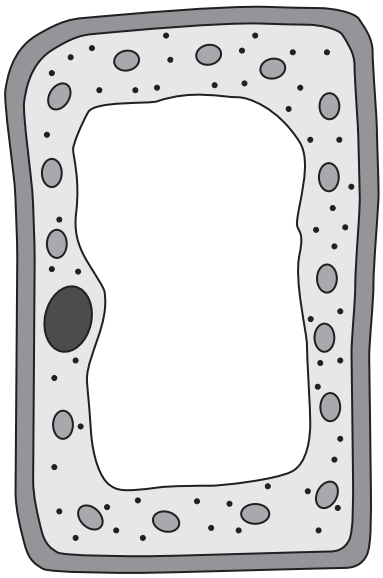
1 The diagram shows a plant cell.



(a) Complete the sentence by putting a cross (☒) in the box next to your answer.

This plant cell is a

(1)

- ☒ **A** xylem vessel
- ☒ **B** phloem vessel
- ☒ **C** root hair cell
- ☒ **D** leaf palisade cell

(b) Explain how water moves from cell to cell in a leaf.

(2)

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.....

(c) Some small plants can grow on the bark of trees.

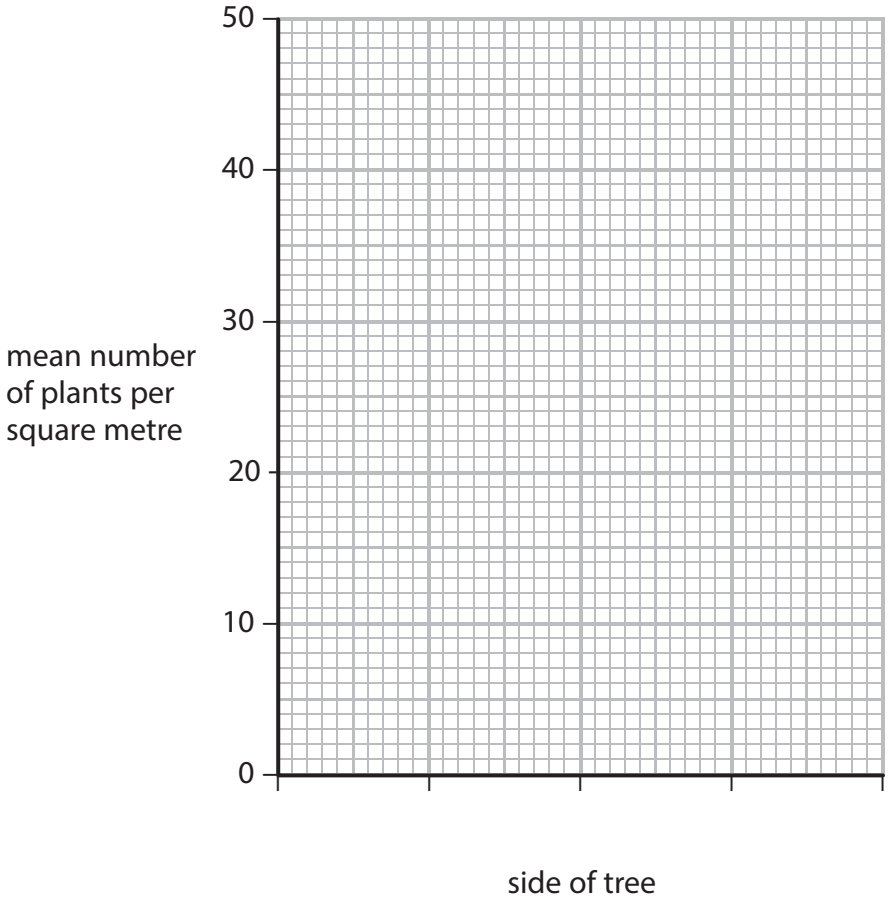
The distribution of two plant species, species A and species B, growing on the north and south side of a tree was investigated.

The results are shown in the table.

	mean number of plants per square metre	
side of tree	**species A**	**species B**
North	48	12
South	0	36

(i) Draw a bar chart to illustrate the data in this table.

(2)



(ii) Which piece of equipment would be used to measure the distribution of plants on the bark of the tree?

Place a cross (☒) in the box next to your answer.

(1)

☒ **A** a pooter

☒ **B** a sweep net

☒ **C** a pitfall trap

☒ **D** a quadrat

(iii) Suggest reasons for the distribution of species B on the north and south sides of the tree.

(2)

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.....

(Total for Question 1 = 8 marks)

2 (a) Complete the sentence by putting a cross (☒) in the box next to your answer.

Plants lose water, into the air, by a process called

(1)

☒ **A** active transport

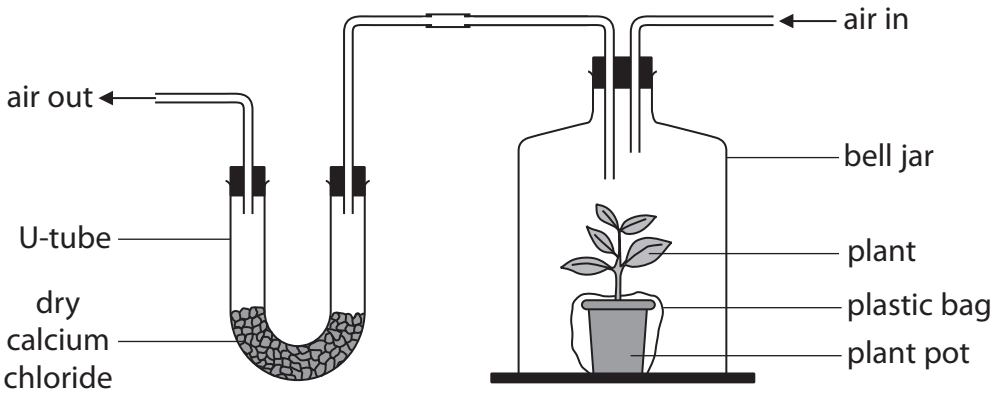
☒ **B** fertilisation

☒ **C** photosynthesis

☒ **D** transpiration

(b) An investigation was carried out to measure water loss from a plant, at four different temperatures.

The diagram shows the apparatus used.



The calcium chloride absorbs the water lost by the plant.

The table shows the results of this investigation.

temperature / °C	mass of calcium chloride / g	
	before investigation	after investigation
15	90	100
25	90	115
35	90	122
45	90	117

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The maximum mass of water lost from the plant in this investigation was

(1)

☒ **A** 27 g

☒ **B** 32 g

☒ **C** 117 g

☒ **D** 122 g

(ii) Describe the effect of temperature on water loss from this plant during the investigation.

(2)

.....

.....

.....

.....

(iii) Suggest why the plastic bag was placed around the plant pot during this investigation.

(2)

.....

.....

.....

.....

(c) Explain how glucose production could be affected if this plant lost a lot of water.

(2)

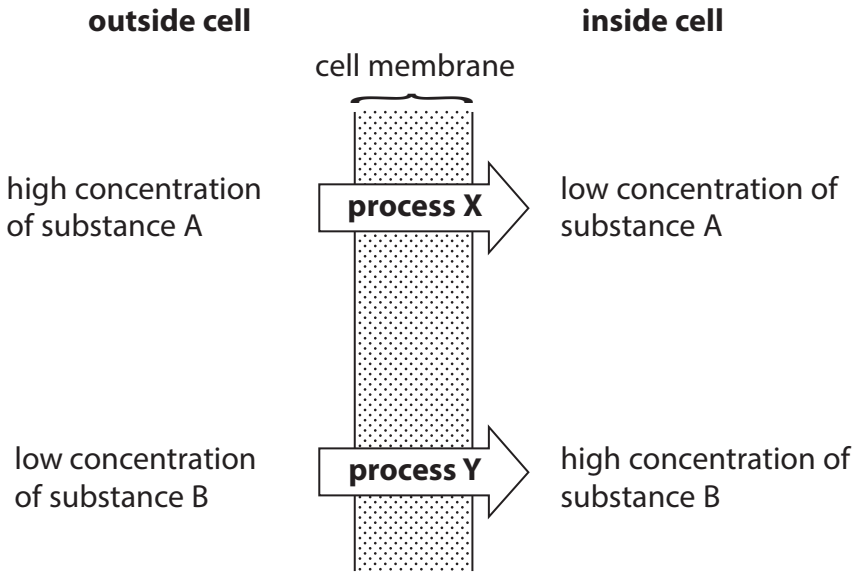
(d) Describe the process that moves water from the soil into the plant.

(2)

(Total for Question 2 = 10 marks)

3 (a) Substances in the soil are taken up by plant root hair cells.

The diagram shows the direction of movement of two substances A and B across the cell membrane of a root hair cell.



(i) Name **process X**.

(1)

.....

(ii) Name **process Y**.

(1)

.....

(iii) Mineral ions are taken up by the root hair cells of plants.

Name the type of vessel that transports these mineral ions through the plant.

(1)

.....

(b) A student investigated osmosis in a courgette.

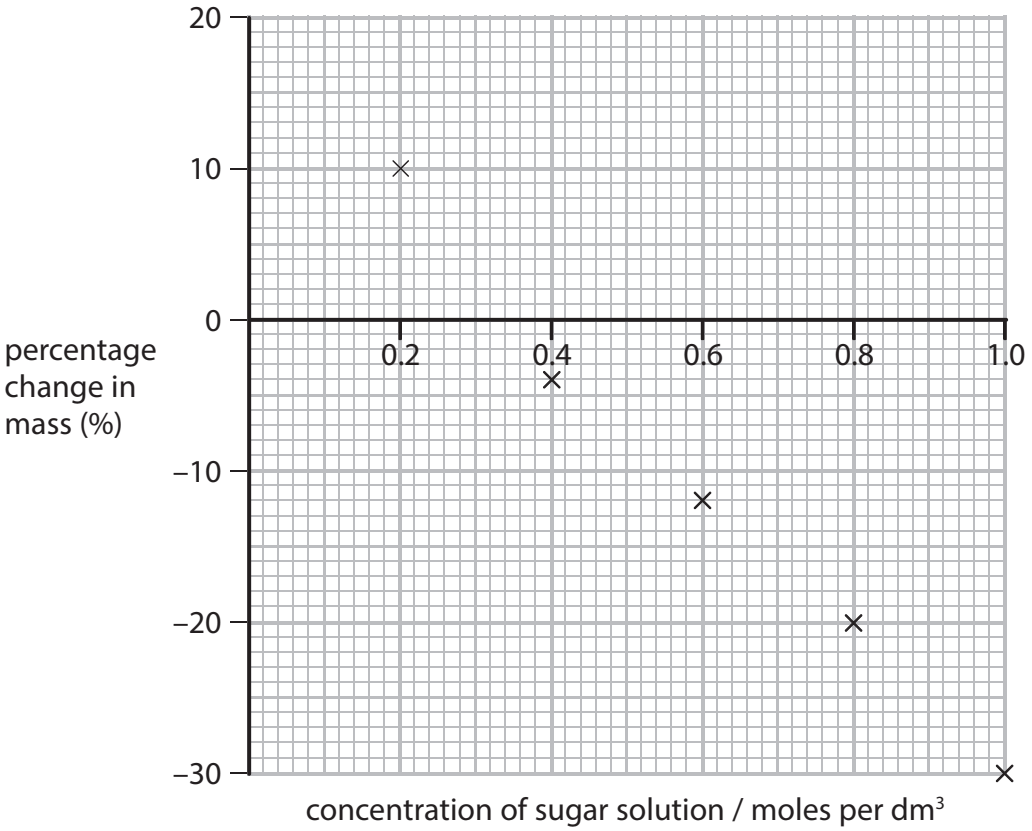
The photograph shows a courgette.

The student weighed pieces of courgette and placed them in five different concentrations of sugar solution.

After one hour she dried and reweighed the pieces of courgette.

She calculated the percentage change in mass.

The graph shows the results of this investigation.



(i) Draw a line of best fit on the graph.

(1)

(ii) Use your line of best fit to estimate the concentration of sugar solution that would result in no change in mass.

(1)

estimate = ... moles per dm³

(iii) Explain why there was an increase in the mass of the courgette in the sugar solution at 0.2 moles per dm^3.

(3)

(Total for Question 3 = 8 marks)

4 Some students investigated water movement in plant cells.

They measured the mass of five pieces of potato.

Each piece of potato was put into a different concentration of salt solution.

After one hour the pieces of potato were dried and the mass of each was recorded.

The results are shown in the table.

concentration of salt solution / %	mass / g			percentage change / %
	start	after 1 hour	change	
0	10.2	13.1	+2.9	+28.4
10	9.8	11.4	+1.6	+16.3
20	10.3	9.8	–0.5	
30	10.1	8.9	–1.2	–11.9
40	9.7	7.7	–2.0	–20.6

(a) (i) Calculate the percentage change in the mass of the potato in the 20% salt solution.

(2)

..... %

(ii) Suggest why calculating a percentage change is more useful than calculating the change in mass in this investigation.

(1)

.....

.....

(b) Mitosis occurs in plant cells during growth.

Describe the division of a cell by mitosis.

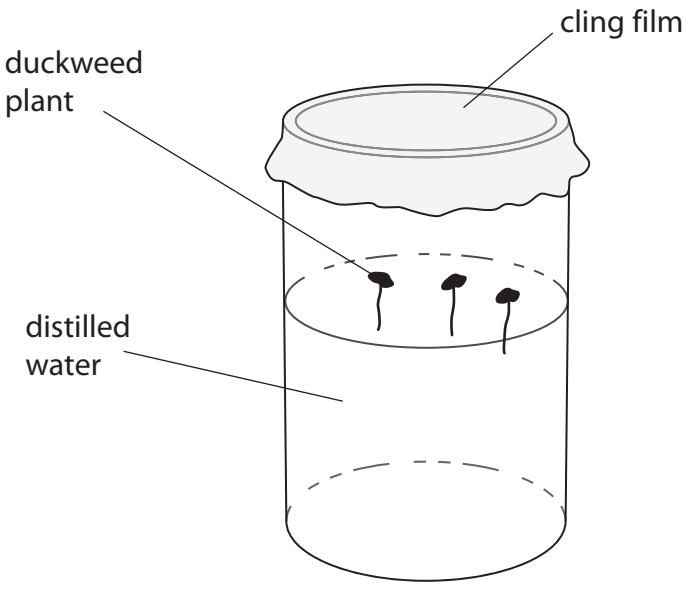
(3)

*(c) Explain how active transport and diffusion provide a plant with named substances it needs for growth.

(6)

(Total for Question 4 = 12 marks)

5 The diagram shows three duckweed plants in a beaker of distilled water.



(a) (i) Explain how the water moves into these plants.

(3)

(ii) Salt was added to the water in the beaker to form a salt solution.

Explain how the salt solution would affect the movement of water into and out of the plant.

(2)

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

When the concentration of mineral ions in the soil is greater than in the root hair cell, mineral ions are transported into the root hair cells by

(1)

☒ **A** diffusion

☒ **B** osmosis

☒ **C** respiration

☒ **D** transpiration

*(b) Explain how water, glucose and mineral salts are transported through a plant.

(6)

(Total for Question 5 = 12 marks)