

6. Plant nutrition

6.2 Leaf structure

Paper 3 and 4

Marking Scheme

Q1.

(b)(i)	<i>any four from:</i> A: spongy mesophyll, (orientation of cells) allow gases to move, easily / to palisade (mesophyll) ; B: stomata, hole / AW that lets (named) gases to, enter / leave, leaf ; C: guard cells, open and close stomata OR control stomatal size AW ; D: air space, allow gases, to move (easily) / to get to the palisade (mesophyll) ; by diffusion ; AVP ;	4	
(b)(ii)	magnesium ;	1	

Q2.

(a)(i)	palisade mesophyll ; photosynthesis / AW ;	2	
(a)(ii)	xylem ; phloem ;	2	
(a)(iii)	guard (cell) ;	1	

Q3.

(a)(i)	A (upper) epidermis ; B spongy mesophyll (layer) ;	2	
(a)(ii)	vascular bundle circled on Fig.7.1 ;	1	
(a)(iii)	arrow drawn to end on an air space in spongy mesophyll tissue on Fig. 7.1 ;	1	

Q4.

(b)(i)	line ending on a guard cell labelled G ; line ending in a stoma labelled S ;	2	
(b)(ii)	gas exchange / diffusion of gases / for transpiration / movement of correct substance in correct direction described ;	1	

Q5.

(b)(i)	group of, same (type) / similar, <u>cells</u> ; carry out a, specific / same / common, function / role / job / task ;	2	
(b)(ii)	<i>any two from:</i> thick (cell) wall / (cell) wall with lignin ; no end <i>or</i> cross walls / continuous tube / no cell contents / hollow ; wide lumen / wide (tube) / large cross-sectional area / large (internal) diameter / AW ; pits (in the walls) ;	2	
(b)(iii)	<i>any one from:</i> thick (waxy) cuticles ; small (leaves) / small surface area / needle-like / AW ; rolled / curled (leaves) ; (leaves reduced to / leaves are) spines / spikes ; hairs ; fleshy / swollen ; few stomata ; sunken stomata / stomata in grooves ;	1	
(b)(iv)	deep / long shallow / widespread / spreading / roots cover a wide area ;	1	

Q6.

(a)(i)	L ; N ; M ;	3	
(a)(ii)	circle drawn around a vascular bundle ;	1	
(a)(iii)	sucrose ; amino acids ;	2	

Q7.

(c)(i)	<u>diffusion</u> ;	1	
(c)(ii)	(enters through) stoma(ta) / between guard cells ; (moves through) interconnecting / intercellular / <u>air</u> , spaces ;	2	

Q8.

(c)	<i>epidermis</i>	4	one mark per row, max two from each tissue		
	feature			adaptation	
	transparent / clear / no chloroplasts			allows light to pass through ;	
	thin / flat			so less cytoplasm / more light, to pass through / AW ;	
	guard cells / stomata			allow gases to enter / leave the leaf / gas exchange ;	
	<i>mesophyll</i>			feature	adaptation
	contains many chloroplasts (palisade)			trapping light energy ;	
	vertically / tightly, packed / column-shaped (palisade)			maximise light received (by cells) / reduce number of, cross / cell, walls ;	
	contain (air) spaces / loosely packed (spongy)			for diffusion / movement of gases (within leaf) ;	

Q9.

(a)	any shape drawn that includes one whole vascular bundle including all of the xylem and phloem with or without sclerenchyma ; label line from X to xylem in any of the vascular bundles ;	2	
(b)	cell vacuoles / cells, contain (much) water / have high water potential ; water absorbed, by osmosis / down water potential gradient ; cells, are turgid / have a turgor pressure ; cell contents / vacuole / cell membrane, pushes out (against cell wall) ; cell wall, does not stretch / is inelastic / is rigid ; AVP ; e.g. cells are tightly packed / AW	3	