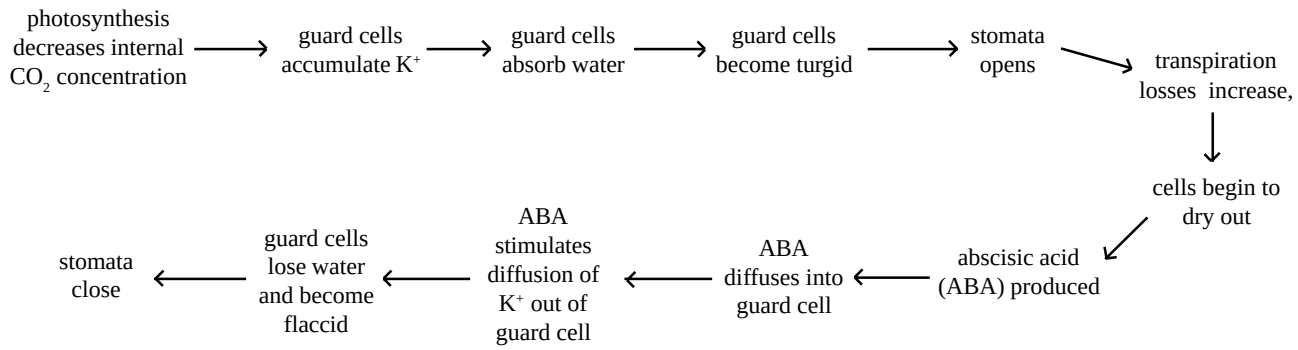
TRANSPORT IN PLANTS

QUESTIONSHEET 1

Do not write in margin

The diagram shows a proposed mechanism to explain the regulation of the opening and closing of stomata.



(a) Explain why:

(i) the accumulation of K^+ in guard cells causes them to absorb water.

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.....

[2]

(ii) stomata open when guard cells become turgid.

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[2]

(b) Using information in the diagram, explain the term negative feedback.

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[3]

(c) Why is transpiration sometimes called ‘a necessary evil’?

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.....

[2]

TOTAL / 9

QUESTIONSHEET 2

Do not write in margin

The table below shows the mean number of stomata on the upper and lower sides of leaves from two species of herbaceous plant.

Species	Mean number of stomata / cm^{-2}	
	Upper surface	Lower surface
A	820	2712
B	5500	5800

(a) Suggest a method which you could use to obtain the data in the table.

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[4]

(b)(i) Which of the two species, A or B is likely to be a monocotyledon? Explain your answer.

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[2]

(ii) Which of the two species, A or B, is likely to live in the driest conditions? Explain your answer.

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.....

[2]

TOTAL / 8

TRANSPORT IN PLANTS

QUESTIONSHEET 3

Do not write in margin

The table shows some of the characteristics of two types of plant cell.

	Cell X	Cell Y
Structure	Hollow and dead when mature. Ends of cells overlapping. Have bordered pits.	Hollow and dead when mature. Form long cylinder as end cell walls break down.
Length	Up to 10 mm	Stacked end to end, units stretch up to 1 metre
Width	10 – 15 μm	40 – 80 μm

(a) Identify cells X and Y.

Cell X: .....

Cell Y: .....

[2]

(b) Explain why angiosperms possess large amounts of tissue formed from cell Y rather than from cell X.

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.....

.....

[4]

(c) (i) Name the plant tissue in angiosperms where sugars and amino acids are transported, and name the two main types of cell found in that tissue.

Tissue: .....

Cell 1: .....

Cell 2: .....

[3]

(ii) Sugars and amino acids are transported in the plant by a mass flow method. Outline the process of mass flow.

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.....

[2]

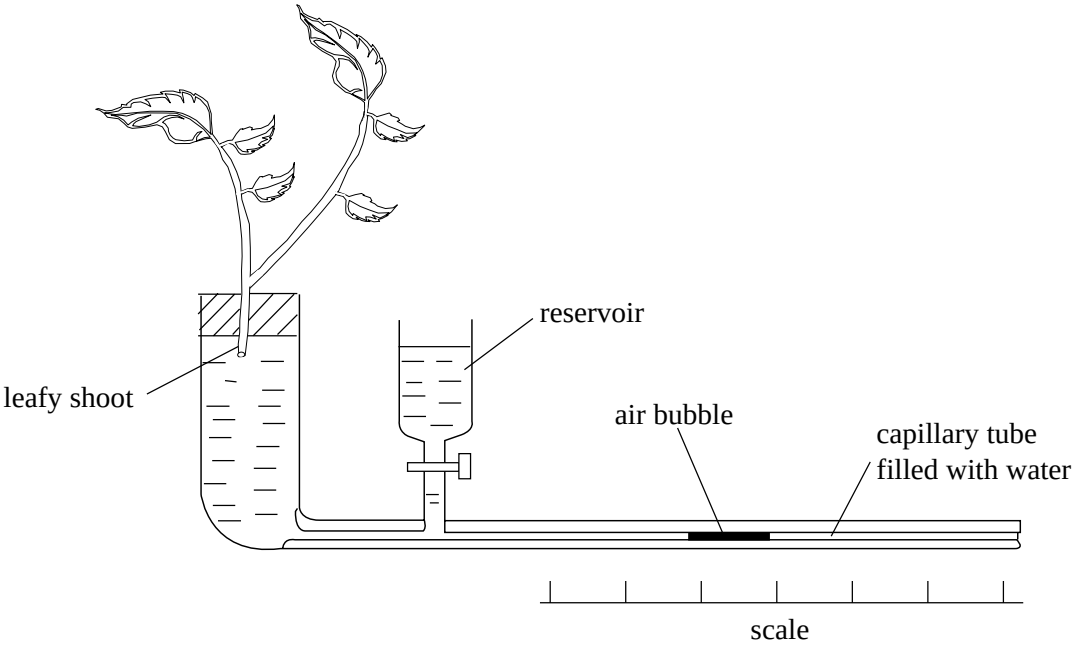
TOTAL / 11

TRANSPORT IN PLANTS

QUESTIONSHEET 4

Do not write in margin

A student used the apparatus below to estimate the rate of transpiration of a leafy shoot.



(a) (i) Name this piece of apparatus.

.....

[1]

(ii) What does this piece of apparatus actually measure?

.....

[1]

(iii) What is the purpose of the air bubble?

.....

[1]

(b) (i) State three precautions which must be taken when setting up this apparatus.

1: .....

2: .....

3: .....

[3]

(ii) How would you use the apparatus to measure the effect of wind speed on transpiration rate?

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[4]

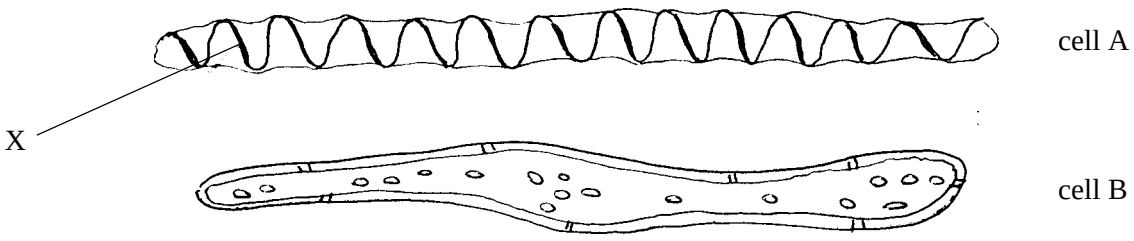
TOTAL / 10

AS 5 **TRANSPORT IN PLANTS**

QUESTIONSHEET 5

Do not write in margin

The diagram below shows two types of cell from a tissue of a flowering plant.



(a) (i) Name cells A and B.

A: ..... B: ..... [2]

(ii) From what plant tissue do these cells come?

.....

[1]

(iii) Name two other types of cell which would be present in the tissue you have named.

1: ..... 2: ..... [2]

(iv) What is X made of and why is it in a spiral form?

.....

.....

[2]

(b) (i) State two functions of this tissue.

1: .....

2: .....

[2]

(ii) State three ways in which cell A is suited for its functions.

1: .....

2: .....

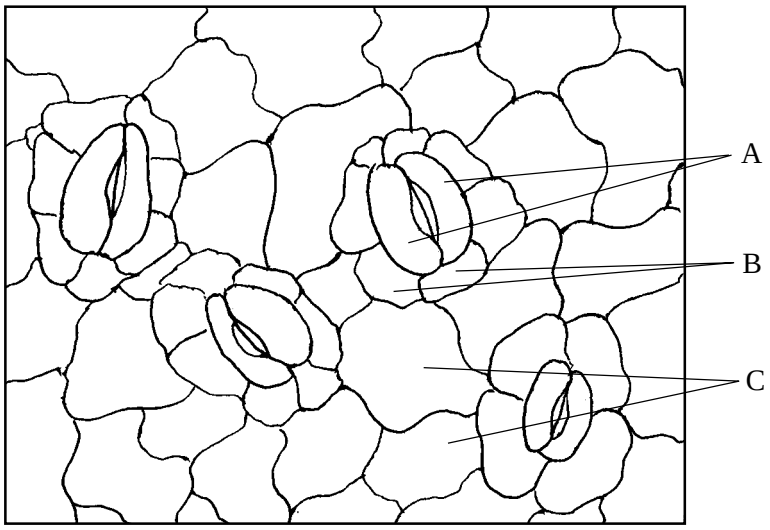
3: .....

[3]

TOTAL / 12

Do not write in margin

The diagram below shows part of the lower epidermis of a leaf. The area shown is 0.0105 mm^2.



(a) (i) Identify the cells labelled A, B and C.

A: ..... B: .....

C: ..... [3]

(ii) What are the functions of the cells labelled A?

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.....

[4]

(iii) Cells A possess chloroplasts but cells B and C do not. Suggest a reason for this difference.

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[2]

(b) (i) Calculate the number of stomata per mm^2 of the lower epidermis. Show your working.

Answer ..... [2]

(ii) Suggest a source of error in this method of estimating stomatal density.

.....

[1]

TOTAL / 12

Do not write in margin

(a) Suggest explanations for the following observations:

(i) In summer, angiosperms may lose a much greater volume of water via transpiration than gymnosperms.

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[2]

(ii) Fruit growth is suppressed if a ring of bark between the fruit and mature leaves is removed.

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[2]

(iii) Translocation in the phloem may be stopped by metabolic inhibitors.

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[2]

TOTAL / 6

Do not write in margin

The table shows the destination (sink) of translocated carbohydrates in a mature tomato plant.

Destination	% of total translocated carbohydrate
Roots	26
Stem	22
Leaves	12
Tomatoes	40

(a) Suggest an explanation for the percentage of carbohydrate translocated to the tomatoes.

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[3]

(b) Outline how phloem tissue is structurally adapted for its role in carbohydrate transport.

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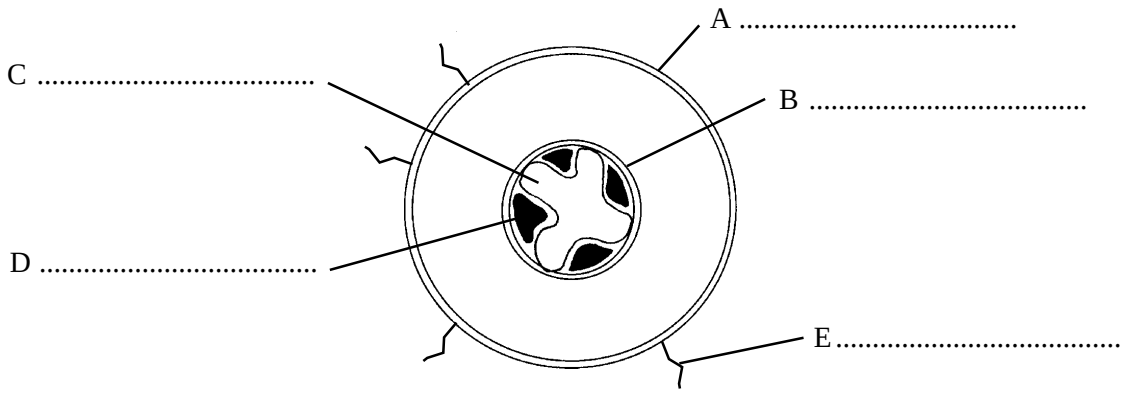
[3]

TOTAL / 6

Do not write in margin

The diagram below shows a transverse section of a root.



(a) On the diagram label A,B,C, D and E. [5]

(b) For each of the following root structures, state their functions and outline one way in which they are structurally adapted for their function:

(i) B

Function: ..... [1]

Adaptation: ..... [1]

(ii) E

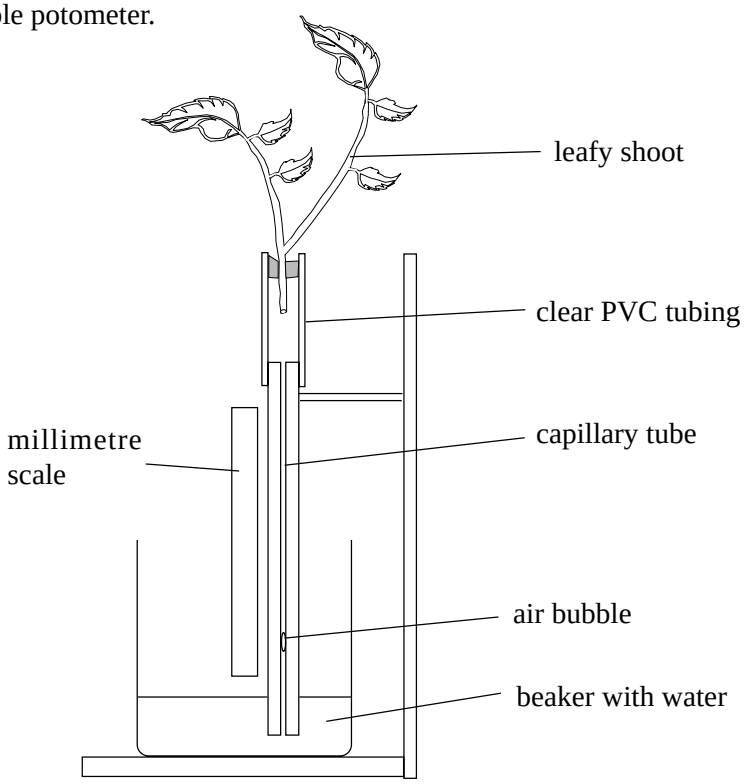
Function: ..... [1]

Adaptation: ..... [1]

TOTAL / 9

Do not write in margin

The diagram shows a simple potometer.



(a) Suggest two precautions which should be taken when setting up this apparatus.

.....

..... [2]

This potometer was used to investigate the effect of leaf area on water uptake. The potometer was initally set up as above and the distance moved by the bubble in ten minutes was recorded. One of the leaves was then detached from the plant. The potometer was adjusted appropriately and the distance moved by the bubble was measured over a second 10 minute period. The investigation was repeated until only one leaf remained. The table below shows the result which were obtained.

Number of leaves on shoot	Distance moved by bubble in ten minutes (mm)
5	83
4	60
3	44
2	10
1	6

(b) (i) Using a suitable scale, plot this data on graph paper. [4]

(ii) Describe and explain the trend shown.

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..... [3]

(iii) What assumption is made in using the apparatus in this way?

..... [1]

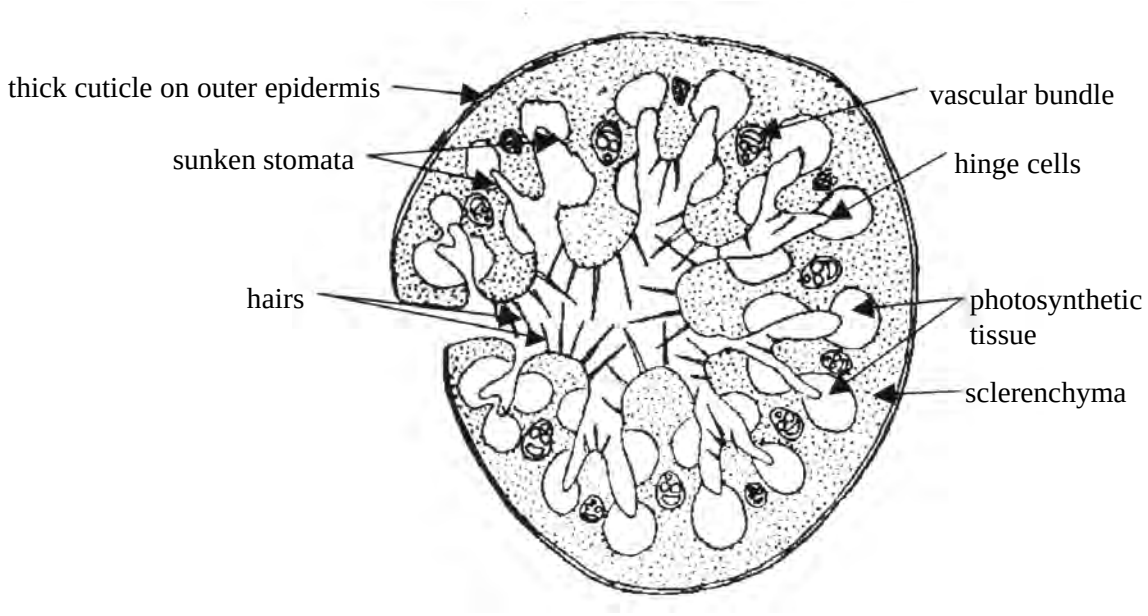
TOTAL / 10

TRANSPORT IN PLANTS

QUESTIONSHEET 11

Do not write in margin

The diagram below shows a transverse section of the leaf of the xerophytic plant Marram grass (Ammophila arenaria).



(a) Describe and explain two xerophytic features shown in the diagram.

Feature 1: .....

.....

Feature 2: .....

.....

[4]

(b) Outline the connection between the loss of water from the leaves and the movement of water through the plant.

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[6]

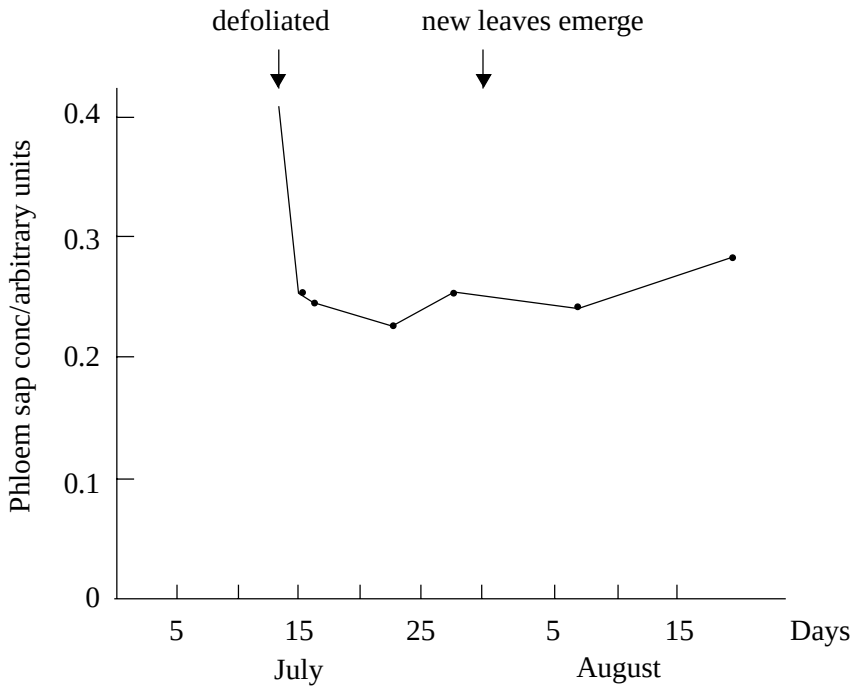
TOTAL / 10

TRANSPORT IN PLANTS

QUESTIONSHEET 12

Do not write in margin

The graph below show the effect of defoliation (removal of all leaves) of a white ash tree on the sugar content of the phloem.



(a) Explain what these results suggest about the source of sugars in the phloem.

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[2]

(b) Outline the 'mass flow hypothesis'.

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[4]

TOTAL / 6