

Mark Scheme (Result)

Series: 2001

BTEC Level 3 Nationals in Agriculture,
Countryside Management, Forestry &
Arboriculture, Horticulture

Unit 2: Plant and Soil Science

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- All marks on the mark scheme should be used appropriately.
- All marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if a candidate's response is not worthy of credit according to the mark scheme.
- Where some judgment is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt about applying the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed-out work should be marked UNLESS the candidate has replaced it with an alternative response.
- Phonetic spelling should be accepted.

Question Number	Answer	Mark
1a	A – Phloem B – Parenchyma	2

Question Number	Answer	Mark
1b	Award one mark for any of the following, up to a maximum of two marks. <ul style="list-style-type: none"> • Transport of water (from roots) • Transport of mineral nutrients • Mechanical support 	2

Question Number	Answer	Mark
1c	Award one mark for any of the following, up to a maximum of two marks. <ul style="list-style-type: none"> • Monocotyledonous flowers usually have flower parts in multiples of 3 • Dicotyledonous flowers have flower parts in multiples of 4 or 5 	2

Question Number	Answer	Mark
1d	Award one mark for identification and one mark for appropriate expansion, for a maximum of four marks. <ul style="list-style-type: none"> • Bulbs (1) swollen / adapted leaves (1) • Tuber (1) adapted stem / root (1) • Corm (1) thickened underground stem (1) • Rhizome (1) horizontal thickened stem (1) <p>Accept any other relevant wording.</p>	4

Question Number	Answer	Mark
1e	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers. Responses may include the following.</p> <ul style="list-style-type: none"> • Storage organs contain a food store. • Ability to keep plant alive during dormant period. • Food store will keep plant alive while new shoots grow. • Storage organ will provide energy for cell growth/ differentiation. • Examples of propagation techniques using storage organs. • Storage organ may provide multiple new plants. • Genetically identical to parent. 	6
Level	Descriptor	
0 0 marks	No rewardable material.	
1 1-2 marks	Demonstrates isolated elements of knowledge and understanding presented in an unstructured format. Generic statements may be presented rather than linkages being made so that lines of reasoning are unclear or rarely supported through the application of relevant evidence from the context.	
2 3-4 marks	Demonstrates mostly accurate knowledge and understanding. There is some structure to the response. Some occasional linkages present so that lines of reasoning are mostly clear and partially supported through the application of relevant evidence from the context.	
3 5-6 marks	Demonstrates accurate and thorough knowledge and understanding presented in a clear and logical format. Comprehensive linkages evidenced so that lines of reasoning are clear and concise, and well supported	

Question Number	Answer	Mark
2a	A- Apex / tip B- Petiole	2

Question Number	Answer	Mark
2b	<p>Award up to four marks for a description that makes reference to the following.</p> <ul style="list-style-type: none"> • Evergreen, retains foliage all year (1). • Leaves have a waxy cuticle (1). • Leaves have an adapted/spiky edge (1). • Leaves are dark green in colour (1). • Leaves are broad leaved (1). • Leaves are approximately 5cm long and 3.5cm wide (1). <p>Accept any other appropriate response.</p>	4

Question Number	Answer	Mark
2c	<p>Award one mark for identification and one mark for linked explanation, for a maximum of four marks.</p> <ul style="list-style-type: none"> • Moisture content (1) uptake dissolved in water (1). • Soil pH (1) ions impact on availability of nutrients (1). • Root size / condition (1) numbers / vigour of root hairs (1). • Nutrient content (1) availability (1). • Air / oxygen content (1) requirement for root respiration. • Soil temperature (1) impact on the rate of reaction in the plant. • Plant growth rates (1) impact on use of minerals (1). 	4

Question Number	Indicative content	Mark
2d	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers.</p> <p>Responses may include the following:</p> <ul style="list-style-type: none"> • Cold weather means low soil temperatures. • Reducing rate of germination. • Seeds remain dormant. • Seeds more accessible to pests / diseases. <p>Cold weather might encourage spread of some pathogens.</p> <ul style="list-style-type: none"> • High precipitation may provide water for germination. • Waterlogging might fill air spaces. • No oxygen for aerobic respiration- impedes growth. • Oxygen required for germination. • Low temperature may inhibit germination. • Snow might prevent light getting to seeds, preventing germination. • Low soil temperature may impede subsequent growth. 	6
Level	Descriptor	
0 0 marks	No rewardable material	
1 1-2 marks	<p>A few key points identified, or one point described in some detail.</p> <p>The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/directly linked to the situation in the question.</p>	
2 3-4 marks	Some points identified, or a few key points described. The answer is unbalanced. Most points made will be relevant to the situation in the question, but the link will not always be clear.	
3 5-6 marks	<p>Range of points described, or a few key points explained in depth.</p> <p>The majority of points made will be relevant and there will be a clear link to the situation in the question.</p>	

Question Number	Indicative content	Mark
3	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers.</p> <p>Responses may include the following:</p> <ul style="list-style-type: none"> • Soil is variable but compost is not. • Ideal root conditions can be specified. • Containers may be moved to maximise growing conditions. • Nutrient content more easily managed. • Easier pest and disease management. • Easier to harvest/ lift/ transport. • Plants requiring different soil conditions can be grown in the same area. • Container growing needs more investment. • Potting compost is more expensive to purchase. • Some soil alternatives are not compostable. • An example of non-compostable material. • Visual impact of container production system. 	8
Level	Descriptor	
0 0 marks	No rewardable material	
1 1-3 marks	<p>A few key points identified, or one point described in some detail.</p> <p>The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/directly linked to the situation in the question.</p>	
2 4-6 marks	<p>Some points identified, or a few key points described. The answer is unbalanced. Most points made will be relevant to the situation in the question, but the link will not always be clear.</p>	
3 7-8 marks	<p>Range of points described, or a few key points explained in depth.</p> <p>The majority of points made will be relevant and there will be a clear link to the situation in the question.</p>	

Question Number	Answer	Mark
4a	Anemophilous / wind (1) Pollen clumps / clustered/ sticky (1)	2

Question Number	Answer	Mark
4b	Award one mark for any of the following, for a maximum of two marks. <ul style="list-style-type: none"> • Stamens lower than stigma (1) • Pollen incompatibility (1) • Dioecious plants (1) • Anthers and stigma active at different times (1) Accept any other relevant phrasing/wording.	2

Question Number	Answer	Mark
4c	Award one mark for identification and one mark for linked explanation, for a maximum of two marks. <ul style="list-style-type: none"> • Pollination still occurs in poor conditions (1) • Lack of insects / pollinators (1) • Reduces requirements / duration of flowering (1) 	2

Question Number	Answer	Mark
4d	Award one mark for identification and one mark for linked explanation, for a maximum of four marks. <ul style="list-style-type: none"> • Increase wild flowers in areas (1) attracts pollinating insects (1). • Bring in beehives (1) increases number of insects (1). • Reduce use of pesticides (1) less pollinators die (1). • Change exposure (1) more wind favours wind pollinators / lower wind speeds favour insects (1). 	4

Question Number	Indicative content	Mark
4e	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers.</p> <p>Responses may include the following.:</p> <ul style="list-style-type: none"> • Soil moisture will impact on root health. • Water needed for nutrient uptake - impacting on yield. • Water also needed to keep plant turgid - impacting on photosynthesis. • Water also needed by cells for biochemical processes. • Nutrients dissolve in soil water. • Decomposers need balance of air and water to live in the soil. • High moisture content means soils will warm up more slowly as water has a higher heat capacity. • Low water availability will reduce yield. • Rainfall will leach through soil reducing nutrient availability. 	6
Level	Descriptor	
0 0 marks	No rewardable material	
1 1-2 marks	<p>Basic arguments on both sides identified, or only one side considered. The answer is likely to be in the form of a list.</p> <p>Points made will be superficial/generic and not applied/directly linked to the situation in the question. No conclusion produced or the conclusion a consequence of only one side of the argument being considered.</p>	
2 3-4 marks	<p>Arguments for and against are described, but there will be more emphasis on one side than the other. The answer will be unbalanced. A conclusion is present, but this is either implicit or as a result of unbalanced consideration of the arguments. There is little or unfocused justification of the conclusion. Most points made will be relevant to the situation in the question, but the link will not always be clear.</p>	
3 5-6 marks	<p>Balanced explanation of both sides for and against. A conclusion is produced which is justified clearly linked to the consideration of arguments for and against, and their relative importance to the situation. The majority of points made will be relevant and there will be a clear link to the situation in the question.</p>	

Question Number	Answer	Mark
5a	Award one mark for any of the following: <ul style="list-style-type: none"> • Improves water holding capacity (1) • Improves air content (1) • Environment for soil animals who break up soil / improve structure (1) • It would change the pH of the soil (1) • Can improve soil structure (1) 	1

Question Number	Answer	Mark
5b	High proportion of phosphate / phosphate stimulates roots growth (1)	1

Question Number	Answer	Mark
5c	<ul style="list-style-type: none"> • Impedes water uptake in the plant (1) which causes plasmolysis of plant cells (1). • Plants wilt (1) impact on photosynthesis reaction (1). • Root death (1) impact on photosynthesis reaction (1). • Cell death / scorching of plant organs (1). <p>Accept any other appropriate response.</p>	2

Question Number	Answer	Mark
5d	Drip irrigation (1) Periodic flooding and draining of excess water (1)	2

Question Number	Answer	Mark
5e	<p>Award one mark for identification and one mark for description, up to a maximum of four marks.</p> <ul style="list-style-type: none">• Air temperature (1) transpiration increases (1).• Humidity (1) reduces at higher humidity (1).• Air movement (1) increases at greater wind speeds (1).• Water supply (1) decreases with low water levels (1). <p>Accept any other reasonable response.</p>	4

Question Number	Indicative content	Mark
5f	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers.</p> <p>Responses may include the following.:</p> <ul style="list-style-type: none"> • Light needed for photosynthesis. • Light may be the limiting factor. • Low light levels reduce rate of growth. • Lower yield or speed to maturity. • Impact on profitability. • Low light levels may cause etiolation. • Lack of plant stability. • Loss of plant quality. • High light levels may cause leaf scorching. • High light levels may increase plant growth. • Other factors become limiting. 	6
Level	Descriptor	
0 0 marks	No rewardable material	
1 1-2 marks	<p>A few key points identified, or one point described in some detail.</p> <p>The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/directly linked to the situation in the question.</p>	
2 3-4 marks	<p>Some points identified, or a few key points described. The answer is unbalanced. Most points made will be relevant to the situation in the question, but the link will not always be clear.</p>	
3 5-6 marks	<p>Range of points described, or a few key points explained in depth.</p> <p>The majority of points made will be relevant and there will be a clear link to the situation in the question.</p>	

Question Number	Indicative content	Mark
6	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers.</p> <p>Responses may include the following.:</p> <ul style="list-style-type: none"> • Soil pH impacts on nutrient availability. • Soil pH impacts on soil organisms. • Air spaces needed for respiration of organisms. • Water holding capacity required by organisms. • Impacted by level of organic matter. • Presence of decomposers impacts on carbon and nitrogen cycles. • Presence of plant roots prevents soil erosion. • Impacts of poor agricultural processes. • Impacts of transport / compaction. 	8
Level	Descriptor	
0 0 marks	No rewardable material	
1 1-3 marks	<p>A few key points identified, or one point described in some detail.</p> <p>The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/directly linked to the situation in the question.</p>	
2 4-6 marks	<p>Some points identified, or a few key points described. The answer is unbalanced. Most points made will be relevant to the situation in the question, but the link will not always be clear.</p>	
3 7-8 marks	<p>Range of points described, or a few key points explained in depth.</p> <p>The majority of points made will be relevant and there will be a clear link to the situation in the question.</p>	

Ofqual



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