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

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

1912382525

BIOLOGY **9700/34**

Advanced Practical Skills 2 **May/June 2011**

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 **11** printed pages and **1** blank page.

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You are reminded that you have **only one hour** for each question in the practical examination.

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You should:

- Read carefully through **the whole** of each question.
- Plan your use of **the time** to make sure that you finish all the work that you would like to do.

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

1 In some countries, certain plants have seasonal growth. During the summer plants transport sucrose from the leaves to store it as starch in the roots.

Table 1.1 summarises the changes in the leaves and roots during the year.

Table 1.1

season	leaves	roots
summer	leaves synthesize sucrose	sucrose stored as starch
winter	no leaves	starch stored
spring	leaves growing	starch converted to glucose

You are required to identify the source of four plant extracts. These have been taken from

- a root in winter
- a root in spring
- phloem sap in summer
- phloem sap in winter

(a) (i) Use the information in Table 1.1 to predict which substances you would expect to be present in each of the four plant extracts, then complete Table 1.2.

Key: ✓ (tick) substance present in plant extract
✗ (cross) substance absent from plant extract

Table 1.2

source of plant extract	substances present in each of the plant extracts		
	starch	**sucrose**	**glucose**
root in winter			
root in spring			
phloem sap in summer			
phloem sap in winter			

[2]

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One sample was taken from each of the four plant extracts shown in Table 1.2.

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You are required to identify from which plant extract each of the four samples **S1**, **S2**, **S3** and **S4** was taken.

You are provided with:

Table 1.3

labelled	contents	hazard	volume / cm^3
Benedict's solution	Benedict's solution	harmful irritant	If you require more of any of these reagents, please ask the Invigilator.
Biuret	copper sulfate sodium hydroxide	harmful irritant	
iodine	iodine in potassium iodide solution	irritant	
hydrochloric acid	hydrochloric acid	irritant	
sodium hydrogen carbonate	sodium hydrogen carbonate	none	

(ii) Describe the tests that show that sucrose is present in a plant extract.

.....

.....

.....

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.....[2]

Select the appropriate reagents from those provided in Table 1.3 and carry out tests to identify the samples **S1**, **S2**, **S3** and **S4**.

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(iii) Prepare the space below and record your results.

[4]

(iv) Complete Table 1.4 to match the samples, **S1**, **S2**, **S3** and **S4**, with each plant extract.

Table 1.4

source of plant extract	sample
a root in winter	
a root in spring	
phloem sap in summer	
phloem sap in winter	

[1]

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A student investigated the effect of different concentrations of sodium chloride solution on root tissues. A separate sample of root tissue was put into a starting volume of each concentration of sodium chloride solution. After a set time the root tissue was removed and the final volume of each solution was recorded. The change in volume for each concentration was calculated.

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(b) (i) State **three** variables which the student should keep the same in this investigation. Describe how the student would keep each of these variables the same.

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..... [4]

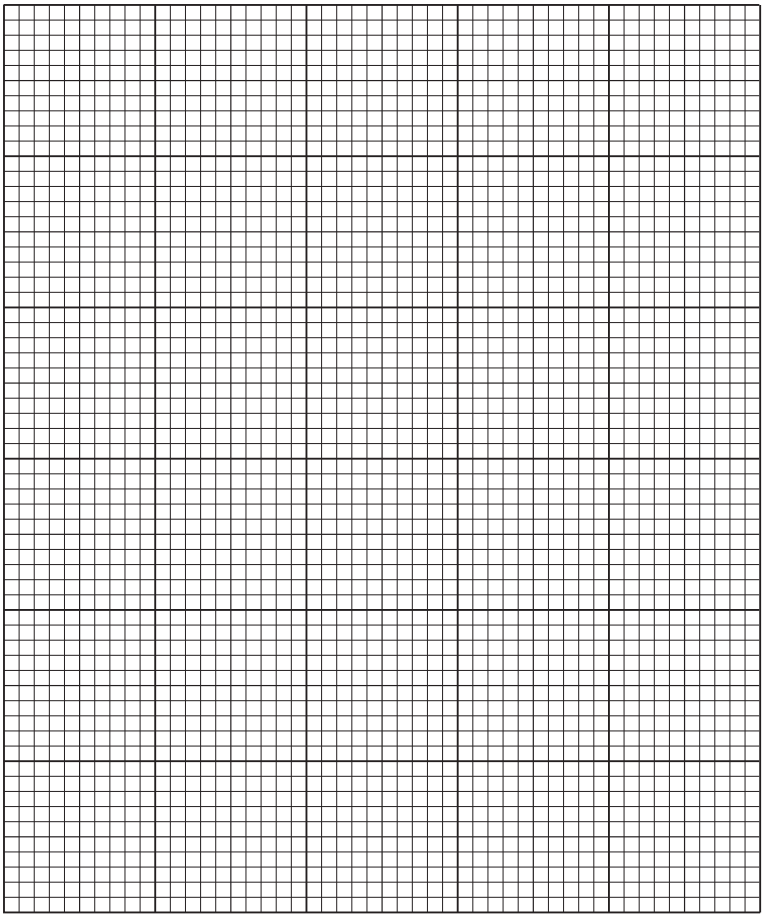
The results of the student's investigation are shown in Table 1.5.

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Table 1.5

concentration of sodium chloride / mol dm^{-3}	change in volume of solution / cm^3
0.00	–6.0
0.25	+1.0
0.50	+4.5
0.80	+5.2
1.00	+5.2

(ii) Plot a graph of the data shown in Table 1.5.



[4]

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(iii) Show on your graph the sodium chloride concentration where there is no change in volume of solution. [1]

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Use this information to estimate the sodium chloride concentration where there is no change in volume of solution.

..... $mol\,dm^{-3}$ [1]

(iv) Use your graph to explain the effect of the different concentrations of sodium chloride solution on the root cells.

.....

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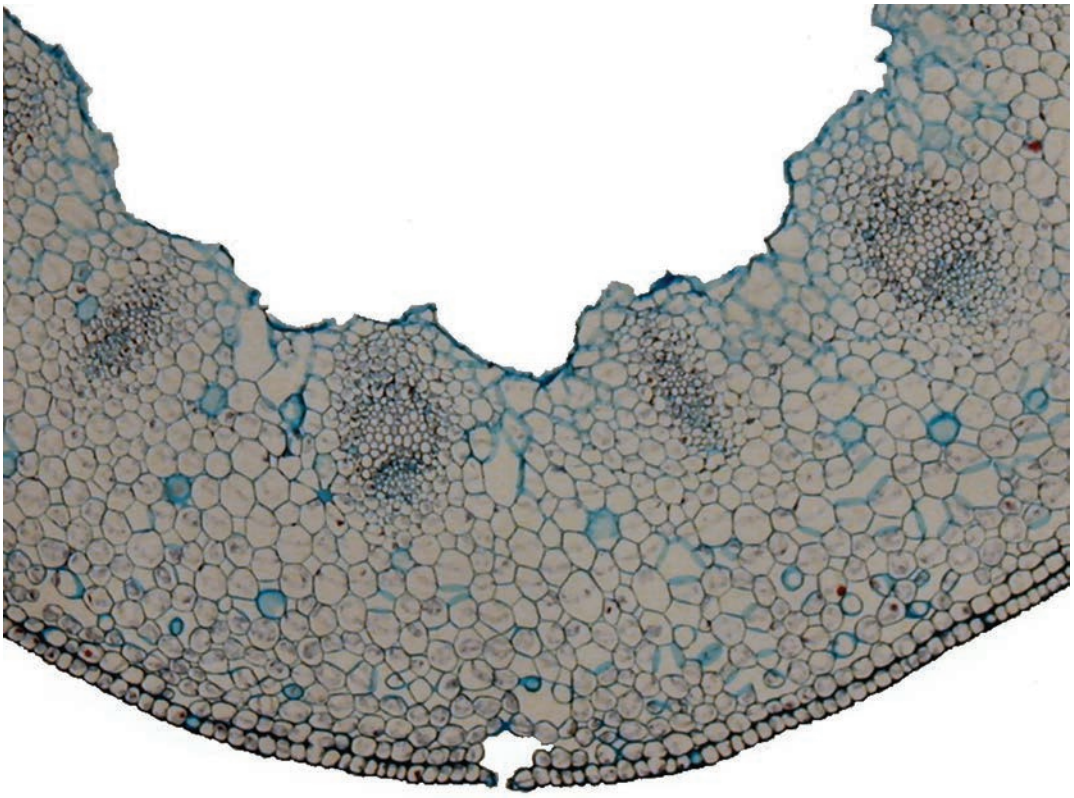
.....

.....[3]

[Total: 22]

2 Fig. 2.1 is a photomicrograph of a transverse section through part of a stem.

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magnification × 100

Fig. 2.1

(a) Draw a large plan diagram of the specimen shown in Fig. 2.1.

Label the epidermis.

[6]

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Fig. 2.2 is a photomicrograph of a transverse section through part of a different plant organ from a different plant species.

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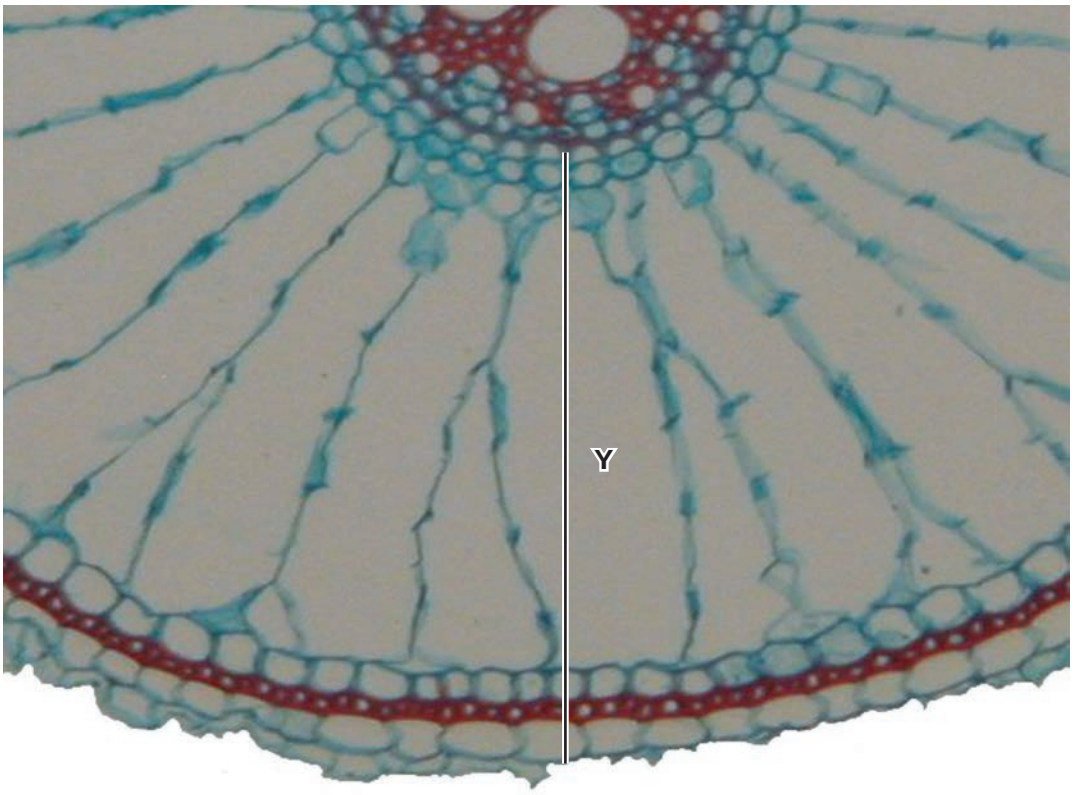


Fig. 2.2

(b) (i) Prepare the space below so that it is suitable for you to record **three** observable differences between the specimens in Fig. 2.1 and in Fig. 2.2.

Record your observations in the space you have prepared.

[4]

(ii) The actual length of line **Y** is 495 μm. Use this measurement to calculate the magnification of Fig. 2.2.
You may lose marks if you do not show your working or if you do not use appropriate units.

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magnification × ..... [4]

(c) You are provided with a sample of plant material, labelled **P**.

You are required to prepare a slide of the xylem vessels from this plant material.

Proceed as follows:

1. Using forceps extract long thin strands of **P** containing xylem vessels as shown in Fig. 2.3.

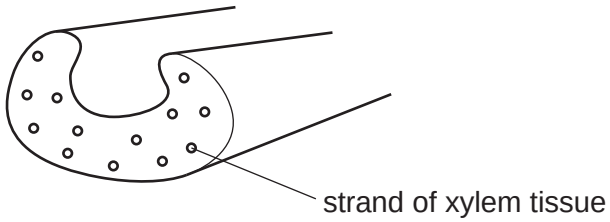


Fig. 2.3

2. Put the strands onto a microscope slide.

3. Add two drops of water and carefully lower a cover slip onto the strands.

4. Put the paper towel over the cover slip and gently press to separate the xylem vessels from surrounding tissue.

5. Look carefully under high power to find two xylem vessels which show different patterns of thickening in the walls.

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Make large drawings of two different patterns of thickening in the walls of the xylem vessels.

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Label the part of the vessel where lignin is found.

[4]

[Total: 18]

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