

1

The leaves of most plants have stomata.

(a) (i) Name the cells which control the size of the stomata.

.....

(1)

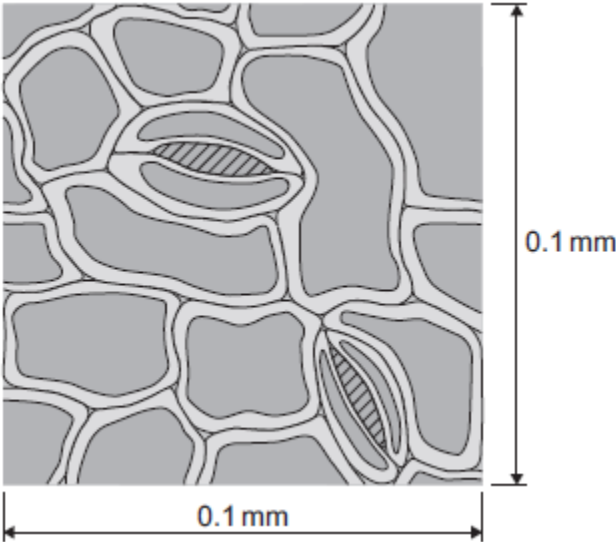
(ii) Give **one** function of stomata.

.....

.....

(1)

(b) The image below shows part of the surface of a leaf.



The length and width of this piece of leaf surface are both 0.1 mm.

(i) Calculate the number of stomata per mm<sup>2</sup> of this leaf surface.

.....

.....

..... per mm<sup>2</sup>

(2)

(ii) A different plant species has 400 stomata per mm<sup>2</sup> of leaf surface.

Having a large number of stomata per mm<sup>2</sup> of leaf surface can be a disadvantage to a plant.

Give **one** disadvantage.

.....  
.....

**(1)**

(c) A student investigated the loss of water from plant leaves.

The student did the following:

- Step 1: took ten leaves from a plant
- Step 2: weighed all ten leaves
- Step 3: hung the leaves up in a classroom for 4 days
- Step 4: weighed all ten leaves again
- Step 5: calculated the mass of water lost by the leaves
- Step 6: repeated steps 1 to 5 with grease spread on the upper surfaces of the leaves
- Step 7: repeated steps 1 to 5 with grease spread on both the upper and lower surfaces of the leaves.

All the leaves were taken from the same type of plant.

The table below shows the student's results.

Treatment of leaves	Mass of water the leaves lost in g
No grease was used on the leaves	0.98
Grease on upper surfaces of the leaves	0.86
Grease on upper and lower surfaces of the leaves	0.01

(i) What mass of water was lost in 4 days through the upper surfaces of the leaves?

.....  
.....

Mass = ..... g

**(1)**

- (ii) Very little water was lost when the lower surfaces of the leaves were covered in grease.

Explain why.

.....

.....

.....

.....

.....

.....

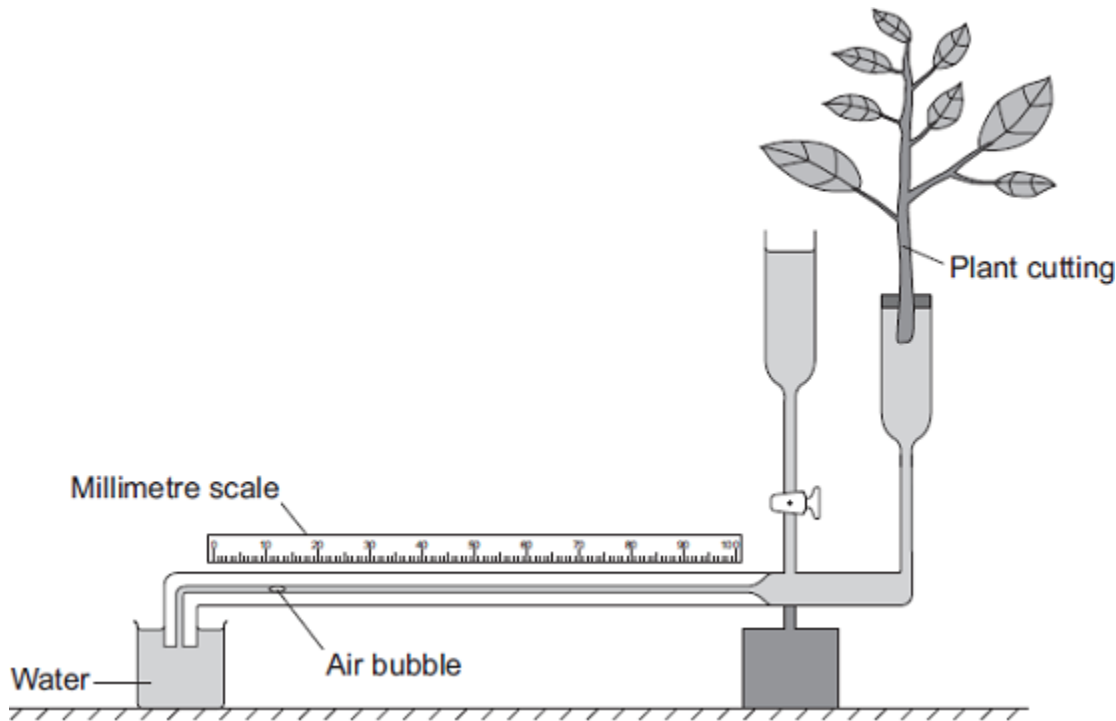
.....

.....

**(3)**  
**(Total 9 marks)**

2

Some students used the apparatus shown in the diagram to measure the rate of water uptake by a plant cutting.



The students set up the apparatus in three different conditions:

- no wind at 15°C
- no wind at 25°C
- wind at 25°C

For each experiment, the students recorded the movement of the air bubble along the scale.

(a) (i) Name the **two** variables the students chose to change in these experiments.

- 1 .....
- 2 .....

(2)

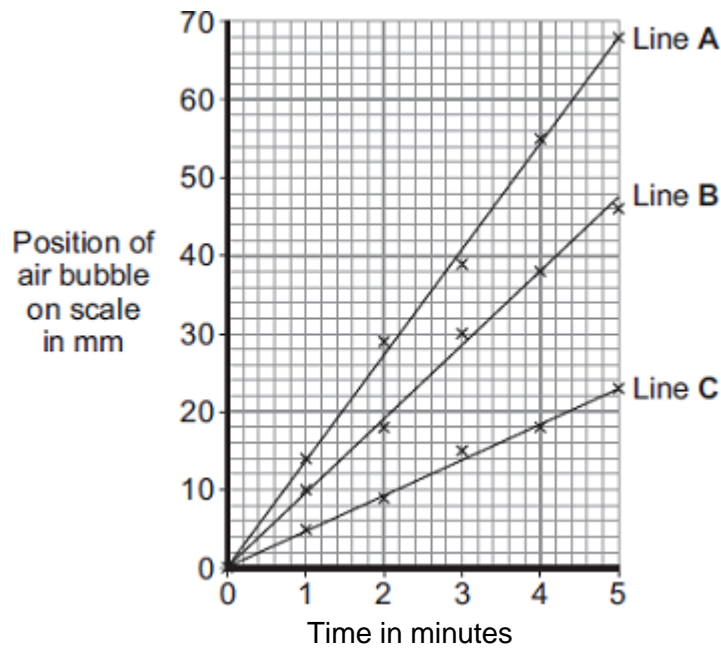
(ii) It was important to use the same plant cutting each time to make these experiments fair.

Explain why.

- .....
- .....

(1)

(b) The graph shows the students' results.



Which line on the graph, **A**, **B** or **C**, shows the results for each of the three different experiments?

Write each of the letters, **A**, **B** and **C**, in the correct boxes in the table.

Conditions	Letter
No wind at 15°C	
No wind at 25°C	
Wind at 25°C	

(2)

(c) Water is lost from the leaves of the plant cutting.

Name this process.

Draw a ring around **one** answer.

**distillation**

**respiration**

**transpiration**

(1)  
(Total 6 marks)

## Mark schemes

1	(a)	(i)	guard (cells) <i>allow phonetic spelling</i>	1
		(ii)	any <b>one</b> from: <i>ignore reference to cells</i> <ul style="list-style-type: none"><li>allow carbon dioxide to enter <i>allow control loss / evaporation of water or control transpiration rate</i></li><li>allow oxygen to leave. <i>allow 'gaseous exchange'</i></li></ul>	1
	(b)	(i)	200 <i>correct answer gains 2 marks with or without working</i> <i>allow 1 mark for <math>0.1 \times 0.1 = 0.01</math> (mm<sup>2</sup>)</i>	2
		(ii)	more / a lot of / increased water loss <i>allow plant more likely to wilt (in hot / dry conditions)</i>	1
	(c)	(i)	0.12	1
		(ii)	the lower surface has most stomata  stomata are now covered / blocked (by grease)  so water cannot escape / evaporate from the stomata <i>ignore waterproof</i> <i>to gain credit stomata must be mentioned at least once</i>	1 1 1
2	(a)	(i)	wind <i>answers in either order</i>	1
			temperature <i>ignore weather</i>	1

[9]

(ii) different plants have different sizes

*ignore reference to validity*

/ different numbers of leaves

/ different sizes of leaves

/ different plants take up different amounts of water

/ different number of stomata

/ different surface area

*allow different plants need different amounts of water*

1

(b) in table, in sequence:

C

B

A

*all 3 correct = 2 marks*

*2 correct = 1 mark*

*0 or 1 correct = 0 marks*

max 2

(c) transpiration

1

[6]