

GCSE

Environmental and Land Based Science

Unit **B681/02**: Management of the Natural Environment (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.

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Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
;	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
	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.

<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

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	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

Question		Answer	Marks	Guidance										
1		<table border="1"> <tr> <td>Cool temperatures, high rainfall</td> <td>✓</td> </tr> <tr> <td>Cool temperatures, low rainfall</td> <td></td> </tr> <tr> <td>High temperatures, high rainfall</td> <td></td> </tr> <tr> <td>High temperatures, low rainfall</td> <td></td> </tr> </table> ;	Cool temperatures, high rainfall	✓	Cool temperatures, low rainfall		High temperatures, high rainfall		High temperatures, low rainfall		1			
Cool temperatures, high rainfall	✓													
Cool temperatures, low rainfall														
High temperatures, high rainfall														
High temperatures, low rainfall														
2		any three from: more habitats for wild organisms; aesthetically better; longer lasting; better shelter for livestock; gives access to environmental stewardship funding; less maintenance	3	reject keeps animals in										
3		<table border="1"> <tr> <td>Light</td> <td></td> </tr> <tr> <td>Loam</td> <td></td> </tr> <tr> <td>Moisture</td> <td>✓</td> </tr> <tr> <td>Oxygen</td> <td>✓</td> </tr> <tr> <td>Tunnels</td> <td></td> </tr> </table> ; ;	Light		Loam		Moisture	✓	Oxygen	✓	Tunnels		2	
Light														
Loam														
Moisture	✓													
Oxygen	✓													
Tunnels														
4		any one from: add lime; add peat; add organic matter; add sulphur; add ammonium sulfate	1											
5		any two from: (deep) ploughing; subsoiling; harrowing; mole drainage; land drains; incorporation of organic matter/ FYM; incorporation of sand/gravel; liming; drainage;	2	reject: use lighter machines or anything that does not alleviate the existing problem reject fertiliser without clarification;										

Question	Answer	Marks	Guidance
6	<p>[Level 3] A detailed description of both the environmental advantages and disadvantages of extensive animal production systems linked to the animal studied. Work is well informed and gives a balanced description clearly communicating the advantages and disadvantages of the issue. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Describes environmental advantages and disadvantages of an extensive animal production system but in a rudimentary way, or with a significant bias towards one side. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] A simplistic response, with little description, typically only listing concepts or ideas. Information is one sided and shows little understanding of the issues. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to C</p> <p>Environmental issues only to be considered.</p> <p>Range of environmental issues for the chosen animal likely to include:</p> <ul style="list-style-type: none"> Land use Visual pollution / impact Pollution from wastes / chemicals Smells Noise pollution Building construction and use of resources Energy use Risk of spread of disease Competition for land use by other demands Reduction in natural habitats Effect on food webs <p>All these issues could be argued from either the stance of the intensive or extensive viewpoint which will make them either advantages or disadvantages - depending on perspective.</p>

Question		Answer	Marks	Guidance
7		360	1	ACCEPT answers between 355 and 365
8	a	water consumption is at zero just before 5am (OWTTE)	1	
	b	any three from: used during milking; washing down; tanker washing; cooling plates; cattle drinking more at milking time	3	Allow justified domestic uses;
9		any two from: less requirement to work antisocial hours; remote monitoring during inclement weather/antisocial hours; quicker diagnosis of problems/problem solving; less paperwork than if recording manually; individual animals can be monitored more easily; more leisure time; less stress;	2	ALLOW completion of government returns
10	a	780(%)	1	
	b	any two from: data is based on estimates; population may depend on weather conditions in any particular year; overall population development will depend on the number of nests destroyed; population will depend on the number of predators that year/disease;	2	
	c	any two from: introduced by human activity, i.e. on imported cargo; no natural predators; parks and streets have lots of similar trees as a food source; out-competing other insects for nest sites/food; climate change means can now live in the UK	2	
	d	correctly plotted points from data; correctly illustrated line of best fit	2	
	e	5100	1	Marker to check the point of plotting to ensure ECF

Question		Answer	Marks	Guidance
11	a	89%	1	ALLOW 88.8%
	b	86% killed; because beans are the same family as peas (legumes) OWTTE	2	Allow justified alternative scenarios 1 mark for figure, 1 mark for reason
	c	any two from: cost; other treatments more effective on certain crops; prevent build-up of resistance; availability; ease of application; broader spectrum of control:	2	ALLOW metaldehyde is the most effective on grapes Note: question state that the chemical concerned is considered to be the most environmentally friendly, reject responses which highlight another product would be less damaging.

Question	Answer	Marks	Guidance
12	<p>[Level 3] Apply knowledge to this unfamiliar situation in a coherent way. Demonstrates an understanding of the inter-relationships within the ecosystem. Answer will combine knowledge of a range of concepts and apply them clearly to the scenario. Quality of written communication does not impede communication of the science at this level. (5-6 marks)</p> <p>[Level 2] Some clearly described tests suggested, although does not cover the full range of the subject. Able to apply knowledge to this scenario with some gaps. Quality of written communication partly impedes communication of the science at this level. (3-4 marks)</p> <p>[Level 1] A simplistic response, with little description. Concepts are limited and poorly articulated. Quality of written communication impedes communication of the science at this level. (1-2 marks)</p> <p>[Level 0] insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to A*</p> <p>Relevant points include:</p> <p>Data on: likelihood to leach from spray site into watercourses; effect on non-target vegetation; persistence in the ecosystem; degradation products – do they form anything more toxic?; effect on animals; storage/shelf-life; changing of natural balances</p> <p>Understanding of the inter-relationship of food webs, and the risk of pesticide accumulation in the higher trophic levels</p> <p>Synergistic activity with other chemicals</p> <p>Flammability/noxious fumes</p>
13	<p>any three from: hedge planting; hedge management; ditch management; wildlife/wild-flower strips to fields; permanent grassland with low inputs; erosion control methods</p>	3	

Question	Answer	Marks	Guidance
14	<p>[Level 3] Demonstrates a thorough understanding of the main developmental advances made in food production. Knowledge of both animal and plant based initiatives and a range of developments within each is shown. Quality of written communication does not impede communication of the science at this level. (5-6 marks)</p> <p>[Level 2] Demonstrates knowledge of a range of technological developments which have helped to increase output. Work is likely to be biased towards animal or plant production. Quality of written communication partly impedes communication of the science. (3-4 marks)</p> <p>[Level 1] A simplistic response, with a limited description, typically only listing techniques. Information is one sided and shows little understanding of the main technological advances which have assisted in the improvement. (1-2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to A*</p> <p>Relevant points include: Increase in mechanisation – reduction in labour costs. Increase in field sizes – less wasted space Use of pesticides and herbicides – reduction in competition and waste Development of fertilisers – to meet the needs of specific crops Development of antibiotics and better veterinary practice for animals Breeding of F1 hybrid/improved varieties of animals/plants Improved storage systems Development of hormonal management techniques in livestock Intensive production of animals – less energy loss as heat etc. Controlled environment production of plants (i.e. ICT/glasshouses/polytunnels) Better farm management techniques/training Genetic modification ICT management systems and control Support for farming via European or Government subsidies Soil improvements</p>

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