

5(a)	A = (waxy) cuticle ; B = spongy mesophyll (layer / tissue) ; R spongy mesophyll cell I parenchyma									
5(b)	<i>one mark each correct row <u>and</u> each example must be different</i> <table><tr><th>structural feature in Fig. 5.1</th><th>one example of xerophytic adaptation</th></tr><tr><td>structure A</td><td>thick / thicker, (waxy cuticle) ; A reflective layer / AW</td></tr><tr><td>upper epidermis</td><td>multi-layered / more than one cell layer / hypodermis or thick walled / thick cell walls / sclerenchyma or presence of, trichomes ;</td></tr><tr><td>lower epidermis</td><td>sunken stomata or stomata in, pits / grooves / crypts / chambers or presence of, trichomes or thick / thicker, (waxy) cuticle or few(er) stomata (per unit area) R no / fewer or stoma / stomata, with smaller, aperture / pore ;</td></tr></table>		structural feature in Fig. 5.1	one example of xerophytic adaptation	structure A	thick / thicker, (waxy cuticle) ; A reflective layer / AW	upper epidermis	multi-layered / more than one cell layer / hypodermis or thick walled / thick cell walls / sclerenchyma or presence of, trichomes ;	lower epidermis	sunken stomata or stomata in, pits / grooves / crypts / chambers or presence of, trichomes or thick / thicker, (waxy) cuticle or few(er) stomata (per unit area) R no / fewer or stoma / stomata, with smaller, aperture / pore ;
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8(a)	<i>any four from:</i> 1 Ca^{2+} act as second messenger ; 2 causes (K^+) channel proteins to open ; 3 X = potassium ions / K^+ (that leave the cell) ; 4 water potential of cell increases / water leaves cell by osmosis ; 5 (guard) cell, becomes flaccid / loses turgidity ;
8(b)	<i>any four from:</i> 1 (stomata) open to take up carbon dioxide for photosynthesis ; 2 (stomata) close to prevent, transpiration / (excessive) water loss ; 3 e.g. conditions when stomata close ; 4 (water homeostasis needed to) maintain turgidity of cells / supply water for reactions ; 5 <i>ref. to</i> daily rhythm or open during, day / light, and close, at night / at low light intensity / in the dark ; 6 AVP ;

1(a)(i)	<i>independent:</i> sucrose <u>concentration</u> ; <i>dependent:</i> <u>width</u> of <u>stomata</u> ;												
1(a)(ii)	2.5 and 17.5 (to produce a 2.5% sucrose solution) ; 5 and 15 (to produce a 5.0% sucrose solution) ;												
1(a)(iii)	1 use all sucrose concentrations ; any four from: 2 leave the epidermis in sucrose solution for the same time ; 3 calibrate, the eyepiece graticule ; 4 <u>measure</u> the width of the stomata ; 5 measure stomata at their widest point ; 6 <i>idea of</i> (measuring) 3 or more (different) stomata (for any single concentration) ; 7 calculate the mean (width of the stomata) for any single concentration ; 8 named hazard <u>and</u> risk <u>and</u> precaution ; <table><tr><th>hazard</th><th>risk</th><th>Precaution</th></tr><tr><td>plant material</td><td>allergy / irritant</td><td>gloves / eye protection / PPE</td></tr><tr><td>slides / cover slip</td><td>cuts</td><td>ensure it is not placed near edge of bench or use glass bin / dustpan and brush / AW, for disposal.</td></tr><tr><td>scalpel / knife</td><td>cuts</td><td>cut away from hand / cut onto board / tile / AW</td></tr></table>	hazard	risk	Precaution	plant material	allergy / irritant	gloves / eye protection / PPE	slides / cover slip	cuts	ensure it is not placed near edge of bench or use glass bin / dustpan and brush / AW, for disposal.	scalpel / knife	cuts	cut away from hand / cut onto board / tile / AW
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1(a)(iv)	<i>predict:</i> (as sucrose concentration increases width of stomata) decreases ; <i>Explain (must match the prediction):</i> (as the sucrose concentration increases) water leaves the <u>guard cells</u> , by, osmosis / down a water potential gradient / from high to low water potential ; or (as the sucrose concentration increases) less water enters the <u>guard cells</u> , by osmosis / down a water potential gradient from high to low water potential ;												
1(b)(i)	1 stomatal density = 367 (mm⁻²) ; Any three of: 2 (number of stomata) = 13 ; 3 <u>diameter</u> of picture = 8.5 <u>cm</u> / 85 <u>mm</u> or <u>radius</u> of picture = 4.25 <u>cm</u> / 42.5 <u>mm</u> or <u>length</u> of scale bar / 40 μm = 1.6 <u>cm</u> / 16 <u>mm</u> ; 4 show stomatal density calculation ; 5 show magnification (calculation) ;												
1(b)(ii)	use more than one, field of view / slide / epidermis / (plantain lily) leaf ;												

1(b)(iii)	<table border="1"> <thead> <tr> <th data-bbox="185 103 566 170">1 Environmental condition ;</th><th data-bbox="566 103 997 170">2 Explanation ;</th></tr> </thead> <tbody> <tr> <td data-bbox="185 170 566 215">dry / arid / less water</td><td data-bbox="566 170 997 394" rowspan="4">So less water lost / less transpiration</td></tr> <tr> <td data-bbox="185 215 566 282">low humidity</td></tr> <tr> <td data-bbox="185 282 566 349">high temperature / warm / hot</td></tr> <tr> <td data-bbox="185 349 566 394">windy / high wind speed</td></tr> </tbody> </table>	1 Environmental condition ;	2 Explanation ;	dry / arid / less water	So less water lost / less transpiration	low humidity	high temperature / warm / hot	windy / high wind speed
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2(a)	(0 $\mu\text{mol dm}^{-3}$ ABA =) 1.85 and (400 $\mu\text{mol dm}^{-3}$ ABA =) 1.35 ; 27 ;							
2(b)	<i>any two from:</i> 1 as ABA concentration increases, transpiration rate decreases, except at (ABA concentration of) 50 ; 2 error bars for (ABA concs) 10 or 50 overlap with (ABA conc) 0 so, there is no significant difference (in transpiration rates) or error bars for (ABA concs) 100 overlap with (ABA conc) 10 so, there is no significant difference (in transpiration rates) or error bars for (ABA concs) 100 overlap with (ABA conc) 400 so, there is no significant difference (in transpiration rates) ; 3 error bars for (ABA concs) 100 or 400 do not overlap with (ABA conc) 0 so, there maybe, a significant difference (in transpiration rates) ;							
2(c)	<i>any three from:</i> 1 data for the non-mutant variety ; 2 need to carry out a statistical test ; 3 & 4 <i>ref. to</i> a named standardised variable ; ; 5 <i>ref. to</i> knowing that water is lost from a named part of plant (somewhere other than the stomata) ;							