

Question number	Answer	Notes	Marks
1 (a) (i)	1. measure mass / measure weight / measure water loss; 2. in one minute / in an hour / per minute / per hour / per day / after a period of time / eq;	2. ignore before and after / at the end of the experiment	2
(ii)	1. no plant; 2. oil layer and water present; 3. balance present;	ignore twig with no leaves  ignore number on balance  labels not needed	3

(b)	<b>change of condition</b>	<b>Change in transpiration rate</b>	<b>Explanation</b>		
	warmer air	<b>increase;</b>	<b>more (kinetic) energy / more evaporation / molecules move faster /eq;</b>		
	put in the dark decrease	put in the dark decrease	<b>stomata close;</b>		
	increased wind increase	increased wind	<b>increased concentration gradient / moves molecules away / blows water away / eq;</b>		
	increased humidity	<b>decrease;</b>	decreased concentration gradient		
(c)	<ul style="list-style-type: none"> <li>1. supply mineral ions / supply named mineral ion;</li> <li>2. support / turgidity / prevent wilting / eq;</li> <li>3. cooling / prevent overheating;</li> <li>4. water for photosynthesis;</li> </ul>			<ul style="list-style-type: none"> <li>1. ignore nutrients</li> <li>3. ignore homeostasis idea</li> </ul>	<ul style="list-style-type: none"> <li>ignore growth</li> </ul>
				5	2

**Total 12 marks**

Question number	Answer	Notes	Marks
2 (a)	1. not full / less water / flaccid / shrink / eq;  2. <u>cytoplasm</u> does not fill cell / <u>cytoplasm</u> away (from cell wall) / <u>membrane</u> away from cell wall / <u>membrane</u> irregular shape / contents away (from cell wall) / eq;  3. plasmolysed / plasmolysis;  4. darker colour / eq;	Allow converse	2 max
(b)	1. movement of water;  2. dilute to concentrated / weak solution to a strong solution / down water potential gradient / high conc of <u>water</u> to low conc of <u>water</u> / eq;  3. selectively permeable membrane / eq;	Movement of water from a high conc to a low conc = 2, but water down a concentration gradient = 1  Membrane alone = 0	2 max

(c)	<p>1. water leaves cell / eq;</p> <p>2. high concentration outside cell / dilute to concentrated / weak solution to a strong solution / down water potential gradient / high conc of <u>water</u> to low conc of <u>water</u> / eq; eq;</p> <p>3. If <u>membrane</u> shrinks from cell wall / cell dehydrates / plasmolysis / flaccid / eq;</p>		max 3
(d) (i)	<p>1. cells burst / eq;</p> <p>2. water enters cells;</p> <p>3. no cell wall / eq;</p>	Ignore bigger idea	2 max
(ii)	<p>1. crenated / buckled / shrink / smaller / flaccid / eq;</p> <p>2. water leaves cells;</p>	Ignore dehydrated	2
			Total 11 marks

Question number	Answer	Notes	Marks										
3 (a)	120 to 136;; within range of 60 to 68 = 1 an indication of times 2 = 1	any number in working times 2 = 1 eg. 50 x 2 = 100 gets one mark	1										
(b)	0.00138 / 0.0014 / $1.38 \times 10^{-3}$ ;;  allow one mark for 0.2/6 or 0.03(3) or 0.2/24 or 0.008 in working		2										
(c)	surface (area) covered or exposed / side of leaf covered or exposed / place where jelly put / eq;	ignore quantity of jelly	1										
(d)	(loss of) mass / weight;		1										
(e)	light / wind / humidity / temperature / time / species / eq;		1										
(f) (i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Mass lost</th> <th>Leaf</th> </tr> </thead> <tbody> <tr> <td>Most</td> <td>A</td> </tr> <tr> <td></td> <td>C</td> </tr> <tr> <td></td> <td>B</td> </tr> <tr> <td>Least</td> <td>D;;</td> </tr> </tbody> </table>	Mass lost	Leaf	Most	A		C		B	Least	D;;	if wrong order then allow one mark for A before D OR C before B	2
Mass lost	Leaf												
Most	A												
	C												
	B												
Least	D;;												
(ii)	stomata;  (more) on lower surface / (fewer) on upper surface / eq;  A no surface covered most mass lost /water lost C upper surface covered next most mass/water lost B lower surface covered less mass /water lost D both surfaces covered least mass /water lost sensible link between leaf coverage and loss of mass/water;	ignore guard cells   allow converse between surface exposed and mass lost	3										
		<b>Total</b>	12										

Question number	Answer	Notes	Marks
4(a) (i)	<u>mass</u> ;		1
(ii)	1. water in; 2. high conc. (of water) to low conc. (of water) / from dilute solution to concentrated solution / eq;	Mp 2 allow correct reference to water potential  Ignore osmosis	2
(b) (i)	minus 10;;	One mark for 10 alone	2
(ii)	bar drawn to minus 10 / answer in (i);		1
(c)	1. water (only); 2. membrane;	Ignore reference concentration gradient	1 max

Total 7 marks