

3: Plant nutrition and transport – Topic questions **Paper 5**

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

Use these questions to formatively assess your learners' understanding of this topic.

Question	Year	Series	Paper number
2	2016	June	52

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at www.cambridgeinternational.org/support

- 2 Fig. 2.1 shows the apparatus used to measure the rate of water loss from the leaves of a plant.

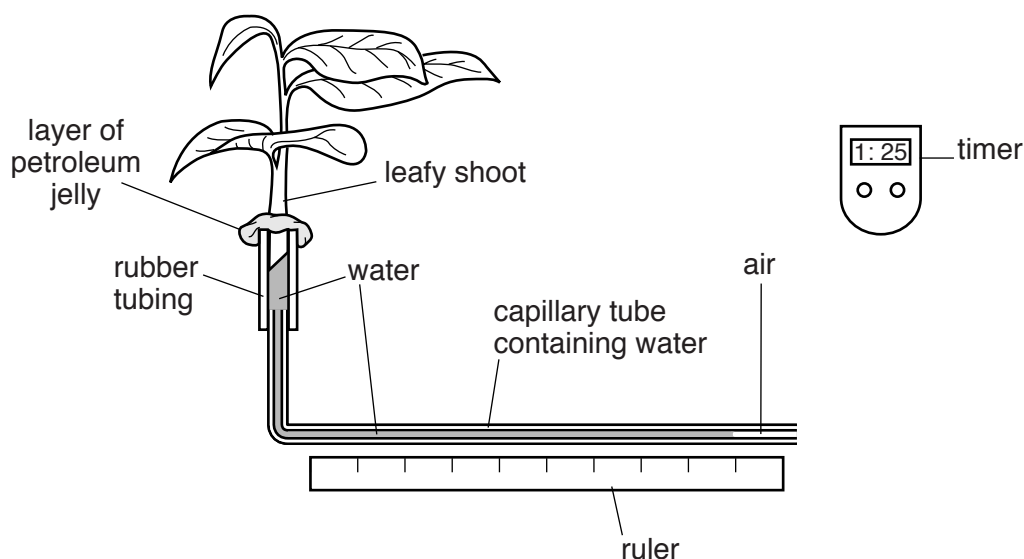


Fig. 2.1

- (a) Suggest how a student might use the apparatus shown in Fig. 2.1 to calculate the **rate** of water loss from the leaves of a leafy shoot.

.....

 [2]

The student used the apparatus shown in Fig. 2.1 to compare the rates of water loss from leaves in still and moving air.

- (b) Suggest **one** piece of apparatus that the student could use to vary the air movement.

..... [1]

- (c) State **two** variables that the student should keep constant in this investigation.

1

 2

[2]

Petroleum jelly is greasy and waterproof.

- (d) Suggest the purpose of the petroleum jelly on the apparatus shown in Fig. 2.1.

.....
..... [1]

The student's results are shown in Fig. 2.2.

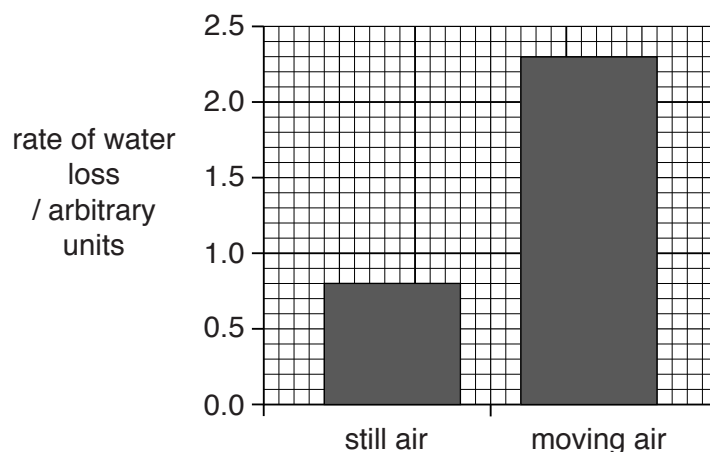


Fig. 2.2

- (e) The rate of water loss is greater in moving air than still air.

Use Fig. 2.2 to calculate how many times greater the rate of water loss is in moving air than still air.

Show your working.

Give your answer to one decimal place.

.....
[2]

- (f) Another student thinks that the apparatus in Fig. 2.1 does not measure water **loss** from the leaves.

Suggest why this student is correct.

.....
.....
..... [1]

(g) Fig. 2.3 shows some laboratory apparatus.

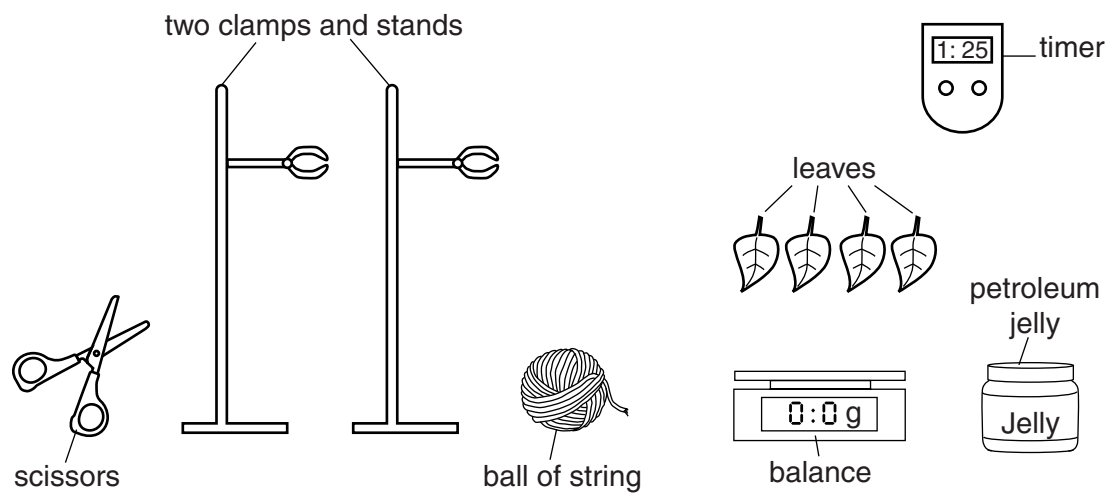


Fig. 2.3

Petroleum jelly is greasy and waterproof.

Describe, with the aid of a labelled diagram, how you could set up the apparatus shown in Fig. 2.3 to find out whether the upper or the lower surface of the leaves loses more water by evaporation.

[6]

(h) Fig. 2.4 shows a section of a stem as seen under a light microscope.

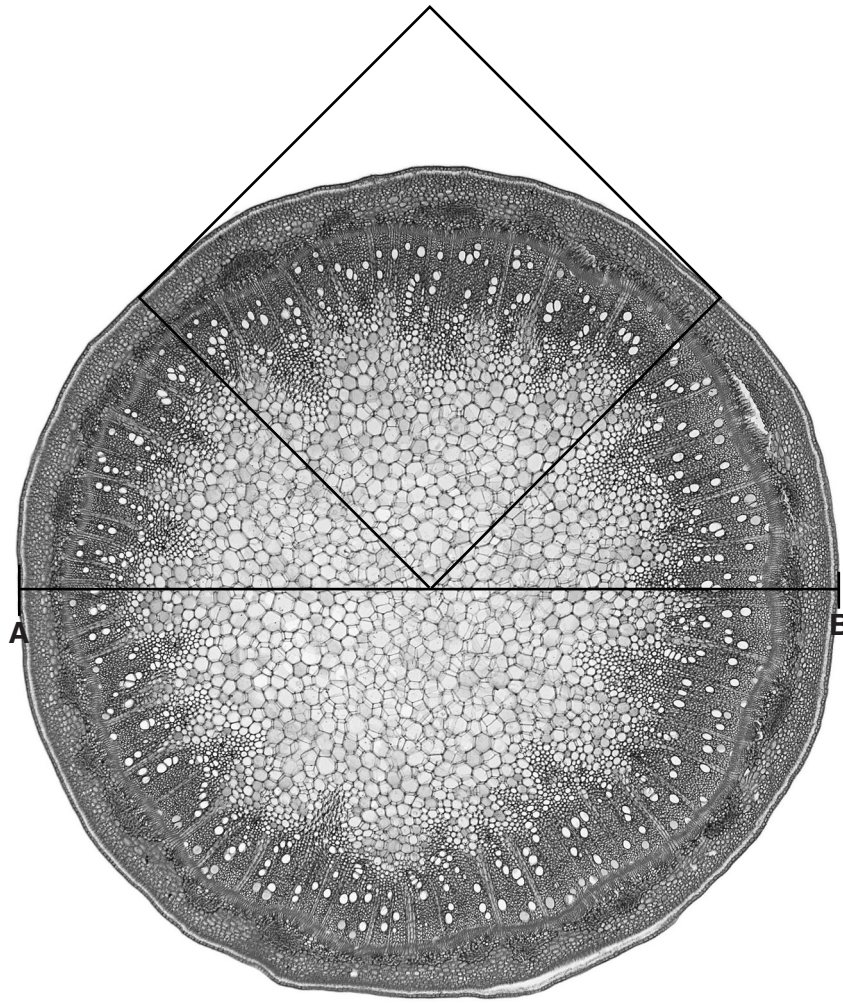


Fig. 2.4

Make a large drawing of the section of the stem contained in the square on Fig. 2.4 to show the different structures and layers.

Do not draw any individual cells.

[4]

- (i) (i) The diameter of the stem in Fig. 2.4 is shown by the line **AB**.

Measure the length of **AB** on Fig. 2.4.

measured length of line **AB** mm [1]

- (ii) (ii) The actual diameter of the stem is 7.5 mm.

The magnification of Fig. 2.4 can be calculated using the following equation:

$$\text{magnification} = \frac{\text{length of } \mathbf{AB}}{\text{actual diameter of stem}}$$

Calculate the magnification of Fig. 2.4 using the information above and your answer to (i).

Show your working.

Give your answer to the nearest whole number.

magnification [1]

[Total: 21]

Abbreviations used in the Mark Scheme:

;	separates marking points
/	alternatives
I	ignore
R	reject
A	accept (for answers correctly cued by the question, or guidance for examiners)
AW	alternative wording (where responses vary more than usual)
AVP	any valid point
ecf	credit a correct statement / calculation that follows a previous wrong response
ora	or reverse argument
()	the word / phrase in brackets is not required, but sets the context
<u>underline</u>	actual word given must be used by candidate (grammatical variants excepted)
max	indicates the maximum number of marks that can be given

Question	Answer	Marks
2 (a)	measure distance moved by air / water / meniscus ; for a set period of time;	[max 2]
2 (b)	fan / hairdryer	[1]
2 (c)	any 2 from: leaf area / size ; type/species of plant / use same leaves ; light (intensity) ; temperature ; diameter of capillary tubing ; no additional air movement, e.g. windows open ; humidity ;	[max 2]
2 (d)	to prevent water leakage / AW ; to stop air getting in ;	[max 1]
2 (e)	correct reading from the graph (2.3 and 0.8) ; $2.3 / 0.8 = 2.9$;	[2]
2 (f)	idea that it actually measures water uptake (not loss);	[1]

Question	Answer	Marks
2 (g)	drawing showing apparatus set up ; description of the treatments ; any 4 of: 1 use of a control with a correct example, 2 weigh (mass of) leaves at beginning with petroleum jelly applied; 3 weigh leaf at end ; 4 for a set period of time ; 5 describe a controlled variable / named environmental factor being kept constant ; 6 repeat experiment / described e.g. two leaves with same treatment ;	[max 6]
2 (h) (i)	O – all lines single, clear and unbroken with no shading ; S - drawing occupies at least half the space ; D1 – no cells and only the sector drawn ; D2 – detail ;	[4]
2 (h) (ii)	$108 \pm 1 \text{ mm}$;	[1]
2 (h) (iii)	(x)14 ; A 15 if (ii) 109 mm ecf for incorrect measurement in (h) (ii) R if units included with the magnification	[1]
[Total: 21]		