OCR
Oxford Cambridge and RSA

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 2018

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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.

Annotations

Used in the detailed Mark Scheme:

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

Available in RM Assessor to annotate scripts

	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
	draw attention to particular part of candidate's response
	no benefit of doubt

R	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.

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.

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

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

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			Answer	Marks	Guidance
1			tick in the box next to “To extend the growing season”	1	
2	a		any **two** from: build-up of pests; build-up of disease; removing the same nutrients year on year; soil becomes sour;	2	
	b		any **two** from: alternative growing mediums (e.g. peat based, hydroponics); sterilisation of the soil with chemicals or steam; liming; add fertilizer	2	**ALLOW** crop rotation and replacing the soil if qualified
	c		any **three** from: water flow rates; pH; nutrient levels; pest/disease control; temperature of the water; gas saturation	3	Answers must refer to hydroponic system control not to the greenhouse environment
3			water retaining gel; slow release fertiliser;	2	**ALLOW** 2 marks for either fully explained
4			can result in in-breeding; leads to concentration of undesirable genes;	2	**ALLOW** ref. to breeding for one feature affecting another e.g. high milk yield in Holsteins resulting in udders which drag on the ground
5	a		tetanus; salmonella	2	**ALLOW** any other suitable example
	b		any **two** from: good hygiene on the farm; wearing PPE; washing hands; vaccination of stock/self; isolation of sick animals; using disinfectant	2	
6	a		average distance from farms to market has increased because markets have closed; the total number of farms has decreased because farms have ceased trading or merged;	3	1 mark per trend (max 2) plus 1 mark for reason given to either trend Max 2 if no explanation
	b		longer journeys mean: animals may need food/water breaks; drivers need to be qualified to transport livestock over 65km; more stress for animals;	2	

Question			Answer	Marks	Guidance
7			**[Level 3]** Explains a range of situations and links these to particular types of mowers appropriate to that use. Quality of written communication does not impede communication of the science at this level. (5-6 marks) **[Level 2]** Explains some situations with reference to particular mower types. Quality of written communication partly impedes communication of the science at this level. (3-4 marks) **[Level 1]** Names a mower type with appropriate use. Quality of written communication impedes communication of the science at this level. (1-2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This questions is targeted at grades up to C** **Indicative scientific points may include:** • Purpose and use of the lawn • Size of the lawn to be mown • Finish required • Nature of the grass on site, rough grass, fine lawn • Slope • Drainage • Safety • Availability of electricity • Auto-collection of grass or not • Cost of the various types **Mower Specifics-** **Mower A** - Cylinder mower, petrol driven so can be used away from power sources, Fine cut suitable for sports fields or specimen lawns, leaves stripes, collects the grass. **Mower B** - Ride on , petrol driven, suitable for large areas such a outfields in sports grounds, public parks and amenity areas, rotary blade can cope with tough grass. **Mower C** - Hover mower, petrol driven so can be used away from power sources, small and relatively cheap so suitable for family lawns, rotary blade can cope with tough grass, being a hover can cope with slopes and uneven ground. **Mower D** - Electric rotary mower, suitable for small family lawns, lightweight, easy to store, not expensive. **Use the L1, L2, L3 annotations in RM Assessor; do not use ticks**

Question			Answer	Marks	Guidance
8	a		£158.20 ✓✓ Or £159.60	2	39.65m^2 (1 mark) 39.65 x £3.99 = £158.20 **ALLOW** 40m^2 x £3.99 = £159.60 as you wouldn't normally buy fractions of a metre. 49p/m^2 or £9.80 / 20m^2
	b		Yes… it saves £18.20 ✓	1	Yes/No (0 marks) ecf
	c		3 boxes ✓ seeds costs £13.44 ✓	2	£13.44 ✓✓
	d		It's cheaper; OWTTE ✓ less than 10% of the cost of producing by turf ✓	2	ecf from Q.11a
9	a		-29%	1	
	b		Cattle in 2005, as it is the only one where the numbers have increased	1	
	c		any **two** from: pigs are bred bigger; eating less pork; cheaper imported meat; changing dietary habits; less profit farmers	2	

Question			Answer	Marks	Guidance
10			**[Level 3]** Clearly explains and compares the different ways nutrients are obtained in both animals including the role of microorganisms in ruminant digestion and enzymes in pigs' digestion. Quality of written communication does not impede communication of the science at this level. (5-6 marks) **[Level 2]** Compares the main physical difference between the digestive systems of pigs and cattle and explains the main features of the digestive process in both animals. Quality of written communication partly impedes communication of the science at this level. (3-4 marks) **[Level 1]** Identifies the main physical differences between the digestive systems of pigs and cattle. Quality of written communication impedes communication of science at this level. (1-2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to A/A*** **Indicative scientific points may include:** **Cattle:** • Have a diet high in fibre, carbohydrate but deficient in protein • If cattle have protein in their diet (e.g. from concentrate) they digest it in the same way as pigs • 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 provide animal protein for the ruminant • Reticulum forms the bolus which enables the ruminant to "chew the cud" • Omasum has rough surface to grind the food • Abomasum is the true stomach where gastric juices are added • **Pigs:** • Pigs chew food physically breaking it down • Saliva is added which breaks down starches to sugar • Stomach acid and enzymes digest protein to amino acids • Grow faster need more protein **Both:** • Food passes to the duodenum where fats are broken by bile from the liver • In the ilium further digestion and nutrients pass into the blood stream **Use the L1, L2, L3 annotations in Scoris; do not use ticks**

Question			Answer	Marks	Guidance
11			**[Level 3]** Clearly describes a good range of advantages of both AI and embryo transfer with some reference to issues with embryo transplants Quality of written communication does not impede communication of the science at this level. (5-6 marks) **[Level 2]** Describes fully both AI and embryo transfer. Quality of written communication partly impedes communication of the science at this level. (3-4 marks) **[Level 1]** Either describes one in detail or both in basic terms, or one ethical issue. Quality of written communication impedes communication of the scient at this level. (1-2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to A/A*** **Indicative scientific points may include:** **Artificial insemination:** • Allows farmers to choose specific characteristics to breed into their herd • Better genetic variability than keeping a small numbers of males • Allows farmers to use the best sires that they could not otherwise afford • Less chance of disease transmission • Safer than keeping males • Semen can be transported more easily than animals **Embryo transfer:** • Enables farmer to rapidly increase numbers of a genetic line compared with traditional breeding • Enables development of cloned animals • Enables rapid reproduction of the best female bloodlines where AI is only the male bloodline • Enables easy transport of bloodline between countries • Enables animals with traditionally difficult calving, like Belgian blues, to be transferred to cows which calve more easily **Ethical concerns** • Disease susceptibility • Reduced gene pool • Playing God" • Unnecessary surgery on the cattle • Use of “unnatural” hormone levels on the mother **Use the L1, L2, L3 annotations in Scoris; do not use ticks**

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