

Plant Nutrition

Mark Scheme 1

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Plant Nutrition
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Mark Scheme 1

Time Allowed: 44 minutes

Score: /36

Percentage: /100

1 (a) (i)	lamina / blade ; midrib ; veins ; petiole / stalk ;	max [2]	
(ii)	<i>any 2 from:</i> (P) is divided into leaflets ; (P) has smooth edge ; (P) does not have pointed tip ;	[2]	A ora if explicitly stated in terms of Q. A edge of Q is toothed / irregular ignore surface area
(b) (i)	drawing of outline uses single clear unbroken lines with no shading anywhere ; drawing occupies at least half of the space provided ; detail of large leaf with clear midrib and four veins radiating from same point and some branching veins ; detail of both forked tendrils ;	[4]	

Question	Answer	Mark	Comments									
(ii)	<p><i>advantage:</i> grip / attach / climb / support / AW;</p> <p><i>disadvantage :</i> less leaf area / less photosynthesis / AW ;</p>	[2]										
(c)	<table border="1" data-bbox="302 570 1079 863"> <tr> <td data-bbox="302 570 531 633">features</td> <td data-bbox="531 570 793 633">eudicotyl</td> <td data-bbox="793 570 1079 633">monocotyledonous</td> </tr> <tr> <td data-bbox="302 633 531 764">veins / (named) vascular (tissue)</td> <td data-bbox="531 633 793 764">network / branching / AW</td> <td data-bbox="793 633 1079 764">parallel / AW ;</td> </tr> <tr> <td data-bbox="302 764 531 863">shape / size ;</td> <td data-bbox="531 764 793 863">broad / wide / AW</td> <td data-bbox="793 764 1079 863">lo / thin / elongated / AW ;</td> </tr> </table>	features	eudicotyl	monocotyledonous	veins / (named) vascular (tissue)	network / branching / AW	parallel / AW ;	shape / size ;	broad / wide / AW	lo / thin / elongated / AW ;	[3]	
features	eudicotyl	monocotyledonous										
veins / (named) vascular (tissue)	network / branching / AW	parallel / AW ;										
shape / size ;	broad / wide / AW	lo / thin / elongated / AW ;										
		[Total: 13]										

<p>2 (a) (i)</p>	<p>drawing of leaf R (monocot):</p> <p>O – outline is single clear line (and no shading anywhere);</p> <p>S – drawing occupies at least half of the space provided;</p> <p>D – detail at least mid-rib and 3 veins each side;</p> <p>L – label on midrib;</p>	<p>4</p>	<p>wrong leaf drawn = max 3 (O, S and L)</p> <p>occupies at least half of the space provided / leaf longer than 50 mm</p> <p>R if drawing touches / extends into printed words</p> <p>minimum 7 lines, central line extends full length of leaf, other veins need not connect to base of midrib / petiole</p> <p>R ruled lines</p> <p>label lines must make contact with midrib</p>
	<p>(ii) line drawn for widest part of leaf R ± 1 (mm);</p> <p>measurement of widest part of leaf R = 15 ± 1 (mm);</p> <p>mm recorded for at least one measurement;</p>	<p>3</p>	
	<p>(iii) formula: $\frac{\text{widest part of drawing}}{\text{widest part of specimen}}$;</p> <p>calculation: magnification correct from their figures;</p>	<p>2</p>	<p>measurements should be same as in (a)(ii)</p> <p>A ecf for cm measurements</p> <p>A words or figures</p> <p>answer must be whole number</p>

(b) (i)		R	S	max 2	A comparative answers on one side only
	shape	n /thin/AW	ov /round/wide/AW;		
	venation	/straight/AW	nett /branched/ curved/AW;		
	leaf stalk	no petiole	petiole;		
	appearance	/bright/light	/dark;		
	edge	smooth	irregular/toothed;		
(ii)	R is monocotyledon as has parallel veins/AW;			1	

(c) (i)	temperature;	keep in the same room / put into an environmental chamber / AW;	max 4	<p>A description e.g. lamp and a heat shield</p> <p>A keep in dark</p>
	idea of no air currents / wind / draughts;	keep all windows and doors closed / idea of a screen around the balance / AW;		
	(sun) light (intensity);	use a light source at a fixed distance / same light source / AW;		
	leaf surface area;	use leaves of same size of leaf / surface area;		
mark as pairs, one mark for a correct variable and one mark for a suitable method				
(ii)	<p>method of collecting liquid / water / water vapour;</p> <p>test for water: use (dry) cobalt chloride paper / test (liquid) boiling point / freezing point for water;</p> <p>result: cobalt chloride changes in colour from blue to pink / boiling point 100 °C / freezing point 0 °C;</p>		3	<p>A e.g. clip paper to leaf, collect water / liquid / water vapour in bag / tube / box</p> <p>A any other anhydrous salt</p>

<p>(iii)</p>	<p>similarities: (max 2)</p> <p>both leaves lose water / mass;</p> <p>both leaves lose more water at the start / water loss slows with time;</p> <p>actual loss as percentage of leaf mass is almost the same;</p> <p>differences: (max 2)</p> <p>leaf W loses more water than leaf V / ora;</p> <p>calculation of data;</p> <p>leaf V appears to have anomalous result (at 10/15 min) / leaf V increase in mass between 10 and 15 min / AW;</p> <p>mass leaf V stops losing mass / stays constant at 50 mins;</p>	<p>max 4</p>	<p>A W loses water at a faster rate than V.</p> <p>A 65% loss for V and 64% loss for W A leaf W loses 4.8g / leaf V loses 3.4g / W loses 1.4g more than V</p> <p>A At 15 min V increases by 1.5g</p>
		<p>[Total: 23]</p>	