WJEC 2014 Online Exam Review

GCE Biology BY2 1072-01

All Candidates' performance across questions

Question Title	N	Mean	S D	Max Mark	F F	Attempt %
1	4904	8.1	3.7	15	53.7	99.9
2	4904	6	2.7	13	46.5	99.9
3	4906	4.4	1.7	10	44	100
4	4902	7.5	2.6	13	57.5	99.9
5	4882	2.7	2.1	9	30.6	99.5
6	4864	5.1	3.2	10	50.8	99.1

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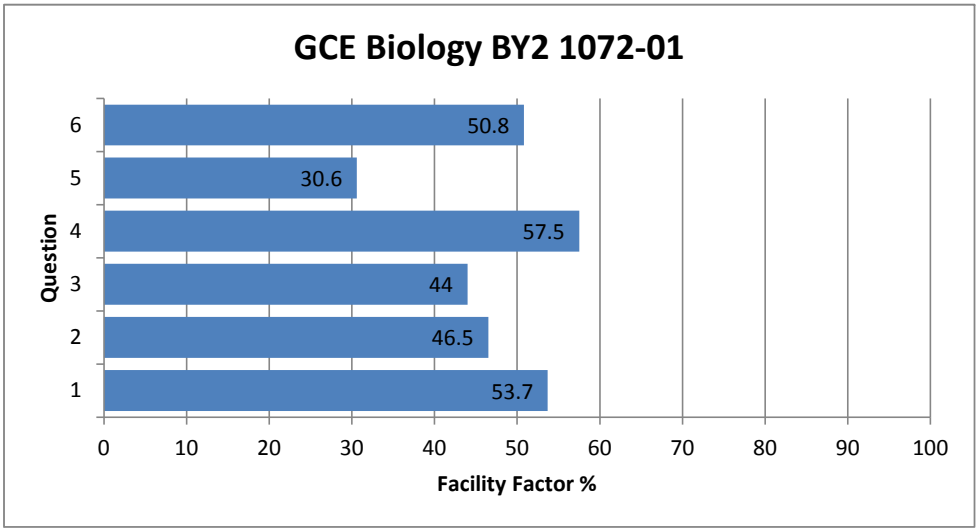
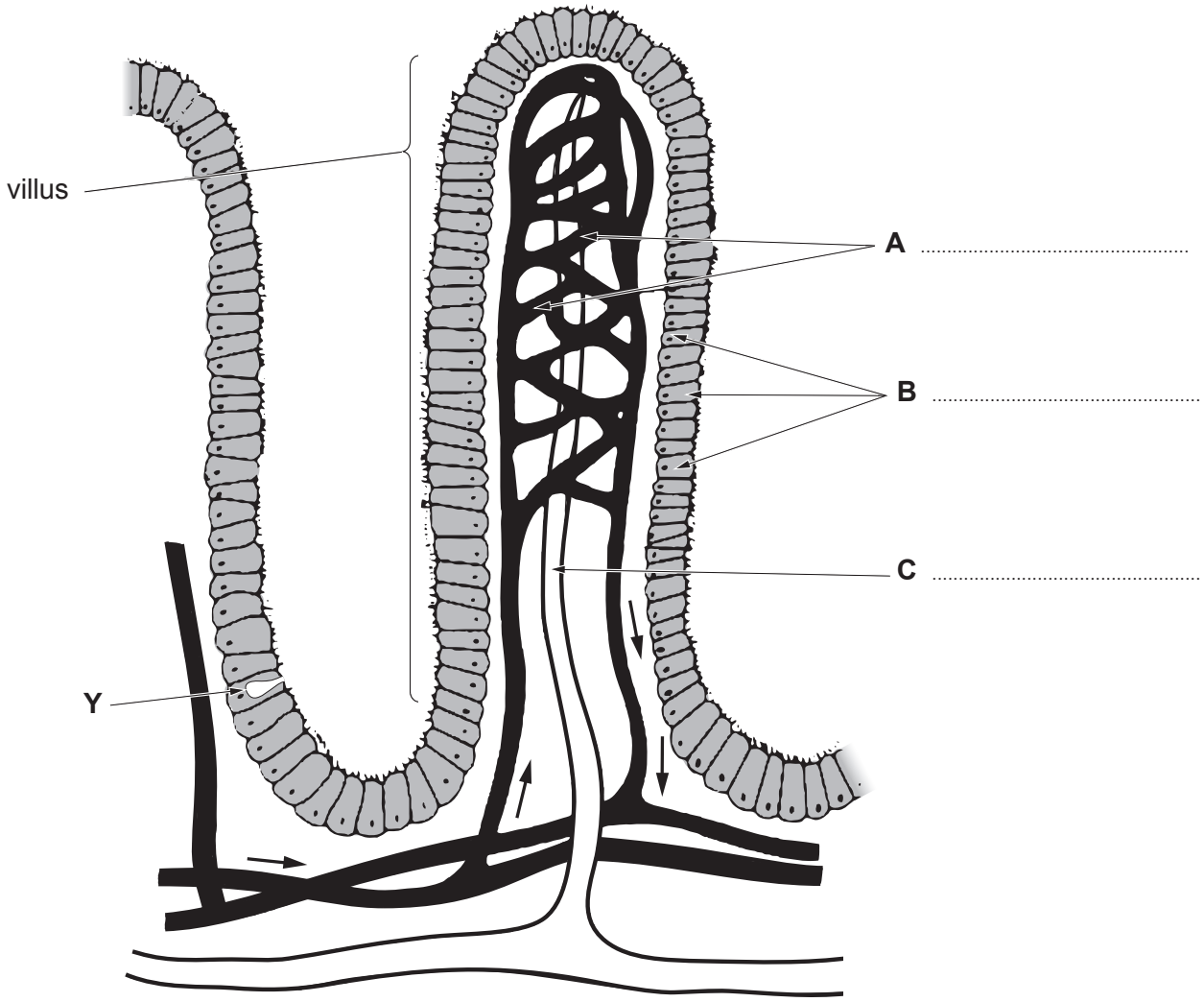


Examiner only

Answer **all** *questions.*

1. The diagram below shows a villus of the small intestine.



(a) Complete the diagram above by naming the structures **A**, **B** and **C**. [3]

(b) With reference to the diagram **only**, describe and explain **two** features that are important in the functioning of the villus. [4]

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Examiner only

(c) (i) Name the substance secreted by cell type **Y**. [1]

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(ii) Explain **two** functions of the secretion of cell type **Y** in the process of digestion. [2]

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(d) Layers of smooth muscle are found in the wall of the small intestine.
Explain the role of these muscle layers in the process of digestion. [3]

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(e) Amino acids absorbed by structure **A** are transported to the liver. Describe the fate of the **excess** amino acids absorbed. [2]

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Turn over.

Examiner only

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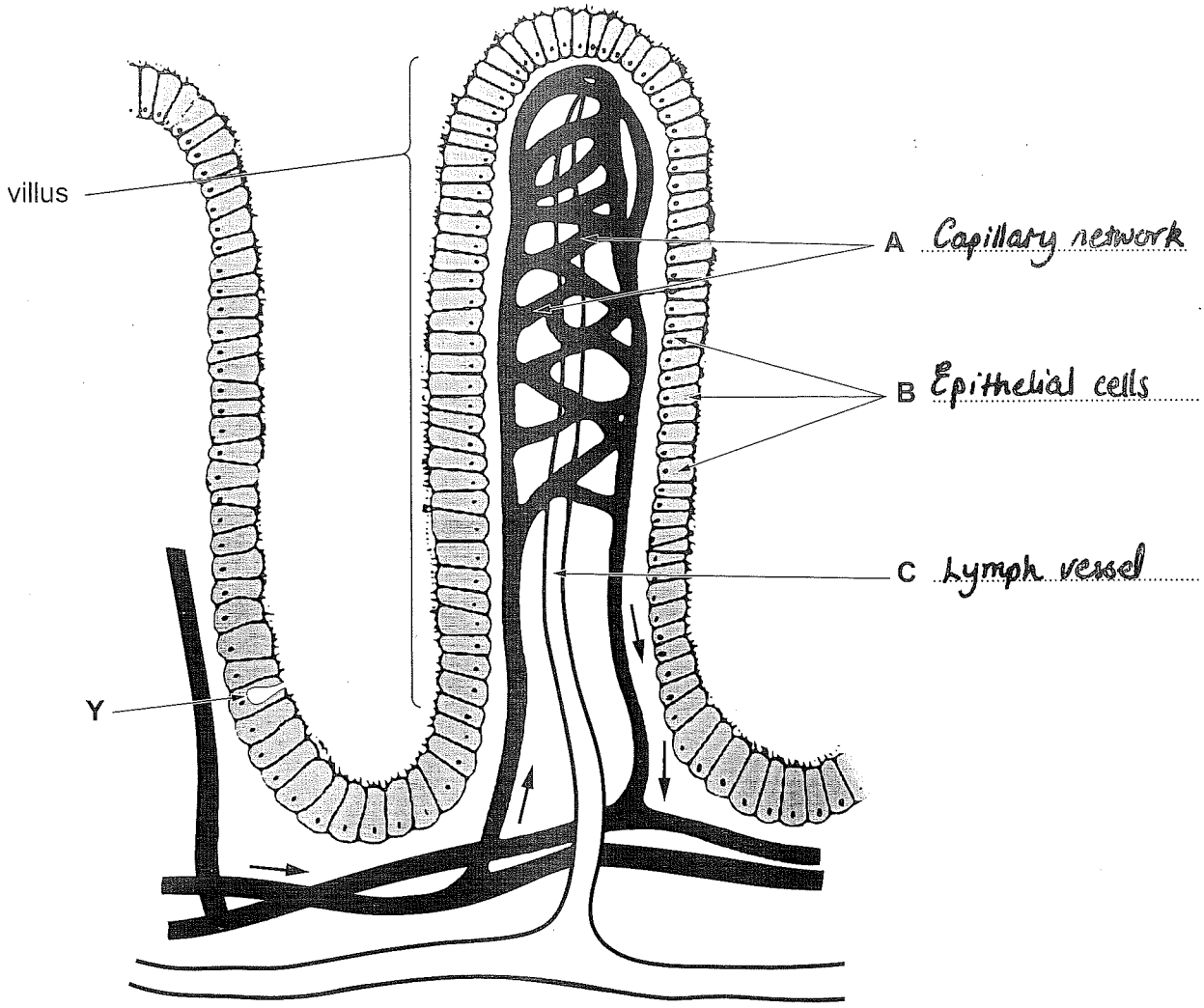

(a) Complete the diagram above by naming the structures **A**, **B** and **C**. [3]

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It is important to have a good capillary network with an efficient blood supply to maintain a concentration gradient for diffusion. The epithelial cells are needed for protection of the villus, and can secrete digestive juices and absorb soluble products of digestion.

Examiner only

(c) (i) Name the substance secreted by cell type Y. [1]

Mucus

(ii) Explain two functions of the secretion of cell type Y in the process of digestion. [2]

Cell Y is a goblet cell which secretes mucus to lubricate food molecules as they pass through the small intestine, and also this mucus contains digestive juices.

(d) Layers of smooth muscle are found in the wall of the small intestine. Explain the role of these muscle layers in the process of digestion. [3]

There are two kinds of muscle here. Circular muscle contracts, peristalsis and longitudinal muscle relaxes. These actions push the food along the gut during peristalsis. Circular muscle contracts behind the food molecules, and longitudinal muscle relaxes in front of it, pushing it along.

(e) Amino acids absorbed by structure **A** are transported to the liver. Describe the fate of the **excess** amino acids absorbed. [2]

They are either released as the waste product urea, or they are converted to carbohydrates for storage.

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Examiner only

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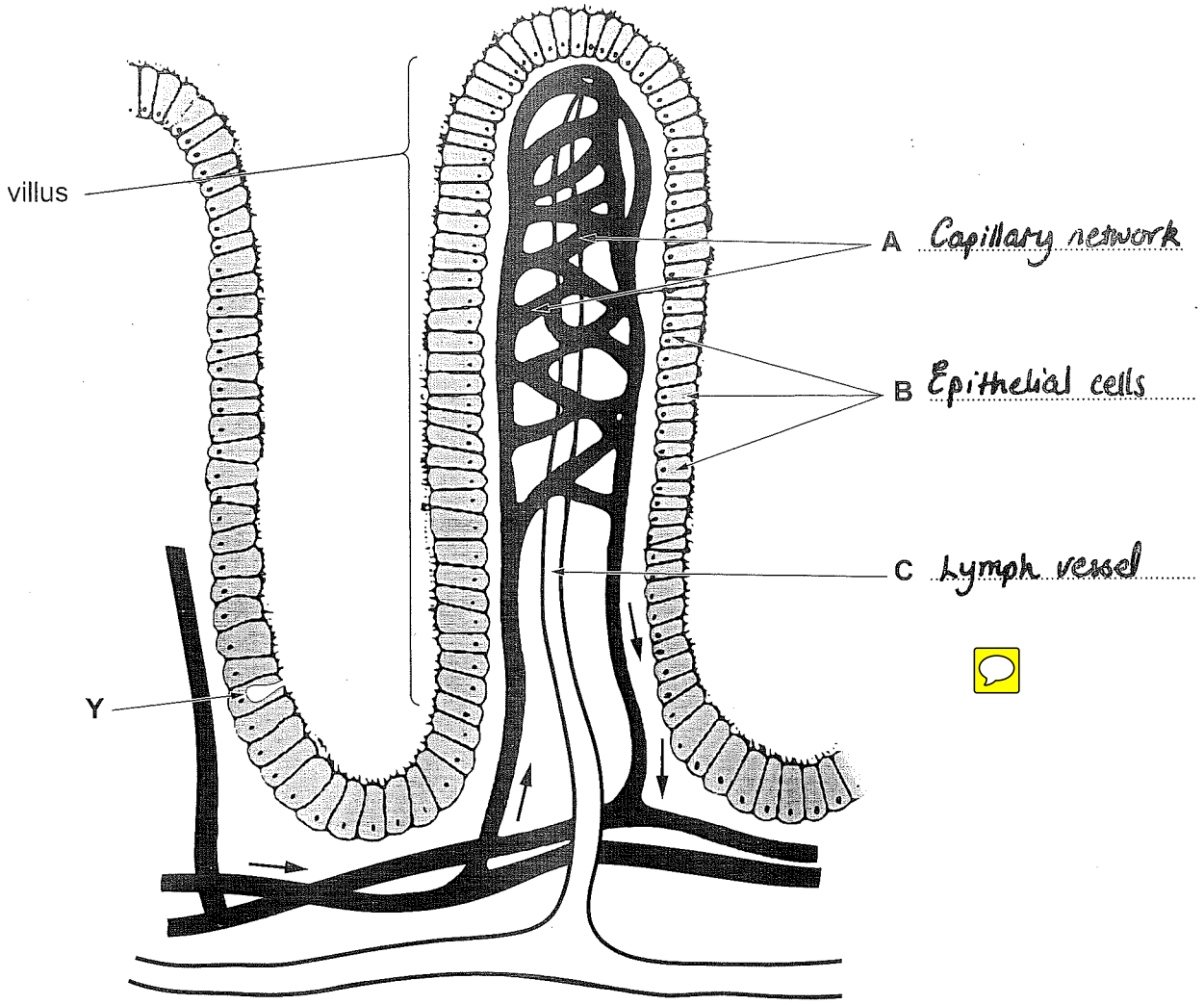

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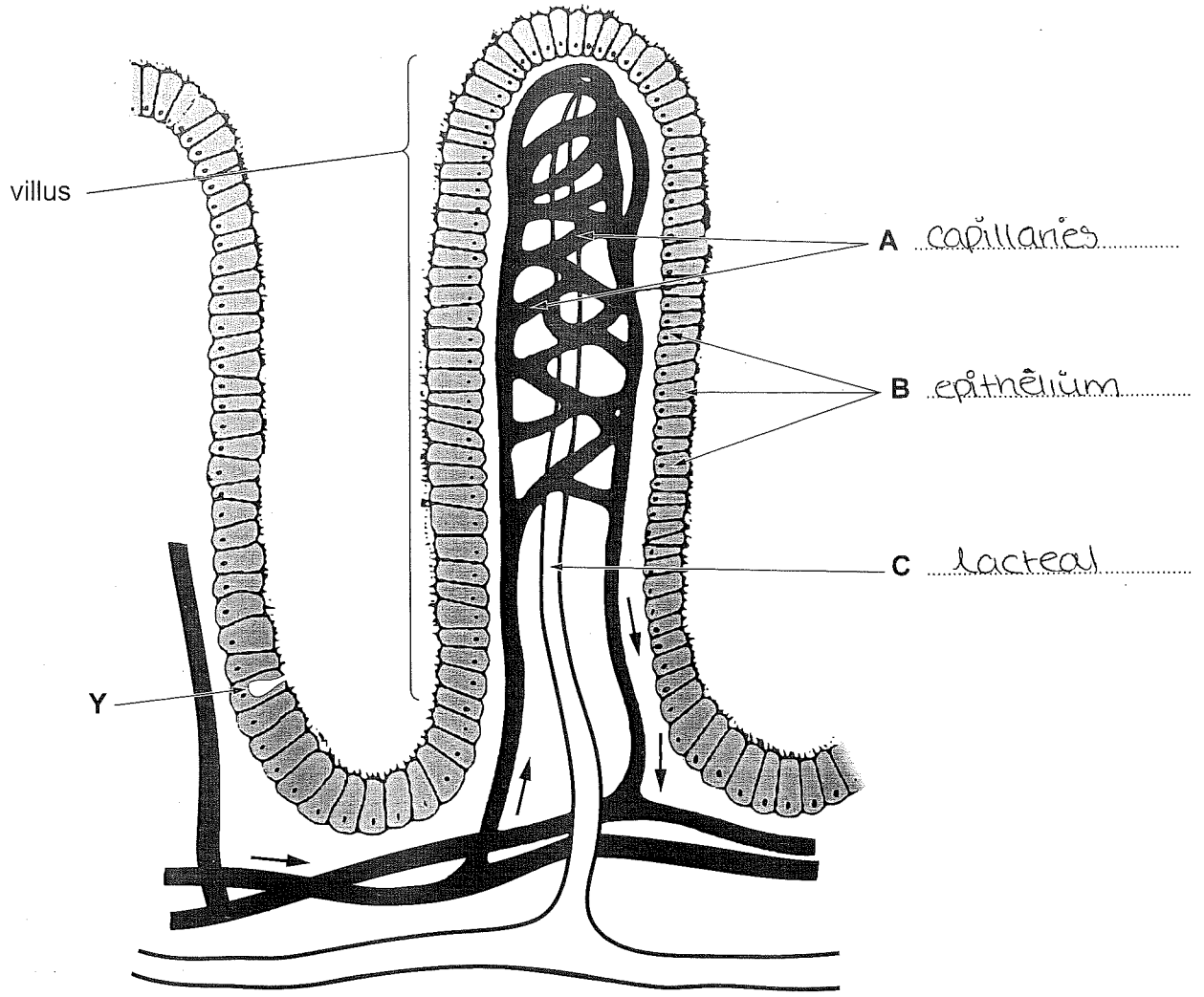

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Microvillus to increase surface area for absorbtion

~~Good~~ Good blood supply (vast network of capillaries) to maintain concentration gradient.

Good blood supply also means good ~~allows for~~ oxygen supply for aerobic respiration in mitochondria to produce ATP.

Examiner only

(c) (i) Name the substance secreted by cell type **Y**. [1]

Goblet cell.

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Goblet cells produce mucus. Mucus reduces friction between ~~f~~dissolved food substances in blood and villi.

(d) Layers of smooth muscle are found in the wall of the small intestine. Explain the role of these muscle layers in the process of digestion. [3]

Muscles contract → Peristalsis

Inner most layer is mucosa which produces mucus therefore reduces ~~friction~~ friction. Next layer up is sub mucosa which contains lymph and transports products of digestion into blood. Muscles are composed of fibrous collagen which contract and push food along.

(e) Amino acids absorbed by structure **A** are transported to the liver. Describe the fate of the **excess** amino acids absorbed. [2]

Some of the excess amino acids ~~are~~ are deaminated and converted into urea and passed out in the urine. The rest is converted into carbohydrates and stored.

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Examiner only

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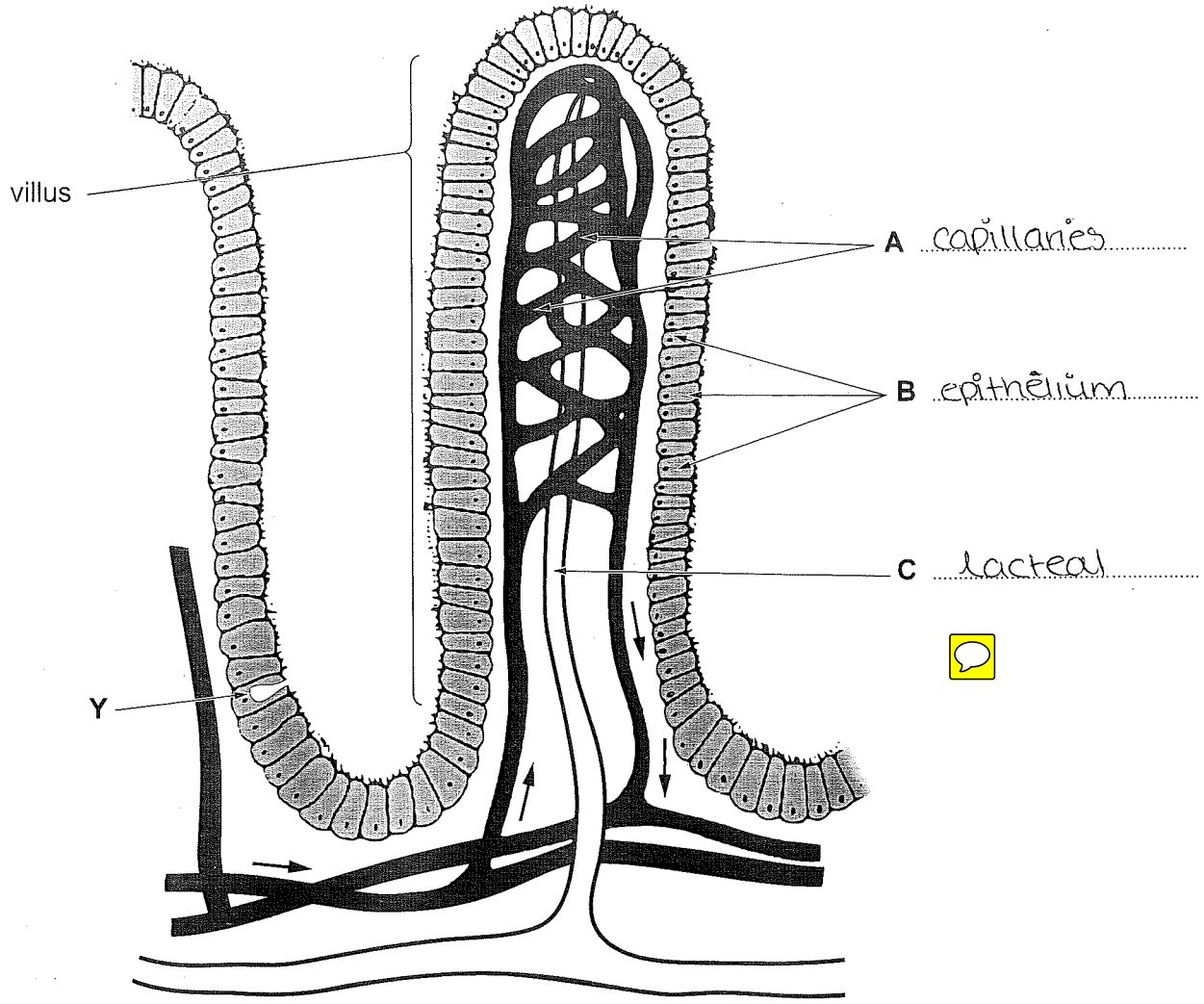

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1072 010003

Examine only

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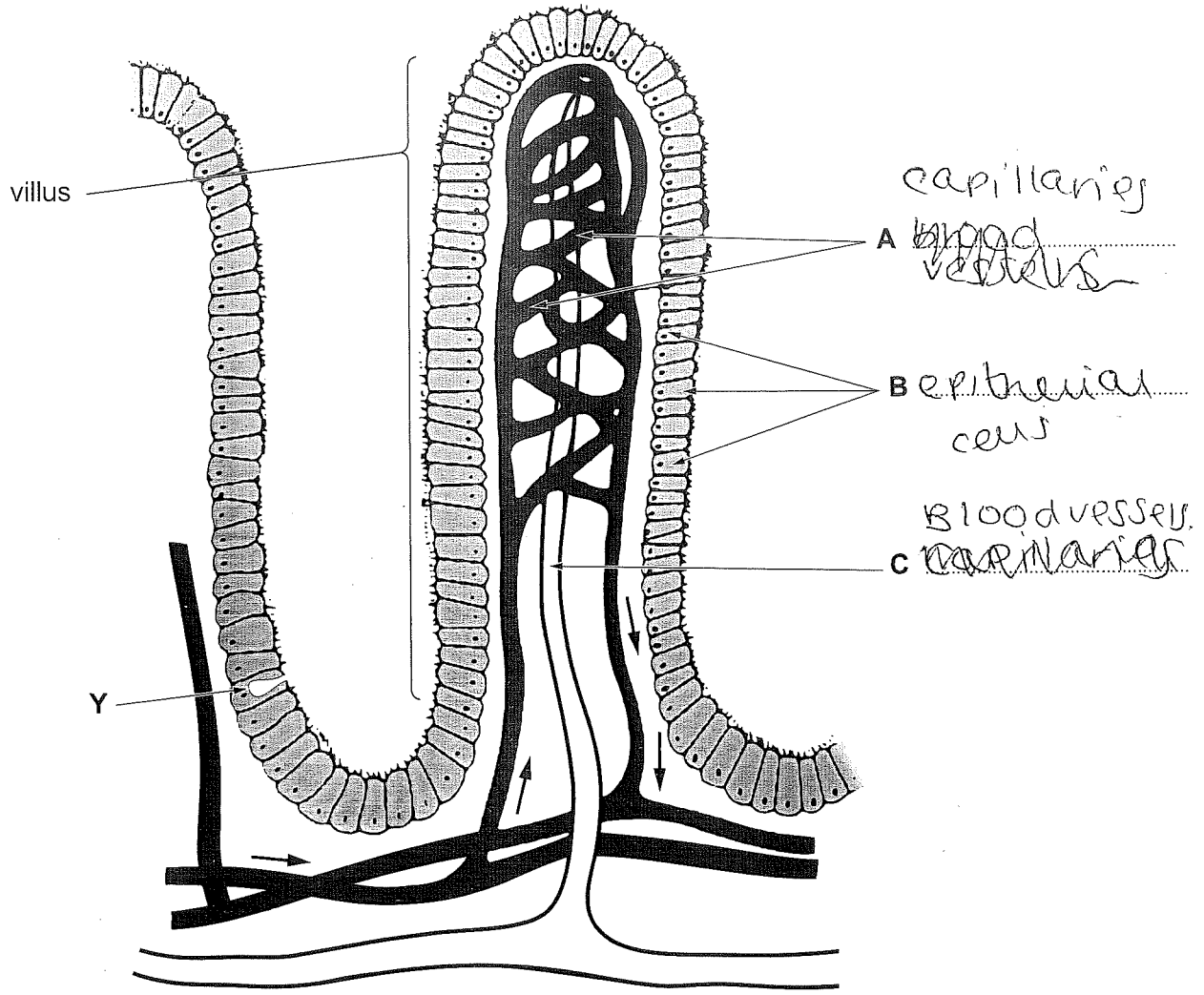

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-villus has large surface area for absorption of nutrients.
-Contains mitochondria in order to produce ATP & to provide energy for protein synthesis.

Examiner only

(c) (i) Name the substance secreted by cell type Y. [1]

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Mucus helps to lubricate food and it also reduces friction during digestion between the cell walls.

(d) Layers of smooth muscle are found in the wall of the small intestine. Explain the role of these muscle layers in the process of digestion. [3]

Layers of elastic and collagen are present which helps the muscle contractions. Muscle contractions are known as peristalsis which helps to push the food down during digestion.

(e) Amino acids absorbed by structure **A** are transported to the liver. Describe the fate of the **excess** amino acids absorbed. [2]

Amino acids are broken down and are transported via the Hepatic portal vein. This causes deamination of waste products such as urine and urea.

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Examine only

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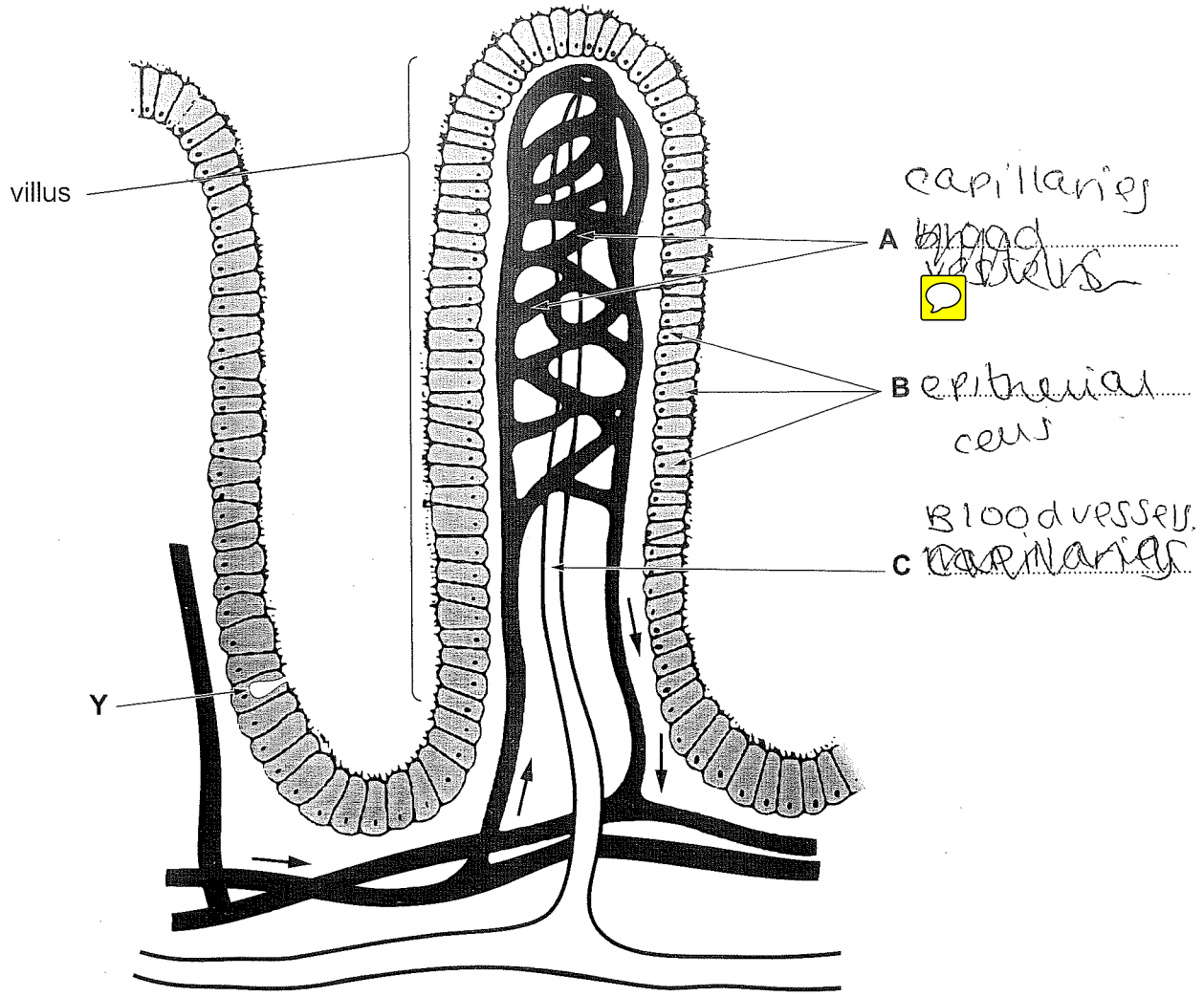

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Examiner only

2. *(a)* (i) State what is meant by the term *transpiration*. [2]

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(ii) Give **one** benefit of transpiration to a plant. [1]

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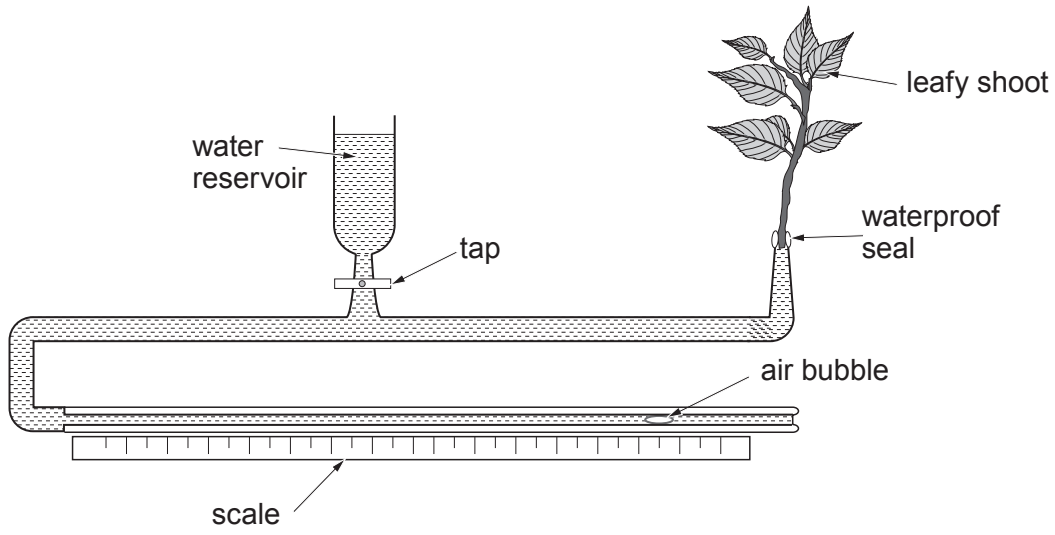
(b) The diagram below shows a piece of apparatus called a potometer which is used to measure the rate of transpiration.



(i) Suggest why the end of the shoot should be cut under water before being inserted into the potometer. [2]

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(ii) State what measurements would have to be made, in order to determine the rate of transpiration. [2]

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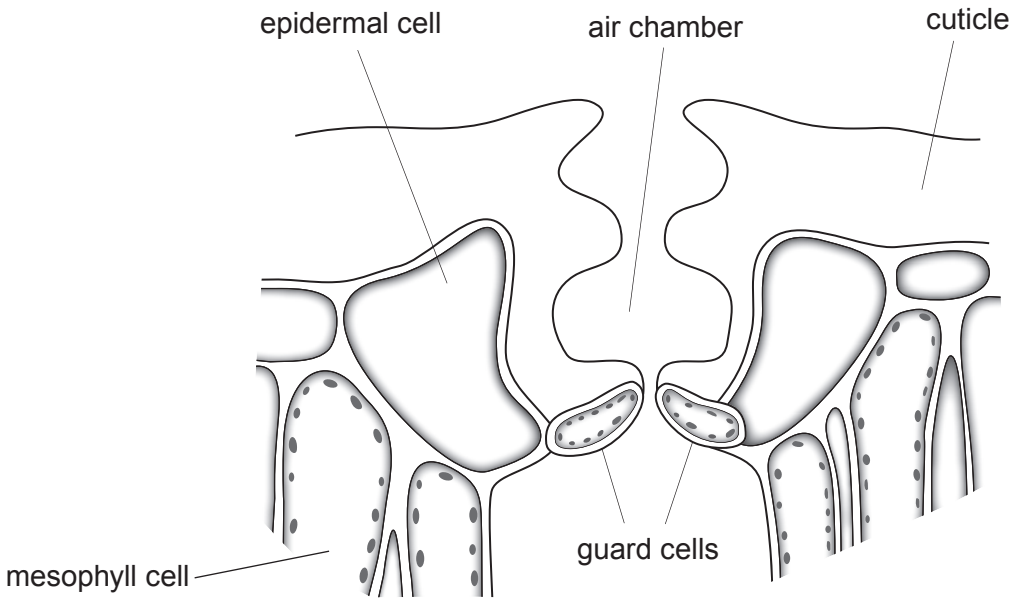
Examiner only

(c) The diagram below shows a sunken stoma which is an adaptation found in the leaves of some plants that live in very dry conditions.



(i) State the general name for plants that live in, and are adapted for, dry conditions. [1]

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(ii) With reference to the diagram, explain how a sunken stoma is able to reduce transpiration. [3]

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(iii) Describe and explain **two** *other* adaptations which reduce the rate of transpiration in plants that live in very dry conditions. [2]

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Examiner only

2. *(a)* (i) State what is meant by the term *transpiration.* [2]

Transpiration is the evaporation of water from the surface of leaves, causing a pull of water up the xylem called a transpiration stream.

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It ensures that the plant is constantly supplied with water.

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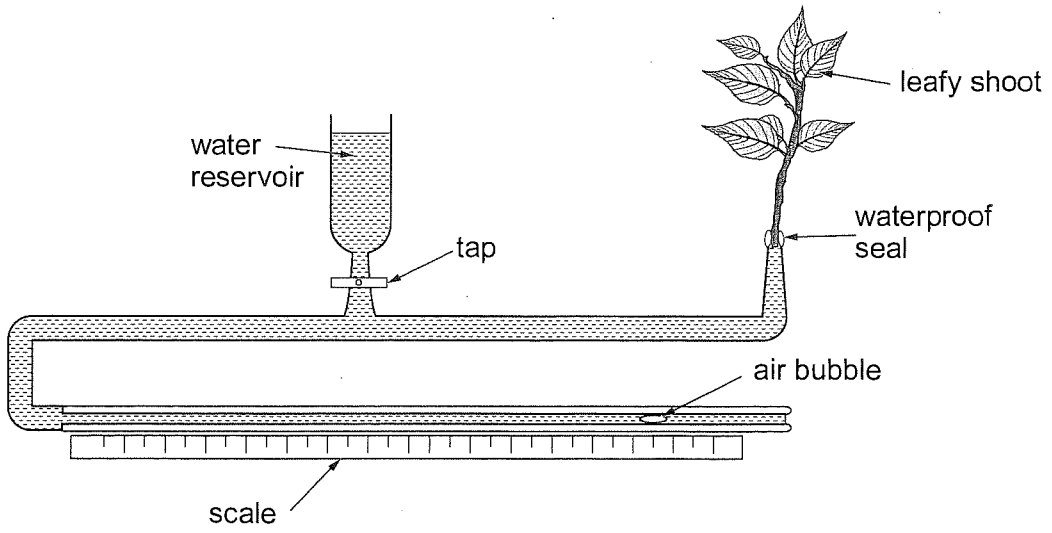


(i) Suggest why the end of the shoot should be cut under water before being inserted into the potometer. [2]

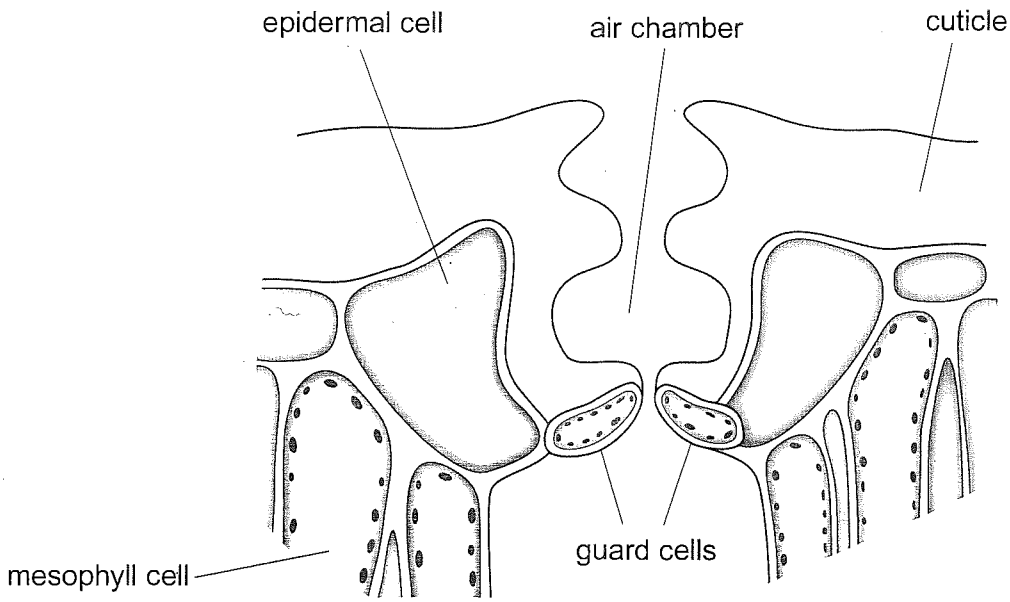
To prevent unwanted air bubbles entering, as there is only one air bubble that should be ~~measured~~ used.

(ii) State what measurements would have to be made, in order to determine the rate of transpiration. [2]

The distance travelled by the air bubble, per unit of measurement. 99% of water taken up is lost by transpiration, so this can give an approximate rate of transpiration.

Examiner only

(c) The diagram below shows a sunken stoma which is an adaptation found in the leaves of some plants that live in very dry conditions.



(i) State the general name for plants that live in, and are adapted for, dry conditions. [1]

Xerophytes

(ii) With reference to the diagram, explain how a sunken stoma is able to reduce transpiration. [3]

This means that a layer of water vapour can form over the stomata. This reduces the ~~water potential~~ concentration gradient, so of water, so less water is lost to the surroundings by evaporation.

(iii) Describe and explain **two** *other* adaptations which reduce the rate of transpiration in plants that live in very dry conditions. [2]

They have a thick cuticle to reduce water loss. They have hairs, which trap water vapour, reducing the water potential gradient, therefore reducing water loss.

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Examiner only

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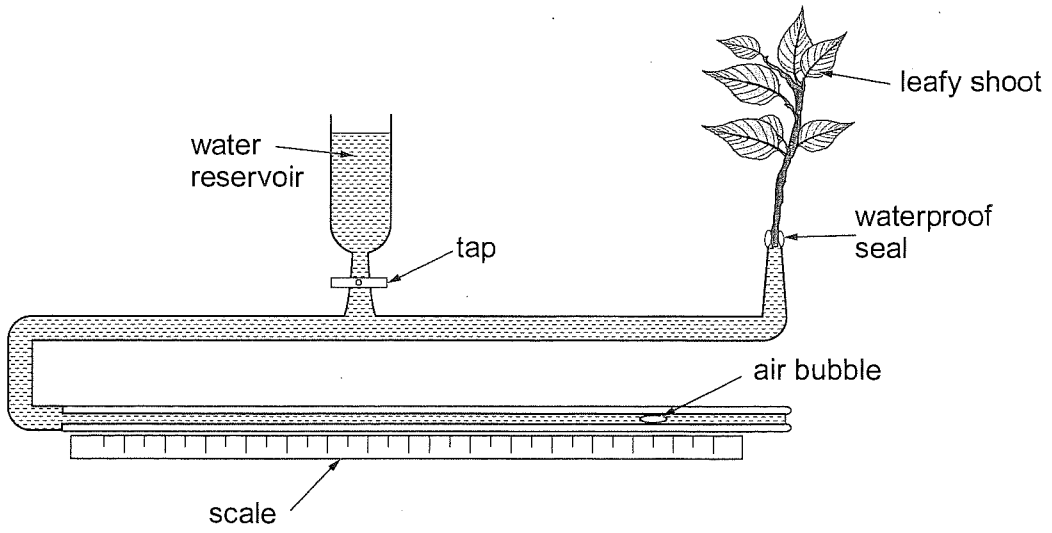

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Examiner only

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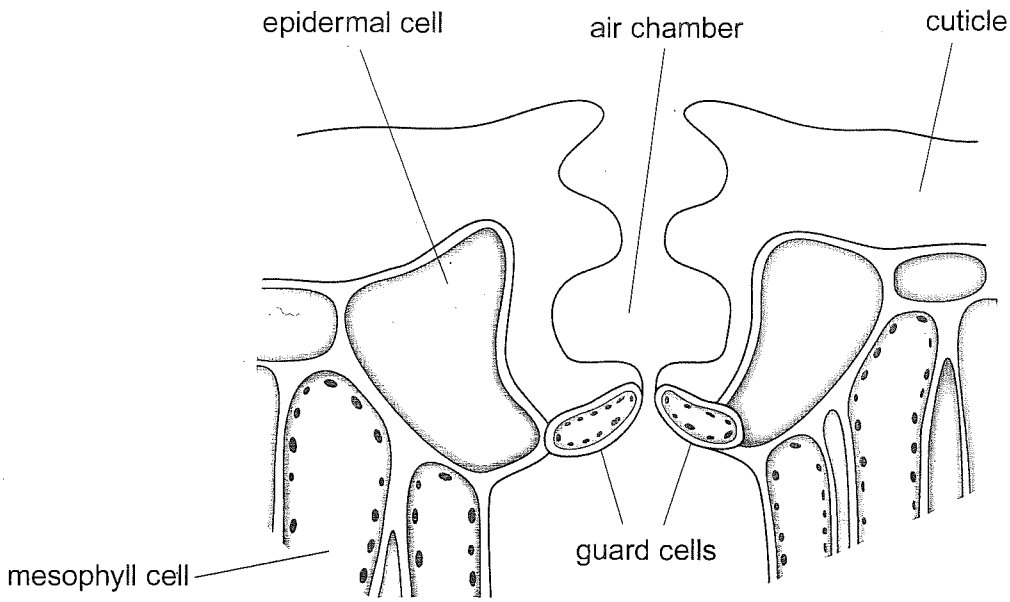

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Examiner only

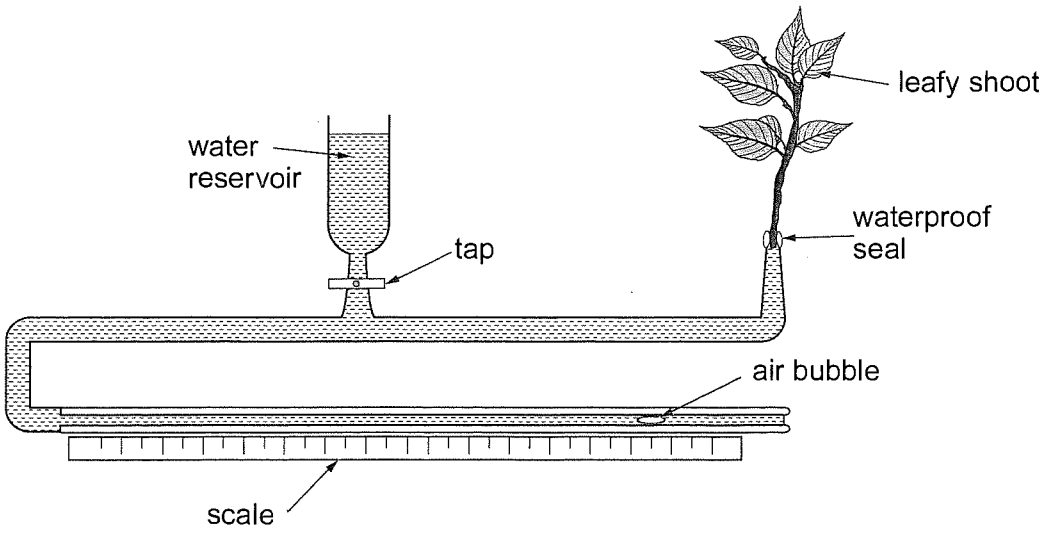
2. *(a)* (i) State what is meant by the term *transpiration.* [2]

Process of water ~~Necessary~~ loss from leaf (and stem)
Water leaves surface of leaf through
stomata

(ii) Give **one** benefit of transpiration to a plant. [1]

Means that plant cells do not become
~~Turgin~~ turgid and burst, also means that water
constantly moving ∴ ~~Reaches~~ all cells recieve water + minerals

(b) The diagram below shows a piece of apparatus called a potometer which is used to measure the rate of transpiration.



(i) Suggest why the end of the shoot should be cut under water before being inserted into the potometer. [2]

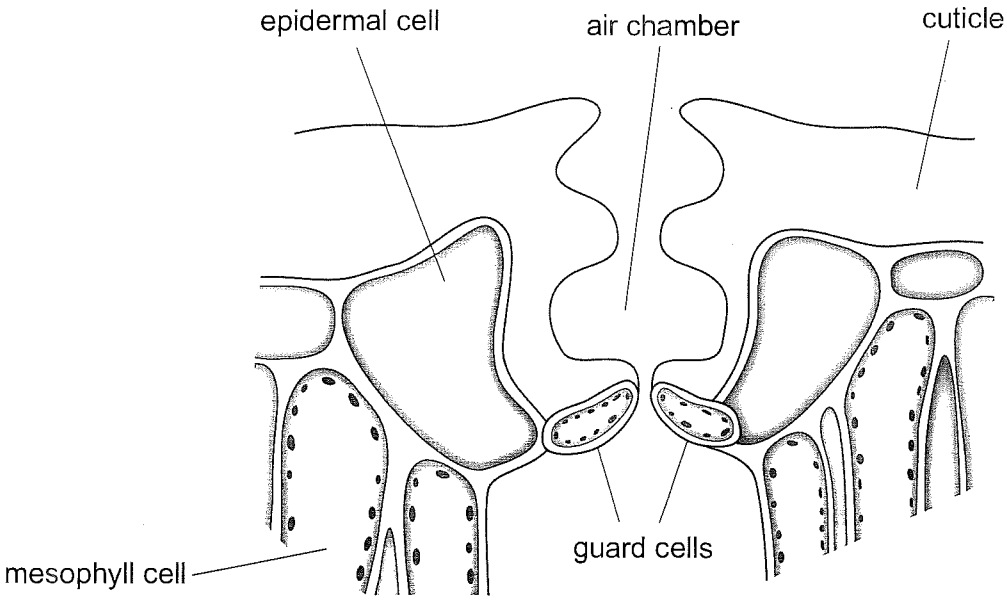
To ensure that no air (bubbles) get into
potometer because there is no air under water.
This will ensure results obtained are a close
approximation.

(ii) State what measurements would have to be made, in order to determine the rate of transpiration. [2]

Measure distance air bubble travels
per unit time. ~~Also measure~~

Examiner only

(c) The diagram below shows a sunken stoma which is an adaptation found in the leaves of some plants that live in very dry conditions.



(i) State the general name for plants that live in, and are adapted for, dry conditions. [1]

Xerophytes

(ii) With reference to the diagram, explain how a sunken stoma is able to reduce transpiration. [3]

Humid air gets trapped in air chamber just outside stomata. This reduces the concentration gradient of water between outside and inside stomata. As a result, less water is lost, because gradient less steep and ψ similar inside and out.

(iii) Describe and explain **two** *other* adaptations which reduce the rate of transpiration in plants that live in very dry conditions. [2]

Thick (waxy) cuticle prevents water loss. Hair traps water which reduces concentration gradient therefore reduces water less. Extensive root system absorbs as much water as possible

13

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Examiner only

2. (a) (i) State what is meant by the term *transpiration*. [2]

Process of water ~~loss~~ loss from leaf (and stem)
Water leaves surface of leaf through
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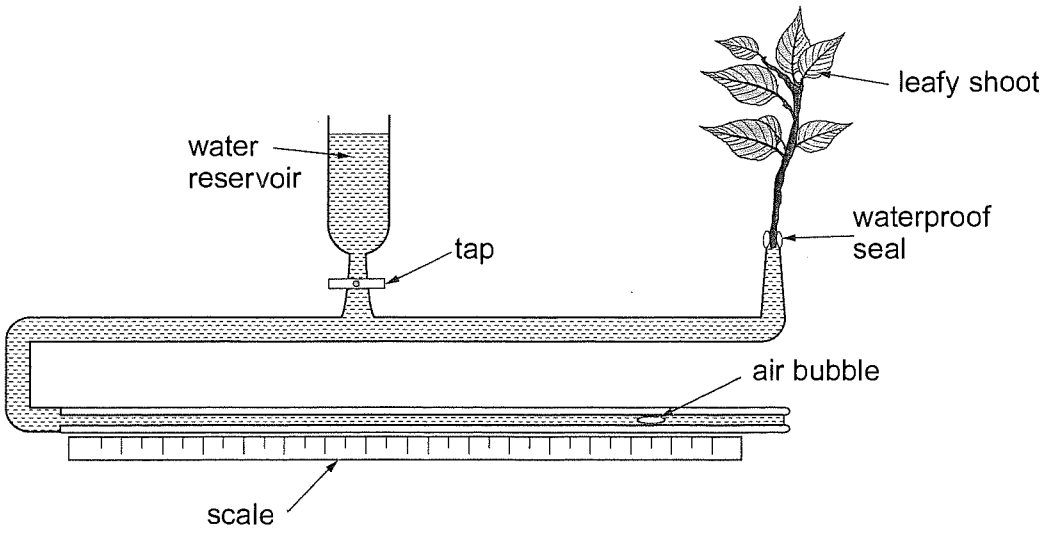

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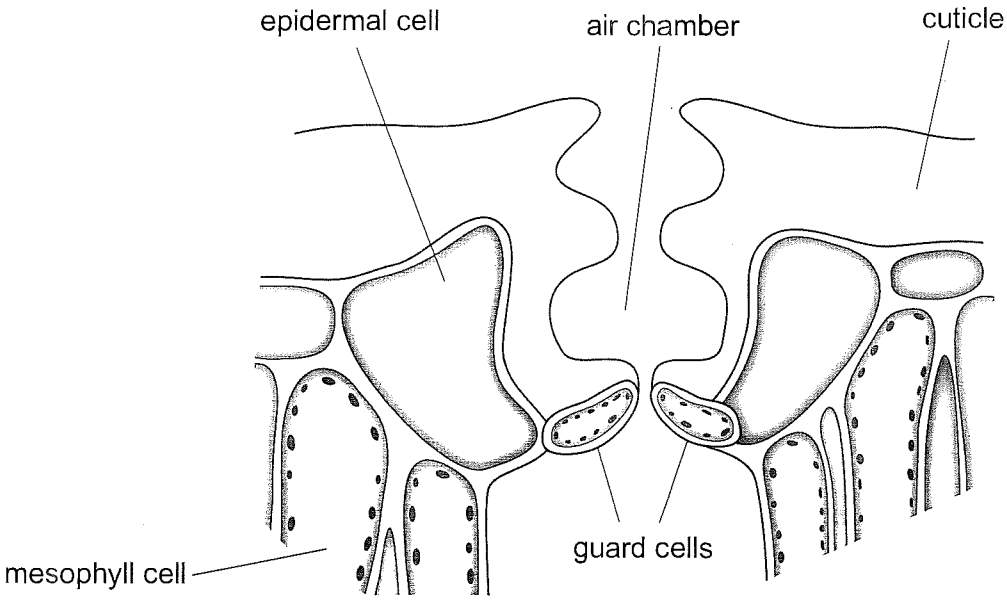
Examiner only

(c) The diagram below shows a sunken stoma which is an adaptation found in the leaves of some plants that live in very dry conditions.



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1072 010005

Examiner only

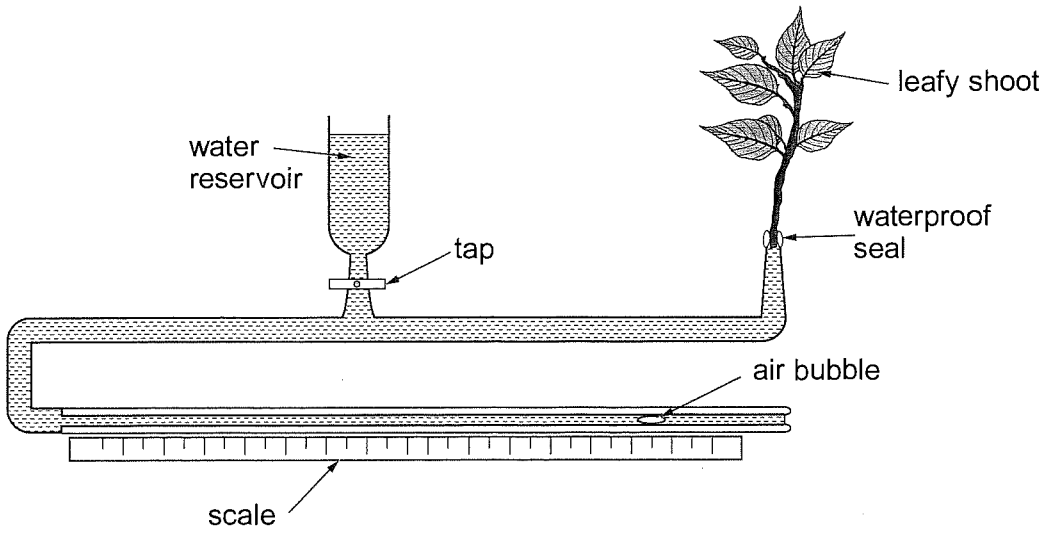
2. *(a)* (i) State what is meant by the term *transpiration*. [2]

Transpiration is the loss of water from the leaves which causes rise to a transpiration stream.

(ii) Give **one** benefit of transpiration to a plant. [1]

Allows waste products to diffuse out such as Oxygen.

(b) The diagram below shows a piece of apparatus called a potometer which is used to measure the rate of transpiration.



(i) Suggest why the end of the shoot should be cut under water before being inserted into the potometer. [2]

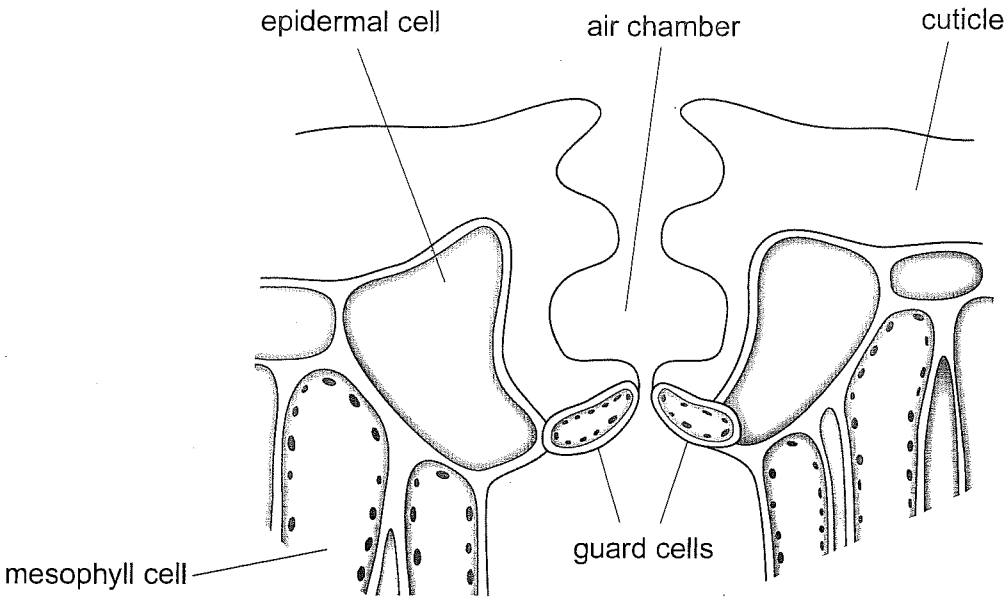
To prevent air bubbles entering, as it should be cut at an angle under water.

(ii) State what measurements would have to be made, in order to determine the rate of transpiration. [2]

Measure the amount of air bubbles in a given time.

Examiner only

(c) The diagram below shows a sunken stoma which is an adaptation found in the leaves of some plants that live in very dry conditions.



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mesophytes xerophytes

(ii) With reference to the diagram, explain how a sunken stoma is able to reduce transpiration. [3]

Sunken stoma reduces transpiration because it has a large surface : volume. It also consists of spongy mesophyll cells which allows the exchange of gases.

(iii) Describe and explain **two** *other* adaptations which reduce the rate of transpiration in plants that live in very dry conditions. [2]

They have curled leaves to trap water in and also have a thick cuticle to reduce water loss.

13

Examiner only

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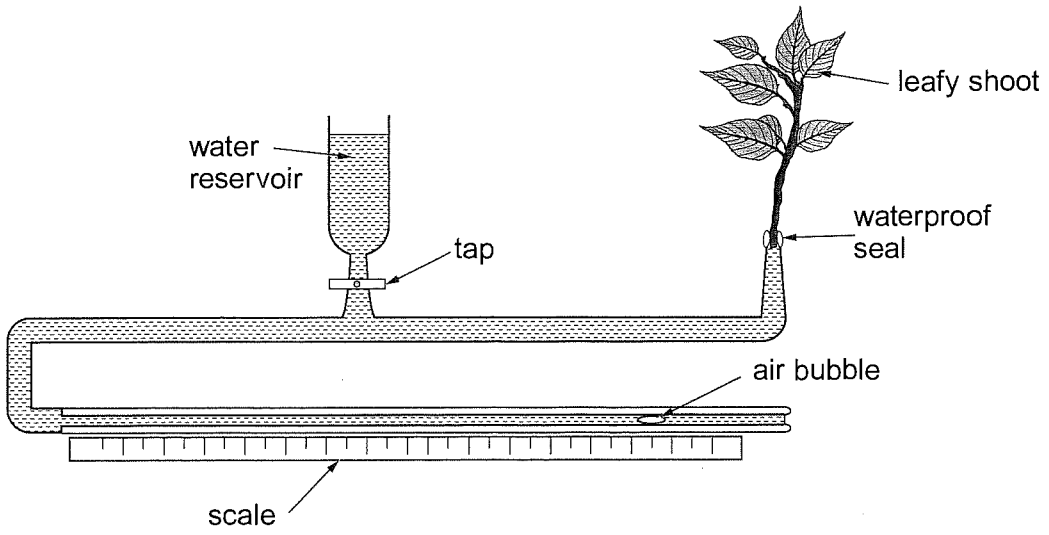
Allows waste products to diffuse out such as Oxygen.

(b) The diagram below shows a piece of apparatus called a potometer which is used to measure the rate of transpiration.



(i) Suggest why the end of the shoot should be cut under water before being inserted into the potometer. [2]

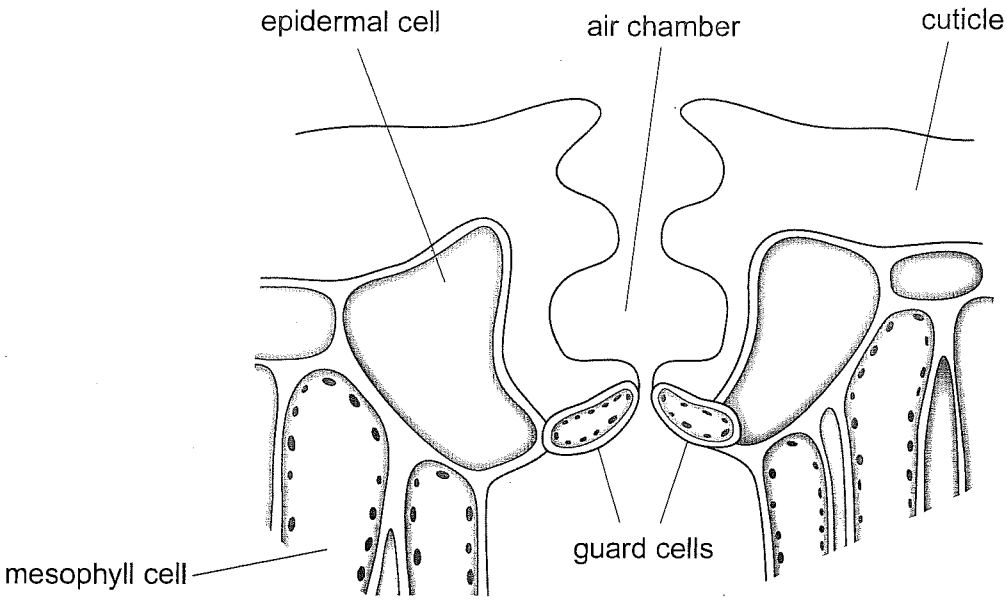
To prevent air bubbles entering, as it should be cut at an angle under water.

(ii) State what measurements would have to be made, in order to determine the rate of transpiration. [2]

Measure the amount of air bubbles in a given time.

Examiner only

(c) The diagram below shows a sunken stoma which is an adaptation found in the leaves of some plants that live in very dry conditions.



(i) State the general name for plants that live in, and are adapted for, dry conditions. [1]

mesophytes xerophytes

(ii) With reference to the diagram, explain how a sunken stoma is able to reduce transpiration. [3]

Sunken stoma reduces transpiration because it has a large surface : volume. It also consists of spongy mesophyll cells which allows the exchange of gases. air chamber

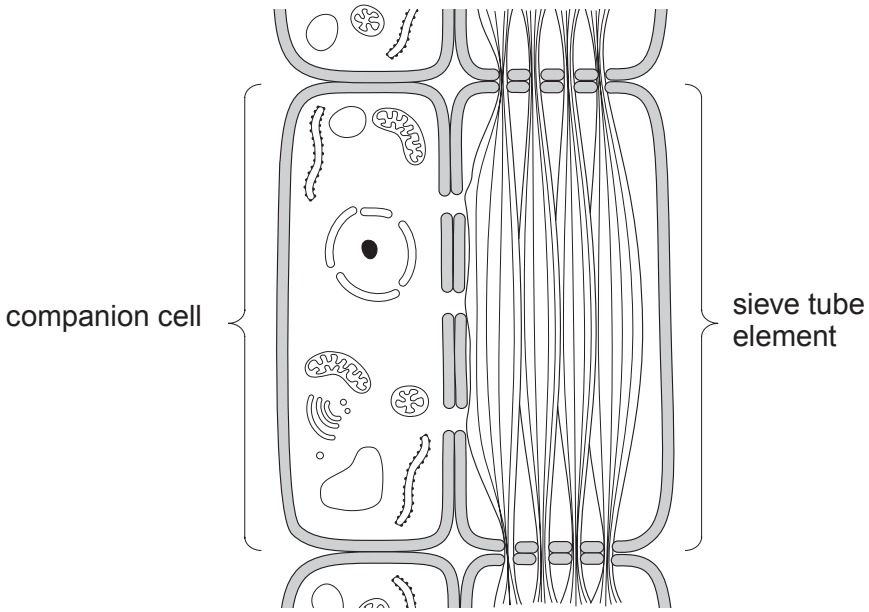
(iii) Describe and explain **two** *other* adaptations which reduce the rate of transpiration in plants that live in very dry conditions. [2]

They have curled leaves to trap water in and also have a thick cuticle to reduce water loss.

13

Examiner only

5. The diagram below shows two types of cell that are found in phloem tissue.



(a) Name **two** other types of cell that are found in phloem. [2]

1 .....

2 .....

(b) The function of phloem is to transport organic molecules, such as sucrose, in a plant.

Using the diagram only, explain how **two** features of the sieve tube element enable the phloem to carry out its function. [4]

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Examiner only

(c) The mass flow theory is one explanation to account for the movement of solutes in the phloem.
Suggest why the presence of large numbers of mitochondria in the companion cells does **not** support this theory. [3]

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Examiner only

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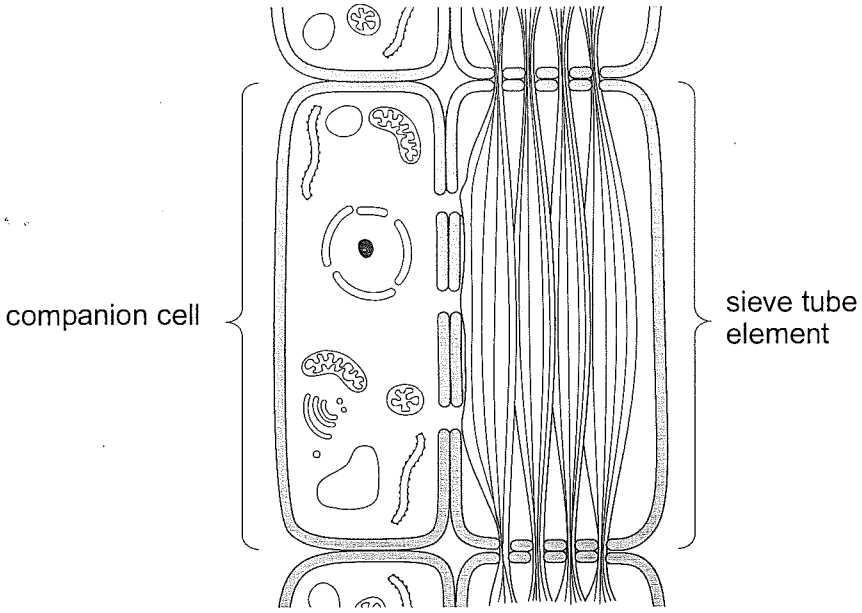

(a) Name **two** other types of cell that are found in phloem. [2]

1 Sieve plates

2 ~~Blood tube cell~~ Root hair cells

(b) The function of phloem is to transport organic molecules, such as sucrose, in a plant.

Using the diagram only, explain how **two** features of the sieve tube element enable the phloem to carry out its function. [4]

It is perforated with pores, to allow the passage of organic molecules. It shares plasmodesmata with a companion cell, so can obtain energy in the form ATP from the respiring companion cell, which has cell organelles including mitochondria.

Examiner only

(c) The mass flow theory is one explanation to account for the movement of solutes in the phloem.
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'Mass flow' is described as passive, not envolving energy. Mitochondria are the site of respiration in a cell, providing energy in the form ATP. If 'mass flow' is passive, energy shouldn't be required.

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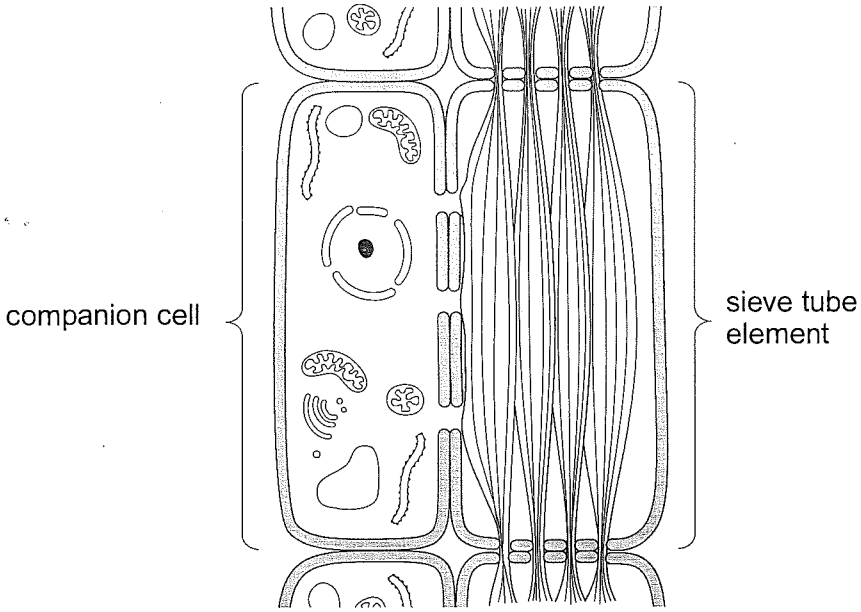

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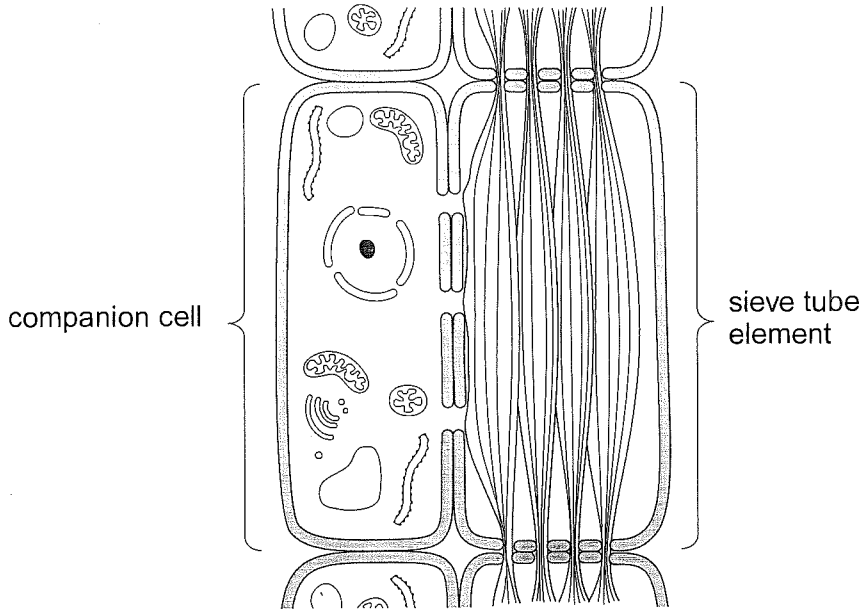

(a) Name **two** other types of cell that are found in phloem. [2]

1 ~~fibres~~ fibres

2 phloem parenchyma.

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Using the diagram only, explain how **two** features of the sieve tube element enable the phloem to carry out its function. [4]

Sieve ~~tube~~ tube element has sieve plates (which have pores) on either ~~end~~ end allowing transport of organic molecules in both direction. Companion cell contains lots of mitochondria which produce ATP, this ATP move down the concentration gradient through a partially permeable membrane to the sieve tube element where it is used. Sieve tube element lined with lignin for support.

Examiner only

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Mass flow theory suggests sucrose (and other products of photosynthesis) move from area of high concentration (source) to area of low concentration (sink). This is not an active process ~~the~~ therefore does not require ATP. Mitochondria however, produce ATP as a result of aerobic respiration therefore ATP must be required at some point. This opposes the mass flow theory. ~~The~~ (The fact that products of ~~the~~ photosynthesis also flow in both directions also ~~as~~ opposes this theory)

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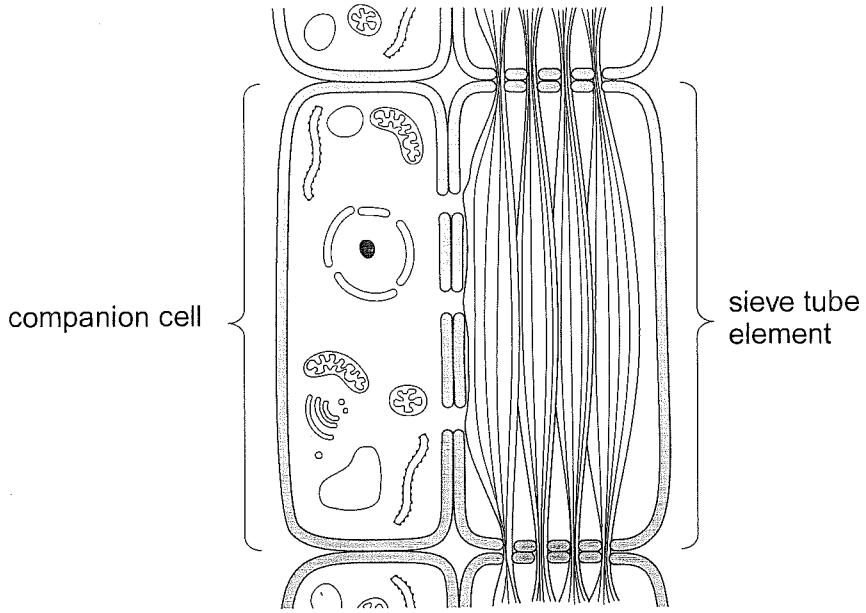

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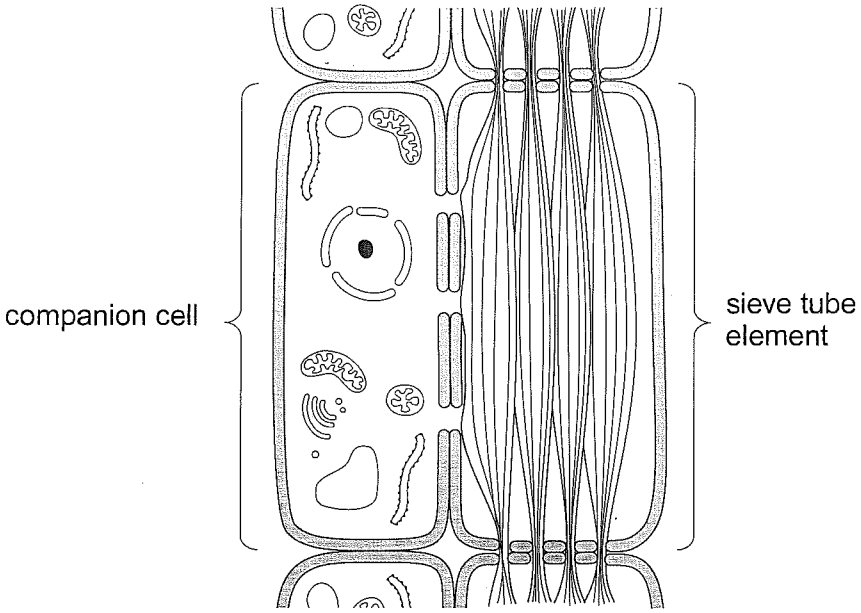

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1 ~~Palisade~~ source

2 ~~Amino acids~~ sink.

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The sieve tube element has plasmod-esmata which allows sucrose to enter the cell.

The sieve tube element also consist of fibres.

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The mass flow theory suggests that there is a low supply of ATP however companion cells contain many mitochondria for sieve tube elements to carry out functions such as protein synthesis.

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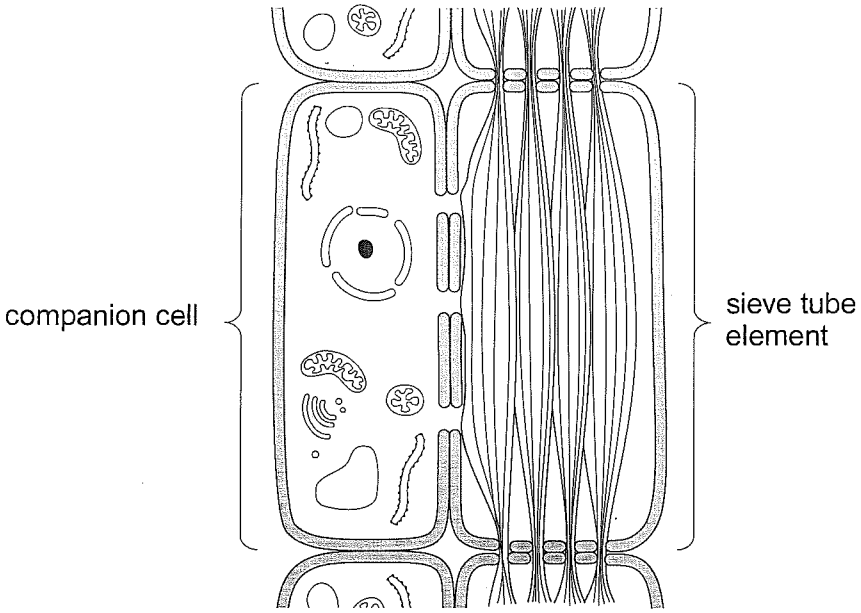

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