Plant Nutrition

Mark Scheme 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Plant Nutrition
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Mark Scheme 2

Time Allowed: **38 minutes**

Score: **/31**

Percentage: **/100**

<table>
<tr>
<td>1 (a (i)</td>
<td>Dark green outer tissue

In solution E – more curved AW;

In water – curve straightened / dark green tissue on inside of curve / AW;</td>
<td>[2]</td>
<td>A. horseshoe shape / curved inwards / curled up / expanded / lengthened / stretched / grew AW
I. curved alone

A. opened out / curved outwards
I. reference to length</td>
</tr>
<tr>
<td>(ii)</td>
<td>Pale green inner tissue

In solution E – more curved AW;

In water – curve straightened / bent backwards / inner pale green tissue on outside of curve / AW;</td>
<td>[2]</td>
<td>A. horseshoe shape / curled up / expanded / lengthened / swollen / stretched / grew AW
I. curved alone / wide

I. contracted / shrink / swell / wider</td>
</tr>
<tr>
<td>(b)</td>
<td>Three from:

<table>
<tr><td>solution E more concentrated / stronger / has less water / lower water potential / ORA for tissues;</td><td>solution E more dilute / weaker / more water / higher water potential / ORA for tissues;</td></tr>
<tr><td colspan="2">water moves by osmosis;</td></tr>
<tr><td>(water moves) out from cells / tissues;</td><td>(water moves) into cells / tissues;</td></tr>
<tr><td>cells / tissues become flaccid plasmolysed;</td><td>cells / tissues become turgid;</td></tr>
</table>
</td>
<td>[max 3]</td>
<td>Answers must all come from one column.

Must be comparative.</td>
</tr>
</table>

<table>
<tr>
<td>(c)</td>
<td>One source of error and one linked improvement
<table>
<tr><td>Source of error;</td><td>Improvement;</td></tr>
<tr><td>slice cut too thick</td><td>use of sharper cutting tool</td></tr>
<tr><td>cut unevenly</td><td>cut halves equally</td></tr>
<tr><td>pieces not submerged with liquid AW</td><td>both pieces must be submerged</td></tr>
<tr><td>pieces placed in solutions at different times</td><td>pieces placed in solutions at same time</td></tr>
<tr><td>only one piece tested in each solution / anomalous AW</td><td>repeat</td></tr>
<tr><td>kept in different temperatures</td><td>keep at same temperature</td></tr>
</table>
</td>
<td>[2]</td>
<td>I. range of solutions

Improvement must be linked to source of error.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Total: 9]</td>
<td></td>
</tr>
</table>

<table>
<tr><th>Question</th><th>scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>2 (a (i)</td><td><u>osmosis</u> ; [1]

accept any two boxes from the table. [2]

<table>
<tr><td>point</td><td>water</td><td>salt solution</td><td>air</td></tr>
<tr><td>direction of water movement</td><td>into</td><td>out of</td><td>out of</td></tr>
<tr><td>reason for water movement</td><td>cell contents solution is more concentrated</td><td>cell contents solution is less concentrated</td><td>cell contents have more water than air</td></tr>
<tr><td>result of water movement</td><td>cells swell / turgid</td><td>cells shrink / flaccid / plasmolysis</td><td>cells shrink / flaccid</td></tr>
<tr><td>additional explanation</td><td>cuticle / leaf curves because inside is different / AW</td><td>cell sap lost</td><td>evaporation / transpiration</td></tr>
</table>
; ;</td><td>Max [3]</td><td></td></tr>
<tr><td>(ii)</td><td>more leaf pieces / samples / repeats ;
leave for longer time ;
reference to controls – eg same type / age / species / thickness ;
determination of mass / weight ;</td><td>Max [2]</td><td></td></tr>
</table>

(b) (i)	mesophyll cell – label **A ;** xylem vessel – label **B ;** an epidermal cell – label **C ;**	[3]	End of line must be in contact with cell.
(ii)	ring round stoma **;**	[1]	
(c)	*Measurement of diam from Fig. 1.3 [external]:* [7.1 – 6.0 **cm** or 71 – 60 **mm**] Units need to be given. *Formula:* show ÷ of measurement by 0. 5 / 5 **;** *Mag* 14.2 – 12 **;**	[3]	
(d) (i)	preparation of sample **e**.g. cut / gri make into solution **;** add Benedict's [solution] **;** heat **;** safety aspect, e.g. goggles / tongs / lab. coat ;	Max [3]	
(ii)	(if absent) stays / turns blue **;** (if low concentration) changes to green / yellow **;** (if high concentration) changes to orange / red **;**	[3]	

(e)	**stage 1** – break cell walls / denature enzymes / or suitable description **;** **stage 2** – remove chlorophyll / decolourise leaf / or suitable description **;** **stage 3** – to soften it / or suitable description **;** **stage 4** – to show colour change (white tile)/ (iodine solution) to test for starch / or suitable description **;**	[4]	
		[Total: 22]	