# 7.2 Transport Mechanisms

## Question Paper

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|---|---|
| Course | CIE A Level Biology |
| Section | 7. Transport in Plants |
| Topic | 7.2 Transport Mechanisms |
| Difficulty | Medium |

**Time allowed:** 20

**Score:** /10

**Percentage:** /100

## Question 1

This diagram shows a transverse section of *Ammophila arenaria*

Which xerophytic adaptations are visible in the diagram?

1 hairs on lower epidermal surface
2 sunken stomata
3 extensive root network
4 external cuticle
5 defensive spines

A. 1, 2 and 3

B. 2, 3 and 4

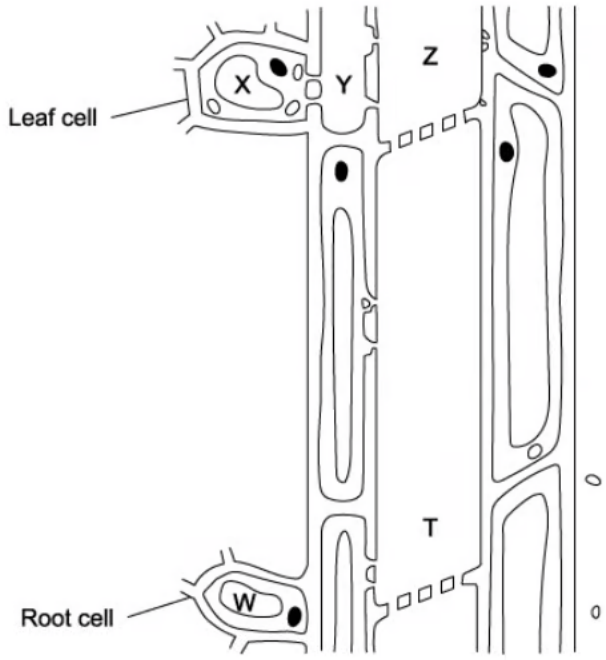
C. 1, 2 and 4

D. 1, 3 and 5

**[1 mark]**

## Question 2

This diagram represents part of the phloem pathway, from leaf to root in a plant.




Which process is occurring between **Y** and **Z**?

A. diffusion of sucrose

B. active transport of sucrose

C. diffusion of water

D. active transport of water

**[1 mark]**

## Question 3

Why is the circumference of a tree trunk larger at night than in the middle of the day?

A. at night the stomata are open so there is a build-up of water in the xylem

B. at night the root pressure has decreased due to reduced mineral uptake by the root hair cells

C. at night there is less tension in the xylem vessels because the rate of transpiration is reduced

D. at night the sieve tube elements are full of dissolved solutes due to a reduced translocation rate

**[1 mark]**

## Question 4

Which xerophytic adaptations reduce the water potential gradient?

1 epidermal hairs
2 sunken stomata
3 reduced number of stomata
4 rolled leaves
5 defensive spines

A. all 5

B. 1,2 and 4

C. 1,4 and 5

D. 1, 2, 3 and 5

**[1 mark]**

## Question 5

A student used a potometer to measure the rate of water loss from a plant by transpiration.

The internal diameter of the capillary tube and the distance moved by the bubble in 30 seconds were recorded.

The results are shown in the table.

| internal diameter of capillary tube / mm | distance moved by bubble in 30 seconds / mm |
|---|---|
| 0.6 | 14 |

What is the amount of water lost by transpiration in $mm^3\ min^{-1}$ to 3 s.f.?

A. 15.8

B. 3.96

C. 31.7

D. 7.92

**[1 mark]**

## Question 6

Sucrose and other products of photosynthesis can be moving both up and down the plant stem at the same time.

Which statement best explains how this occurs?

A. mass flow occurs in both directions in a phloem sieve tubes at the same time

B. mass flow occurs in different directions in different phloem sieve tubes at the same time

C. mass flow overpowers the effects of active transport

D. active transport moves substances up and mass flow moves substances down

**[1 mark]**

## Question 7

Which feature of water is least likely to affect the climate in a tropical rainforest?

A. capillary action

B. cohesion to other water molecules

C. maximum density at 4°C

D. low viscosity

**[1 mark]**

## Question 8

The rate at which water flows through xylem vessels is influenced by numerous external factors.

An increase in which factor would reduce the flow of water in the xylem?

A. air temperature

B. light intensity

C. wind speed

D. atmospheric humidity

**[1 mark]**

## Question 9

Which statements about the uptake and transport of water in plants are correct?

1 water is transported in xylem by the symplast and apoplast pathways to reach the leaves
2 water transported by the symplast pathway enters root hair cells down a water potential gradient
3 water being absorbed in the root must always pass through the symplast pathway at some point
4 water transported by the apoplast pathway through plasmodesmata must pass through cell surface membranes of endodermal cells

A. 1, 2 and 4

B. 1, 2 and 3

C. 2 and 3

D. 3 and 4

**[1 mark]**

## Question 10

Water absorbed by a root hair cell can travel via different pathways to reach the xylem

Which of the following best describes the route taken by water?

| | **apoplast pathway** | **symplast pathway** |
|---|---|---|
| **A** | always | sometimes |
| **B** | always | always |
| **C** | sometimes | always |
| **D** | sometimes | sometimes |

**[1 mark]**