Question 1

question	answers	extra information	mark
allow w		either order allow words ringed in box allow mis-spelling if unambiguous	1
1(b)(i)	movement / spreading out of particles / molecules / ions / atoms ignore names of substances / 'gases' accept down concentration gradient ignore 'along' / 'across' gradient		1
		ignore 'with' gradient	
1(b)(ii)	oxygen / water (vapour)	allow O ₂ /O2 ignore O ² /O allow H ₂ O/H2O ignore H ² O	1
Total			4

Question 4

question	answers	extra information	mark
4(a)	solution in soil is more dilute (than in root cells)	concentration of water higher in the soil (than in root cells)	1
	so water moves from the dilute to the more concentrated region	so water moves <u>down</u> (its) concentration gradient or water moves from a high concentration <u>of water</u> to a lower concentration	1
	concentration of ions in soil less (than that in root cells)		1
	so energy needed to move ions		1
	ions are moved against concentration gradient	the direction of the concentration gradient must be expressed clearly	
		accept correct reference to water potential or to concentrations of water	
4(b)	any three from:		3
	movement of water from roots / root hairs (up stem)		
	via xylem		
	to the leaves		
	(water) evaporates		
	via stomata		
4(c)(i)	0.67/0.7	accept 0.66, 0.6666666 or ¾ or 0.6	2
		correct answer gains 2 marks with or without working	
		if answer incorrect allow evidence of $\frac{100}{150}$ for 1 mark	
		do not accept 0.6 or 0.70	

Question 4 continues on the next page . . .

Question 4 continued

question	Answers	extra information	mark
4(c)(ii)	during the first 30 minutes any one from: it was warmer it was windier it was less humid there was more water (vapour) in the leaves so there was more evaporation or stomata open during first 30 minutes or closed after 30 minutes (1) so faster (rate of) evaporation in first 30min or reducing (rate of) evaporation after 30min (1)	ignore 'water loss'	1
Total			11

Question	Answers	Extra information	Mark	AO / spec ref.
5(a)(i)	guard (cells)	allow phonetic spelling	1	AO1 3.1.3e
 allow carbon dioxide to enter allow oxygen to leave. 		ignore reference to cells allow control loss / evaporation of water or control transpiration rate allow 'gaseous exchange'	1	AO1 3.1.3a, c,e
5(b)(i)	correct answer gains 2 marks with or without working allow 1 mark for 0.1 × 0.1 = 0.01 (mm²)		2	AO2 3.1.3
5(b)(ii)	more / a lot of / increased water allow plant more likely to wilt (in hot / dry conditions)		1	AO3 3.1.3d
5(c)(i)	0.12		1	AO2 3.1.3
5(c)(ii)	5(c)(ii) the lower surface has most stomata		1	AO3 3.1.3c, d
	stomata are now covered / blocked (by grease)		1	
	so water cannot escape / evaporate from the stomata	ignore waterproof to gain credit stomata must be mentioned at least once	1	
Total			9	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	guard (cells)	allow phonetic spelling	1	AO1 3.1.3e
2(b)(i)	as carbon dioxide (concentration) increases, the (mean) number of stomata decreases	allow there is a <u>negative</u> <u>correlation</u>	1	AO2 3.1.3
	(there is a) rapid drop initially	allow use of any number between 1.5 and 3.0 to indicate "initially"	1	
2(b)(ii)	(there is) more carbon dioxide so plant doesn't need as many stomata (to obtain the amount needed) or (there is) less carbon dioxide so the plant needs more stomata (to obtain enough)		1	AO3 3.1.3c
2(c)(i)	may lose too much water	allow plant may wilt ignore references to oxygen / carbon dioxide plants lose a lot of water is insufficient ignore flaccid	1	AO3 3.1.3d
2(c)(ii)	any one from: • hot • dry • windy	ignore environments unqualified eg desert	1	AO3 3.1.3d
Total			6	

Question	Answers		Extra information Mark		Mark	AO / Spec. Ref.
3					6	AO1
as well as the	led for this answer will be e standard of the scientific nd apply a 'best-fit' approa	response. E	Examiners sl			3.1.1a/b/g 3.1.1a/d 3.2.3a
0 marks	Level 1 (1–2 marks)	Level 2 (3	–4 marks)	Level 3 (5-	6 marks)	
No relevant points are made	At least one process (P) for obtaining a material is given or at least one vessel (V) and the material it carries is given or there is a description of the direction of movement (M) for at least one material	At least on for obtaining specified magiven and is correctly the vessel material is transported or correctly lindescription direction of movement material	linked to that the liked to a of the	Processes used for specified materials and correctly linked to a the materials are to or correctly linked to a the direction of mormaterials. For full credit, in a above descriptors the processes must the vessel that the transported in and the movement of the specified materials.	the vessels that ransported in a description of vement of the addition to the at least one of st be linked to material is the direction of	
Ions: (P) taken up from (diffu conce (V) travels in		sport ncentration high)	extra infor	mation		
Water: (P) taken up from (V) travels in (M) to the lea (P) transpirat move evap (V) in the xyle Sugar:	an area of low to high cor the xylem aves or from the roots / so tion stream ement replaces water as it orates from leaves em	ncentration	concentrati allow from potential	concentration of wat on of water high water potential g a concentration g	to low water	
(V) travels in (M) to other p	ring photosynthesis the phloem parts of the plant or to sto evels up and down	rage				

Total

6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)	xylem transports mineral (ions)	allow xylem transports water	1	AO1
	phloem transports sugars	allow <u>phloem</u> transports sucrose / glucose / carbohydrate	1	3.2.3a
		ignore minerals / ions transported in phloem		
		if no other marks given allow one mark for xylem and phloem		
5(b)(i)	lost the most water or lost water faster than the others	allow mass decreased the most	1	AO3 3.1.3d
	(it) has the greatest number of stomata (per mm ²)		1	
	(and) water is lost through the stomata		1	
5(b)(ii)		at least one comparative must be given		AO2/3 3.1.3d
	(transpiration rate would be)		1	
	(because) slow(er) evaporation / diffusion (into the air)	allow 'lower rate of evaporation' for these 2 marks	1	
	(because) concentration gradient will be less			
	(due to) high(er) humidity	allow air becomes saturated	1	
Total			8]

18	(a)		(more water/mass lost when fan is on because)		-	allow reverse argument
			air movement removes water vapour / reduces water vapour concentration outside leaves	1	2.2	
			increases water vapour concentration gradient (1) so evaporation / diffusion happens more quickly (1)	1	1.2	
	(b)	(i)	(because otherwise) an increase in light intensity would open stomata (1)	1	2.2	
			increasing transpiration / ORA (1)	1	2.2	
		(ii)	(because otherwise) an increase in temperature would increase evaporation / ORA (1)	1	2.2	