorbic acid / cm^3	volume of distilled water / cm^3	concentration of ascorbic acid / %

[3]

Make up the concentrations of ascorbic acid you have chosen.

Repeat steps 4 to 13 with each of your concentrations of ascorbic acid and the two samples **X** and **Y**.

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[Turn over

(ii) Prepare the space below to show the concentration of ascorbic acid and record your results, including samples **X** and **Y**.

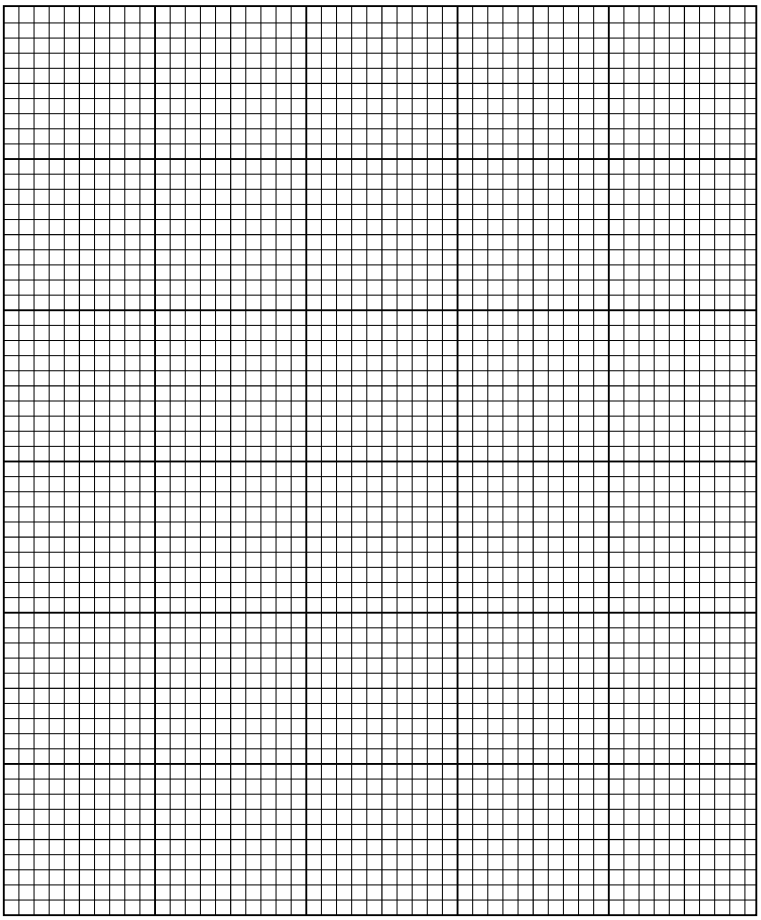
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[6]

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(iii) Plot a graph of the results.

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[4]

(iv) Use your graph to estimate the ascorbic acid concentration of sample **X**.

Show clearly on your graph how you obtained the ascorbic acid concentration. [1]

concentration of ascorbic acid in sample **X** ..... [2]

(v) Identify **two** significant sources of error when finding the concentration of ascorbic acid in sample **X**.

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..... [2]

(vi) Suggest how you would make **three** improvements to this investigation.

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..... [3]

[Total: 21]

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2 **L1** is a slide of a stained transverse section through a leaf-like structure.

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You are not expected to have studied this material.

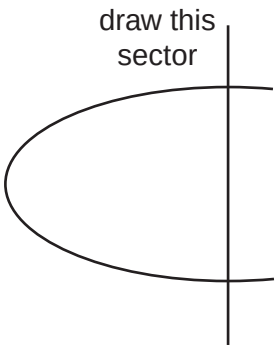


Fig. 2.1

(a) **(i)** Draw a large plan diagram of the sector shown in Fig. 2.1 to include the **outline** of two vascular bundles. No details of the internal tissues of the vascular bundles are required.

Label, with a **C**, the tissue containing chloroplasts.

[5]

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(ii) Locate a large vascular bundle on **L1**. Using high-power, draw a large **plan** diagram to show one large vascular bundle in detail.

Label the phloem.

[5]

Fig. 2.2 is a photomicrograph of a transverse section of a leaf from a different plant species.

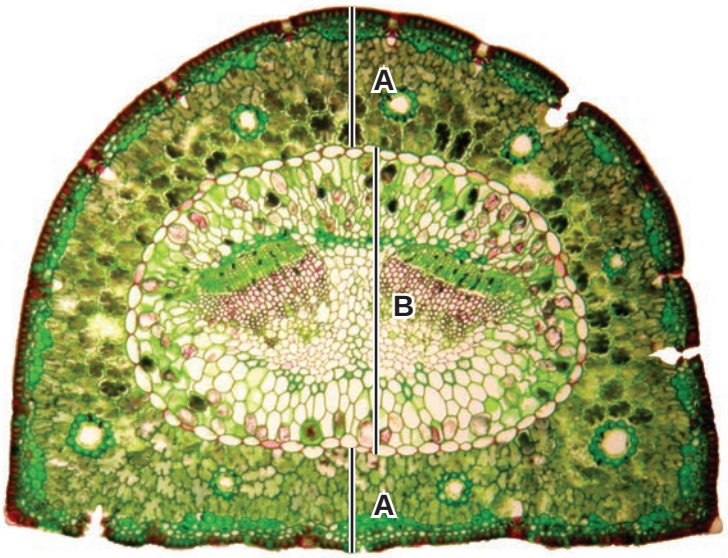


Fig. 2.2

(b) Calculate the ratio of the thickness of the layer labelled **B** compared to the total thickness of the layer labelled **A** as shown in Fig. 2.2.

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[3]

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(c) Prepare the space below so that it is suitable for you to record the observable differences between the specimens on slide **L1** and in Fig. 2.2.

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Record your observations in the space you have prepared.

[3]

(d) Describe how the observable features of the leaf section shown in Fig. 2.2 support the conclusion that this is a leaf from a plant growing in a dry habitat.

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..... [3]

[Total: 19]

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