

**GCSE**

**Environmental and Land Based Science**

Unit **B683/02**: Commercial Horticulture, Agriculture and  
Livestock Husbandry (Higher Tier)

General Certificate of Secondary Education

**Mark Scheme for June 2015**

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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These are the annotations, (including abbreviations), including those used in scoris, which are used when marking

Annotation	Meaning of annotation
	Blank Page – this annotation <b>must</b> be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	Tick
	Cross
	Unclear
	Benefit of doubt
	Effective evaluation
	Level 1
	Level 2
	Level 3
	Level 4
	Not answered question
	Own figure rule
	Noted but no credit given
	Too vague
	Omission

**Subject-specific Marking Instructions**

- a. If a candidate alters his/her response, examiners should accept the alteration.
- b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

c. The list principle:  
 If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick boxes:

Always check the additional guidance.

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.

If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.

Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

E.g. If a question requires candidates to identify a city in England, then in the boxes

<b>Edinburgh</b>	
<b>Manchester</b>	
<b>Paris</b>	
<b>Southampton</b>	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

<b>Edinburgh</b>			✓			✓	✓	✓	✓	
<b>Manchester</b>	✓	x	✓	✓	✓				✓	
<b>Paris</b>				✓	✓		✓	✓	✓	
<b>Southampton</b>	✓	x		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question		Answer	Mark	Guidance
1		D (If the number of pests increases, the population of wasps increases )	1	
2		D.	1	
3		Growing crops in glasshouses in the UK could require more energy than importing them from where the crops would grow outside; more energy used means more CO <sub>2</sub> produced  Glasshouse typically use peat to grow crops, peat extraction harms ecosystems/contributes to global warming; greenhouse construction may be bad for the environment.	2	
4		Gradually increasing a plant raised in a glasshouse to colder temperatures; until they can survive outside.	1	allow provides some protection before putting outside
5	a	Any 2 from the following: It is cheaper; it produces a finer lawn; it is less labour intensive once the soil has been prepared; the lawn established better as it adapts to the site; no pests / weeds introduced; better able to get type of lawn required; buying seeds more convenient than buying turf.	2	
6	a	250g or 625g (0.625kg) (allowed if traditional ratios not percentages used for calculation)	2	1 mark for correct calculation with incorrect answer.
6	b	Nitrogen is needed for the rapid leaf growth in spring; grass grows less in autumn	1	
6	c	Sandy soils leach nutrients more than clay soils therefore need more nutrients.	1	allow clay soils have more nutrients than sandy

Question		Answer	Mark	Guidance
7	a	4	2	1 mark if they do any calculation towards the volume of the glasshouse
7	b	The cost of pest damage is greater than the cost of the candles; reduces the need to treat pest during the growing season.	1	allow other methods of pest control may be more expensive.
8	a	Peat use declined by 400 000 m <sup>3</sup> ; alternative use increased by 1 700 000m <sup>3</sup>	2	figures =/- 100 000 accept 0.4 &1.7
8	b	Less loss of wetland habitats/less additional CO <sub>2</sub> in the atmosphere; less import of peat; less waste to landfill if converted to peat alternatives; peat is non-renewable	1	any 1 allow visual impact of peat extraction.

Question	Answer	Mark	Guidance
9	<p><b>[Level 3]</b> Describe a full range of vegetative propagation methods. Explains a good range of advantages and disadvantages of each method of propagation Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Describes some vegetative propagation methods with explanations of advantages or disadvantages of each. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Describes a limited range of vegetative propagation methods with an advantage or disadvantage of vegetative reproduction. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p><b>[Level 0]</b> Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p><b>This question is targeted at grades up to A/A</b></p> <p><b>Indicative scientific points may include:</b></p> <p><b>A definition of asexual</b></p> <ul style="list-style-type: none"> <li>• <b>Methods:</b> bulbs corms rhizomes tubers runners accept - splitting/division of herbaceous plants, cuttings tissue culture (cloning)</li> <li>• <b>Advantages:</b> Rapid propagation of plants Only one parent plant needed Enables identical copies of new varieties Simple method for inexperienced Enables plants to be stored over winter Plants mature rapidly Allows crops like potato to be harvested in one season Tissue culture enables production of virus free plants</li> <li>• <b>Disadvantages:</b> Genetically identical therefore vulnerable Disease/pests may be transmitted via stock Can lead to a gradual loss of vigour If plants not divided can lead to overcrowding</li> </ul>

Question	Answer	Mark	Guidance
10	<p><b>[Level 3]</b> Full description of pruning techniques and an explanation of how they impact on bud and flower development and fruiting. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Full description of pruning techniques and an explanation of how they impact on the growth of the plant. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Describes the basic methods of pruning with some explanation of why they are carried out. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p><b>[Level 0]</b> Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p><b>This question is targeted at grades up to A/A*</b></p> <p><b>Indicative scientific points at Level 3 may include:</b></p> <ul style="list-style-type: none"> <li>• Level 1 and 2 points</li> <li>• The impact removing terminal bud has on auxin levels in the plant (apical dominance)</li> <li>• How changes in auxin levels impact on bud development</li> <li>• Auxin inhibits bud development</li> <li>• gibberellins and cytokinins encourage bud development</li> <li>• How changes in auxin levels impact on flower/fruit development</li> <li>• Different timing of pruning for different species depending if they flower on new wood or old.</li> <li>• Pruning reduces the number of fruits but increases individual fruit size.</li> <li>• encourage flowers/fruitletting</li> <li>• pruning away excess leaves to help fruit ripen</li> </ul> <p><b>Indicative scientific points at Level 2 may include:</b></p> <ul style="list-style-type: none"> <li>• Level 1 points</li> <li>• the need to choose when to prune</li> <li>• difference between pruning for growth and flowering/fruitletting</li> <li>• removal of dead/diseased wood to prevent further problems</li> <li>• pruning to encourage a particular shape</li> <li>• removal of suckers on roses</li> </ul> <p><b>Indicative scientific points at Level 1 may include:</b></p> <ul style="list-style-type: none"> <li>• description of a basic pruning cut</li> <li>• pruning to above a healthy outward facing bud to encourage open shape or to direct the growth in a particular direction.</li> </ul>

Question		Answer	Mark	Guidance
				<ul style="list-style-type: none"> <li>• pruning encourages lower buds to break encouraging bushing</li> <li>• scientific detail</li> <li>• mention of auxin</li> </ul> <p><b>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</b></p>
11		A - bacterium	1	
12		Two hormones are involved; progesterone seems to inhibit milk production; prolactin controls/stimulates milk production; prolactin levels are controlled by progesterone	2	
13	a	D. Protein	1	
13	b	C. quiet	1	
14	a	a) omasum b) rumen c) abomasum d) reticulum	4	
14	b	Ruminants eat mainly grass; grass is high in fibre/cellulose (indigestible); compartments/bacteria help break this down; grass is deficient in protein; bacteria and protozoa in the rumen help provide this.	3	allow regurgitation to chew the cud

Question	Answer	Mark	Guidance
15	<p><b>[Level 3]</b> Explains what foods are given, what they contribute to a balanced diet and their role in maintaining health with possible discussion of the impact of deficiency of some of these components. Impact of excess fats and carbohydrates. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Explains most of the components of a balanced diet and their role in maintaining health. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Describes the main components of a balanced diet. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p><b>[Level 0]</b> Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p><b>This question is targeted at grades up to C</b></p> <p><b>Indicative scientific points may include:</b></p> <ul style="list-style-type: none"> <li>• role of carbohydrates</li> <li>• role of protein</li> <li>• role of lipids</li> <li>• role of fibre</li> <li>• role of water</li> <li>• role of vitamins ( A,C and D)</li> <li>• role of minerals ( Ca and Fe)</li> <li>• Impact of deficiencies</li> <li>• effect of excesses of fat and/or carbohydrates</li> <li>• the differences in dietary requirements for different classes of animals(ruminant or omnivore)</li> <li>• the differences in dietary requirements for animals at different stages in their lifecycles</li> <li>• production and maintenance rations</li> <li>• bulk, concentrate, succulent and roughage</li> <li>• need for a balanced diet</li> </ul> <p><b>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</b></p>
16	<p>Rare breeds are more suited to extremes in temperature than commercial breeds / rare breeds cope better with being housed outdoors than many commercial breeds; rare breeds can cope on a poorer diet than commercial species; less susceptible to pests/disease than commercial breeds; provide a gene pool of features useful for breeding new 'commercial' breeds; added value of rare breeds to replace lost income following banning intensive.</p>	3	<p>ignore factors not related loss of intensive systems eg to prevent rare breeds becoming extinct.</p>

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