Do not write outside the box

1 A student did an investigation into the loss of water vapour from the leaves of a plant. This is the procedure he followed in order to carry out his investigation.

- Cut three leaves from a plant
- Add a thin waterproof layer of vaseline to the top of one, the bottom of the second and both surfaces of the third leaf
- Measure the mass of each leaf
- Record the mass every 5 minutes for 30 minutes

Leaf 1
Vaseline on top surface

Leaf 2
Vaseline on bottom surface

Leaf 3
Vaseline on both surfaces

The table shows the results of the investigation.

Position of vaseline	Mass of Leaf (g)						
	0 mins	5 mins	10 mins	15 mins	20 mins	25 mins	30 mins
Leaf 1: top only	10.1	9.9	9.6	9.4	9.1	8.8	8.6
Leaf 2: bottom only	10.5	10.5	10.5	10.5	10.4	10.4	10.4
Leaf 3: both surfaces	9.8	9.8	9.8	9.8	9.8	9.8	9.8

1 (a) (i) Calculate the **loss in mass** of leaf 1, in g/min over the 30 minutes of the experiment.

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Loss in mass = …….. g/min
(2 marks)

1 (a) (ii) What do the results suggest about water vapour loss from the surfaces of leaves?

Use information from the table in your answer.

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(3 marks)

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1 (b) In a separate experiment the student did an experiment to investigate the effect of environmental conditions on the water loss from leaves. The two conditions are described in the diagram. The mass was measured before and after the experiment.

Five minutes blown by a fan.

Five minutes at 30 degrees

1 (b) (i) Another student suggested that there should be another leaf that should:

- be at normal room temperature
- have no air blown on it.

Suggest a reason why would it be useful to have a third leaf with these conditions?

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(2 marks)

1 (b) (ii) Suggest one other environmental factor that affects the rate of water loss from leaves.

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(1 mark)

1 (b) (iii) What is the role of stomata in leaves?

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(2 marks)

(Total 10 marks)

2 Plants take in water and mineral ions from the soil through their roots.

Mineral ions are often found in lower concentrations in the soil than in the roots.

Describe in detail the way in which water and mineral ions are taken up from the soil by the roots.

Water ……..

……..

……..

……..

(3 marks)

Mineral ions ……..

……..

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……..

(3 marks)

2 (a) Describe how the structure roots help to maximise the uptake of water and mineral ions.

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(2 marks)

(Total 8 marks)