Movement of Substances into and out of Cells

Mark Scheme 4

Level	IGCSE(9-1)
Subject	Biology
Exam Board	Edexcel IGCSE
Module	Single Award (Paper 2B)
Topic	Structure and Functions in Living Organisms
Sub-Topic	Movement of Substances into and out of Cells
Booklet	Mark Scheme 4

Time Allowed: **51 minutes**

Score: **/42**

Percentage: **/100**

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>90%	80%	70%	60%	50%	40%	30%	20%	10%

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

<table>
<tr><td>(b)</td><td>
<table>
<tr><th>change of condition</th><th>Change in transpiration rate</th><th>Explanation</th></tr>
<tr><td>warmer air</td><td>increase;</td><td>more (kinetic) energy / more evaporation / molecules move faster / eq;</td></tr>
<tr><td>put in the dark decrease</td><td>put in the dark decrease</td><td>stomata close;</td></tr>
<tr><td>increased wind increase</td><td>increased wind</td><td>increased concentration gradient / moves molecules away / blows water away / eq;</td></tr>
<tr><td>increased humidity</td><td>decrease;</td><td>decreased concentration gradient</td></tr>
</table>
</td><td></td><td>5</td></tr>
<tr><td>(c)</td><td>1. supply mineral ions / supply named mineral ion;

2. support / turgidity / prevent wilting / eq;

3. cooling / prevent overheating;

4. water for photosynthesis;</td><td>1. ignore nutrients

3. ignore homeostasis idea

ignore growth</td><td>

2</td></tr>
</table>

Total 12 marks

Question number	Answer	Notes	Marks
2 (a)	1. not full / less water / flaccid / shrink / eq; 2. cytoplasm does not fill cell / cytoplasm away (from cell wall) / membrane away from cell wall / membrane 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 water to low conc of water / 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)	1. water leaves cell / eq; 2. higher concentration outside cell / dilute to concentrated / weak solution to a strong solution / down water potential gradient /high conc of water to low conc of water / eq; eq; 3. cell membrane shrinks from cell wall / cell dehydrates / plasmolysis / flaccid / eq;		max 3
(d) (i)	1. cells burst / eq; 2. wat enters cells; 3. no cell wall / eq;	Ignore bigger idea	2 max
(ii)	1. crenated / buckled / shrink / smaller /flaccid / eq; 2. water leaves cells;	Ignore dehydrated	2
			Total 11 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>3 (a)</td><td>120 to 136;;
within range of 60 to 68 = 1
an indication of times 2 = 1</td><td>any number in working times 2 = 1
eg. 50 x 2 = 100 gets one mark</td><td>1</td></tr>
<tr><td>(b)</td><td>0.00138 / 0.0014 / 1.38 x 10^{-3};;

allow one mark for 0.2/6 or 0.03(3) or 0.2/24 or 0.008 in working</td><td></td><td>2</td></tr>
<tr><td>(c)</td><td>surface (area) covered or exposed / side of leaf covered or exposed / place where jelly put / eq;</td><td>ignore quantity of jelly</td><td>1</td></tr>
<tr><td>(d)</td><td>(loss of) mass / weight;</td><td></td><td>1</td></tr>
<tr><td>(e)</td><td>light / wind / humidity / temperature / time / species / eq;</td><td></td><td>1</td></tr>
<tr><td>(f) (i)</td><td><table><tr><th>Mass lost</th><th>Leaf</th></tr><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></table></td><td>if wrong order then allow one mark for A before D
OR C before B</td><td>2</td></tr>
<tr><td>(ii)</td><td>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;</td><td>ignore guard cells

allow converse between surface exposed and mass lost</td><td>3</td></tr>
<tr><td></td><td></td><td>Total</td><td>12</td></tr>
</table>

Question number	Answer	Notes	Marks
4(a) (i)	mass;		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