0 9   Plants transport water and mineral ions from the roots to the leaves.

0 9 . 1   Plants move mineral ions:

- from a low concentration in the soil
- to a high concentration in the root cells.

What process do plants use to move these minerals ions into root cells?

[1 mark]

Tick **one** box.

Active transport   ☐

Diffusion   ☐

Evaporation   ☐

Osmosis   ☐

0 9 . 2   Describe how water moves from roots to the leaves.

[2 marks]

_____

_____

_____

_____

Plants lose water through the stomata in the leaves.

The epidermis can be peeled from a leaf.

The stomata can be seen using a light microscope.

Table 5 shows the data a student collected from five areas on one leaf.

Table 5

Leaf area	Number of stomata	
	Upper surface	**Lower surface**
1	3	44
2	0	41
3	1	40
4	5	42
5	1	39
Mean	**2**	**X**

| 0 | 9 | . | 3 | Describe how the student might have collected the data in **Table 5**.

[3 marks]

_____

_____

_____

_____

_____

_____

_____

| 0 | 9 | . | 4 | What is the median number of stomata on the upper surface of the leaf?

[1 mark]

_____

| 0 | 9 | . | 5 | Calculate the value of **X** in **Table 5**.

Give your answer to 2 significant figures.

[2 marks]

_____

_____

Mean number of stomata on lower surface of leaf = _____

| 0 | 9 | . | 6 | The plant used in this investigation has very few stomata on the upper surface of the leaf.

Explain why this is an **advantage** to the plant.

[2 marks]

_____

_____

_____

_____

Turn over for the next question

Question 9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	active transport		1	AO1/1 4.1.3.3
09.2	by transpiration stream / pull		1	AO1/1 4.2.3.2
	in xylem		1	AO1/1 4.2.3.1
09.3	any **three** in the correct order from: • mount epidermis on a slide • count stomata in one area • repeat in four more areas • repeat method on other surface of leaf • calculate mean	allow nail varnish film	3	AO2/2 4.2.3.2
09.4	1	allow numbers written out in a line with middle number circled	1	AO2/2 4.2.3.2
09.5	(44 + 41 + 40 + 42 + 39) / 5 = 41.2		1	AO2/2 4.2.3.2
	41	allow 41 with no working shown for **2** marks allow 41.2 for **1** mark	1	AO2/2 4.2.3.2
09.6	less water lost		1	AO3/1a 4.2.3.2
	so it does not wilt		1	AO3/1b 4.2.3.2
Total			**11**	