Question Number	Answer	Acceptable answers	Mark
1(a)(i)	C - positive gravitropism		**(1)**

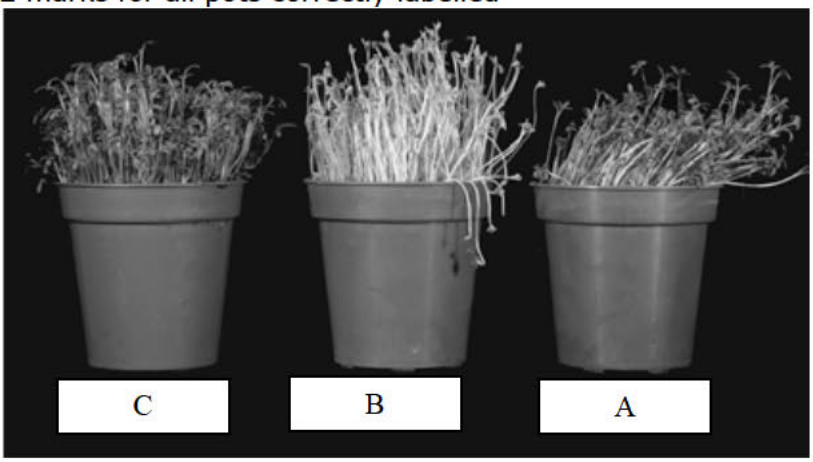
Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	An explanation to include three of the following points: auxin (1) moves to / on the underside of the plant root (1) inhibits the elongation of root cells (on the underside of the root) (1) cells on upper side continue to elongate (1) making the root grow downwards (1)	Grows towards gravity (1)	**(3)**

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	A suggestion to include the following points anchor the plant /make plant stable (1) root can reach water / absorb water / access to mineral ions (1)	Accept nutrients/named mineral ion/ mineral for mineral ions	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	A suggestion to include the following to see what the shoot should do under normal conditions /to compare the control results with the experimental results (1)		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	A explanation to include three of the following: Rebecca's shoot did not curve and Andrew's shoot did curve (1) Rebecca's experiment (black cap will) does not allow light to shine on the tip (1) auxin / plant growth substance will not move (to shaded side of shoot) / is evenly distributed (1) Andrew's experiment jelly will allow auxin / plant growth substance to diffuse /move (through to shaded side) (1) causing cell elongation (1)	auxin is made/found in the tip	**(3)**

(Total for question 1 = 10 marks)

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

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

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

Question number	Answer	Mark
2(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)

Question number	Answer	Mark
2(c)(i)	An explanation that makes reference to: identification – knowledge (1 mark) and reasoning /justification – knowledge (1 mark): • it surrounds the pine leaf (1) • so prevents water loss from the pine leaf/prevents dehydration (1)	(2)

Question number	Answer	Mark
2(c)(ii)	D	(1)

(Total for question 2 = 9 marks)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	**D** ☒ positive phototropism		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	An explanation to include the following linked points (auxins) move to the shaded side of a shoot (1) causing cells on the shaded side to <u>elongate</u> (1)	 accept move to the side opposite the light accept get longer for elongate Ignore references to cell division	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	there is an increase in the % of bananas that ripen as the ethylene concentration increases	Ignore positive effect	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	An explanation to include two of the following points • concentration of ethylene to use is 3% (1) • would be more expensive to increase the ethylene concentration above 3% • when there is no added ripening benefits past 3%(1) • below 3% not all bananas are ripe (1)	 Do not credit ideas related to longer shelf life as the question asks about ripening	**(2)**

Question Number		Indicative Content	Mark
QWC	***3(c)**	A description to include some of the following points • selective weedkillers • allows broad-leaved plants to grow uncontrollably and die • narrower-leaved plants and crops left unaffected • 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 the same 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 not • fruits are able to grow larger (larger biomass) • gibberellins are used	**(6)**
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	

Total for question 3 = 12 marks