

1. Fig. 18.1 shows a simplified drawing of a section through a plant organ.

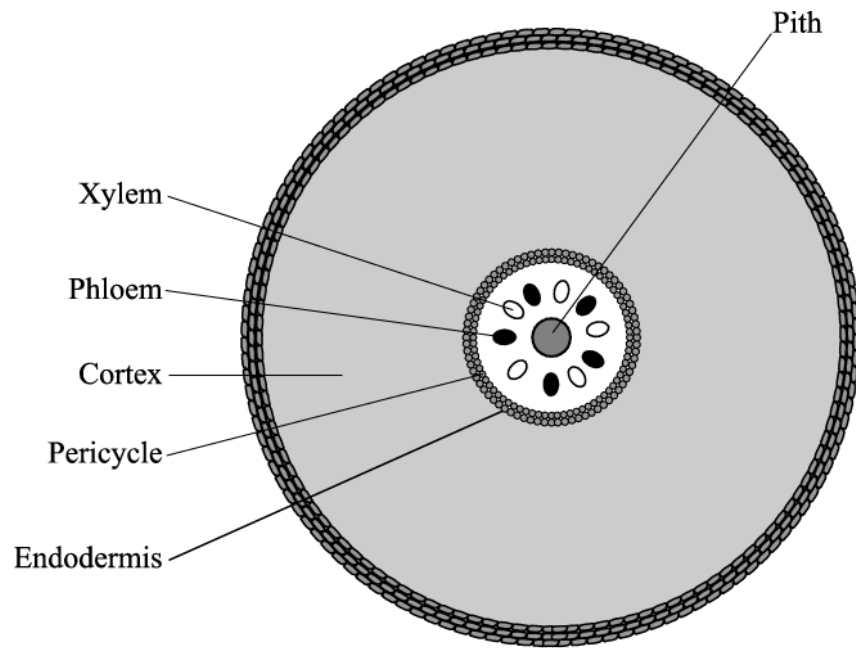


Fig. 18.1

Which organ is illustrated by Fig. 18.1?

- A a section through the stem of a wheat plant
- B a section through the stem of a cabbage plant
- C a section through the root of a wheat plant
- D a section through the root of a cabbage plant

Your answer

[1]

2. The water potential in the soil where potatoes are growing successfully is -400 kPa.

Which of the following water potential values is likely to be found in the cytoplasm of the **root hair cells** of the potato plants?

- A -400 kPa
- B -800 kPa
- C -200 kPa
- D -100 kPa

Your answer

[1]

3. Fig. 12.1 shows a section through a dicotyledonous plant leaf.

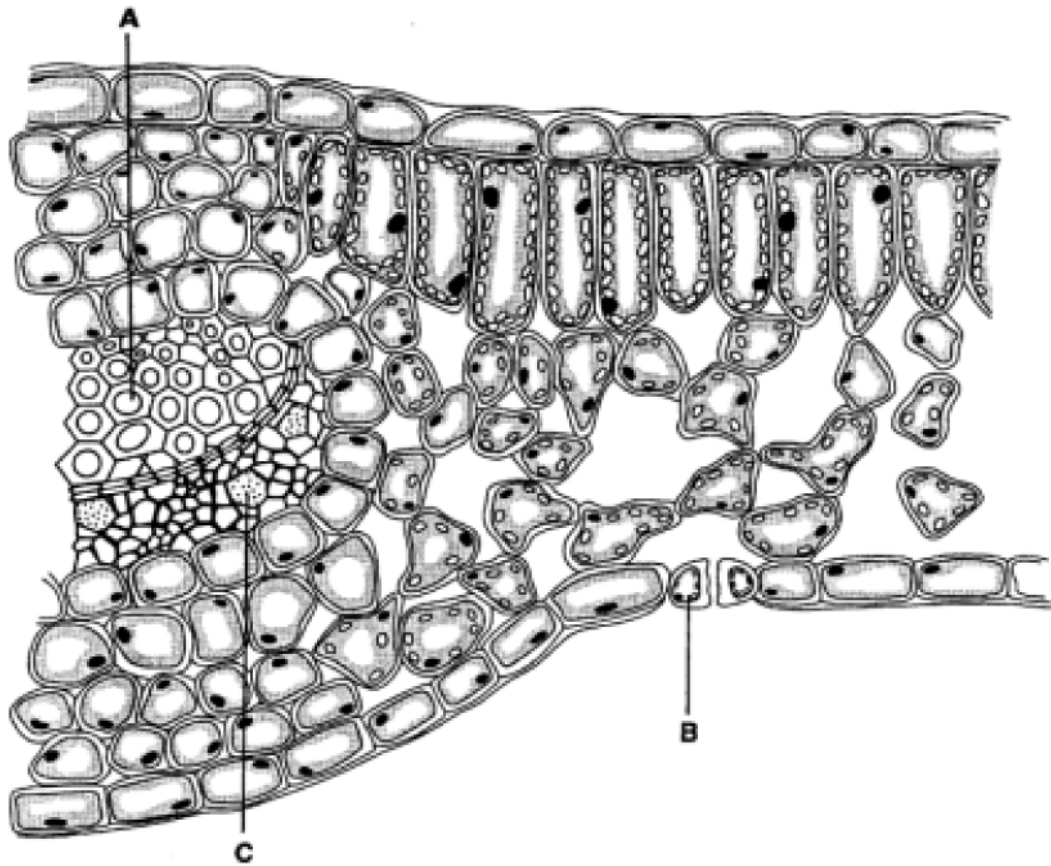


Fig. 12.1

Which of the cells labelled in Fig. 12.1 contain mitochondria?

- A A, B and C
- B A and C
- C B and C
- D B only

Your answer

[1]

4. Fig. 22.1 is a simplified diagram of cells in a dicotyledonous root.

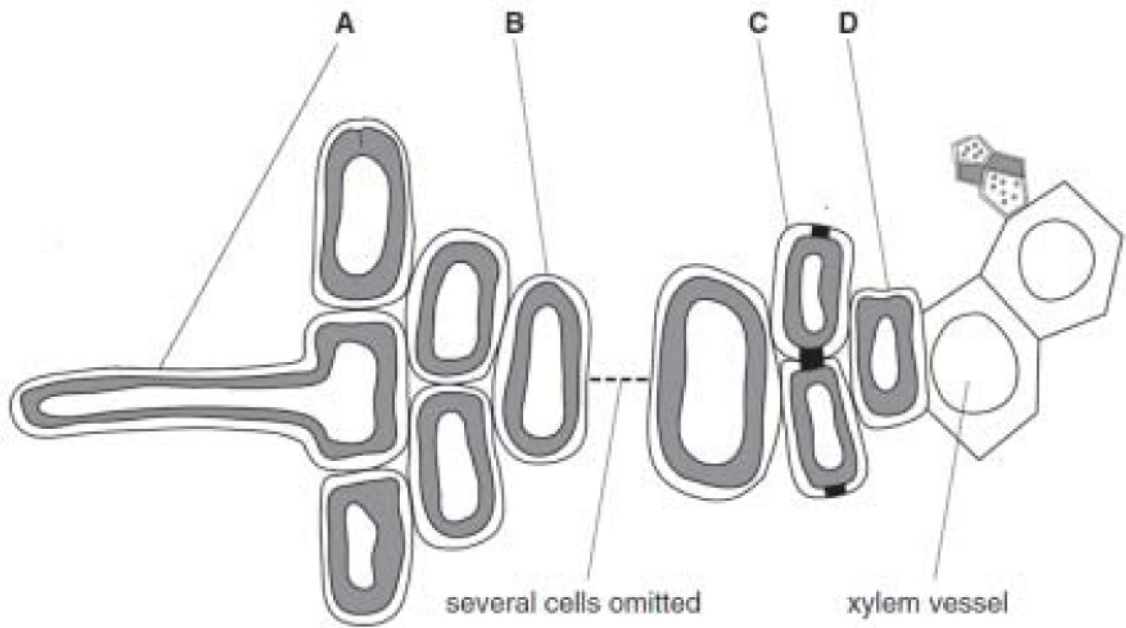


Fig. 22.1

Which of the following is a cell in the endodermis?

- A A
- B B
- C C
- D D

Your answer

[1]

5. In Fig. 22.1, which of the following statements is **incorrect** about the movement of water across the root?

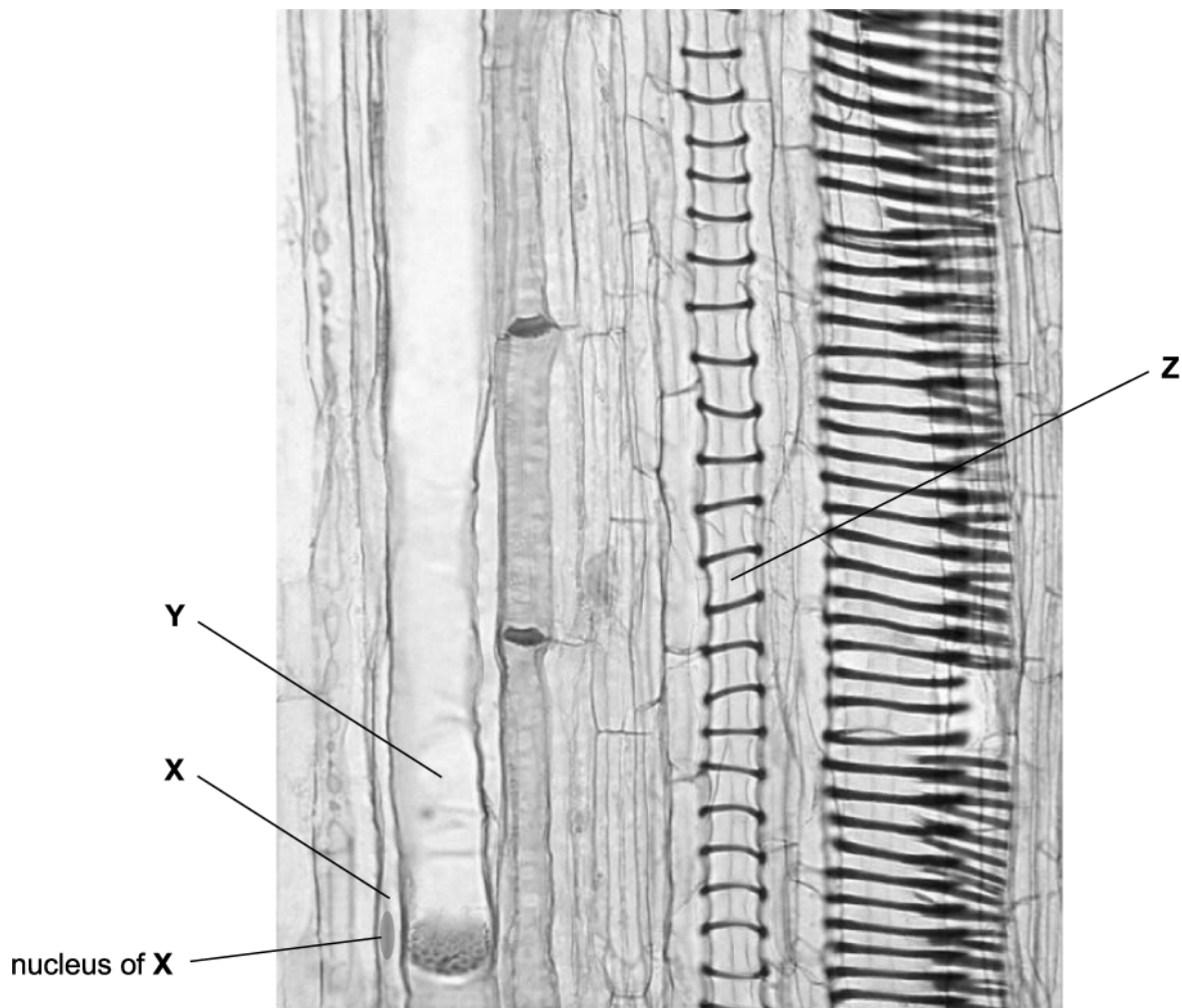
- A Water moves from cell A to cell B by the apoplast pathway
- B Water moves from cell A to cell B by the symplast pathway
- C Water moves from cell B to cell D by the apoplast pathway
- D Water moves from cell B to cell D by the symplast pathway

Your answer

[1]

6. The photomicrograph below shows a longitudinal section through a plant stem.

Three structures found in the vascular tissue have been labelled X, Y and Z.



Which of the following statements is / are correct?

- Statement 1:** X and Y are connected by plasmodesmata.
- Statement 2:** Protein synthesis **cannot** occur in X.
- Statement 3:** The dark horizontal bands in Z are cellulose.

- A 1, 2 and 3 are correct
- B Only 1 and 2 are correct
- C Only 2 and 3 are correct
- D Only 1 is correct

Your answer

[1]

7. Below are some statements about how water is transported from soil to the xylem of plants.

The statements are **not** in the correct order.

- 1 Mineral ions are actively transported into the xylem vessel.
- 2 The cohesive properties of water create a tension which draws water along the cell walls of the root cortex cells.
- 3 Water enters the root hair cell by osmosis, creating a higher water potential than that of the adjacent root cortex cell.
- 4 Water enters the xylem by osmosis.
- 5 Water is forced into the cytoplasm of the endodermal cells by the presence of the Casparian strip.
- 6 Water moves from the cytoplasm of one root cortex cell to the next cell down the water potential gradient until it reaches the endodermis.

Which of the options, **A** to **D**, correctly explains how water enters a xylem vessel via the symplast pathway?

- A 3, 6, 2, 4
- B 3, 5, 1, 4
- C 3, 6, 1, 4
- D 3, 6, 5, 4

Your answer

[1]

8. The walls of some plant cells are impregnated with a band of waterproof material known as a Casparian strip.

Which of the options, A to D, is the cell type that has a Casparian strip?

- A companion cell
- B endodermal cell
- C root cortex cell
- D root hair cell

Your answer

[1]

9. In a plant, sucrose is loaded into a companion cell using a protein carrier that co-transportes H^+ ions.

Which of the options, A to D, is a correct description of how H^+ ions are co-transported?

- A into the companion cell against the concentration gradient
- B into the companion cell down the concentration gradient
- C out of the companion cell against the concentration gradient
- D out of the companion cell down the concentration gradient

Your answer

[1]

10. Transpiration in plants is affected by environmental factors.

Which of the environmental factors, A to D, will affect transpiration by changing the kinetic energy of water molecules?

- A humidity
- B temperature
- C light intensity
- D carbon dioxide concentration

Your answer

[1]

11. The photomicrograph below is a transverse section through a dicotyledonous stem showing two types of cell in phloem tissue.



structure X

The structure labelled X allows exchange of materials between the two types of cells.

Which of the options, A to D, identifies structure X?

- A plasmodesma
- B stoma
- C lenticel
- D casparian strip

Your answer

[1]

12. The rate of transpiration can be affected by changing certain environmental factors.

Which of the options, A to D, are changes that would result in an **increased** rate of transpiration?

- A lower humidity and greater air movement
- B lower humidity and less air movement
- C higher humidity and greater air movement
- D higher humidity and less air movement

Your answer

[1]

13. Wind speed influences the rate of transpiration in a plant.

Which of the options, A to D, would **increase** in windy conditions?

- A kinetic energy of water molecules in leaf airspaces
- B probability that stomata are open
- C relative humidity of the atmosphere
- D water potential gradient between airspaces in the leaf and the atmosphere

Your answer

[1]

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Guidance
1			C	1	
			Total	1	
2			B	1	
			Total	1	
3			C	1	
			Total	1	
4			C	1	
			Total	1	
5			C	1	
			Total	1	
6			D	1	
			Total	1	
7			C	1	<p>Examiner's Comments</p> <p>Candidates had a lot of information to process in this question. They not only had to put the statements about water transport in plants in the correct order, they also had to eliminate statements that were not relevant. It was not unexpected that candidates found this to be a challenging question.</p>
			Total	1	
8			B ✓	1	
			Total	1	
9			B ✓	1	<p>Examiner's Comments</p> <p>This question should have been straightforward but candidates commonly answered C suggesting that they had confused the idea of sucrose moving out the companion cell into the sieve element with the loading of the companion cell from the source cell.</p>
			Total	1	

Question			Answer/Indicative content	Marks	Guidance
10			B	1	Examiner's Comments The link between the kinetic energy of water molecules and transpiration factors was assessed here which was answered correctly by a high proportion of candidates.
			Total	1	
11			A	1	Examiner's Comments The majority of candidates chose the correct option for this question.
			Total	1	
12			A	1	Examiner's Comments There were many correct responses. Option C was the most commonly selected incorrect response demonstrating some confusion surrounding humidity and its effect on the rate of transpiration.
			Total	1	
13			D	1	
			Total	1	