Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0195201 98

BIOLOGY **9700/32**

Advanced Practical Skills 2 **May/June 2015**

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 pen.
You may use an HB pencil for any diagrams or graphs.
Do **not** use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
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 **12** printed pages.

CAMBRIDGE International Examinations

[Turn over

Before you proceed, read carefully through **the whole** of Question 1 and Question 2.

Plan the use of the two hours to make sure that you finish all the work that you would like to do.

If you have enough time, consider how you can improve the accuracy of your results, for example by obtaining and recording one or more additional measurements.

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

1 Athletes who run long distances need to drink while they are running. Their drinks often contain carbohydrates to provide energy.

You are provided with four drinks: **D1**, **D2**, **D3** and **D4**.
Each drink contains **one** or **more** carbohydrates.

You are required to identify the carbohydrates in the drinks using the reagents provided.

(a) (i) Describe how you will use the reagent(s) to determine whether any of the drinks contain a polysaccharide.

.....

.....

..... [1]

Carry out the test you have described in **(a)(i)** on **D1**, **D2**, **D3** and **D4**.

(ii) Complete the table by using a tick (✓) to show the presence of a polysaccharide and a cross (✗) to show the absence of a polysaccharide, in any of **D1**, **D2**, **D3** and **D4**.

drink	presence (✓) or absence (✗) of polysaccharide
D1	
D2	
D3	
D4	

[1]

You are required to compare the quantity of reducing and non-reducing sugars in each of the drinks.

You will need to record the time taken for the first appearance of any colour change.
If no colour change occurs after 180 seconds (3 minutes), stop the experiment and record '**more than 180**'.

(iii) Describe how you will use the reagent(s) to test for reducing and non-reducing sugars.

reducing sugar test: .....

.....

.....

.....

non-reducing sugar test: .....

.....

.....

.....

.....

[3]

When carrying out a practical procedure, the hazards of the use of all the apparatus and all of the reagents need to be considered, then the **level** of risk needs to be assessed as low or medium or high.

(iv) State the hazard with the greatest level of risk when testing for reducing and non-reducing sugar.
State the level of risk of the procedure: low or medium or high.

hazard .....

level of risk .....

[1]

Carry out the tests on **D1**, **D2**, **D3** and **D4**, as described in **(a)(iii)**, and record your results in **(a)(v)**.

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

[5]

The sugars in the drinks are sucrose and glucose.

(vi) Suggest which drink, **D1**, **D2**, **D3** or **D4**, would provide the athletes with the greatest quantity of glucose, and explain why you selected this drink.

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..... [1]

(vii) A student wanted to investigate the concentration of **reducing sugar** in another drink, **D5**, used by athletes. Describe how the student could estimate the concentration of reducing sugar in drink **D5**.

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.....

.....

.....

..... [3]

Question 1 continues on page 6

(b) The London Olympic Games of 2012 included races run over distances ranging from 100 m to 42 200 m (the Marathon).

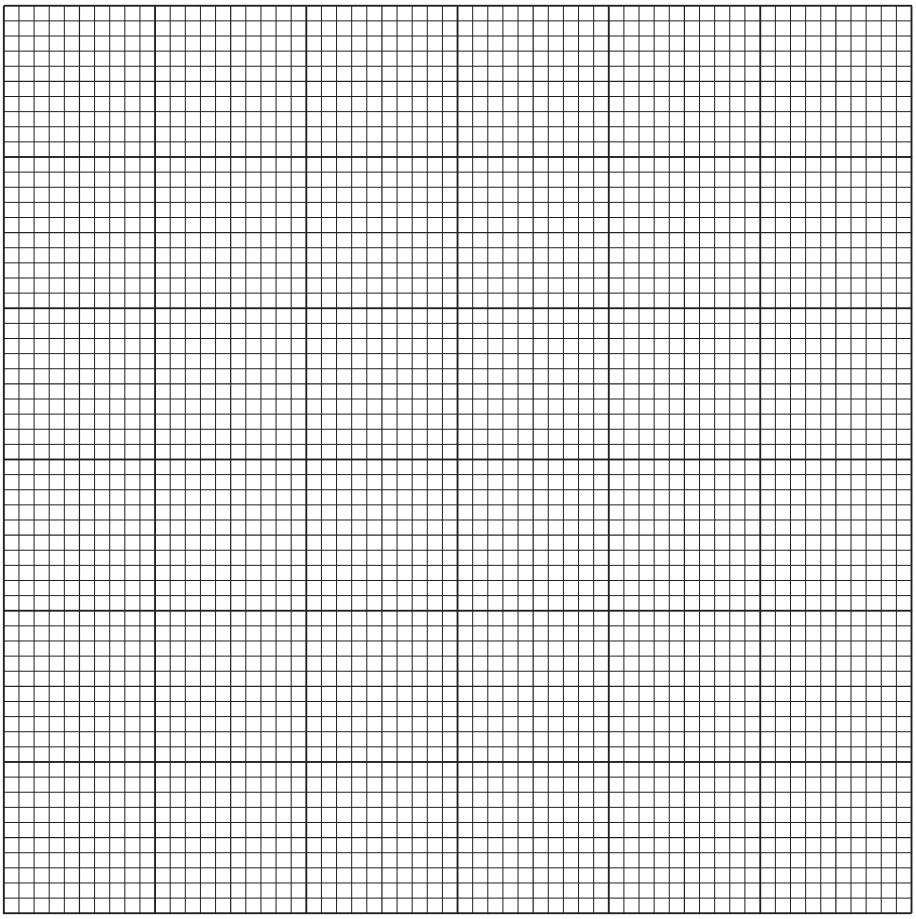
Table 1.1 shows the average speed of the winner of five of these races over different distances. Using $\log_{10}$ of the distance makes the numbers easier to plot on a graph.

Table 1.1

$\log_{10}$ distance/m	average speed/m s^{-1}
2.0	10.4
2.6	9.1
3.2	7.0
4.0	6.1
4.6	5.5

You are required to use a sharp pencil for graphs.

(i) Plot a graph of the data in Table 1.1.



[4]

(ii) Estimate the average speed for a race of distance $\log_{10} 3.5\,\text{m}$.

..... [1]

(iii) Describe the trend shown by the data.

.....

.....

..... [1]

(iv) The winner of the Marathon race had trained at high altitude. Explain why this may have resulted in an increased average speed.

.....

.....

..... [1]

[Total: 22]

You are required to use a sharp pencil for drawings.

2 **(a)** **L1** is a slide of a stained transverse section through a plant stem. This plant species is a native of Europe and parts of Asia. You are not expected to be familiar with this specimen.

(i) Draw a large plan diagram of the quarter of the stem, as shown in Fig. 2.1.

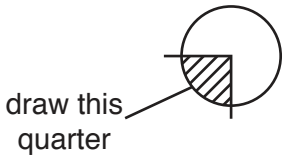


Fig. 2.1

Use **one** ruled label line and label to identify **one** vascular bundle.

[5]

(ii) Select one group of **four** cells from near the centre of the stem. Each cell in the group should touch two of the other cells.

Make a large drawing of this group of **four** cells.

Use **one** ruled label line and label to identify **one** cell wall.

[5]

(b) Fig. 2.2 is a stained transverse section of an organ from a different plant species.
This plant species grows in Asia, Europe and North America.
You are not expected to be familiar with this specimen.

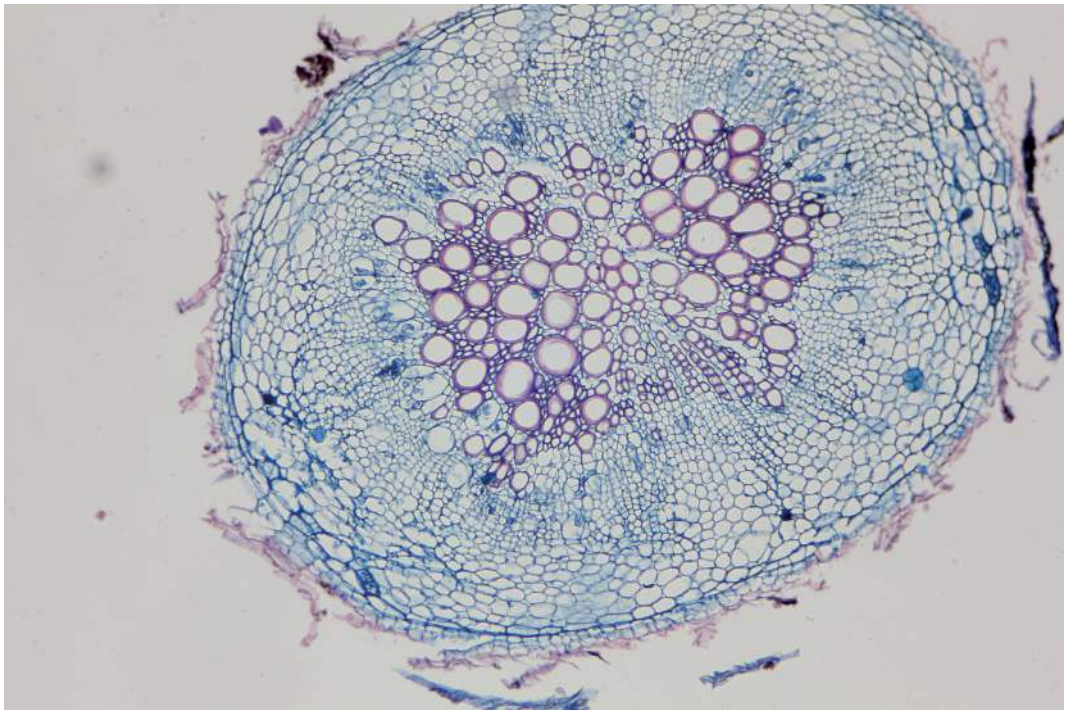


Fig. 2.2

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

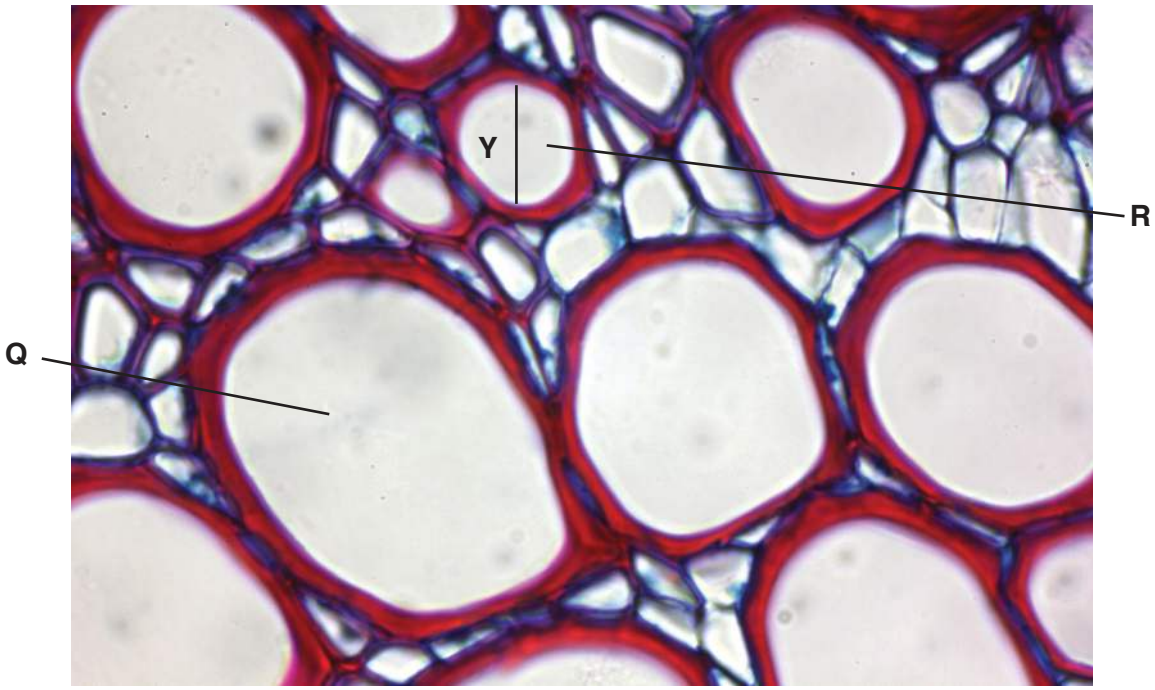
Record your observations in the space you have prepared.

The differences should include:

- the vascular tissue
- one other tissue.

[4]

(c) Fig. 2.3 is a high power view of part of the organ shown in Fig. 2.2.



magnification × 250

Fig. 2.3

(i) Calculate the **actual** widest diameter of the cell labelled **R** as shown by line **Y** in Fig. 2.3.

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

actual widest diameter ..... μm [2]

(ii) State **one** observable feature of cells **Q** and **R** shown on Fig. 2.3, and explain how this feature enables the cells to carry out their function.

.....

.....

..... [1]

[Turn over

(iii) A student observed a different plant of the same species as shown in Fig. 2.3. The student determined the ratio of the diameter of one cell to the diameter of a smaller cell as 360 : 85.

However, a ratio may be simplified by dividing each side by the same number to give the smallest possible whole number on each side.

In this example, both sides of the ratio 360 : 85 are divisible by 5, so the simplest ratio for the diameters measured by the student is 72 : 17.

In Fig. 2.3, cell **Q** has an actual diameter of 200 μm. Determine the simplest ratio of the diameter of cell **Q** to the diameter of cell **R**.

ratio .....[1]

[Total: 18]