PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



MARK SCHEME

TOPIC 6: PLANT STRUCTURES AND THEIR FUNCTIONS (PACK 1)

SCORE	PERCENTAGE
/58	%

STEMUP

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Mark Scheme

Q1.

Question number	Answer		Mark
(i)	An explanation linking: • largest amount of growth seen with the highest concentration of nitrates / the higher the concentration of nitrates the more growth /ORA (1) • nitrates are needed to make proteins (1)	accept faster growth for more growth accept nitrates stimulate growth accept amino acids	(2) AO 3 2a AO 3 2b

Question number	Answer	Additional guidance	Mark
(ii)	An explanation that links the following: • by the roots/ root hair cells (1) AND • by diffusion (1) • from a high concentration to a low concentration / down the concentration gradient (1) OR • by active transport (1) • from a low concentration to a high concentration / against the concentration gradient / using energy (1)	 reject osmosis reject osmosis	(3) AO 2 1

Q2.

Question number	Answer	Additional guidance	Mark
	An explanation including the following: • lower surface (of leaf) is not in contact with air / is in water (1) • so gas exchange cannot occur (1)	 accept water would enter the stomata accept oxygen /carbon dioxide /water (vapour) accept reduced/no transpiration	**(2)** **AO2.1**

Q3.

		Indicative Content	
QWC	*	A description to include some of the following points • selective weedkillers • allows broad-leaved plants to grow uncontrolla • narrower-leaved plants and crops left unaffect • auxins and or gibberellins are used • rooting powders • plant cuttings are dipped into rooting powder • roots develop rapidly • large number of plants can be produced from plant • no need to wait for plants to grow from seeds • auxins are used • seedless fruit production • the fruit will develop but the seeds inside will • fruits are able to grow larger (larger biomass) • gibberellins are used	

Level	**0**	No rewardable content
1	**1 - 2**	• a limited description of at least one use of plant hormones • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	**3 - 4**	• a simple description of two or more uses of plant hormones • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	**5 - 6**	• a detailed description of two or more uses of plant hormones with at least auxin, gibberellins or other relevant hormone in the correct

		context • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Q4.

Question number	Answer	Additional guidance	Mark
(i)	Any one from: • make sure all areas have the same amount of light/water/minerals (1) • use the same volume of solution / weedkiller (1) • temperature (1) • pH of soil (1)	ignore amount accept mass	**(1)** **AO2 1**

Question number	Answer	Additional guidance	Mark
(ii)	An explanation linking the conclusion with two of the explanation marks: Conclusion • 80 (arbitrary units) is the best concentration to use (1) Explanation • because it kills the maximum amount of dandelion plants (1) • at lower concentrations not all the weeds were killed (1) • because the highest concentration contains the most weedkiller (1)	accept the highest concentration of weedkiller is the best to use accept it kills **all** the weeds	**(3)** **AO3 2ab**

Q5.

Question Number	Answer	Additional Guidance	Mark
	Any **one** from: • so the leaves are the same age (1) • so the results can be compared (1) • to control a variable (1)	accept similar for same accept so the results are valid (1)	**(1)** **AO2 2**

Q6.

Question Number	Answer	Mark
(i)	**B** positive gravitropism | positive phototropism	**(1)**

Question Number	Answer	Mark
(ii)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks): • auxins accumulate on the underside of the root (1) • causing inhibition of cell elongation (1) • the cells on the top side of the root elongate more causing the root to grow downwards (1)	**(3)**

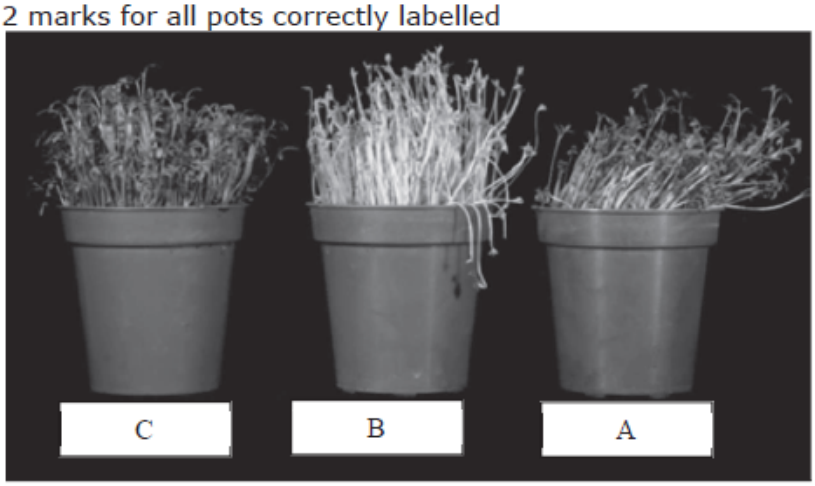
Q7.

	Answer	Acceptable answers	Mark
(a)	A suggestion including any three linked points • ref to use of enzymes (1) • isolate / remove /cut out gene / DNA (for resistance)(1) • (coding for) enzyme (1) • from bacteria (1) • insertion of gene / DNA into crops / plants (1)	Any named enzyme must be in correct context. Ignore plasmids Reject replace	**(3)**
(b)	• in the phloem (1)	Accept phonetic spelling e.g. phloem /flowem	**(1)**
(c)(i)	A description including two of the following points • 0 to 10/11 no effect / change / difference (1) • 10/11 to 28 / 29/30 decrease in mass / yield (1) • Over 28 / 29/30 no change (1)	Accept decreases for 1 mark (if no other marks awarded) ecf throughout	**(2)**
(c)(ii)	B - 30 arbitrary units		**(1)**
(d)(i)	• number of **species**increase / go up (1)	Ignore number of weeds	**(1)**
(d)(ii)	Suggestions including two of the following linked points • increased use of herbicideresistant crops (1) • increased use (concentration / time) of herbicide (1) • ref to transfer of genes into weeds from other plants / cross pollination (1) • mutation(1)	Ignore ref to evolution / natural selection Ignore immune (to herbicide) Accept a description eg continued use of herbicide Accept cross breeding / reproduction / contamination	**(2)**

Q8.

Question number	Answer	Mark
	C by translocation through the phloem **A.** *is not correct because sucrose does not move by osmosis only water does* ***B*** *is not correct because sucrose is transported through the phloem and not by osmosis* ***C*** **The only correct answer is C** ***D*** *is not correct because sucrose is transported through the phloem*	**(1)** AO1 1

Q9.

Question number	Answer	Mark
(a) (i)	1 mark for 1 or 2 correctly labelled pots 2 marks for all pots correctly labelled  	**(2)**

Question number	Answer	Mark
(a) (ii)	D	**(1)**

Question number	Answer	Mark
(a) (iii)	Auxin	**(1)**

Question number	Answer	Mark
(b)	An answer that combines the following points to provide a logical description of the method: • remove the tip from one of the plant shoots and leave the other (1) • measure the changes in growth and direction of movement (1)	(2)

Q10.

Question number	Answer	Mark
(i)	**B palisade mesophyll** **A.** *is not correct because spongy mesophyll is layer B* ***B*** **The only correct answer is B** ***C*** *is not correct because the upper epidermis is at the top of the leaf* ***D*** *is not correct because the waxy cuticle is above the upper epidermis*	**(1)** AO1 1

Question number	Answer	Mark
(ii)	An explanation linking: • gas exchange / diffusion (1) • so {carbon dioxide / oxygen} can enter the cells / so {carbon dioxide / oxygen / water} can leave the cells (1)	**(2)** AO1 1

Question number	Answer	Additional guidance	Mark
(iii)	An explanation linking two from: • part C is stoma (1) • allows gas exchange (1) • allows water (vapour) to leave (1)	 accept stomata accept correct named gases being exchanged	**(2)** AO2 1

Q11.

Question Number	Answer	Mark
(i)	D ethene **The only correct answer is D** ***A*** *is incorrect because auxins cause growth responses in plants* ***B*** *is incorrect because gibberellins cause germination and flower and fruit formation* ***C*** *is incorrect because sucrose is not a plant hormone*	**(1)** **AO1 1**

Question Number	Answer	Mark
(ii)	B gibberellin **The only correct answer is B** ***A*** *is incorrect because auxins cause growth responses in plants* ***C*** *is incorrect because sucrose is not a plant hormone* ***D*** *is incorrect because ethene causes fruit ripening*	**(1)** **AO1 1**

Q12.

Question number	Answer	Mark
(i)	D chloroplast The only correct answer is **D** chloroplast A is incorrect because the nucleus does not photosynthesise B is incorrect because the vacuole does not photosynthesise C is incorrect because the mitochondrion does not photosynthesise	**(1)** **AO1.1**

Question number	Answer	Mark
(ii)	C sucrose The only correct answer is **C** sucrose A is incorrect because glycerol is not a sugar B is incorrect because although ribose is a sugar this is found in DNA D is incorrect because starch is not a sugar	**(1)** **AO1.1**

Question number	Answer	Additional guidance	Mark
(iii)	A description including two from: • in the phloem (1) • dissolved (in water) (1) • by translocation (1) • using active transport (1)	 reject xylem accept by diffusion	**(2)** **AO1.2**

Q13.

Question number	Answer	Additional guidance	Mark
(i)	29 ÷ 500 = 0.058 (1) 0.058 × 100 = 5.8 (1)	award full marks for correct numerical answer without working	 **(2)**

Question number	Answer	Mark
(ii)	An explanation that combines identification via a judgment (1 mark) to reach a conclusion via justification/reasoning (1 mark): • compost B (1) as it has the highest percentage water retained • and there is a higher amount of water loss in the plants due to higher temperatures causing a {larger rate of evaporation of water/higher transpiration rates} (1)	(2)

Question number	Answer	Additional Guidance	Mark
(iii)	Use the same starting mass of compost (1)	accept any other relevant improvement	(1)

Q14.

Question Number	Answer	Mark
(i)	**B** to provide carbon dioxide for photosynthesis	(1)

Question Number	Answer	Mark
(ii)	**C** the chlorophyll in the chloroplast	(1)

Q15.

Question Number	Answer	Mark
(i)	An explanation including **three** from: • fan causes air to move / creates wind / increased air flow (1) • water (vapour) removed (from around leaf) (1) • **increased** {rate of diffusion / evaporation / transpiration} (of water vapour from leaf) (1) • causing the plant to take up more water (1)	**(3)** **AO2** **2**

Question Number	Answer	Additional Guidance	Mark
(ii)	to compare (the effect) / as a control	accept to get a baseline measurement	**(1)** **AO2 2**

Question Number	Answer	Additional guidance	Mark
(iii)	68 – 52 / 16 (1) (16 ÷ 2) 8 (mm^3 per minute)	award full marks for correct answer with no working e.c.f. for incorrect graph readings for 1 mark	**(2)** **AO2 1**

Q16.

Question Number	Answer	Acceptable answers	Mark
(i)	**A** stomata		**(1)**

Question Number	Answer	Acceptable answers	Mark
(ii)	diffusion / diffusing /	Accept description of diffusion eg carbon dioxide molecules move from an area of high concentration to an area of low concentration accept diffuse	**(1)**

Question Number	Answer	Acceptable answers	Mark
(iii)	• guard cells change shape / (guard cells) close stomata /guard cells close (1) • to reduce water loss /rate of transpiration reduced (1)	accept stop water loss / keep water in Ignore get more water	**(2)**

Q17.

Question number	Answer	Mark
	D inversely proportional to the distance from a light source **1. The only correct answer is D** ***A*** *is not correct because light intensity is not directly proportional to photosynthesis* ***B*** *is not correct because light intensity is not just inversely proportional to photosynthesis it is an inverse square.* ***C*** *is not correct because temperature is not directly proportional to photosynthesis*	**(1)** AO 1 1

Q18.

Question number	Answer	Additional guidance	Mark
(i)	Any **one** from: • direction of light (1) • ensure equal light intensity around the plant (1)		**(1)** AO 2 2

Question number	Answer	Mark
(ii)	Any **one** from: • {the substance that causes shoot growth/auxin} is found in the **tip** of the shoot (1) • the **tip** controls growth (1) • the shoot grows from the **tip**(1)	**(1)** AO 3 1b

Question number	Answer	Mark
(iii)	A auxin **1. The only correct answer is A** ***B*** *is not correct because ethane is responsible for fruit ripening* ***C*** *is not correct because gibberellins are used for seed germination, fruit formation and seedless fruit* ***D*** *is not correct because chlorophyll is the green pigment found in chloroplasts which is the main site for photosynthesis it does not promote shoot growth*	**(1)** AO 1 1

Question number	Answer	Mark
(iv)	An explanation that links two of the following: • repeat the experiment with more plant shoots (1) • in order to calculate the mean/improve validity / identify anomalies (1) OR • control a variable e.g. temperature, water (1) • in order to improve validity / make the results comparable (1) OR • place something between the tip and the shoot (e.g. agar / mica)/ cover the tip(1) • to see if it is a chemical response from the tip. (1) OR • set up a control / shoot with no tip cut off (1) • to make the results more comparable (1)	**(2)** AO 3 3b

Q19.

	Answer	Acceptable answers	Mark
(i)	A description including **three** of the following points: • into root hairs (1) • through a partially permeable membrane (1) • by osmosis (1) • down a concentration gradient (1)	accept: through leaves (as correct for water plants) reject: active transport ignore: refs to diffusion accept: from a high concentration (of water) to a low concentration (of water)	**(3)**
(ii)	An explanation including **two**of the following points: • less /slower movement of water into the plant (1) OR • more / faster movement of water out of the plant (1) • (because) less (free) water outside the plant than inside (1)	accept: lowers concentration of water outside the plant (than inside) ORA	**(2)**
(iii)	**A** diffusion		**(1)**

Q20.

Question number	Answer	Additional guidance	Mark
(i)	guard (cells)	accept phonetic spellings	**(1)** AO1 1

Question number	Answer	Additional guidance	Mark
(ii)	A description including: • the stomata openings increase in size until 8am (1) • then decreases (until 6pm) (1)	 accept size of stomata peak at 8am / 0.9 mm	**(2)** AO3 1ab

Question number	Answer	Additional guidance	Mark
(iii)	An explanation linking two from: • the stomata {get smaller / are closing} (1) • because guard cells lost water (1) • to reduce water loss (from the stomata) (1)	 accept guard cells {shrink/plasmolysed/flaccid} accept prevent evaporation	**(2)** AO2 1