

Assessment Schedule – 2013

Agricultural and Horticultural Science: Demonstrate knowledge of horticultural plant management practices and related plant physiology (90924)

Evidence Statement

Question One – Pest and disease control

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
		Describes horticultural plant management practices and related plant physiology and /or growing conditions.		Links ideas to explain why horticultural plant management practices, or steps within practices, are carried out.		Applies knowledge of horticultural plant management practices to given situations. This may involve comparing and contrasting or justifying management practices.	
N1	N2	A3	A4	M5	M6	E7	E8
Describes ONE idea at the Achievement level.	Describes TWO ideas at the Achievement level.	Describes THREE ideas at the Achievement level.	Describes FOUR ideas at the Achievement level.	Explains THREE ideas at the Merit level.	Explains FOUR ideas at the Merit level.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

N0 = No response; no relevant evidence.

Examples of evidence for answers

Describe (Achievement) integrated pest management

A combination of pest control methods and tools. These include pest monitoring, using biological control, pheromone mating disruption, selective chemical control insecticides, and using resistant cultivars.

Describe (Achievement) the actions taken when carrying out integrated pest management / **Explain** (Merit) why each of the actions should be carried out in the way you have described

Description (Achievement)	Explanation (Merit)
Monitor pest levels.	So that when a threshold level is passed, the best control method can be implemented.
Release biological insects / agents.	To control the pest.
Use selective chemical insecticides.	To target the pest with little impact on other organisms.
Use resistant / tolerant cultivars.	So the pest will not impact on the crop, or the impact is reduced.
Remove weed plants that may host the pest.	So the pest population numbers are reduced around the cultivated plant.
Use insect pheromone baits around the cultivated plants.	To confuse the male insects as to the location of the female insects, disrupting mating.

With respect to the methods of chemical control and integrated pest management, select and **justify** (Excellence) the best management practice for controlling pests by comparing and contrasting it with the other management practice

Chemical control	Integrated pest management
<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Simpler to use, as it requires less decision-making. • The impact on pest and disease levels is quick. 	<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Incorporates a variety of techniques, so that the safest / fastest / most targeted technique may be used for the time of year, the pest, or the stage of product development. • Has the benefits of chemical control, as this is one of the tools of integrated pest management.
<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Chemical control may not be possible if the produce is close to harvesting, due to active chemical residues. • Application of chemicals is weather-dependent. • Safety must be considered for people and animals. 	<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • A greater level of knowledge is required to integrate several management practices. • A minimum population of the pest in the crop is often required, which can cause some damage or may exceed maximum export thresholds.

Question Two – Nutrient application

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
		Describes horticultural plant management practices and related plant physiology and / or growing conditions.		Links ideas to explain why horticultural plant management practices, or steps within practices, are carried out.		Applies knowledge of horticultural plant management practices to given situations. This may involve comparing and contrasting or justifying management practices.	
N1	N2	A3	A4	M5	M6	E7	E8
Describes ONE idea at the Achievement level.	Describes TWO ideas at the Achievement level.	Describes THREE ideas at the Achievement level.	Describes FOUR ideas at the Achievement level.	Explains THREE ideas at the Merit level.	Explains FOUR ideas at the Merit level.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

N0 = No response; no relevant evidence.

Examples of evidence for answers

Describe (Achievement) the pathway that nutrients take from the soil, through the plant, with reference to plant structures

Fertiliser dissolves in the water, so the nutrients may be absorbed by the root hairs and then into the xylem (vascular bundle) of the root. The nutrients travel through the xylem until they get to the cells where they are used by the plant.

Describe (Achievement) THREE things a grower should do or decide on before applying nutrients to the soil, and **explain** (Merit) the reason for each action

Description (Achievement)	Explanation (Merit)
Identify the nutrient deficiency by observation/soil test/ leaf analysis.	So that the status of the deficient nutrient can be targeted and corrected.
Do a pH test on the soil.	Because some nutrients are locked up at unfavourable pHs, and adding more nutrients won't make them more available to the plant.
Decide on the rate of fertiliser application.	So that toxic or wasteful levels are not applied, which may harm the plant or cause environmental problems.
Decide on the method of nutrient application.	Because some nutrients may be dissolved in water and applied through the irrigation system, whereas others may have to be applied in solid form.
Remove weeds.	So the weeds will not absorb the fertiliser and impact on the crop.

Fertiliser can be applied in a solid form or through the irrigation system. Select and **justify** (Excellence) the best management practice by comparing and contrasting it with the other management practice

Solid form	Through the irrigation system
<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Slow release, so the time between applications is greater. • Soil acts as a nutrient buffer, so application doesn't require such close monitoring. • Doesn't require complicated monitoring equipment. 	<p><i>Advantages</i></p> <ul style="list-style-type: none"> • The effect of nutrient application is very quick. • Application is easy. • Dispersal of the nutrients is even. • A more even application of nutrients to the soil for plants.
<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Nutrients may be depleted from the soil between applications of fertiliser. • Extra machinery such as trucks, or equipment such as fertiliser spreaders on ATVs, are required to apply solid fertiliser, or it must be applied by hand, which is time-consuming. • Needs to be dissolved before being absorbed by plants. 	<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Nutrient levels in the irrigation water need to be frequently monitored. • Fertiliser quantities need to be measured precisely, because there is no soil to act as a buffer to hold or release nutrients.

Question Three – Growing tomatoes in a glasshouse

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
		Describes horticultural plant management practices and related plant physiology and /or growing conditions.		Links ideas to explain why horticultural plant management practices, or steps within practices, are carried out.		Applies knowledge of horticultural plant management practices to given situations. This may involve comparing and contrasting or justifying management practices.	
N1	N2	A3	A4	M5	M6	E7	E8
Describes ONE idea at the Achievement level.	Describes TWO ideas at the Achievement level.	Describes THREE ideas at the Achievement level.	Describes FOUR ideas at the Achievement level.	Explains THREE ideas at the Merit level.	Explains FOUR ideas at the Merit level.	Justifies the method chosen.	Fully justifies the method chosen by comparing and contrasting.

N0 = No response; no relevant evidence.

Examples of evidence for answers

Describe (Achievement) THREE management practices where growers change the environmental conditions in the greenhouse, and **explain** (Merit) how each of the environmental changes increases production. Include plant processes in your answer

Description (Achievement)	Explanation (Merit)
Increasing carbon dioxide levels by releasing it into the greenhouse through pipes.	To increase the rate of photosynthesis, which increases production.
Increasing carbon dioxide levels by releasing it into the greenhouse when LPG is burned. This also increases the temperature within the greenhouse.	Carbon dioxide increases the rate of photosynthesis, increasing production because more glucose is produced.
Temperature can be increased by heating water running through pipes in the greenhouse.	Raising the temperature increases the rate of plant processes, increasing the rate of growth and production.
Temperature can be decreased by introducing outside air into the greenhouse through vents in the roof or on the sides of the greenhouse, or by fans drawing air through the greenhouse.	If the temperature is too high, the plant can become stressed, and this reduces the speed of plant processes such as photosynthesis and respiration, reducing production.
High humidity can be reduced by exchanging air outside the greenhouse through ventilation.	This reduces the likelihood of disease outbreaks, which will maintain the leaf area for photosynthesis, so that plant production is maximised.

<p>Light can be increased by using growing lights placed in the roof cavity above the plants.</p>	<p>To supply light when it is too dark for photosynthesis. This increases the rate of photosynthesis and glucose production for plant growth.</p>
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Growers train tomato plants up strings. **Justify** (Excellence) why this is the better management practice to manage tomato production by comparing and contrasting it with letting the tomatoes grow unaided over the ground

<p>Training up strings</p>	<p>Growing unaided over the ground</p>
<p><i>Advantages</i></p> <ul style="list-style-type: none"> • Tomatoes are within easy reach of people harvesting them, so harvesting is easier. • Tomatoes are easily seen, so they will not be missed by the harvester, and therefore will not rot and cause a disease problem. • Leaves can be easily removed, so light can get to the tomatoes to help ripening. 	<p><i>Advantages</i></p> <ul style="list-style-type: none"> • There are no labour costs in training the plants up strings and moving the strings.
<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • A lot of extra labour is required to train the plants. 	<p><i>Disadvantages</i></p> <ul style="list-style-type: none"> • Disease is more of a problem, as air cannot circulate through the plant so well. Sprays cannot easily get to all parts of the plant. • Harvesting is more difficult, as the harvester has to bend to the ground to pick the tomatoes.

Judgement Statement

	<p>Not Achieved</p>	<p>Achievement</p>	<p>Achievement with Merit</p>	<p>Achievement with Excellence</p>
<p>Score range</p>	<p>0 – 6</p>	<p>7 – 12</p>	<p>13 – 18</p>	<p>19 – 24</p>