



# **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 2014**

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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.

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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
	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.
	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"/>

Put ticks (✓) in the  
two correct boxes.

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

Put ticks (✓) in the  
two correct boxes.

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

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, 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 should be blank (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	✗	✓	✓	✓	✓			✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	✗		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

## MARK SCHEME:

Question		Answer	Mark	Guidance
1		Leaves need sweeping up; slipping/tripping hazard; skidding cars; obstacle for disabled; unattractive in winter; cost of cleaning up leaves, blocked drains/pipes.	2	
2		A. Tuber B. Corm C. Rhizome D. Bulb	3	4 correct 3 marks 2 / 3 correct 2 marks 1 correct 1 mark
3	a	25,600	1	Allow 25,601
3	b	Biological because the predator eats the pest before they can reach these numbers, better for the environment /organic/no residue on crop  Chemical because it needs to act fast to stop rapid population growth, kills all the pests  <del>Chemical because it needs to act fast to stop rapid population growth.</del>  <del>Biological because the predator eats the pest before they can reach these numbers</del>	2	Do not accept does not kill other animals /does not harm plants  Whichever method is described the reason must fit with the chosen method Accept general advantages of biological/ chemical control
4		Glass advantages - better light transmission / longer life; Glass disadvantages – fragile / weight / dangerous / poor thermally; Plastic advantages – safer / less weight / better thermally; flexible Plastic disadvantages – can dull / get brittle with age, scratches easily	4	Do not credit converse points  Must identify which they are talking about.  Allow <u>becomes</u> unsightly

Question			Answer	Mark	Guidance
5	a		The warm and moist conditions needed for seed germination is ideal for many fungal diseases; poor ventilation within the propagator; overwintering of fungal spores within the propagator; high plant density	3	Max 3 valid points Allow plants confined in limited space – easy disease transmission
5	b	i	Chemical fungicide is best for reducing leaf damage but has poor effectiveness in reducing losses to yield;  Mycostop is effective in maintaining yield with low leaf damage;  Topsheild has the highest number of surviving plants but poor yields;  Bac-Pac is the best for maintaining yield but has as high levels of leaf damage as the control	3	Max 3 marks
5	b	ii	To give evidence of the effect of each treatment by comparing them to giving no treatment	1	
6			Auxin produced in the terminal bud 1 mark  Auxin suppresses the development of lateral buds 1 mark	1 1	Accept - bud at top /end  Accept – other buds
7			Forsythia should be pruned as soon as it has flowered; cutting back close to old wood; encourages vigorous new shoots to grow; these shoots will carry the flowers next year	2	all points made for 2 marks first statement 1 mark

Question		Answer	Mark	Guidance
8		<p><b>[Level 3]</b> Presents a balance of the arguments both for and against genetic engineering with suitable examples from plant production with explanations of both sides of the argument. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Describes arguments both for and against genetic engineering in plant production including with some explanation. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Identifies arguments for or against genetic engineering in plant production. 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> <b>Indicative scientific points may include:</b> <b>Arguments for genetic engineering of plants.</b></p> <p>Crops engineered with pest/disease resistance reducing the need for pesticide and herbicides with resulting environmental benefits.</p> <p>GM foods could be made healthier than conventional foods with higher nutritional values for example.</p> <p>There is no evidence of any danger to human health since they have been first used.</p> <p>Could be engineered to include treatment for diseases.</p> <p>Could be modified to withstand extreme conditions eg drought.</p> <p>Crops can have greater yields to cope with growing demands for food.</p> <p>Plants engineered as fuel crops.</p> <p>Plants engineered with medical benefits.</p> <p>Plants engineered to improve the environment</p> <p><b>Arguments against genetic engineering of plants.</b> Concern over creation of superbugs or super weeds</p> <p>Cross-pollination between GM and non GM crops GM crops “escaping”</p>

Question		Answer	Mark	Guidance
				<p>GM crops could cause toxic or allergic reactions in people. Long term effects not known</p> <p>Dependency on the big multi-national companies for expensive seed a problem for LEDCS</p> <p>Reduction in genetic diversity</p> <p>Not needed as there is not a food shortage just unequal distribution of food and resources and too much waste in MEDCs</p> <p><b>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</b></p>
<b>9</b>		<p>As antibiotics are used more the chances of some bacteria not being killed increases;</p> <p>These bacteria are likely to be more resistant to the antibiotic;</p> <p>these bacteria reproduce passing on resistance to their offspring,</p> <p>therefore all the population become resistant</p>	Max 3	<p>Allow reference to not using the full dose of antibiotics making survival of more resistant bacteria more likely</p> <p>Allow new strains of bacteria/ mutations</p>

Question		Answer	Mark	Guidance
10		<p><b>[Level 3]</b> Explains in detail the range of different methods a farmer could use to improve the milk yield of the herd. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Explains with some omissions the methods that could be used to improve the milk yield of the herd. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Describes some ways the farmer could improve the milk yield of the herd. 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> <p><b>Feeding</b></p> <ul style="list-style-type: none"> <li>• Careful feeding to production levels. Could include the role of protein &amp; minerals.</li> <li>• Good water supply</li> <li>• feeding ad lib/palatable food – to encourage cows to eat sufficient for production</li> <li>• hormones in feed – to trigger milk</li> </ul> <p><b>Breeding</b></p> <ul style="list-style-type: none"> <li>• Age of cows – replacing low yielding older cows</li> <li>• Blood lines – using bulls with proven high yielding offspring</li> <li>• selective breeding for milk production</li> </ul> <p><b>General management</b></p> <ul style="list-style-type: none"> <li>• Environment – warm, restricting movement</li> <li>• features to improve comfort of cows</li> <li>• Health of the animals – sick cows produce less milk (particularly mastitis)</li> <li>• Handling to reduce stress – stressed produce less milk</li> <li>• more frequent milking - increases total daily yield</li> <li>• Make sure cows calve annually</li> <li>• Regular time of time for milking</li> </ul> <p>Regular time of time for milking <b>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</b></p>

Question		Answer	Mark	Guidance
11		<p>Super Sup – High protein for the growing baby and for milk production</p> <p>High calcium for bone formation in the baby and milk production</p> <p>High magnesium to prevent hypomagnesaemia / grass staggers</p> <p>High vitamin content to support growth of healthy embryo / baby</p> <p>High sugar for energy</p>	3	<p>No mark for name of supplement</p> <p>If super sub not given accept reasons if correct</p> <p>Max 2 marks if no explanations</p>
12	a	<p>Established £50 / h new £25 / h 1 mark.</p> $50 \times 175 = £8750 + £25 \times 80 = £2000$ <p>Total cost £10750 1 mark</p>	2	Correct final answer for 2 marks ecf
12	b	Spraying is 20% of the cost of replanting making it much more cost effective; £200 per hectare cheaper	1	allow comparative price differences

Question		Answer	Mark	Guidance
13		<p><b>[Level 3]</b> Presents a balanced comparison of both intensive and extensive systems covering economic and environmental considerations. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Compares both systems including some environmental and economic issues. Some attempt at explanations not necessarily complete. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Describes features of both systems in terms of either economic or environmental issues. 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> <b>Indicative scientific points may include:</b> <b>Intensive economic advantages</b> Less labour needed, quicker growth rates, better food conversion, higher yields. Less land needed per unit animal.</p> <p><b>Intensive economic disadvantages</b> High cost of equipment, energy costs, lower value of product , faster spread of disease</p> <p><b>Extensive economic advantages</b> Lower input costs, higher value of product, lower set up costs</p> <p><b>Extensive economic disadvantages</b> More land needed, higher labour costs, lower yields, disease less easy to spot/control</p> <p><b>Intensive environmental advantages</b> Less land used freeing up for other uses.</p> <p><b>Intensive environmental disadvantages</b> Waste produced, energy consumed, named pollution produced.</p> <p><b>Extensive environmental advantages</b> Maintenance of traditional landscapes, better for wildlife, less waste to be disposed of.</p> <p><b>Extensive environmental disadvantages</b> Some systems cause damage to habitats, visual impact of animal housing.</p> <p><b>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</b></p>

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