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

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

8419007959

BIOLOGY **9700/35**

Paper 31 Advanced Practical Skills **May/June 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 pen.
You may use a pencil for any diagrams, graphs or rough working.
Do **not** use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
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.
You are advised to spend one hour on each 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. 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 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 find the water potential of two solutions, **A** and **B**.

The water potential of a plant tissue can be found by immersing the plant tissue in sucrose solutions of different water potential.

Sucrose solutions **A** and **B** are the solutions in which tissues from two different species of plant did not change in mass after immersion for 30 minutes as shown in Fig. 1.1.

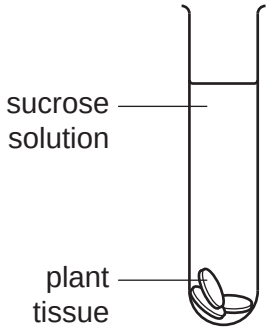


Fig. 1.1

(a) (i) Use two of the following words to complete the sentences below.

gains **less** **loses** **more**

If the plant tissue ..... water then the sucrose solution will become more dilute.

This will change the solution so that it becomes ..... dense. [1]

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A blue dye is added to the two solutions, **A** and **B**, so that they can be seen.

A drop of the coloured solution is placed into a known concentration of sucrose solution.

Fig. 1.2 shows how the drop is released.

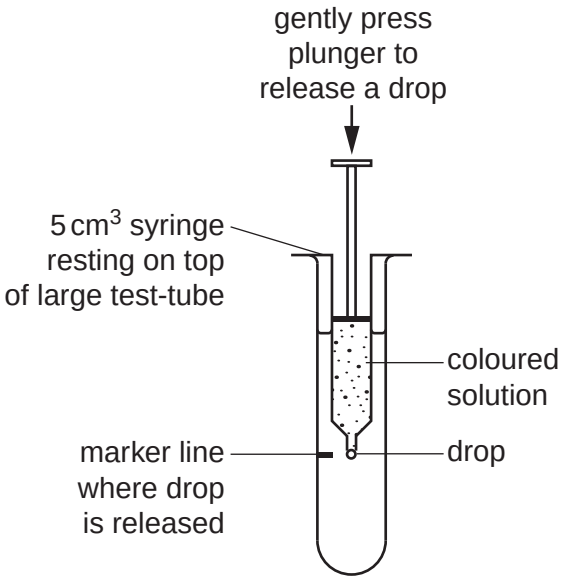
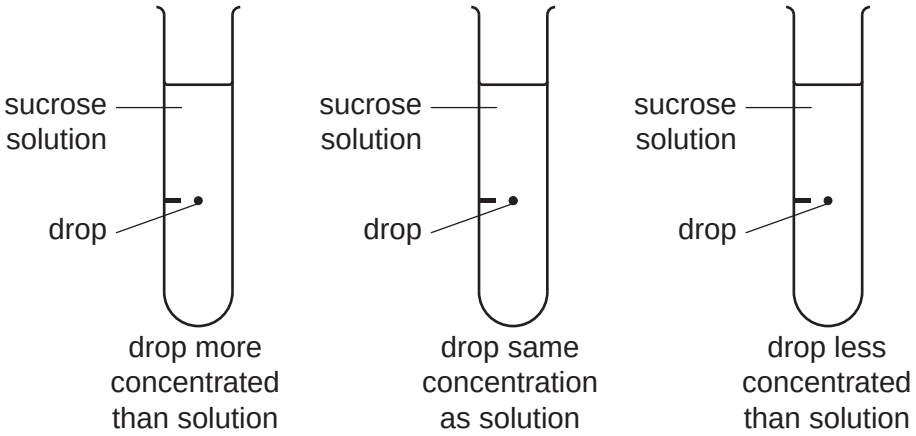


Fig. 1.2

Immediately the drop is released the syringe is removed.

The drop may move up, move down or remain at the same level.

(ii) Show clearly on the diagrams below how you would expect to see the drop move.



[2]

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You are provided with

- 200 cm^3 of 1.0 mol dm^{-3} sucrose solution in a beaker, labelled **S**
- 200 cm^3 of distilled water in a beaker, labelled **W**

- 10 cm^3 of sucrose solutions **A** and **B**
- 10 cm^3 of 0.01% methylene blue, labelled **D**.

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

It is recommended that you wear safety goggles/glasses.

To find the concentration of sucrose in samples **A** and **B** you will need to dilute the 1.0 mol dm^{-3} sucrose solution to provide a range of concentrations.

(iii) Decide on the concentrations of sucrose solution that you will prepare using the 1.0 mol dm^{-3} sucrose solution and distilled water.

You will need to make up 50 cm^3 of each sucrose solution.

Prepare the space below to show

- the concentrations of sucrose solution
- the volumes of 1.0 mol dm^{-3} sucrose solution
- the volumes of distilled water.

[3]

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Make up the sucrose solutions that you have chosen in the containers provided.

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1. Place a 5 cm^3 syringe on top of the large test-tube and use the glass marker to draw a line on the test-tube at the same height as the end of the syringe nozzle as shown in Fig. 1.2.

2. Use a 5 cm^3 syringe to collect 4.0 cm^3 of **A** and place it in a Petri dish. With a pipette, add sufficient drops of **D** to turn the solution blue and stir.

3. Use the same syringe to collect 1.0 cm^3 of the coloured solution **A**. Wipe the syringe with a paper towel and label the syringe **A**.

4. Repeat steps 2 and 3 with sample **B** and label the second syringe **B**.

5. Put 35 cm^3 of one of your sucrose solutions into the large test-tube.

6. As shown in Fig. 1.2, put syringe **A** into the large test-tube so the end of the nozzle is level with the mark.

   Hold the syringe vertically and very gently push out a drop of the coloured solution.

7. Immediately observe the movement of the drop.

8 Record your observations.

9. Repeat steps 6 to 8 with sample **B** in syringe **B**.

10. Empty and wash the large test-tube.

11. Repeat steps 5 to 10 with each sucrose solution that you have made and record all your observations.

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[Turn over

(iv) Prepare the space below to record your observations.

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[6]

(v) Use your results to estimate the sucrose concentration of

sample **A**.....mol dm^{-3}

sample **B**..... mol dm^{-3}.

[2]

In order to find the water potential of the solutions **A** and **B** a graph is required showing the relationship between sucrose concentration and water potential.

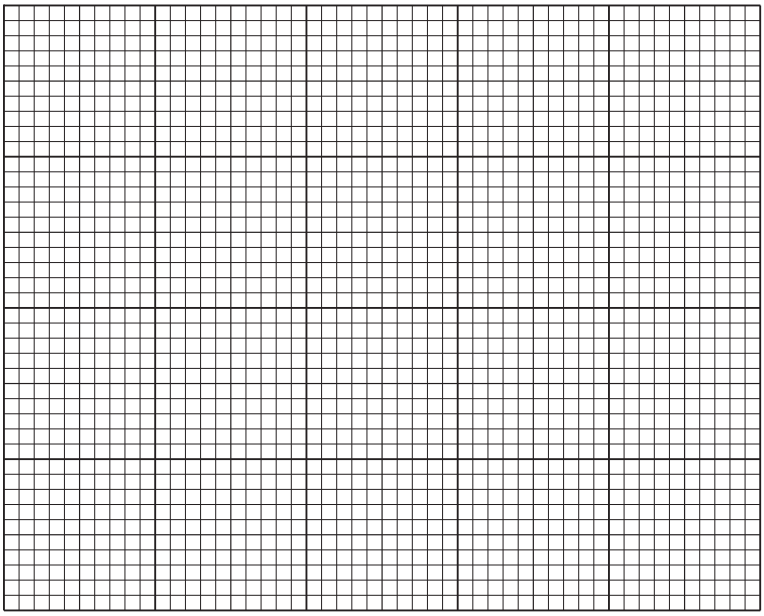
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Table 1.1 shows the water potential of different sucrose concentrations.

Table 1.1

sucrose concentration / mol dm^{-3}	water potential / kPa x 10^2
0.15	–5.0
0.35	–12.0
0.55	–19.0
0.75	–26.0
1.00	–35.0

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



[4]

(ii) Using your results and your graph estimate the water potential of sample **A**.

Show clearly on your graph how you obtained the water potential. [1]

water potential of sample **A** ..... [1]

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(iii) Describe how you would improve the investigation to obtain a more accurate estimate of the water potential of sample **A**.

.....

.....

.....

.....

.....

.....

.....[3]

[Total: 23]

2 **L1** is a slide of a stained transverse section of the trachea from a mammal.

The slide shows the C-shaped ring of cartilage.

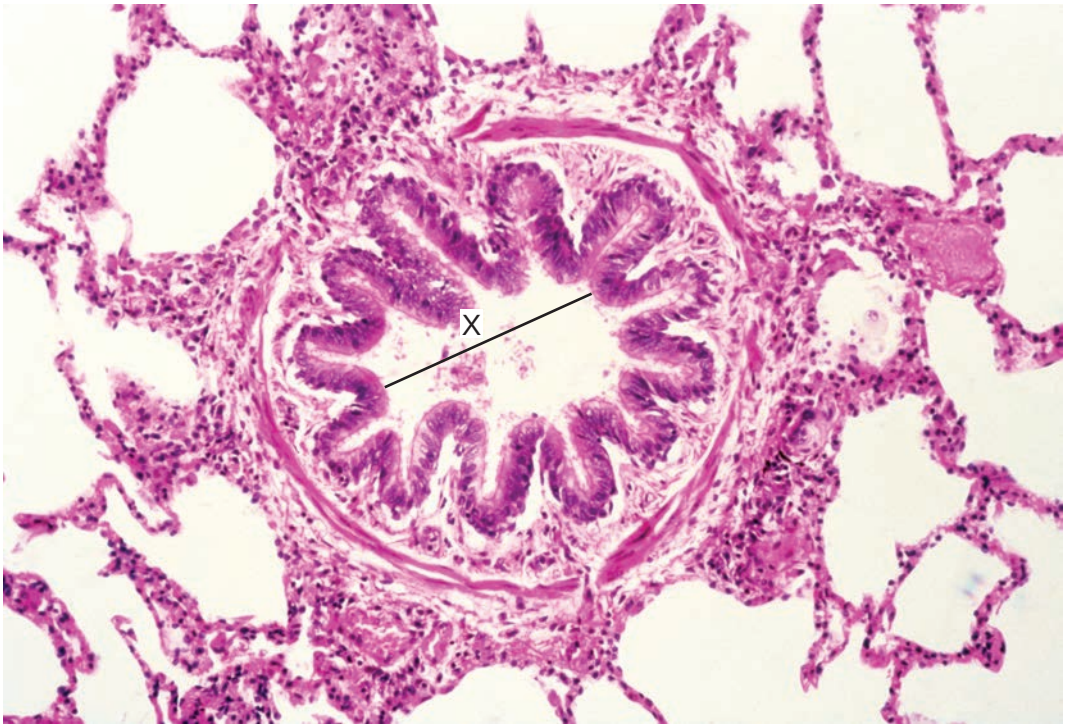
(a) **(i)** Draw a large plan diagram of half of the trachea showing the ends of the cartilage ring.

Label the diagram.

[5]

Fig. 2.1 is a photomicrograph of a transverse section through a different tubular structure from an animal.

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magnification x70

Fig. 2.1

(ii) Prepare the space below so that it is suitable for you to compare and contrast the specimens on slide **L1** and in Fig. 2.1.

Record your observations.

[5]

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[Turn over

(iii) Calculate the actual distance across the lumen of the structure shown by line **X** in Fig. 2.1.

Show all the steps in your calculation.

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[3]

Fig. 2.2 shows a photomicrograph of structures labelled **Z**.

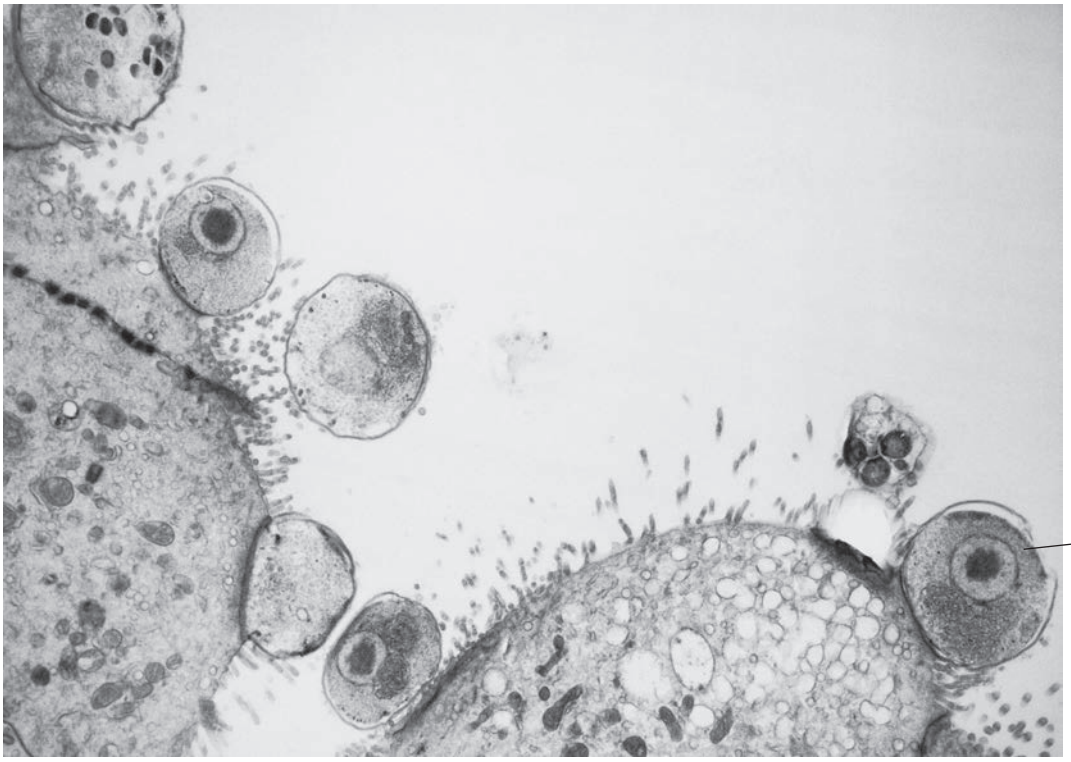


Fig. 2.2

(b) Make a large drawing of three of these structures, which must be complete, to show the differences between them.

Draw a circle on Fig. 2.2 around each of the structures **Z** which you have drawn.

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[4]

[Total: 17]

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