

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

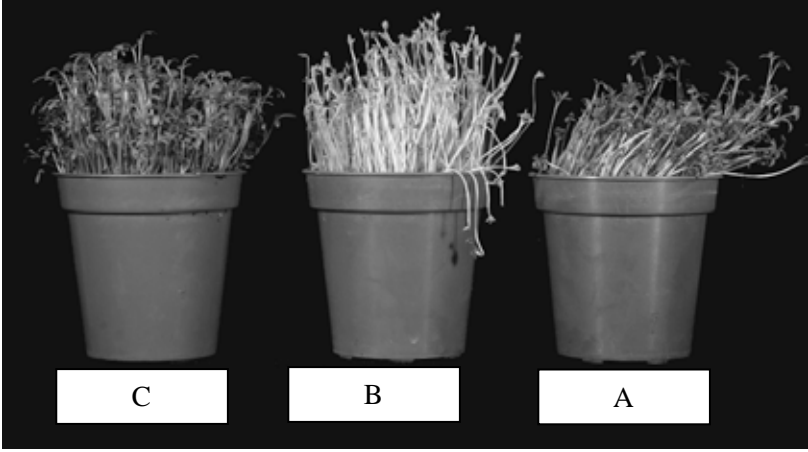
| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|---------------------------|------------|
| 1(a)(ii) | <p>An explanation to include three of the following points:</p> <p>auxin (1)</p> <p>moves to / on the underside of the plant root (1)</p> <p>inhibits the elongation of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

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|------------------|--|--|------------|
| 1(a)(iii) | <p>A suggestion to include the following points</p> <p>anchor the plant /make plant stable (1)</p> <p>root can reach water / absorb water / access to mineral ions (1)</p> | Accept nutrients/named mineral ion/ mineral for mineral ions | (2) |

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|-----------------|---|--------------------|------------|
| 1(b)(i) | <p>A suggestion to include the following</p> <p>to see what the shoot should do under normal conditions /to compare the control results with the experimental results (1)</p> | | (1) |

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

(Total for question 1 = 10 marks)

| Question number | Answer | Mark |
|-----------------|---|------|
| 2(a)(i) | <p>1 mark for 1 or 2 correctly labelled pots 2 marks for all pots correctly labelled</p>  | (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) | <p>An answer that combines the following points to provide a logical description of the method:</p> <ul style="list-style-type: none"> • 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) | <p>An explanation that makes reference to: identification – knowledge (1 mark) and reasoning /justification – knowledge (1 mark):</p> <ul style="list-style-type: none"> • 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 <input checked="" type="checkbox"/> 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 <ul style="list-style-type: none"> • 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) | <p>A description to include some of the following points</p> <ul style="list-style-type: none"> • selective weedkillers • allows broad-leaved plants to grow uncontrollably and die • narrower-leaved plants and crops left unaffected • auxins and or gibberellins are used <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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