

PEARSON EDEXCEL A-LEVEL BIOLOGY B • 9B10

BIOLOGY



EXAM QUESTION PACK

TOPIC 4: EXCHANGE AND TRANSPORT
TRANSPORT IN PLANTS

SCORE

/64

PERCENTAGE

%

STEMUP

These questions belong to Pearson Edexcel, not to us.

The examination questions and mark schemes in this pack were written and published by Pearson Edexcel. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with Pearson Edexcel and does not own, and makes no claim to own, any of the question or mark scheme material in this pack. Pearson has not endorsed, approved or been involved in the production of it. Pearson, Edexcel and the qualification titles used here belong to their respective owners and appear for identification only.

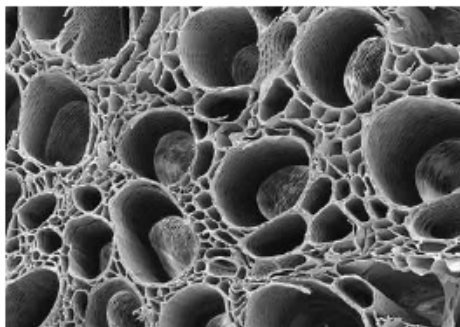
Where to find the originals

Pearson publishes its past papers and mark schemes free of charge. Always check the current specification at [qualifications.pearson.com](https://www.pearson.com/qualifications) before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Q1.

The photograph below shows an electronmicrograph of xylem tissue.



© B705/0112 Xylem tissue, SEM Steve Gschmeissner/Science Photo Library

Give **three** ways in which xylem tissue is adapted for its functions.

(3)

.....

.....

.....

.....

.....

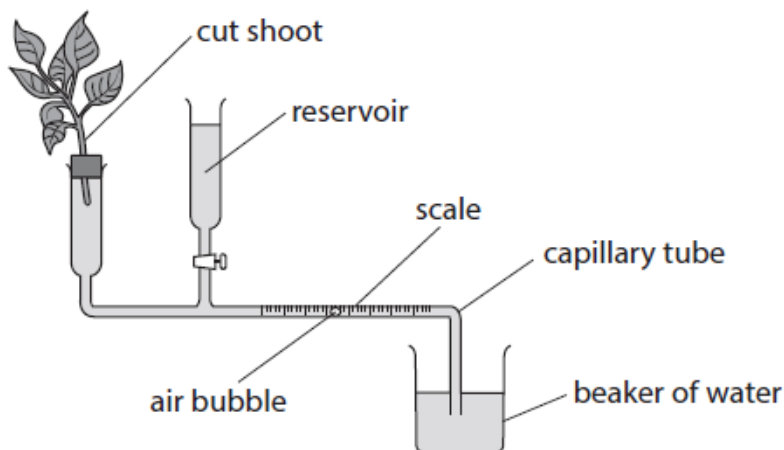
.....

(Total for question = 3 marks)

Q2.

Water moves through xylem vessels in a plant during transpiration.

A student used the potometer shown in the diagram to investigate the rate of water uptake in a leafy shoot.



The student investigated the effect of a combination of environmental conditions on the rate of water uptake.

The table shows the results of this investigation.

Conditions	Distance moved by the bubble in 5 minutes / cm					
	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Mean
Still air, in light	2.4	2.2	2.2	2.2	2.1	2.2
Moving air, in light	6.5	6.7	6.4	6.2	6.3	6.4
Still air, in dark	0.9	0.4	0.0	0.0	0.0	0.3
Moving air, in dark	1.7	0.8	0.0	0.0	0.0	0.5

(i) The internal diameter of the capillary tubing is 0.3 mm.

The volume of a cylinder is calculated using the formula

$$\pi r^2 h$$

Calculate the mean rate of water uptake for the shoot in moving air, in the light.

Give your answer in $\text{mm}^3 \text{min}^{-1}$ to two significant figures.

(3)

Answer $\text{mm}^3 \text{min}^{-1}$

(ii) Analyse the data to explain the results of this investigation.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

.....

(iii) Describe how this investigation could be modified to make a valid comparison of water loss from the upper and lower surfaces of the leaves.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 10 marks)

Q3.

The photograph shows a wombat, an animal that lives in dry parts of Australia.



Source: © Blue Gum Pictures/Alamy Stock Photo

Wombats are herbivores, feeding on grasses, leaves and bark. Wombats also dig in the soil for roots.

They have behavioural and physiological adaptations to survive periods of severe drought.

The effect of drought on the health of wild wombats was investigated.

Changes in body mass, body condition and the chemical constituents of stomach contents and faeces were recorded.

These changes were related to the changes in the quality and quantity of the food of wombats.

Explain why drought affects the quality and quantity of the food of wombats.

(5)

.....

.....

.....

.....

.....

.....

.....

.....

.....

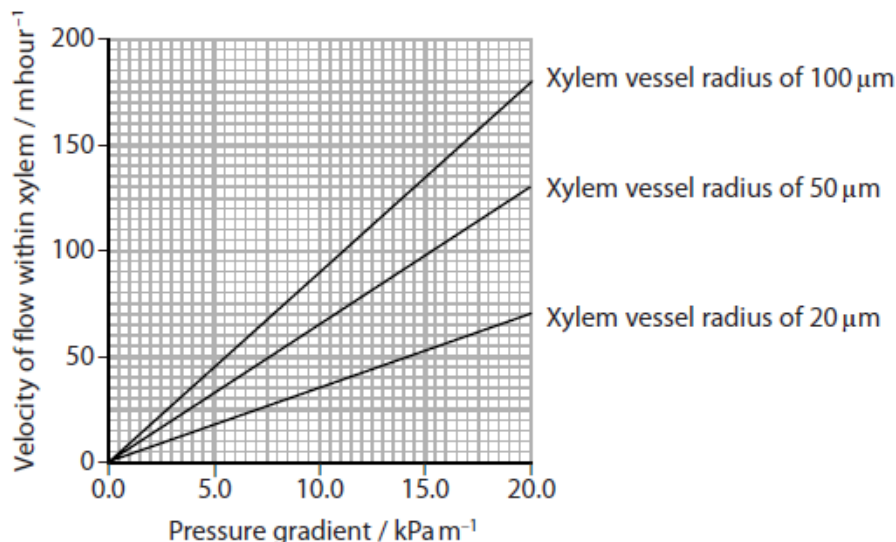
.....

(Total for question = 5 marks)

Q4.

Xylem and phloem are involved in transport in plants.

The graph shows the effect of pressure gradient on the velocity of flow within three xylem vessels.



(i) Describe the effect of pressure gradient and radius on the velocity of flow within the xylem vessels.

(2)

.....

.....

.....

.....

.....

.....

.....

.....

.....

(ii) Calculate the percentage increase in the velocity of water flowing through a xylem vessel of radius 20 μm and a xylem vessel of radius 100 μm , at a pressure gradient of 17.5 kPa m^{-1} .

(2)

Answer

(Total for question = 4 marks)

Q5.

Plants and animals are adapted for gas exchange.

(i) Which row of the table describes gas exchange in the root of a plant?

(1)

	Net movement of carbon dioxide	Net movement of oxygen
☐ A	in only	out only
☐ B	out only	in only
☐ C	in and out	in and out
☐ D	neither in nor out	neither in nor out

(ii) Which is the gas exchange surface in the stem of a woody plant?

(1)

- ☐ **A** lenticel
- ☐ **B** pit
- ☐ **C** plasmodesmata
- ☐ **D** stomata

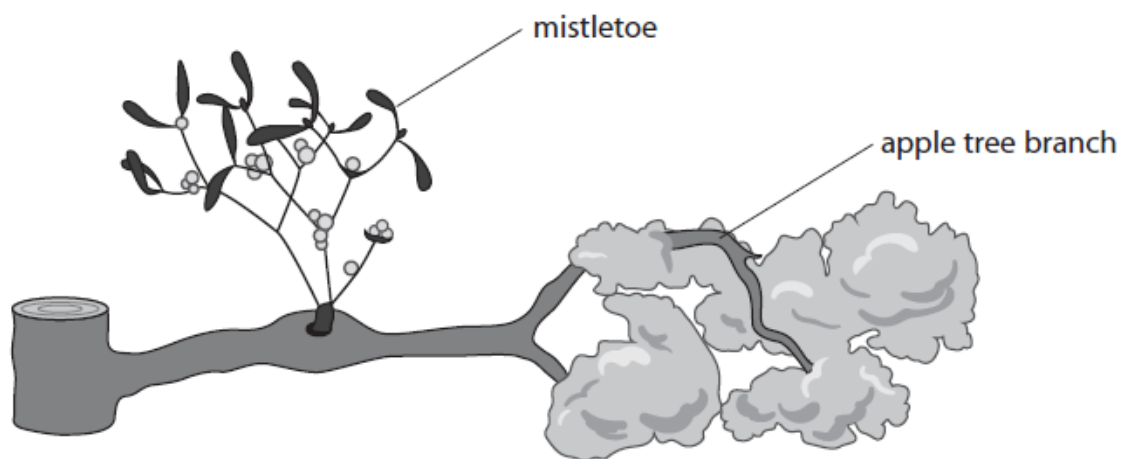
(Total for question = 2 marks)

Q6.

*Mistletoe is a plant that is a parasite on trees.

Mistletoe has green leaves. Mistletoe also has a modified root that grows into the xylem of a tree.

The diagram shows mistletoe growing on an apple tree branch.



The effect of mistletoe on the growth of apple trees was investigated.

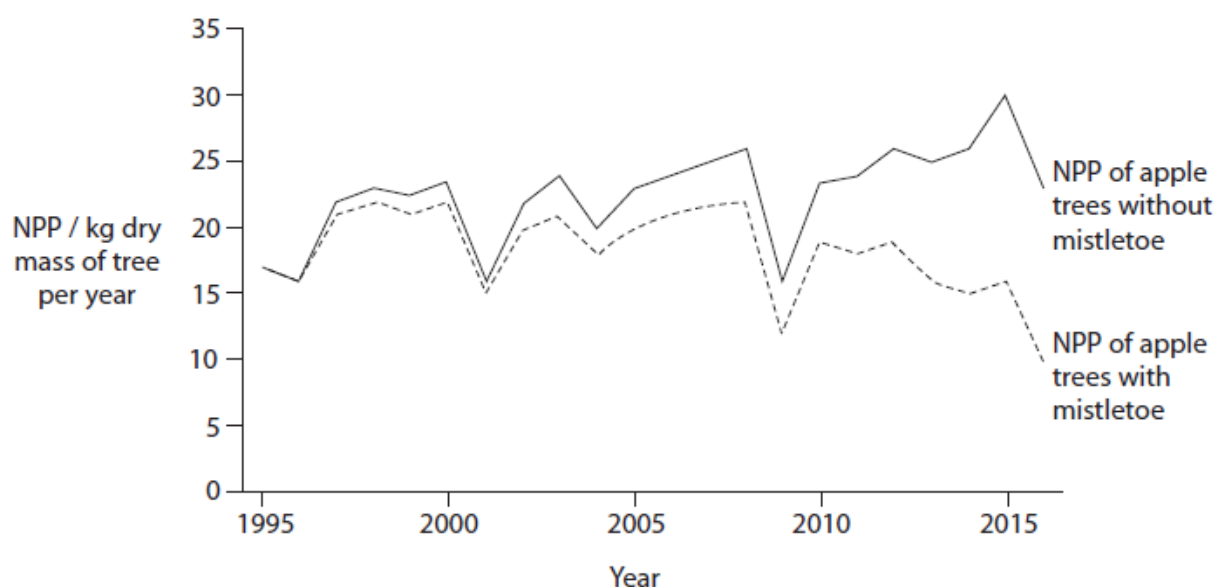
Every year for 20 years, scientists selected apple trees infected with mistletoe and measured the:

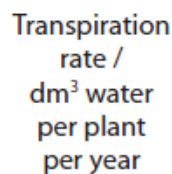
- mean net primary productivity (NPP) of the apple trees
- transpiration rate of the apple trees
- transpiration rate of the mistletoe branches on the apple trees

They also determined the mineral content of the apple tree leaves after 20 years.

A control group of apple trees not infected with mistletoe was included in this investigation.

The graphs and table show the results of the investigation.





Analyse the data to explain the effect of mistletoe on the NPP of apple trees.

[illegible]

.....

.....

.....

.....

.....

.....

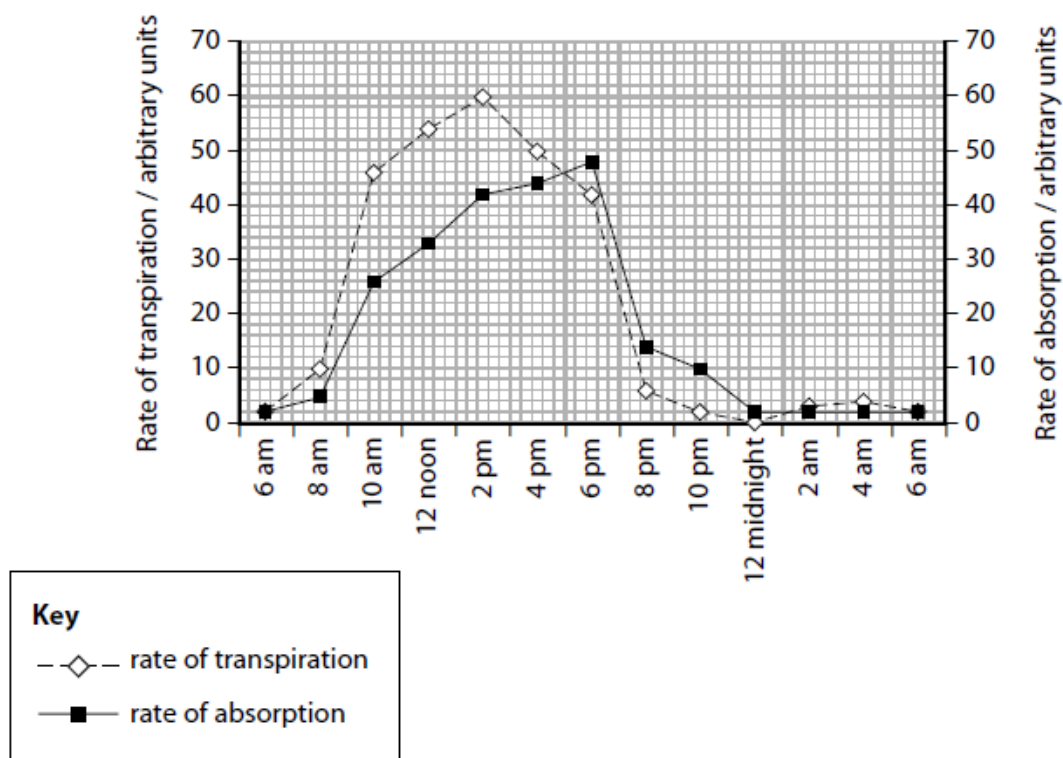
.....

.....

(Total for question = 6 marks)

Q7.

The graph below shows the rates of transpiration and water absorption by a Jerusalem pine tree (*Pinus halepensis*), during a 24-hour period.



Analyse the data to explain the relationship between these two rates during this 24-hour period.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 4 marks)

Q8.

The primary productivity of plants depends on their ability to synthesise carbohydrates and transport solutes to cells.

Explain how the mass-flow hypothesis accounts for the movement of sugars from leaves to roots.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 4 marks)

Q9.

Which statements describe some properties of water that are useful to plants?

- 1 Hydrogen bonding makes water a polar solvent.
- 2 Cohesive forces between water molecules allow the water to move in an unbroken stream.
- 3 Weak hydrogen bonds between water molecules attract the molecules to each other and allow water molecules to move easily in relation to one another.

(1)

- ☐ **A** 1 and 2 only
- ☐ **B** 2 and 3 only
- ☐ **C** 1 and 3 only
- ☐ **D** 1, 2 and 3

(Total for question = 1 mark)

Q10.

Biodiversity is monitored by conservationists.

The photograph shows a hedge.



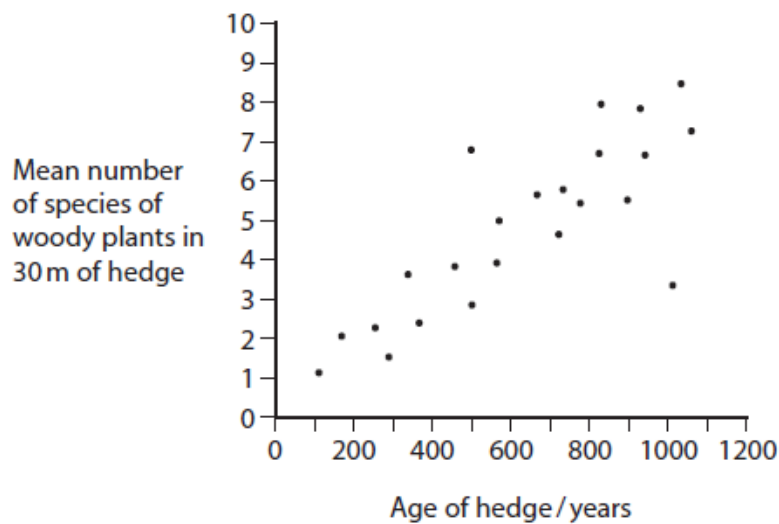
(Source: © 1000 Words/Shutterstock)

Many fields in the UK are separated by hedges.

Conservationists investigated biodiversity in hedges of different ages.

Hedges of different ages were sampled at random and the number of species of woody plants was counted.

The graph shows the results of this investigation.



The conservationists observed that the plants in older hedges contained more wood than the plants in younger hedges.

Wood consists of xylem tissue.

(i) Give an advantage for older plants of containing more wood.

(1)

.....

.....

.....

.....

(ii) Describe a method to show that the stem of an older plant contains more wood.

(3)

.....

.....

.....

.....

.....

.....

(Total for question = 4 marks)

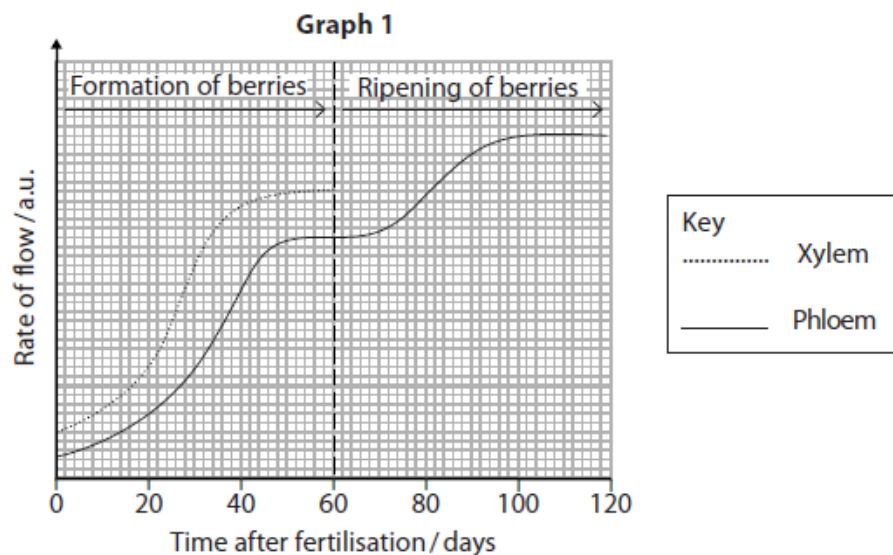
Q11.

Xylem and phloem are involved in transport in plants.

* Double fertilisation in some plants leads to the development of fruits, such as berries.

In an investigation, the rate of flow in xylem during the formation of berries was measured. The rate of flow in the phloem during the formation and ripening of the berries was also measured.

The results are shown in graph 1.



In a second investigation, two plants with berries were exposed to radioactive carbon dioxide (^{14}C).

After exposure to ^{14}C , the berries were removed from one plant and left on the second plant.

The percentage of ^{14}C remaining in the leaves of each plant was determined during the next 10 hours.

The results are shown in graph 2.

The graph shows the percentage of ^{14}C remaining in the leaf over a 10-hour period. The y-axis represents the percentage of ^{14}C remaining, ranging from 50 to 100. The x-axis represents time in hours, ranging from 0 to 10. Two conditions are compared: 'berries removed' and 'berries left'.

Time (hours)	Berries removed (%)	Berries left (%)
0	100	100
1	78	52
2	75	51
3	73	51
4	71	51
5	69	51
6	67	51
7	65	51
8	63	51
9	61	51
10	59	51

(6)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

(Total for question = 6 marks)

Q12.

Xylem and phloem are involved in transport in plants.

(i) Which row of the table shows some of the substances transported in xylem and phloem?

(1)

	Xylem	Phloem
☐ A	water only	sucrose only
☐ B	water only	water and sucrose
☐ C	water and mineral ions	sucrose only
☐ D	water and mineral ions	water and sucrose

(ii) Describe the differences between the structure of xylem and that of phloem.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 4 marks)

Q13.

Water moves through xylem vessels in a plant during transpiration.

Phloem tissue is responsible for transport of organic materials such as sucrose.

Compare and contrast the structure of xylem tissue and phloem tissue.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

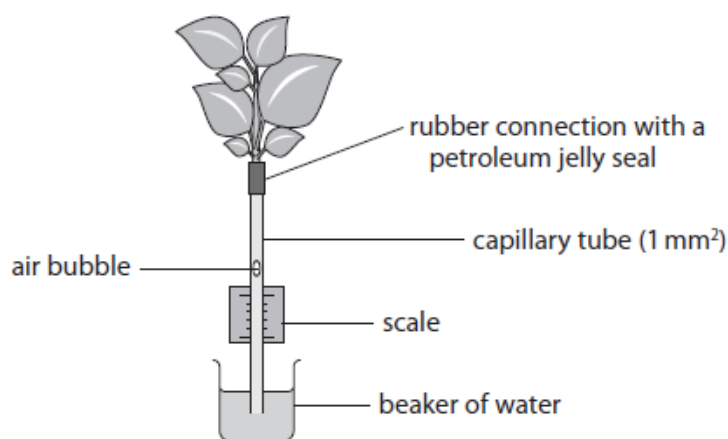
.....

(Total for question = 3 marks)

Q14.

A student investigated the effect of moving air on transpiration in a leafy shoot.

The diagram shows the potometer used by the student.



The student measured the distance in millimetres that the air bubble moved during a five-minute period in moving air and in still air.

(i) Explain how the student could convert these readings into a transpiration rate using the units $\text{mm}^3 \text{ cm}^{-2} \text{ min}^{-1}$.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

(ii) The table shows the mean results and standard deviations of this investigation.

Mean rate of transpiration / $\text{mm}^3 \text{ cm}^{-2} \text{ min}^{-1}$	
In moving air	In still air
3.2 ± 0.3	0.8 ± 0.2

Explain the results of this investigation.

(2)

.....

.....

.....

.....

.....

.....

(Total for question = 5 marks)

Q15.

Answer the question with a cross in the box you think is correct ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

Transpiration moves water and mineral ions from the roots to the leaves of plants.

Water enters the root hair cells and moves through the root tissues by the apoplastic and symplastic pathways.

(i) Root hairs have a large surface area that increases the rate of uptake of water.

The surface area of a root hair is rounded up to $3.14 \times 10^5 \mu\text{m}^2$.

Which is the actual surface area of this root hair?

(1)

- ☐ **A** 31 460 μm^2
- ☐ **B** 314 600 μm^2
- ☐ **C** 313 900 μm^2
- ☐ **D** 3 139 000 μm^2

(ii) Which row of the table shows the movement of water through the apoplastic and symplastic pathways?

(1)

	Apoplastic pathway	Symplastic pathway
☐ A		
☐ B		
☐ C		
☐ D		

(iii) Water moves through the root tissue due to a difference in water potential between one cell and the next cell.

Which row of the table describes this movement?

(1)

	Direction of water movement with respect to water potential	Direction of water movement with respect to concentration of solutions
☐ A	higher to lower	concentrated to dilute
☐ B	higher to lower	dilute to concentrated
☐ C	lower to higher	concentrated to dilute
☐ D	lower to higher	dilute to concentrated

(Total for question = 3 marks)

Mark Scheme

Q1.

Question Number	Correct Answer	Additional guidance	Mark
	An answer that makes reference to three of the following: • wide/large cross-sectional area to transport large volume of water (1) • empty cells/no cytoplasm so low resistance to flow (1) • thickening of the wall / lignification that strengthens the wall to prevent collapse (1) • annular/spiral thickening to allow xylem tissue to stretch during growth (1)		(3)

Q2.

Question Number	Answer	Additional Guidance	Mark
(i)	A calculation that shows the following stages • use manipulation of units to mm (1) • calculation of volume of cylinder (1) • rate per minute calculated to 2sf (1)	Example of calculation: eg mean is 64 (mm) 4.522 / 4.524 (this gets mp1 and 2 if 64 not seen) 45.2 is correct value if 6.4 is used 0.90 Correct answer with no working gains 3 marks 0.9 gets 2 marks (not 2sf) 0.09 gets 2 marks (if 6.4 is used for distance) 18 gets 2 marks (if diameter is used) 4.5 gets 2 marks (2sf if they do not divide by 5)	Exp (3)

Question Number	Answer	Additional Guidance	Mark
(ii)	An explanation that includes three of the following • {water uptake / transpiration} is fastest in moving air in the light (1) • {water uptake / transpiration} {is very slow / stops / decreases} in the dark as stomata close (1) • {water uptake / transpiration} is faster in moving air (than still air) as the diffusion gradient is {maintained / steeper} (1) • comment on decline in rate (of transpiration / water uptake) as trials continue in darkness with explanation (1) • effect of light is greater than effect of moving air (1)	Accept {water uptake / transpiration} is slowest in still air in the dark Not converse Accept concentration gradient / water potential gradient / diffusion shells around stomata or leaf Accept converse Accept stomata do not close completely until trial 3	Exp (3)

Question Number	Answer	Additional Guidance	Mark
(iv)	A description that includes four of the following: - cover one surface of leaves with vaseline / petroleum jelly / clear tape (to prevent transpiration) - measure {rate / distance moved in 5 mins / volume of water taken up in 5 mins} (1) - ensure that covering is fully removed or use another shoot with same surface area (1) - repeat for other surface of leaves (and compare results) (1) method of control of one named variable / monitoring named variable which cannot be controlled (1) - repeats for each set up and calculate standard deviation (1)	Accept clear nail varnish / clingfilm Accept other times Accept time how long it takes to move a set distance Accept same number of leaves / similar surface area Accept calculate rate of water loss per unit area Piece together Accept eg. temperature – AC room / room temperature humidity – clear bag over plant light intensity – distance from lamp air movement – distance from fan Accept repeat and carry out appropriate stats test eg t-test, 95% confidence limits, Mann Whitney U test	Exp (4)

Q3.

Question Number	Answer	Additional Guidance	Mark
	An explanation that makes reference to five of the following: - because there would be less water to take up from the soil (1) - therefore there will be fewer {mineral ions / minerals} (transported to the rest of the plant / taken up) (1) - example of a mineral ion deficiency on the plant explained (1) - there will be less water for {photolysis / light-dependent reaction / photosynthesis} (1) - therefore there will be less GALP produced in the {light-independent reaction / Calvin cycle} (1) - therefore less {NPP / plant biomass} (1)	ACCEPT plants will {wilt / die} without water ACCEPT less glucose produced	(5)

Q4.

Question Number	Answer	Additional Guidance	Mark
(i)	A description that makes reference to the following: - as the pressure gradient increases there is (a linear) increase in the velocity (for all three radii) (1) - as the radius of the xylem increases the velocity increases (1)	ACCEPT converse for both points ACCEPT higher the pressure gradient the higher the velocity ACCEPT greater the radius the higher the velocity	(2)

Question Number	Answer	Additional Guidance	Mark
(ii)	• velocities read from graph (1) • correct percentage calculated (1)	156 / 157 and 61 / 62 $(156 - 61) \times 100 \div 61 = 155.73$ / 155.7 / 156 % $(156 - 62) \times 100 \div 62 = 151.61$ / 151.6 / 152 % $(157 - 61) \times 100 \div 61 = 157.38$ / 157.4 / 157 % $(157 - 62) \times 100 \div 62 = 153.23$ / 153.2 / 153 % CE applies if 155 / 158 and / or 63 given as values from graph $(155 - 61) \times 100 \div 61 = 154.1$ / 154 % $(155 - 62) \times 100 \div 62 = 150$ % $(155 - 63) \times 100 \div 63 = 146.03$ / 146 % $(156 - 63) \times 100 \div 63 = 147.62$ / 147.6 / 148 % $(157 - 63) \times 100 \div 63 = 149.21$ / 149.2 / 149 % $(158 - 61) \times 100 \div 61 = 159.02$ / 159 % $(158 - 62) \times 100 \div 62 = 154.84$ / 154.8 / 155 % $(158 - 63) \times 100 \div 63 = 150.79$ / 150.8 / 151 %	(2)

Q5.

Question Number	Answer	Additional Guidance	Mark
(i)	The only correct answer is B A is incorrect because respiration takes place in the root C is incorrect because photosynthesis does not take place in the root D is incorrect because respiration takes place in the root		(1) COMP

Question Number	Answer	Additional Guidance	Mark
(ii)	The only correct answer is A B is incorrect because pits are in the xylem C is incorrect because plasmodesmata are between cells D is incorrect because stomata are in the leaves		(1) COMP

Q6.

Question Number	Indicative content
*	Answers will be credited according to candidate's deployment of knowledge and understanding of material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. - mistletoe lowers the NPP of apple trees over time (D) - NPP of trees without mistletoe shows an upward trend over 20 years (D) - NPP of trees with mistletoe shows an downward trend over 20 years (D) - mistletoe decreases the transpiration rate of the trees (D) - mistletoe has a higher transpiration rate than the apple tree (D) - higher transpiration rate of mistletoe diverts transpiration stream to mistletoe rather than apple tree / mistletoe takes the water from apple tree (E) - so less minerals are given to the apple tree (E) - less water for photosynthesis (E) - nitrogen content of apple trees is lower (D) - less amino acid / protein synthesis occurs (E) - less enzyme production so less photosynthesis (E) - lowering NPP (due to less enzymes) (E) - less nucleic acid synthesis (E) - less chlorophyll synthesis (E) - calcium content of the apple trees is lower (D) - so there is less production of cell walls / calcium pectate (E) Level 1: one or two D or E Level 2: three or four from both D and E Level 3: five or six from both D and E, must explain effect of either low nitrogen / calcium and have no major errors

Level	Marks	
Level	Marks	
0	0	No awardable content
1	1-2	An explanation may be attempted but with limited interpretation or analysis of the scientific information with a focus on mainly just one piece of scientific information. The explanation will contain basic information with some attempt made to link knowledge and understanding to the given context.
2	3-4	An explanation will be given with occasional evidence of analysis, interpretation and/or evaluation of both pieces of scientific information. The explanation shows some linkages and lines of scientific reasoning with some structure.
3	5-6	An explanation is made which is supported throughout by sustained application of relevant evidence of analysis, interpretation and/or evaluation of both pieces of scientific information. The explanation shows a well-developed and sustained line of scientific reasoning which is clear and logically structured.

Q7.

Question Number	Answer	Additional guidance	Mark
	An explanation that makes reference to the following: - transpiration rate is greater than absorption rate from 6am to 5pm because stomata are open (1) - between 5pm and midnight, the absorption rate is greater than the transpiration rate because stomata are closed (1) - lag effect because the uptake of water depends on transpiration (1) - the cohesion-tension effect (1)		(4)

Q8.

Question Number	Answer	Additional Guidance	Mark
	An answer that makes reference to four from the following: - sugars are loaded / pumped / transferred into phloem / sieve tubes in leaf (1) - lowering water potential so that water enters phloem (1) - pressure in phloem increases (moving sugars) (1) - sugars are converted to (insoluble) starch in root cells / low sugar concentration in root cells (1) - increasing the water potential, so water moves out (1)		4

Q9.

Question Number	Correct Answer	Additional guidance	Mark
	D		(1)

Q10.

Question Number	Answer	Additional Guidance	Mark
(i)	An answer that makes reference to one of the following: - stems are {stronger / less likely to break / better supported} (1) - more {mineral ion / water} transport (1)		(1)

Question Number	Answer	Additional Guidance	Mark
(ii)	A description that makes reference to three of the following: - cut thin sections (of the stem) (1) - from same height of stem in young and old plants (1) {use a stain / named stain} to see xylem (1) - measure thickness of xylem tissue (1)	Accept cut a core (if rings are being measured) Measure thickness of {rings / xylem} 1 mark if potometer used in method	(3)

Q11.

Question Number	Indicative content
*	Answers will be credited according to candidates' deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. Indicative content: • male gamete fertilise female gamete to produce embryo • one male gamete fuses with {both polar nuclei / (diploid) endosperm nucleus} to form a triploid endosperm nucleus • endosperm is a store of {starch / protein / oils} • ovules will become the seeds inside the berries • xylem transports the water needed for berry formation shown in graph 1 • xylem transports the water needed for hydrolysis of food stores • xylem transports mineral ions for berry formation • phloem transports the sucrose needed for berry formation and ripening in graph 2 • more sucrose is transported from the leaves when berries are present in graph 2 • ^{14}C incorporated into glucose during photosynthesis • glucose converted into sucrose for transport in the phloem

Level 0	Marks	No awardable content
Level 1	1-2	An explanation may be attempted but with limited interpretation or analysis of the scientific information with a focus on mainly just one piece of scientific information. The explanation will contain basic information with some attempt made to link knowledge and understanding to the given context. 2 or 3 comments made which may include description of graphs and / or explanations
Level 2	3-4	An explanation will be given with occasional evidence of analysis, interpretation and/or evaluation of both pieces of scientific information. The explanation shows some linkages and lines of scientific reasoning with some structure. 4 of 5 comments that include explanations with reference to at least two components
Level 3	5-6	An explanation is made which is supported throughout by sustained application of relevant evidence of analysis, interpretation and/or evaluation of both pieces of scientific information. The explanation shows a well-developed and sustained line of scientific reasoning which is clear and logically structured. 6 or 7 comments that include explanations with reference to all three components

Q12.

Question Number	Answer	Mark
(i)	The only correct answer is D <i>A is not correct because xylem carries water and mineral ions and the sucrose is in solution in the phloem</i> <i>B is not correct because xylem carries water and mineral ions</i> <i>C is not correct because the sucrose is in solution in the phloem</i>	(1)

Question Number	Answer	Additional Guidance	Mark
(ii)	A description that makes reference to three of the following: - xylem cell walls contain {cellulose and lignin / lignin} but phloem cell walls contain {only cellulose / no lignin} (1) - xylem is {hollow / no end walls} but phloem has {cell contents / sieve plates} (1) - xylem has pits but phloem does not (1) - xylem {does not have companion cells / is dead} but phloem has companion cells (1)	Do not piece together unless points are clearly paired in adjacent sentences ACCEPT xylem has thick cell walls but phloem has thinner cell walls {xylem is / xylem cells are} lignified ACCEPT {modified / enlarged} plasmodesmata	(3)

Q13.

Question Number	Answer	Additional Guidance	Mark
	An answer including at least one similarity • both tissues contain tubes (1) • both have cell walls containing cellulose (1) and at least one difference • xylem vessels contain lignin, but phloem does not (1) • in xylem, end walls of cells break down completely (to leave hollow tubes), but in phloem there are sieve plates (1) • phloem (sieve tubes) have companion cells, but xylem does not (1) • phloem (sieve tubes) contains cytoplasm, but xylem does not (1)	Accept both have vessels which are cylindrical Accept xylem has thicker walls / xylem vessels have pits in side walls and phloem does not Accept phloem has sieve plates, but xylem does not Accept phloem contains plasmodesmata but xylem does not / phloem contains organelles but xylem does not	Exp (3)

Q14.

Question Number	Answer	Additional Guidance	Mark
(i)	An explanation that makes reference to the following: • multiply cross-sectional area by distance moved by bubble / $\pi r^2 \times d / \pi r^2 \times h$ (1) • divide by total area of leaves (1) • divide by 5 (1)		(3)

Question Number	Answer	Additional Guidance	Mark
(ii)	An explanation that makes reference to two of the following: - moving air moves {water molecules / droplets} away (from leaf) (1) - therefore increases concentration gradient / diffusion gradient / water potential gradient (1) - difference is significant because SDs do not overlap (1)	ACCEPT converse ACCEPT wind	(2)

Q15.

Question Number	Answer	Additional Guidance	Mark
(i)	The only correct answer is C A is incorrect because 31 460 would be rounded up to 3.15×10^4 B is incorrect because 314 600 would be rounded up to 3.15×10^5 D is incorrect because 3 139 000 would be rounded up to 3.14×10^6		(1)
(ii)	The only correct answer is C A is incorrect because symplast pathway does not go through cell walls B is incorrect because it shows the pathways the wrong way round D is incorrect because it shows apoplastic going through the cytoplasm		(1)
(iii)	The only correct answer is B A is incorrect because water moves from a dilute solution to a more concentrated one B is incorrect because water moves from a high water potential to a lower one D is incorrect because water moves from a high water potential to a lower one		(1)