

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

BIOLOGY



Practical Examination 1 (Part B – Practical Test) **2803/03/TEST**

Tuesday **10 JANUARY 2006** Morning 1 hour 30 minutes

Candidates answer on the question paper.

Additional materials:

- Candidate's Plan (Part A of the Practical Examination)
- Electronic calculator
- Ruler (cm/mm)

Candidate
Name

Centre
Number

--	--	--	--	--

Candidate
Number

--	--	--	--

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Pencils may be used for graphs or diagrams **only**.
- Read the instructions and questions carefully before starting your answers.
- Do not write in the bar code. Do not write in the grey area between the pages.
- **DO NOT WRITE IN THE AREA OUTSIDE THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

- In this Practical Test, you will be assessed on the Experimental and Investigative Skills:
 - Skill I: Implementing
 - Skill A: Analysing evidence and drawing conclusions
 - Skill E: Evaluating
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
Planning	16	
1	30	
2	14	
TOTAL	60	

This question paper consists of 11 printed pages, a Report Form and an Insert.

Answer **all** the questions.

Question 1 [60 minutes]

You are required to investigate the effect of immersing a plant tissue in a range of sucrose solutions with different water potentials.

You will use strips of tissue cut from the petioles (leaf stalks) of celery.

You are provided with two petioles that have been standing in water. One of them, the stained petiole, has been standing in water coloured with a blue dye.

Take care when using the scalpel, single-edged razor blade or sharp knife.

Proceed as follows:

1. You are provided with six Petri dishes labelled **A** to **F** and six boiling tubes labelled **A** to **F**. Boiling tube **A** contains 30 cm³ distilled water. Tubes **B** to **F** contain 30 cm³ of different sucrose solutions.
2. Pour:
 - the distilled water from tube **A** into Petri dish **A**, and
 - each of the five sucrose solutions into the Petri dishes labelled **B** to **F** as shown in Table 1.1.

Replace the lids after the liquids have been poured into the dishes.

Table 1.1

Petri dish	contents
A	distilled water
B	0.1 mol dm ⁻³ sucrose solution
C	0.2 mol dm ⁻³ sucrose solution
D	0.3 mol dm ⁻³ sucrose solution
E	0.4 mol dm ⁻³ sucrose solution
F	0.5 mol dm ⁻³ sucrose solution

3. Place the **unstained** celery petiole on the tile and use the scalpel (or razor blade or knife) to trim about 5 mm from each end of the petiole.
4. Cut the remaining piece of **unstained** celery petiole into three roughly equal sized pieces each about 45 mm in length.

5. Trim each piece of celery to exactly 40 mm in length. Place one of the lengths of celery on its end on the tile, as shown in Fig. 1.1. Cut at least three sheets of tissue that are approximately 10 mm wide and no more than 2 mm thick from the **ridged** side of the petiole, as shown in Fig. 1.1.

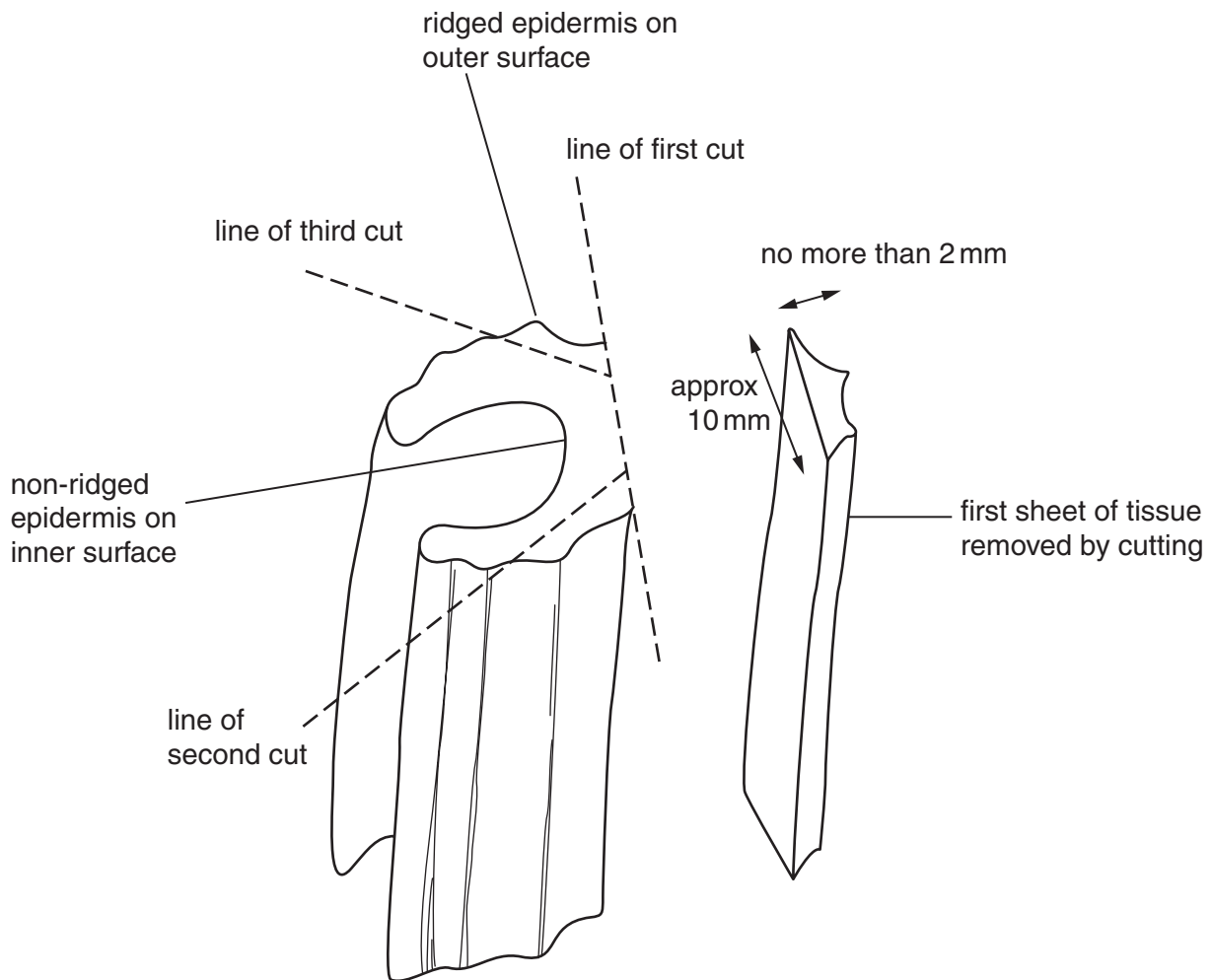


Fig. 1.1

6. Place the sheets of tissue flat on the tile and cut them lengthways into strips that are about 3 to 4 mm wide by 40 mm long. Use the other lengths of petiole as required in order to obtain a total of at least **twelve** of these strips. Note that the **outer surface** (epidermis) of each strip is covered by a shiny, waxy cuticle.
7. Place **two** of the strips into each Petri dish and replace the lids. Start a stop watch or stopclock. Leave the strips in the Petri dishes for **at least ten minutes**.

8. While you are waiting, cut **across** the middle of the **stained** petiole. Use the hand lens to look at the cut end (transverse section) of the petiole you have prepared and the distribution of the blue dye within it.
 - (a) In the space below, make a drawing of the transverse section you have prepared to show its outline and the areas stained by the blue dye. Label the blue areas.

- (b) Explain the distribution of the blue dye within the section.

.....

.....

.....

.....

9. Continue from step 7 by removing one strip from dish **A** (strip 1) and blotting it gently on some absorbent paper.
10. Make a drawing to show the outline of the strip in the space provided in Table 1.2 on page 5. Indicate which side of the strip is the epidermis by labelling it '**E**'.
11. Remove the second strip from dish **A** (strip 2), blot it and draw an outline of the strip in Table 1.2. Indicate which side of the strip is the epidermis by labelling it '**E**'.
12. Remove the remaining strips from the Petri dishes one at a time and draw them in the appropriate places in Table 1.2. Indicate on each drawing which side is the epidermis by labelling with an '**E**'.

(c)

Table 1.2

Petri dish	concentration of sucrose / mol dm ⁻³	outline of strip 1	outline of strip 2
A	0.0 (distilled water)		
B	0.1		
C	0.2		
D	0.3		
E	0.4		
F	0.5		

[Turn over

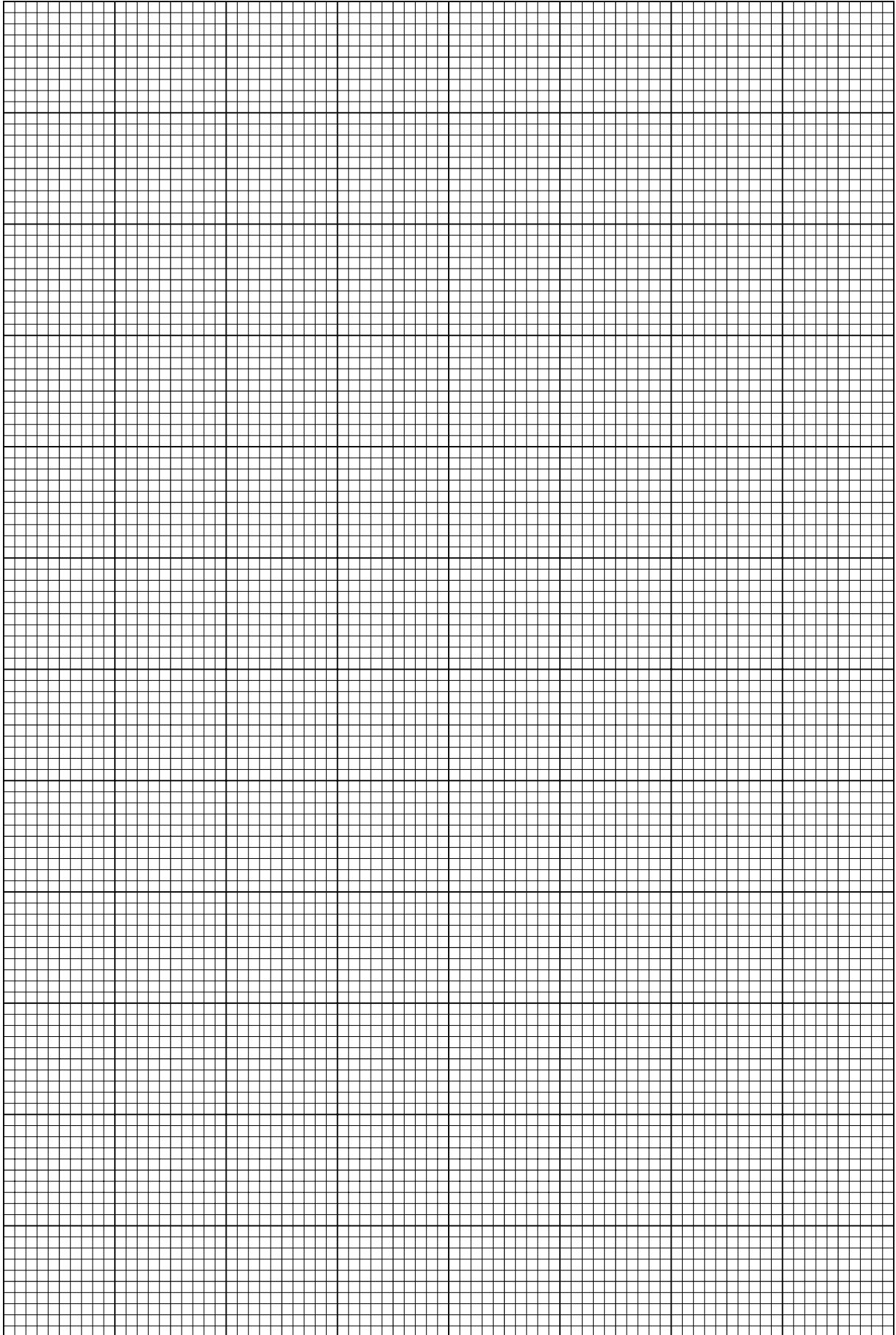
A student carried out an investigation to find the **water potential** of some grapes. The student weighed the grapes in groups of three and then placed them in salt solutions for 24 hours. The grapes were then removed, surface dried and reweighed. The student's results are shown in Table 1.3.

Table 1.3

concentration of salt solution / mol dm ⁻³	water potential of salt solution / kPa	initial mass / g	final mass / g	change in mass / g	% change
0.00	0	15.42	16.65	1.23	+8.0
0.05	-220	15.79	16.80	1.01	+6.4
0.10	-440	15.33	16.07	0.74	+4.8
0.25	-1055	16.16	16.73	0.57	+3.5
0.50	-2120	15.10	15.28	0.18	+1.2
0.75	-3195	15.53	15.32	0.21	-1.4
1.00	-4320	15.26	14.98	0.28	-1.8

- (f) The student concluded that the water potential of the grapes was approximately -2600 kPa.
- (i) Plot a graph of the student's results on the graph paper provided on page 9.
- (ii) Indicate on your graph how you would estimate the water potential of the grapes.

[Total: 30]



Question 2 [30 minutes]

Slide **K1** is a transverse section of mammalian trachea.

Fig. 2.1 is a plan drawing of a section of the trachea.

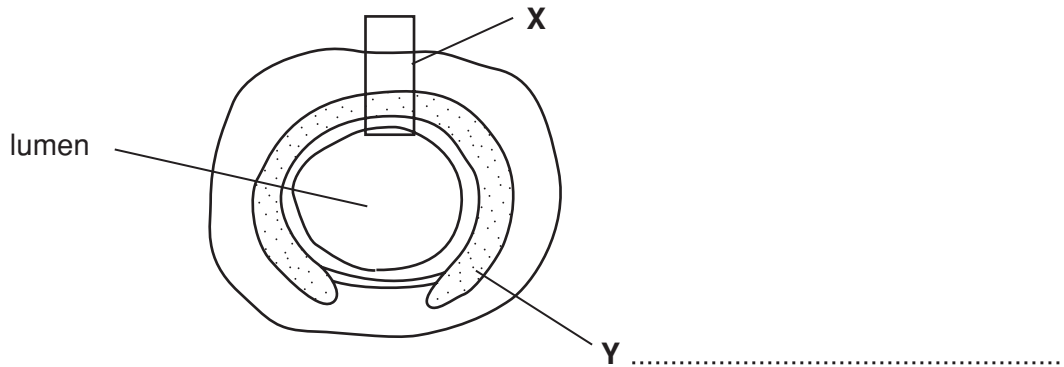


Fig. 2.1

Examine **K1** using the **low** and **high powers** of your microscope.

- (a) (i) Name the tissue labelled **Y** on Fig. 2.1.
- (ii) Make a low power **plan drawing** in the space below to show the structures and tissues in the area equivalent to **X** in Fig. 2.1. Do not draw individual cells.
- (iii) Label your drawing **and** annotate it to show the **roles** of the structures and tissues you have labelled.

- (b) Fig. 2.2, provided on an insert, shows two photomicrographs of a transverse section of the wall of an artery.

Complete the table below to describe the **structure** of the wall of the artery as shown in Fig. 2.2.

feature	artery (Fig. 2.2)
lining of the lumen	<p>.....</p> <p>.....</p>
distribution of smooth muscle	<p>.....</p> <p>.....</p>
tissues that are present, other than smooth muscle	<p>.....</p> <p>.....</p>

- (c) Outline the changes that take place in the trachea and in an artery leading to a leg muscle during exercise.

changes in the trachea

.....

.....

.....

.....

changes in an artery leading to a leg muscle

.....

.....

.....

.....

[Total: 14]

END OF QUESTION PAPER

[Turn over

REPORT FORM

The teacher responsible for the supervision of the Practical Test is asked to report on the following:

- (a) Any particular difficulties encountered in making preparations for the Practical Test.

- (b) Whether it was necessary to make any substitutions for the materials listed in the Instructions. If so, submit a copy of the results obtained by a teacher or technician, using the substituted materials, on top of the candidates' scripts.

- (c) Any difficulties experienced by the candidate due to deficient materials or faulty apparatus. If so, give brief details.

- (d) Any assistance given to the candidate with respect to colour blindness or other physical handicap. If so, give brief details.

Other cases of hardship, for example illness or temporary disability, should be reported directly to OCR, by the Examinations Officer, as a normal Application for Special Consideration.

Signed

Information that applies to all candidates should be given on the first candidate's script only .