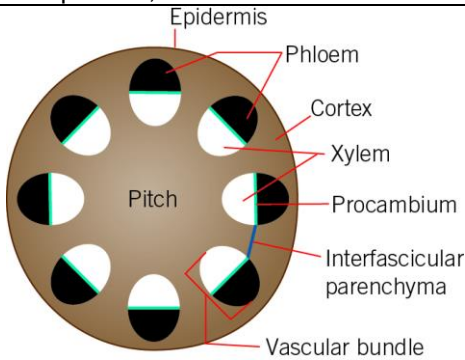


Question number	Answer	Marks	Guidance																										
1 (a)	transport system in plants; composed of xylem and phloem;	2																											
1 (b)		2																											
1 (c)	bulge above the ring; translocation past ring prevented; sucrose accumulates; lowers water potential; water moves into area by osmosis;	4	Max 4																										
2 (a) (i)	loss of water vapour; from aerial parts of plant;	2																											
2 (a) (ii)	photosynthesis; requires carbon dioxide; stomata must be open; water vapour diffuses out;	4																											
2 (b) (i)	potometer;	1																											
2 (b) (ii)	measures water uptake; water may be used in photosynthesis ;	2																											
2 (c) (i)	<table border="1" data-bbox="311 1310 890 1724"> <thead> <tr> <th></th> <th>Treatment</th> <th>Light</th> </tr> </thead> <tbody> <tr> <td rowspan="12">Water loss ml</td> <td>0</td> <td>0</td> </tr> <tr> <td>3</td> <td>0.11</td> </tr> <tr> <td>6</td> <td>0.11</td> </tr> <tr> <td>9</td> <td>0.11</td> </tr> <tr> <td>12</td> <td>0.11</td> </tr> <tr> <td>15</td> <td>0.11</td> </tr> <tr> <td>18</td> <td>0.11</td> </tr> <tr> <td>21</td> <td>0.11</td> </tr> <tr> <td>24</td> <td>0.11</td> </tr> <tr> <td>27</td> <td>0.018</td> </tr> <tr> <td>30</td> <td>0.018</td> </tr> </tbody> </table>		Treatment	Light	Water loss ml	0	0	3	0.11	6	0.11	9	0.11	12	0.11	15	0.11	18	0.11	21	0.11	24	0.11	27	0.018	30	0.018	2	1 mark for using the surface area to calculate water loss per m ² and 1 mark for getting all the calculations correct.
	Treatment	Light																											
Water loss ml	0	0																											
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	30	0.018																											
	2 (c) (ii)	assume constant thickness of leaves; measure mass of section of leaf with known surface area; leaf mass multiplied by this figure equals surface area of leaf;	3																										
2 (c) (iii)	<i>independent variable</i> light intensity or wind speed or humidity; <i>dependent variable</i> water loss; <i>controlled variables (when not independent variable)</i> light intensity / wind speed / humidity / temperature;;	4																											

2 (c) (iv)	axes correct; units; plots; line of best fit;	4	
2 (c) (v)	fan 18, fan 30 and mist 18, mist 27; (these) results, do not follow trend / very different from expected;	2	Max 2
2 (c) (vi)	rate of water loss is measure of transpiration rate; increased concentration of water vapour outside leaves decreases water vapour potential gradient; ORA rate of water loss higher with fan than (just) light because air movement increased water vapour potential gradient; rate of water loss decreased with mist because water droplets (in mist) reduced water vapour potential gradient;	4	
2 (d)	A osmosis; down water potential gradient; B osmosis; down water potential gradient; C mass flow; down pressure gradient ; D diffusion; down water (vapour) potential gradient;	6	Max 6 is best.
3 (a)	passive movement from high to low concentration;	1	
3 (b)	$10 \times 10 \times 6 = 600 \text{ mm}^2$ and $10 \times 10 \times 10 = 1000 \text{ mm}^3$; $600/1000 = 0.6$;	2	
3 (c) (i)	as (surface area to volume) ratio decreased the rate of diffusion decreases / proportional; figures quoted;	2	
3 (c) (ii)	large plants have large leaves; SA/volume ratio increases; increases, rate of transpiration / water loss; <i>reference</i> to presence of adaptations;	2	Max 2
3 (d) (i)	divided length of side by time taken ;	1	IGNORE divide mm by s (units alone too vague)
3 (d) (ii)	idea that student used whole length of side, rather than half length ;	1	ACCEPT needs to divide answer by 2 / distance has to be to centre of cube rather than whole length of side / assumed diffusion occurs (across whole cube) from one side
4 (a)	plant adapted to survive in dry environments;	1	
4 (b)	reduced size of leaves / needles; chloroplasts in stem; thick cuticle; stores water in stem / succulent;	3	Max 3
5 (a)	active transport requires, energy / ATP; is movement against concentration gradient; facilitated transport is passive; is movement down concentration gradient;	3	
5 (b)	movement is only upwards in xylem; movement in any direction in phloem; between source and sink;	2	
5 (c)	1 phloem must be under pressure; presence of pressure gradient; 2 gradients of organic solvents will mean water potential gradients are present; movement of water by osmosis; 3 must be an active process; photosynthesis leads to the production of ATP / respiratory substrate / glucose;	6	2 marks per point

