

**Environmental and Land Based Science**

General Certificate of Secondary Education

Unit **B681/02/04**: Management of the Natural Environment (Higher Tier)

**Mark Scheme for June 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.

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For answers marked by levels of response:

- a. **Read through the whole answer from start to finish**
- b. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor
- c. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

- d. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

### Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
<b>not/reject</b>	answers which are not worthy of credit
<b>ignore</b>	statements which are irrelevant - applies to neutral answers
<b>allow/accept</b>	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 scoris to annotate scripts

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
	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

<b>Edinburgh</b>	
<b>Manchester</b>	
<b>Paris</b>	
<b>Southampton</b>	

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).

<b>Edinburgh</b>			✓			✓	✓	✓	✓	
<b>Manchester</b>	✓	x	✓	✓	✓				✓	
<b>Paris</b>				✓	✓		✓	✓	✓	
<b>Southampton</b>	✓	x		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question			CBT	Answer	Mark	Guidance
1			1	oxygen; water	2	
2			2	<b>B</b> dormice are not equally spread across the area	1	
3			3	<b>B</b> there is less dependence on other sources of water	1	
4			4	<b>A</b> add nitrogen into the soil	1	
5	(a)	(i)	5	<b>B</b> free draining	1	
		(ii)	5	<b>D</b> be sticky	1	
	(b)		6	<b>A</b> to increase the calcium available to the plants	1	
	(c)		6	lot 1 due to; the openness/ level (1); good drainage (1)	2	no mark for simply choosing lot 1 <b>ignore</b> due to size, as all would be large enough
6			7	<b>D</b> reduced survival of tree seedlings	1	
7			8	<b>any three from:</b> less damage to land; management of waste simpler; visual impact; less smell; less energy used	3	one advantage and one disadvantage

Question		CBT	Answer	Mark	Guidance
8	(a)	9	increased tyre pressure increases compaction; increase in number of passes increases compaction	2	<b>accept</b> reverse arguments
	(b)	10	206	1	<b>accept</b> between 200 and 215
	(c)	10	if the new machine could do the task in 2 passes and it reduced the number of passes at lower tyre pressures ie 4 passes at 97kPa or 6 passes at 69kPa or 97kPa; larger tractor can pull in larger equipment hence do the job in fewer passes	2	1 mark for generic statement 1 mark for inclusion of specific situation <b>accept</b> machine can do the task in 1 pass
9	(a)	11	soil 2 has greatest mean mass of earthworms. <b>any two from:</b> smaller population means more food; the species (or characteristics) may be larger/ larger species overall	3	1 mark for correct soil  2 marks for reasons  <b>allow:</b> soil type itself might affect the population
	(b)	12	herbicide application of 1g per litre has no significant effect on earthworm numbers; application rate of 5g per litre or more significantly reduces numbers	2	1 mark for increase in herbicide rate decreases earthworm numbers
	(c)	13	<b>any three from:</b> fewer worms will mean less food for birds and other predators; less aeration in the soil so less oxygen for other soil living organisms; reduction in weeds/ plant diversity; fewer plants for herbivorous animals/ birds to feed on/ breed on	3	<b>accept</b> other correct validated answers.

Question		CBT	Answer	Mark	Guidance
10		14	<p><b>any one from:</b>            does not leave residue in the soil/plant;            does not leach/ harm other organisms;            non selective</p> <p><b>any one from:</b>            difficult to use with established plants;            visually intrusive;            causes rubbish when degrades;            reduces air in soil/ reduces organism activity</p>	2	<p><b>allow</b> other valid answers  <b>ignore</b> 'cost' without a well argued justification.</p>
11		15	<p><b>any three from:</b>            management of environment;            restriction of access; changing populations of organisms;            changing or monitoring habitats;            education;            lobbying government regarding legislation/ planning            carry out research            monitor and record (ie data collection)</p>	3	no mark for naming a conservation organisation.

Question	CBT	Answer	Mark	Guidance
12	16	<p><b>Level 3 (5–6 marks)</b> A range of arguments for and against given with justified reasons linked to greenbelt land. Quality of written communication does not impede communication of the science at this level.</p> <p><b>Level 2 (3–4 marks)</b> Some arguments for and against given with reasons linked to greenbelt land. Arguments presented may be biased to one side. Quality of written communication partly impedes communication of the science at this level.</p> <p><b>Level 1 (1–2 marks)</b> Limited arguments for and/or against building on greenbelt land. Quality of written communication impedes communication of the science at this level.</p> <p><b>Level 0 (0 marks)</b> Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p><b>Relevant points include:</b></p> <p><b>This question is targeted at grades up to A*</b></p> <p>For:</p> <ul style="list-style-type: none"> <li>Requirement for additional housing</li> <li>Shortage of suitable sites in the required locations (ie Home Counties)</li> <li>Building keeps people in employment</li> <li>People want to live in the countryside</li> <li>Live near where you work</li> <li>New developments allows for economic regeneration in an area</li> <li>Some brownfield sites may have greater biodiversity or rare species.</li> </ul> <p>Against:</p> <ul style="list-style-type: none"> <li>Green Belt land is not abundant</li> <li>Designed to prevent small towns conjoining</li> <li>Shortage of sites could be addressed by brown field site development</li> <li>Green spaces essential for ensuring reserves of organisms</li> <li>Aesthetic/recreational uses</li> <li>Food security</li> </ul>

Question	CBT	Answer	Mark	Guidance
13	17	<p><b>Level 3 (5–6 marks)</b> Comprehensive account describing the stages in doing a risk assessment with reference to hazards associated with mowing. Quality of written communication does not impede communication of the science at this level.</p> <p><b>Level 2 (3–4 marks)</b> An account describing some stages in doing a risk assessment with reference to hazards associated with mowing. Quality of written communication partly impedes communication of the science at this level.</p> <p><b>Level 1 (1–2 marks)</b> An outline account describing some stages in doing a risk assessment with limited reference to hazards associated with mowing. The hazards associated with mowing. Quality of written communication impedes communication of the science at this level.</p> <p><b>Level 0 (0 marks)</b> Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p><b>Relevant points include:</b></p> <p>This question is targeted at grades up to C</p> <p>Identify the hazards/ what are the hazards? injury from machinery (electrical or mechanical), hidden objects, trip hazards, noise</p> <p>Decide who might be harmed operator, bystander, wildlife</p> <p>Evaluate/quantify the risk</p> <p>Decide on the precautions needed (linked to hazards)</p> <p>Record your findings and implement them</p> <ul style="list-style-type: none"> <li>• tell others</li> <li>• suggestion of items related to the task</li> </ul> <p>Review your finding and update where needed. Check to make sure that new problems have not been created</p>

Question		CBT	Answer	Mark	Guidance
14		18	<p><b>Level 3 (5–6 marks)</b> Clear description of the main stages presented in a logical order. Quality of written communication does not impede communication of the science at this level.</p> <p><b>Level 2 (3–4 marks)</b> Most of the main stages described in the correct order. Quality of written communication partly impedes communication of the science at this level.</p> <p><b>Level 1 (1–2 marks)</b> Some of the main stages described but not in the correct order. Quality of written communication impedes communication of the science at this level.</p> <p><b>Level 0 (0 marks)</b> Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p><b>This question is targeted at grades up to A*</b></p> <p><b>Relevant points include:</b></p> <p>Stages may include:</p> <p>Identification of desired characteristic</p> <p>Identification of a gene with a significant desirable effect</p> <p>Introduction of the DNA coding for the desired gene</p> <ul style="list-style-type: none"> <li>• Use of early stage embryos in animals</li> </ul> <p>Regulation of the introduced gene (switching gene on)</p> <p>Testing and monitoring of new gene</p> <p>Further replication of new organism</p>
			<b>Paper Total</b>	<b>50</b>	

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