

GCSE

Environmental and Land Based Science

Unit **B681/01**: Management of the Natural Environment (Foundation 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.

✗
✗

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 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>Cheaper than a barbed wire fence</td> <td></td> </tr> <tr> <td>Makes use of natural resources</td> <td>✓</td> </tr> <tr> <td>Can be built quickly</td> <td></td> </tr> <tr> <td>Will last a long time</td> <td>✓</td> </tr> <tr> <td>Requires no skill to build</td> <td></td> </tr> </table> ; ;	Cheaper than a barbed wire fence		Makes use of natural resources	✓	Can be built quickly		Will last a long time	✓	Requires no skill to build		2	
Cheaper than a barbed wire fence														
Makes use of natural resources	✓													
Can be built quickly														
Will last a long time	✓													
Requires no skill to build														
2		C fixation	1											
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 sulphate;	1											

Question	Answer	Marks	Guidance
5	<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
6	a	5946m ²	2	Correct answer 2 marks Allow one mark for evidence of correct working
	b	1500m ³	1	
	c	1 year	2	ALLOW 12 months ALLOW one mark for evidence of correct working
	d	any four from: washing down machines; cooling dairy equipment; irrigation of crops; water for livestock; grey water domestic uses e.g. flushing toilets; keeping fish;	2	ACCEPT other valid answers which do not require water of drinking water quality. 1-2 valid distinct uses for 1 mark 3-4 valid distinct uses needed for 2 marks Allow: feeding of stock
7	a	100	1	
	b	At risk	1	
	c	any four from: keep records of pedigrees / breeding lines; publicity on uses; subsidies to keep the breed; use of AI or other advanced techniques; improved veterinary / science in breeding condition monitoring / hormones; spread out flocks to prevent disease; swapping of rams; good communication between breeders; surrogacy; freezing eggs/sperm;	4	

Question		Answer	Marks	Guidance
8		adaptation and explanation: - mouthparts: efficient for grazing vegetation / eat a wide range of vegetation - flexible "foot": allows for climbing a variety of surfaces to reach food - hard shell: protects from some predators - hermaphrodite: increases ability to breed - produces large quantities of eggs: rapid population increase possible - nocturnal: reduces risk of predator attack - shell: survives in dry weather slime: used to climb/ attach to plants; camouflage: harder to be seen by predator	4	Max 2 marks for simplistic statements Max 2 marks for explanations of how the adaptation makes it a good crop pest No need for precise organ names ALLOW other accurate, reasoned statements

Question		Answer	Marks	Guidance
9	a	Iron phosphate	1	
	b	74(%)	2	ALLOW 73.5 ALLOW one mark for evidence of correct working
	c	any two from: cost; other treatments more effective on certain crops; prevent build-up of resistance; availability; ease of application	2	ALLOW metaldehyde is the most effective on grapes
10		any three from: poisoning of workers; pollution of area; fire risk; effects on visitors/children; run-off into watercourses; contamination/degradation of chemical; impact on wildlife; corrosive to skin; reactions with other chemicals;	3	ALLOW other realistic responses linked to scenario

Question	Answer	Marks	Guidance
11	<p>[Level 3] A comprehensive response citing a wide range of different sources and demonstrating a knowledge of how they are used to supply energy in a useable form. Quality of written communication does not impede communication of the science at this level. (5-6 marks)</p> <p>[Level 2] Response gives a wide ranging list of potential energy sources with little explanation or a few energy sources with an explanation of how they are converted into a useable source of energy. Work is accurate in its content but is less expansive in style. Quality of written communication partly impedes communication of the science at this level. (3-4 marks)</p> <p>[Level 1] A simplistic response, likely to consist of a limited list of potential sources with little additional information. 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 E</p> <p>Relevant points include: Wind: use of turbines to generate electricity</p> <p>Water: water wheels / turbines and wave power, creating kinetic energy which is converted into electricity</p> <p>Solar: generating energy through photovoltaic cells to produce electricity or heating of water directly through pipes</p> <p>Fuel crops: producing biodiesel, burning of crops such as Miscanthus or short rotation coppice, waste from crops e.g. straw – used to generate steam / heat hot water / run generators</p> <p>Anaerobic digestion: development of methane for use</p> <p>Geothermal: use of ground source pumps to supply warm water for heating</p>

Question	Answer	Marks	Guidance								
12	<table border="1" data-bbox="367 1145 958 1289"> <tr> <td>To fund farmers to manage...</td> <td>✓</td> </tr> <tr> <td>To promote recycling...</td> <td></td> </tr> <tr> <td>To reduce the amount...</td> <td></td> </tr> <tr> <td>To stop the development...</td> <td></td> </tr> </table> <p>;</p>	To fund farmers to manage...	✓	To promote recycling...		To reduce the amount...		To stop the development...		1	
To fund farmers to manage...	✓										
To promote recycling...											
To reduce the amount...											
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Question	Answer	Marks	Guidance
13	<p>[Level 3] A thorough description of effects of weeds on crop growth, focussing on the value of the crops. A wide range of weed control measures is explained. Quality of written communication does not impede communication of the science at this level. (5-6 marks)</p> <p>[Level 2] Response demonstrates knowledge of the issues relating to plant competition. Simple references to the value of the crop. The response may describe methods of weed control. Work is accurate in its content but is less expansive in style. 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 explanation or description, typically only listing impact of weeds on crops or methods of control. 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>Relevant points include:</p> <p>Growth:</p> <ul style="list-style-type: none"> • Weeds will compete for light, water and nutrients – affecting the rate of photosynthesis in the crop plant • Competition will affect crop growth and yield • Space issues may also affect growth of crops/gas exchange/still air encouraging disease <p>Value:</p> <ul style="list-style-type: none"> • Weeds may also contaminate crop – reducing its value • Creates more difficulty in harvesting i.e. clogging up machines • Alternative host for pests or diseases • Lower yields reduce returns for the farmer • Lower quality crop <p>Control:</p> <ul style="list-style-type: none"> • Herbicides • Harrowing/hoeing • Large scale control using tractor / herbicides or alternatively pre-planting controls such as polythene or large scale cultivation activities • Mulching – membranes, plant remains, organic material • Hand weeding • Crop rotation

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