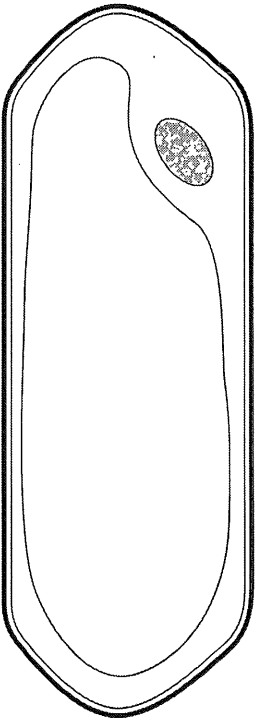


In this section, students investigate the transport of water between the cells and organs of a plant.

1. (a) The diagram shows one cell from an onion epidermis.



Examiner Only
Marks Remark

Part of the cell is selectively permeable.

(i) Name this part.

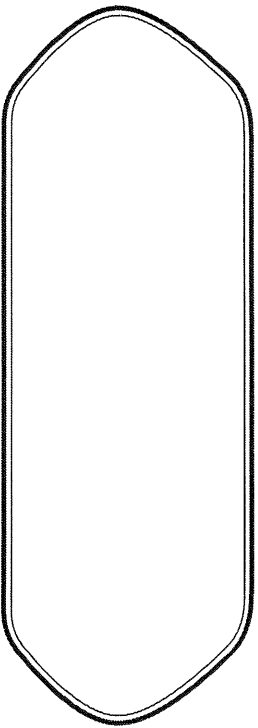
_____ [1]

(ii) What does selectively permeable mean?

_____ [1]

(b) The cell is placed in concentrated sugar solution for 30 minutes.

(i) Complete the diagram below to show the appearance of this cell after 30 minutes.



[3]

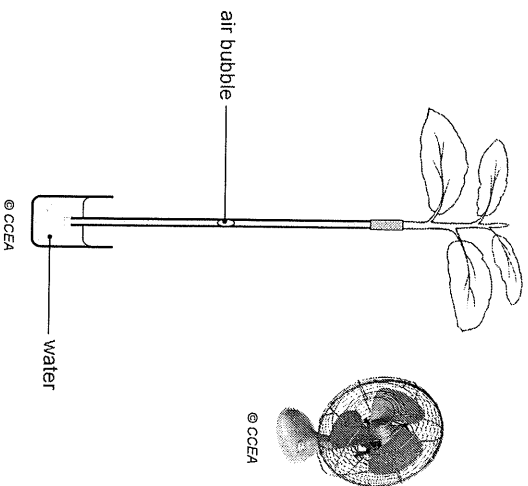
(ii) What word is used to describe the cell after 30 minutes?

_____ [1]

Examiner Only
Marks Remark

2.

The diagram shows a simple potometer at the start of an experiment.



(a) The potometer was left for 30 minutes in front of a fan.

(i) What would happen to the air bubble during this time?

_____ [1]

(ii) Explain what causes this change.

_____ [2]

(b) Give two other ways plants use water.

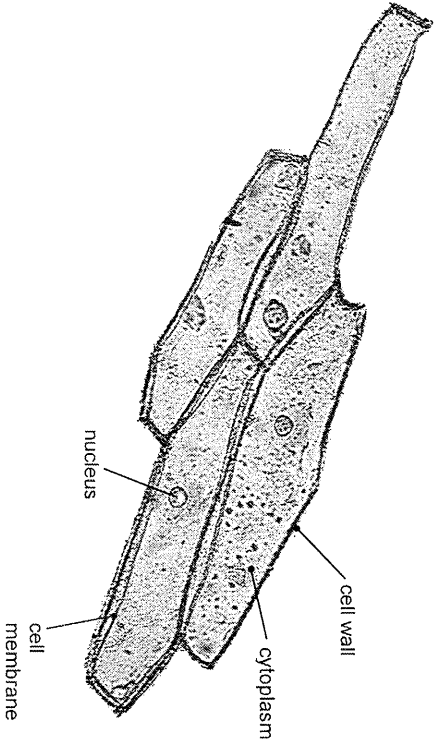
1. _____ [1]
2. _____ [1]

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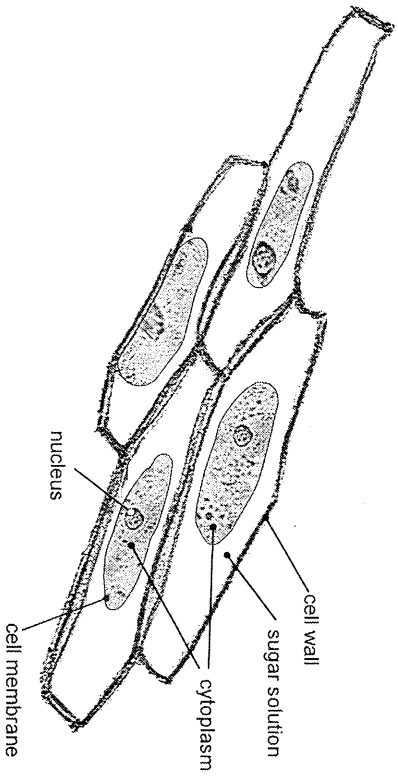
3. Onion tissue was moved from water into a concentrated sugar solution.

The photographs show cells of the onion tissue in each solution.

Onion cells placed in water



Onion cells placed in concentrated sugar solution



© CCEA

Look at the photographs.

Use evidence from the photographs to

- describe how the cells changed when placed in concentrated sugar solution.
- use the theory of osmosis to explain these changes.

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

4. A group of students used a weight potometer to investigate the water loss of three different plants after 5 days.

The table shows the results.

Plant	Loss in mass after 5 days /g	Average rate of water loss /g per day
A	8.0	
B	10.0	2.0
C	5.0	1.0

Adapted from: www.transciencetools.com

- (a) Complete the table by calculating the average rate of water loss for plant A.

Show your working.

[2]

- (b) Suggest two **environmental** factors the students should have controlled during this investigation.

- _____ [1]
- _____ [1]

The students then counted the number of stomata found on the leaves of each plant. They calculated the average number of stomata per mm².

The table shows the results.

Plant	Average number of stomata per mm ² of leaf surface
A	51
B	74
C	18

- (c) Use data from **both** tables to describe and explain the results of the investigation.

- _____
- _____
- _____
- _____
- _____
- _____ [4]

5. Osmosis has a different effect on animal and plant cells.

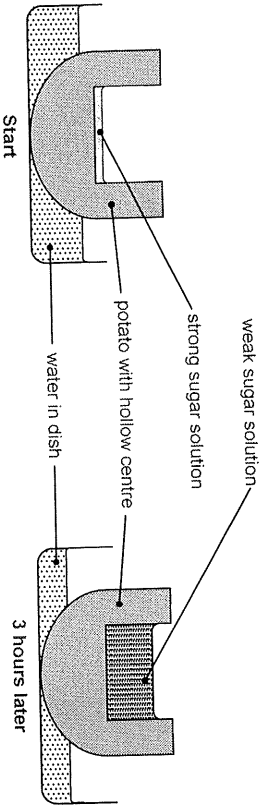
(a) Explain what happens to a red blood cell when it is placed in water.

[4]

(b) Describe and explain why osmosis has a different effect on plant cells when placed in water.

[3]

The diagrams show an experiment carried out over three hours.



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(c) Describe and explain the changes that occurred during the three hours.

Suggest why similar changes would not occur using a boiled potato.

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

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6.

(a) A student carried out an experiment on water loss from leaves.

(i) Describe how water moves out of leaves into the surrounding air.

[2]

(ii) Environmental factors affect this loss of water from leaves.

Give two of these factors.

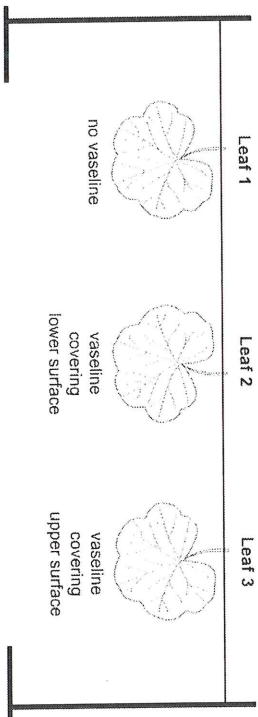
1. _____

2. _____

[2]

(b) The student wanted to find out which surface of a leaf loses more water.

He set up the following experiment.



The student weighed each leaf at the start and hung them on the line. He weighed them again after 24 hours.

When water is lost from a leaf the mass of the leaf decreases.

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Mark: Remark

The table shows the percentage decrease in mass of the three leaves after 24 hours.

Leaf	Surface covered with vaseline	Mass/g		Percentage decrease in mass
		at start	after 24 hours	
1	Neither	1.9	1.3	32
2	Lower	1.8	1.6	11
3	Upper	2.0	1.6	

The student calculated the percentage decrease in mass of leaves 1 and 2 using the following equation.

$$\text{Percentage decrease} = \frac{\text{mass at start} - \text{mass after 24 hours}}{\text{mass at start}} \times 100$$

(i) Use the equation to calculate the percentage decrease in mass of leaf 3. Show your working.

Draw a circle around the correct answer.

12.5% 20% 25% 80%

[2]

(ii) The percentage decrease in mass is used to compare the results. Explain why.

Look at the diagram.

(iii) The student did not put vaseline on either surface of leaf 1.

What was the purpose of leaf 1?

[1]

(iv) The student covered the lower surface of leaf 2 with vaseline.

Suggest why leaf 2 had the smallest percentage decrease in mass.

[1]

Examiner Only
Mark: Remark

Examiner Only
Mark: Remark