9.1 Transport in the Xylem of Plants

Question Paper

Course	DP IB Biology
Section	9. Plant Biology (HL Only)
Topic	9.1 Transport in the Xylem of Plants
Difficulty	Medium

Time allowed: 20

Score: /10

Percentage: /100

Question 1

Identify the set of conditions under which transpiration would occur at the slowest rate.

	Humidity	Temperature	Air movement	Light intensity
A	Low	Low	Low	Low
B	High	Low	Low	Low
C	High	High	Low	Low
D	High	Low	High	Low

[1 mark]

Question 2

When a very narrow glass tube known as a capillary tube is dipped into water, water can flow up the tube despite the opposing force of gravity.

What is this model demonstrating?

A. Translocation

B. A hydrostatic pressure gradient

C. Cohesion between water molecules

D. Adhesion between water molecules

[1 mark]

Question 3

The following steps describe the process of transpiration.

I. Water is drawn from xylem vessels to replace the water lost
II. A pulling force is transmitted throughout the xylem vessels all the way down the stem of the plant and to the ends of the xylem in the roots
III. Water evaporates from the surfaces of cells inside a leaf
IV. A low pressure is generated within the xylem

What is the correct order of the steps?

A. III → II → IV → I

B. III → I → IV → II

C. I → III → IV → II

D. I → IV → III → II

[1 mark]

Question 4

Which of the following relates to xylem vessels?

I. Transport organic compounds from source to sink
II. Transport mineral ions from roots to leaves
III. Provides mechanical support to the plant
IV. Closely associated with companion cells to assist with loading of sucrose

A. I only

B. II and III only

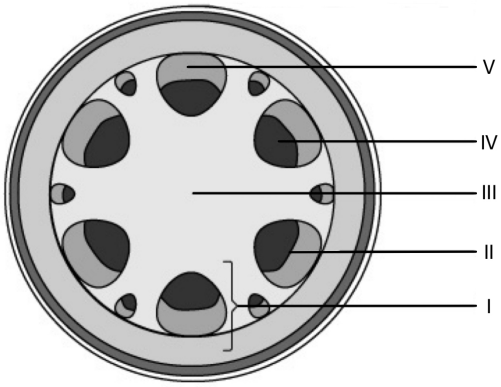
C. I, II and III

D. III and IV only

[1 mark]

Question 5

A student drew a diagrammatic representation of a transverse section of a plant stem based on what they saw using a light microscope.



Identify the correct labels required for the drawing above.

	I	II	III	IV	V
A	Vascular bundle	Pith	Phloem	Cambium	Xylem
B	Phloem	Xylem	Vascular bundle	Cambium	Pith
C	Vascular bundle	Xylem	Pith	Cambium	Phloem
D	Vascular bundle	Cambium	Pith	Xylem	Phloem

[1 mark]

Question 6

Identify which of the adaptations below is **not** found amongst the group of plants known as xerophytes.

A. Having long hairs on their surface, so air moisture is absorbed at night

B. Having reduced leaves in the form of spines, so the surface area for transpiration is reduced

C. Having reduced numbers of stomata, so there are fewer pores through which water can be lost

D. Having hinge cells that shrink when flaccid, so the leaves roll up

[1 mark]

Question 7

When water is taken up by roots, what process is responsible for this and what is the cause behind this process?

	Process	Cause
A	Cohesion	The concentration of solutes in the soil is higher than in the roots
B	Cohesion	The concentration of solutes in the soil is lower than in the roots
C	Osmosis	The concentration of solutes in the soil is higher than in the roots
D	Osmosis	The concentration of solutes in the soil is lower than in the roots

[1 mark]

Question 8

What does a potometer measure?

A. The rate of photosynthesis of a plant

B. The rate of water uptake of a plant

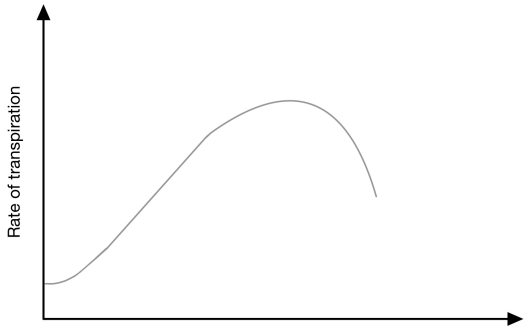
C. The rate of respiration of a plant

D. The rate of transpiration of a plant

[1 mark]

Question 9

Certain environmental factors can affect the rate of transpiration in plants. The effect of one environmental factor on transpiration rate is shown in the graph below.



Identify the environmental factor that is having this effect on transpiration rate.

A. Temperature

B. Humidity

C. Air movement

D. Light intensity

[1 mark]

Question 10

Identify the process by which mineral ions in soil move towards the root cell membrane.

A. Translocation

B. Transport through proteins known as protein pumps

C. Osmosis

D. Mass flow of water

[1 mark]