OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



MARK SCHEME

B3.2 HOW DO PRODUCERS GET THE SUBSTANCES THEY NEED? (FOUNDATION)

SCORE	PERCENTAGE
/37	%

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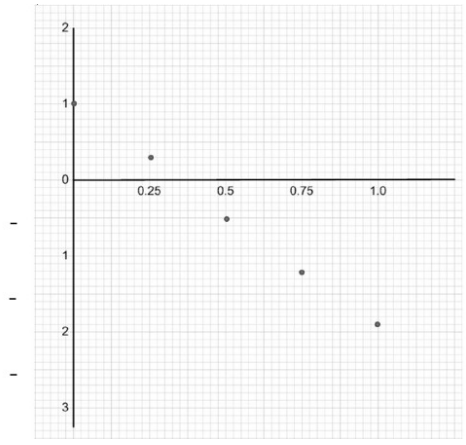
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Question			Answer/Indicative content	Marks	Guidance
1		i	Cells are joined end to end with no connecting cell walls ✓	1	If more than one box is ticked, do not award the mark even if the correct box is also ticked.
		ii	**Any three from** Carbon dioxide concentration ✓ As carbon dioxide concentration in air is very low ✓ Temperature will be high ✓ Light intensity will be high ✓	3	1 mark for identification and 2 marks for explanation ALLOW quoted figures e.g. 0.03%
			Total	4	
2	a	i	**FIRST CHECK THE ANSWER IN TABLE. If answer = +6.1 award 2 marks** (0.3 ÷ 4.9) × 100 ✓ +6.1 ✓	2	~~DO NOT ALLOW answer if not given to dp~~
		ii	~~4, 1, 5, 3, 2 ✓~~	~~1~~	
		iii	~~Does not take into account width ✓~~	~~1~~	~~ALLOW reference to diameter / volume~~
		iv	~~Set up experiment as above and re~~-measure every 10 minutes / other suitable time period ✓ Find out how long it takes until there is now further change in length ✓	~~2~~	
	~~b~~	~~i~~	~~X = sugar concentration (mol / dm ^{3})~~ **AND** Y = change in mean length (mm) ✓	~~1~~	~~DO NOT ALLOW axis labels without units~~
		~~ii~~		2	5 plots correct = 2 3 or 4 plots correct = 1
		iii	Straight line through points ✓	1	
		iv	0.35 to 0.4 ✓	1	

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Question			Answer/Indicative content	Marks	Guidance
		v	Any one from Idea that it is the same concentration as the potato cell content ✓ Water movement is the same in both directions / no net Flow in or out of the potato ✓	1	
			Total	12	

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Question			Answer/Indicative content	Marks	Guidance
3			Diffusion (1)	1	Examiner's Comments This was not well answered – few recognised the diffusion as the correct term for the process by which carbon dioxide enters the leaf. Respiration was the most common incorrect response.
			Total	1	
4		i	Concentration of solution in arbitrary units / Potato chip 0.0 **D** 0.3 **B** 0.6 **A** 0.9 **C**	2	4 correct = 2 marks 2 or 3 correct = 1 mark 1 or 0 correct = 0 marks Examiner's Comments This question was very often answered with the responses in exactly the reverse order to the correct one, suggesting that candidates were unclear about the mechanism of osmosis.
		ii	answer between 0.01 – 0.29 (2) between D and B **OR** close to D (1)	2	**ignore** ref. to units **ecf** accept correct value between D and B – based on the values presented in 2(a)(i) = 1 mark max Examiner's Comments Most candidates were able to draw a reasonable conclusion from their answer to the first part of the question.
			Total	4	
5			water (1) out of (1) osmosis (1)	3	Examiner's Comments Candidates were asked to complete a sentence describing the effect of salt on bacterial cells. Perhaps surprisingly, answers scoring full marks were rarely seen – few could state that the name of the process was osmosis.
			Total	3	

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Question			Answer/Indicative content	Marks	Guidance
6			water **and** partially-permeable membrane (1)	1	**accept** H_2O **accept** semi or selectively for 'partial' **Examiner's Comments** This question involved the candidates in completing the sentence about osmosis. Most knew that the first word was water; however, few knew that the 2nd space needed 2 words, 'partially permeable' and therefore failed to score.
			Total	1	

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Question			Answer/Indicative content	Marks	Guidance
7	a		(nitrate ions are the plant's only source of) nitrogen ✓ to make amino acids/proteins/nitrogenous compounds ✓	2 (AO 1.1 × 2)	ALLOW examples e.g. enzymes / DNA Examiner's Comments Very few candidates showed understanding that nitrate ions are the plant's source of nitrogen, or that this is necessary for making amino acids and therefore proteins.
	b	i	A (cell/partially-permeable) membrane ✓ B mitochondrion ✓	2 (AO 2.1 × 2)	ALLOW mitochondria Examiner's Comments The names of many different cell structures were given for both A and B, suggesting that many candidates were simply guessing using terms they knew from lessons about cells. Misconception It was common to see chloroplasts suggested as the name of structure B. This could be evidence of the misunderstanding that all plant cells have chloroplasts, as one of the features that sets them apart from animal cells, regardless of the cell's position and function in the plant. Root hair cells, of course, do not need chloroplasts because they are underground where there is no light.
		ii	A(transports nitrate ions into the cell by) active transport _____ (using carrier proteins) (against a concentration gradient) ✓ B provides ATP/energy (from cellular respiration) (for active transport) ✓	2 (AO 1.1 × 2)	Examiner's Comments To score marks here, candidates needed to link ideas about active transport (B3.2.2a) and cellular respiration (B4.1.3).

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Question			Answer/Indicative content	Marks	Guidance
		iii	increased/large surface area (to volume ratio) ✓ so there is increased/more active transport/absorption/uptake (of nitrate ions) ✓	2 (AO 1.1 × 2)	ALLOW quicker (but not quickly, as comparison required) Examiner's Comments To score marks here, candidates needed to link ideas about active transport across the cell membrane (B3.2.2a) to the benefits of increasing the surface area of an exchange surface (B5.1.7).
	c		osmosis ✓ xylem ✓ diffusion ✓ stomata ✓	4 (AO 1.1 × 4)	
			Total	12	

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