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

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

5697327874

BIOLOGY **9700/32**

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	
3	
Total	

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

You are reminded that you have **two hours** to complete questions 1, 2 and 3.
It is expected that each question will take you approximately **40 minutes**.

For Examiner's Use

Question 2 does not require any apparatus or the use of a microscope. You should **plan your work** so that you complete this question whenever you have spare time.

You may start with **either** Question 1 **or** Question 3, which require the use of apparatus or a microscope.
At the start of the second hour, you should begin the work for the other question, **either** Question 1 **or** Question 3.

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 Doctors use the analysis of urine to help diagnose some medical conditions. One such medical condition is diabetes which results in glucose being released in urine if the condition is untreated.

You are provided with:

labelled	**contents**	**hazard**	**concentration / %**	**volume / cm^3**
G	glucose solution	none	4	30
S1	unknown glucose concentration representing urine	none	–	15
S2	unknown glucose concentration representing urine	none	–	15
W	distilled water	none	–	100
Benedict's solution	Benedict's solution	harmful irritant	–	50

You are required to find the glucose concentrations of solutions **S1** and **S2**.

You are required to carry out a serial dilution of glucose solution, **G**, to reduce the concentration of the glucose solution by half between each successive dilution.

Fig. 1.1 shows how to make the first concentration of 2% glucose solution.

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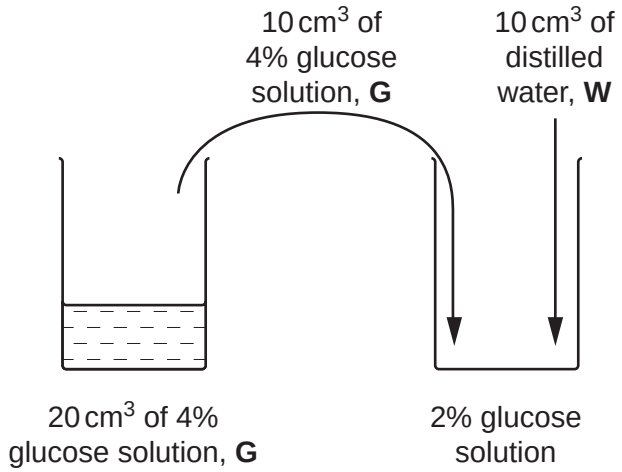

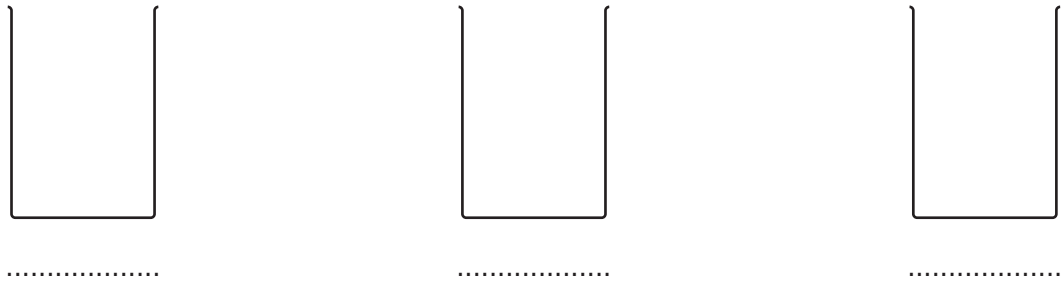

Fig. 1.1

(a) (i) Complete Fig. 1.1 to show how you will make **three** further concentrations of glucose solution, **G**. [3]

(ii) Complete Table 1.1 to show the volumes of solutions you intend to use in your investigation.

Table 1.1

solution	volume / cm^3
Benedict's	
each concentration of **G**	
S1	
S2	

[2]

Proceed as follows:

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1. Prepare the dilutions of **G** as shown in Fig. 1.1 in the containers provided.

2. Label test-tubes with the concentrations of **G**.

3. Label test-tubes **S1** and **S2**.

4. Set up a water-bath and, testing each test-tube separately, test all the concentrations of **G** and the solutions **S1** and **S2** for the presence of glucose. Start timing when the test-tube is placed into the hot water-bath. If there is no colour change after 300 seconds, record 'more than 300' as your result (for step 5).

5. Observe the test-tube very carefully for the first sign of a colour change. This is the end-point of the reaction. **As soon as you see this colour change**, record the time taken for the reaction to reach the end-point.

(b) **(i)** State **one** variable, other than the volume of each solution, which needs to be kept the same in this investigation. Describe how you will keep this variable the same.

.....

.....

..... [1]

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

[4]

(c) (i) Estimate the concentration of glucose in solutions **S1** and in **S2**.

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S1 .....

S2 ..... [1]

(ii) State which solution, **S1** or **S2**, is most likely to be from an untreated diabetic.

untreated diabetic ..... [1]

[Total: 12]

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Question 2 starts on page 7

2 The diameter of a tube, which carries urine in a mammal, was measured at different distances along its length. The diameter of the tube was found to vary along its length.

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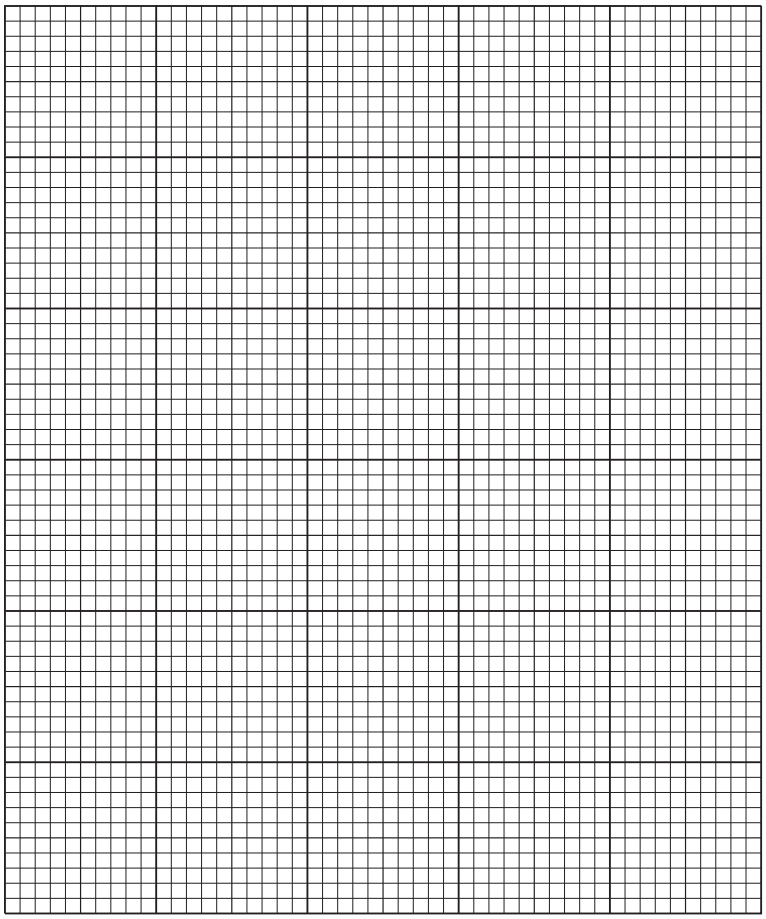
The results are shown in Table 2.1.

Table 2.1

distance along the tube / cm	diameter of the tube / mm
0.5	1.8
4.5	2.4
12.5	3.8
20.0	5.1
24.0	5.8

(a) (i) Plot a graph of the data shown in Table 2.1.



[4]

Fig. 2.1 is a photomicrograph of the transverse section through this tube.

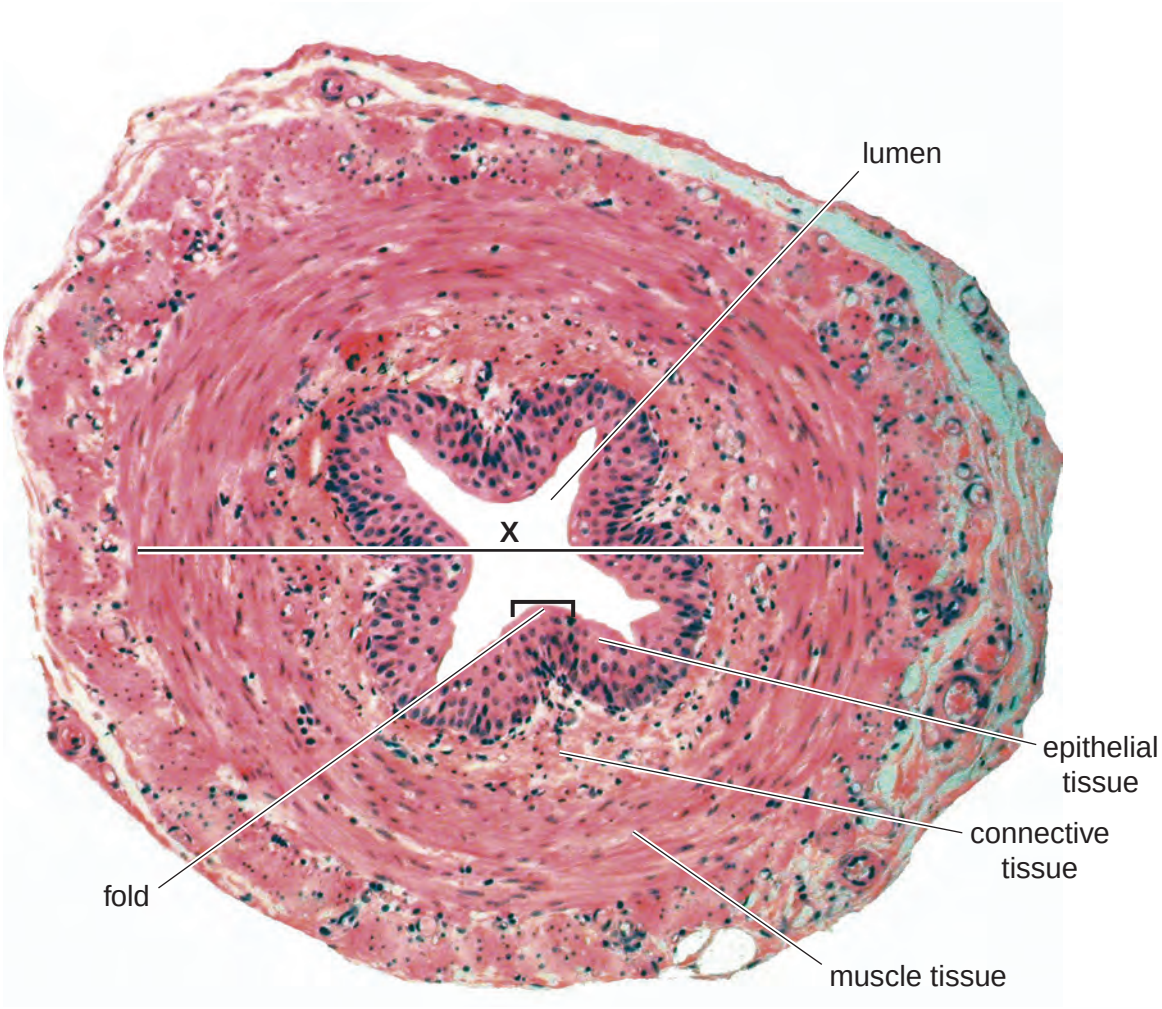


Fig. 2.1 magnification × 22

(b) (i) Calculate the actual diameter of the tube shown by line **X** in Fig. 2.1.

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

[4]

(ii) Use the actual diameter of the tube calculated in **(ii)** and your graph in **(a)(i)** to estimate the distance along the length of the tube, where the section was cut.

.....[1]

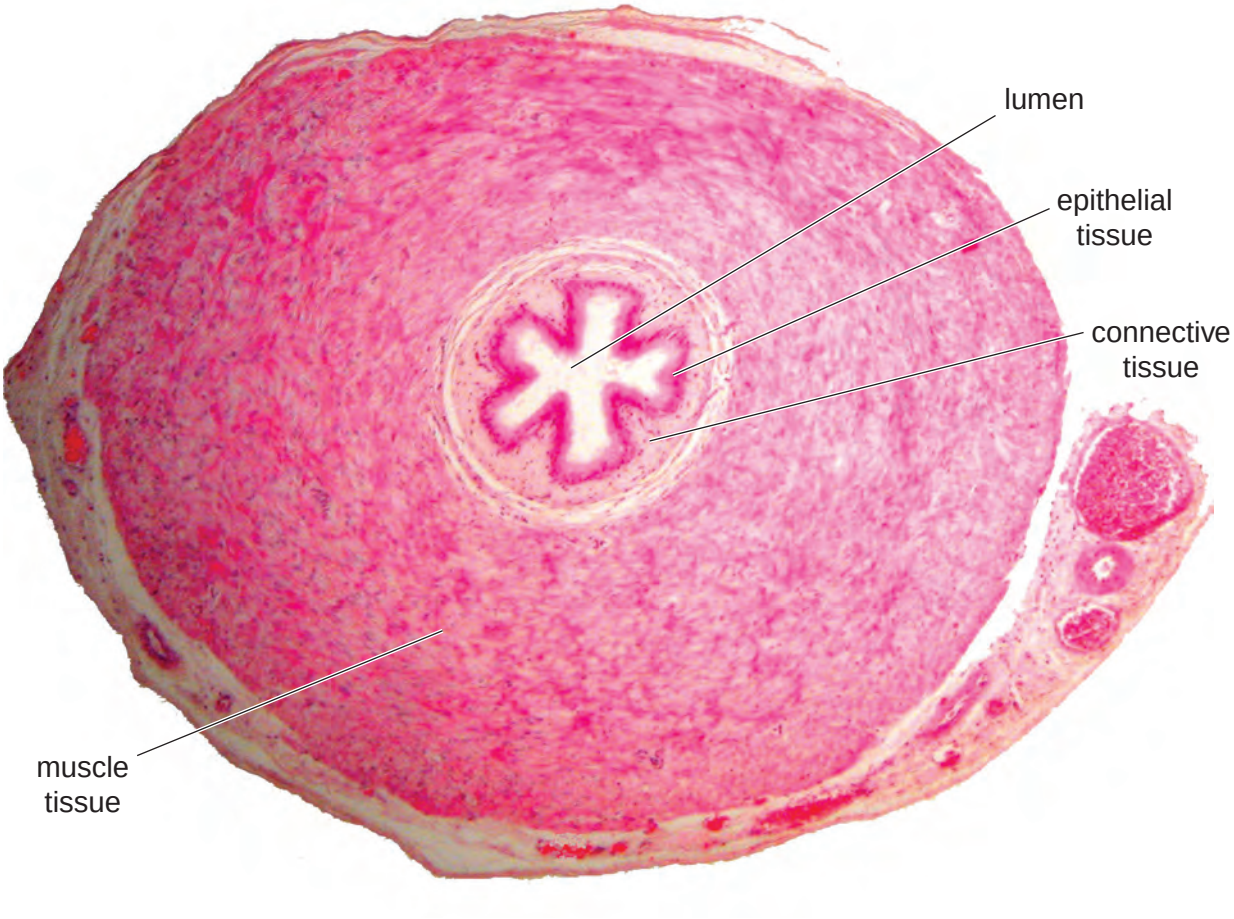
(iii) Describe how you would find the **mean** diameter of the tube shown in Fig. 2.1.

.....

.....

.....[2]

Fig. 2.2 is a photomicrograph of a transverse section of a different tube from a mammal.



magnification × 90

Fig. 2.2

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

Record your observations in the space you have prepared.

[5]

[Total: 16]

3 **L1** is a slide of a stained transverse section through a stem.

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(a) **(i)** Draw a large plan diagram of the whole of the transverse section.

Label the epidermis and xylem.

[5]

(ii) Calculate the ratio of the total diameter of the stem to the diameter of the central pith.

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

[1]

(b) (i) State one observable feature of the epidermis that supports the conclusion that this is a stem from a plant growing in a dry habitat.

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Explain how this feature reduces water loss.

feature .....

explanation .....

.....

.....[1]

(ii) Make a large drawing of three adjacent (touching) cells from the central pith.

Label the cell wall.

[5]

[Total: 12]

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