OCR
RECOGNISING ACHIEVEMENT

GCSE

Environmental and Land Based Science

General Certificate of Secondary Education

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

Mark Scheme for January 2013

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant – applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument
Annotation	**Meaning**
	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response

Annotation	Meaning
	draw attention to particular part of candidate's response
	no benefit of doubt
	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

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.

Eg

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

Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.
☐	☐	☒
☐	☐	☒
☒	✓	✓
☒	☒	✓
☐	☐	☐
This would be worth 1 mark.	This would be worth 0 marks.	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, eg 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, eg 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.

Eg If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

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

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

Question			CBT	Answer	Marks	Guidance
1			1	hybrid vigour	1	
2			2	disadvantages: no new varieties; lack of genetic variability; build up of disease. advantages: rapid production; identical offspring; species which don't produce seed can be reproduced	3	any three but max two from advantages / disadvantages **accept** no need for pollinating insects / wind pollination.
3	(a)		3 (a)	$6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$	1	
	(b)		3 (b)	a description of the concept of rate limiting factors to include the idea that as one factor increases lack of another becomes rate limiting. High temperatures cause enzymes to become denatured the others factors do not cause damage at higher levels.	2	
4			4	strangers cause stress in the cows; milk let-down is controlled by hormones; stress hormones cause less milk to be released.	2	

Question			CBT	Answer	Marks	Guidance
5			5	**Level 3 (5–6 marks)** Will include detail on the role of protozoa and bacteria in providing protein for the cow as well as the role of bacteria in cellulose digestion and the physical breakdown of the food. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. **Level 2 (3–4 marks)** Will include detail of the role of bacteria in cellulose digestion as well as the physical processes. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. **Level 1 (1–2 marks)** Will include detail of the physical breakdown of the food such as chewing the cud and that the cow has several stomachs. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the science. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to A*** **Relevant points include:** • the ruminant has a stomach divided into 4 compartments • rumen full of bacteria and protozoa • bacteria digest the cellulose • bacteria produce fatty acids for the ruminant • bacteria eaten by protozoa • bacteria and protozoa digested by the ruminant • bacteria and protozoa provide animal protein for the ruminant • reticulum forms the bolus which enables the ruminant to 'chew the cud' • ruminant regurgitates material and 'chews the cud' • omasum has rough surface to grind the food • abomasum is the true stomach where gastric juices are added. **accept** 4 stomachs. **ignore** comments to general features of mammalian digestion not specific to ruminants.

Question			CBT	Answer	Marks	Guidance
6			**6**	b) more shoots will grow	1	
7			**7**	removal by hand; hoeing; mulching; weed suppressant membrane; ground cover plants	3	any three max 2 if mention of chemicals
8			**8**	keep the farm as clean as possible; use disinfectants; wash hands; only keep healthy stock; keep vermin out; not allowing eating on the farm; only keeping vaccinated stock; isolate infected stock	2	max 2 **accept** wearing PPE if explained how it reduces chances of contamination.
9			**9**	c) produces new varieties of plant	1	
10	**(a)**		**10 (a)**	a change in the genetic material OWTTE	1	
	(b)		**10 (b)**	when the change improves the performance of the animal	1	
11			**11**	cloning can concentrate undesirable characteristics as well as beneficial/reducing the gene pool OWTTE	1	

Question			CBT	Answer	Marks	Guidance
12	(a)		12	**Level 3 (5–6 marks)** Will cover all aspects of feeding including colostrum, introduction of solids, hay / straw, water and the process of weaning with explanations as to the importance of each. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. **Level 2 (3–4 marks)** Covers the basics of feeding but ignores either early feeding or weaning, limited explanations as to the importance of each stage. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. **Level 1 (1–2 marks)** Covers one aspect of feeding a young animal, little or no explanations of importance. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the science. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to C** **Relevant points include:** • colostrum – essential young mammals receive this in the first few hours – High in antibodies for immunity; rich in fat and protein for energy and growth • provide tasty / sweet food in small amounts straight away • If bottle feeding the need for hygiene, correct amounts / temperature • provide clean water • hay and straw to stimulate rumen development • weaning – A soon as the young animal is taking sufficient solid food; start reducing the amounts of milk; increasing the amounts of **solid** food; eventually removing milk altogether. **accept** references to the commercial importance of weaning early: importance of mother/offspring bonding.
12	(b)	(i)	13	800 & 14700	1	
		(ii)		30880cc	1	
		(iii)		6176g (6.18kg)	1	
		(iv)		£15.44	1	

Question			CBT	Answer	Marks	Guidance
13	(a)		14	growers need to choose a material with the lowest U value; because the greater the heat loss the greater the cost of heating the greenhouse / save energy / better for the environment;	2	.
	(b)	(i)	15	3022.5W	1	**accept** answers as a result of error carried forward.
		(ii)		25^0C; 75562.5W	2	**accept** answers not rounded up
		(iii)		4	1	**do not allow** decimal points of a heater
14			16	if all the pests are killed the parasite has no food; the parasite would die out / leave as a consequence; if the pest reappeared in the glasshouse its population would establish quickly with no control in place; the parasite might then eat something beneficial.	3	**accept** biological pest control aims to maintain pest levels at sub-economic levels not remove them entirely.

Question			CBT	Answer	Marks	Guidance
15			17	**Level 3 (5–6 marks)** Covers both the advantages and disadvantages of peat as a growing medium, the environmental consequences of peat use and compare these to at least two alternatives. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. **Level 2 (3–4 marks)** Covers at least 1 advantage of peat for growing and 2 environmental consequence of its use. Discusses the alternatives to peat. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. **Level 1 (1–2 marks)** Covers the environmental consequences or the value of peat in horticulture. Mentions an alternative to peat. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the science. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to A*** **Relevant points include:** • Arguments for peat use – readily available in the UK, known quantity, sterile, light weight, easily converted to complete growing medium(addition of lime / nutrients / sand) good water holding / nutrient retention properties • Arguments against – unsustainable being used much faster than it forms (1mm/yr), extraction causes irreversible damage to habitats species, releases CO_2 as it decays added greenhouse effect • Alternatives – Coir – waste product, similar properties to peat, initial products poor quality but improved now (bad press) • Vermiculite / perlite – expensive to produce / buy energy used in manufacture, non-biodegradable, imported product. • Bark / wood fibre / green waste compost- waste products, variable quality / consistency, inexpensive, locally produced, reduces waste going into landfill • Hydroponics – needs no resources apart from water renewable, No soil is needed, the water stays in the system and can be reused – thus, lower water costs. It is possible to control the nutrition levels in their entirety – thus, lower nutrition costs. No nutrition pollution is released into the environment because of the controlled system. Stable and high yields. Pests and diseases are easier to get rid of / less likely than in soil. **accept** – references to environmental costs of transporting / importing alternatives.
				Total	**50**	

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