OCR
RECOGNISING ACHIEVEMENT

GCSE

Environmental and Land Based Science

General Certificate of Secondary Education

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

Mark Scheme for January 2013

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

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 scoris 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 <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**

MARK SCHEME:

Question			CBT Question Numbers	Answer	Mark	Guidance
1			**1**	A and E	2	Answers may be in any order
2			**2**	A: less damage to local seabed's	1	
3			**3**	Any **two** from: Brassicas to follow legumes to use nitrogen fixed; Onions to follow potatoes so soil is well cultivated; Different crops take different nutrients from / part of the soil	2	**Accept** potatoes to follow brassicas to make use of pH change from liming
4			**4**	Any **two** from: Allows space for public to walk; Ensures greater biodiversity; Prevents leaching of chemicals into water courses; Reduces the destruction of natural habitats; Corridors for wildlife	2	
5			**5**	**1 mark for each correctly completed row**: Cattle break down fence: ensure fence is maintained / use electric fence; Agitated by visitors: signage / ban dogs / use another fence as a barrier; Disease spread: restrict ability to touch / hand washing facilities; Cattle fed wrong foods: signage / restrict access; Damage to visitors by bull / crushing arms	4	Risk and likelihood rating are subjective. Markers are to concentrate on hazard and action needed.
6			**6**	Any **three** from: Safeguarding the geological / environmental / historic feature or organism; No deliberate damage / active management of item; Give notice of any operations on site; Restrictions of access to site by animals / humans	3	

Question			CBT Question Numbers	Answer	Mark	Guidance
7			7	Any **three** from: **Advantages**: Profitable for farmer; Renewable source; Smaller carbon footprint **Disadvantages**: Reduction in land for food	3	
8	(a)		8	93p	1	**Accept** £0.93
8	(b)		8	30.7p	1	**Accept** £0.307 **Allow ECF** from previous question
8	(c)		9	Any three from: Increase in space needed for same amount of egg production; Increase in costs of production; Egg prices would need to rise; Existing buildings would be redundant	3	**Accept** a shortage of eggs **Accept** more imports of eggs
9	(a)		10	No effect for nitrogen; Initially (rapid) decrease (to pH 7.5) then (a gradual) increase for manganese	2	**Ignore** rises in pH. For **two** marks both nitrogen and manganese must be referred to and linked
9	(b)		11	Improved structure / flocculation of clay particles / increase activity of soil organisms	1	
9	(c)		11	pH 5.5	1	
10	(a)		12	Increasing salt content decreases suitability for use in irrigation	1	
10	(b)		12	Any **two** from: High salt content will affect water uptake due to reversal of osmosis; Pesticide / herbicide residues in the water; Potential disease transmission; Changes to pH	2	

Question			CBT Question Numbers	Answer	Mark	Guidance
11			13	Any **three** from: Low impact tyres; Wider booms / fewer passes; Greater ground clearance; Quieter machines; More fuel efficient; Narrow tyres; GPS / computerised applications of chemicals; Catalytic converters	3	

Question			CBT Question Numbers	Answer	Mark	Guidance
12			14	**[Level 3]** A well structured response, explaining a wide range of relevant points including advantages and disadvantages. To include abiotic and biotic factors. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. (5 – 6 marks) **[Level 2]** Covers a range of environmental impacts, both advantages and disadvantages. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. (3 – 4 marks) **[Level 1]** Covers a limited range of environmental impacts. May be either advantages or disadvantages. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the Science. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant Science. Answer not worthy of credit. (0 marks)	6	**Relevant points include:** **Advantages:** windbreaks will reduce the speed of the wind in the crop / reduce transpiration rate windbreak gives shelter from frosts act as security to the field habitat for beneficial organisms reduces soil erosion aids pollination by insects **Disadvantages:** competition (for nutrients / water / light) high winds might cause damage (wind funnelling) windbreaks might shade the crop might cause frost pockets might harbour pests or diseases. need pruning take up space which could be used for growing a crop

Question			CBT Question Numbers	Answer	Mark	Guidance
13			15	**[Level 3]** A well structured response, explaining a range of relevant points from the list opposite that would lead to reliable results. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. (5 – 6 marks) **[Level 2]** Give a description of sufficient stages to produce a valid result. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. (3 – 4 marks) **[Level 1]** Gives a description that includes some of the stages necessary to produce a valid result. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the Science. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant Science. Answer not worthy of credit. (0 marks)	6	**Relevant points include:** use of quadrats choice of sampling technique (random number generation) / systematic sampling. use of tape measure (for edges or transect) number of samples taken sufficient to identify anomalies identification of species size of plants v percentage cover risk assessment **Accept**: size of quadrat how to identify species percentage cover / abundance

Question			CBT Question Numbers	Answer	Mark	Guidance
14			16	**[Level 3]** A well structured response, describing all the principles of genetic modification with correct suggestions of practical details. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. (5 – 6 marks) **[Level 2]** Describes most of the principles of genetic modification with some suggestions of practical details. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. (3 – 4 marks) **[Level 1]** Limited steps of the procedure described with few or no practical details. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the Science. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant Science. Answer not worthy of credit. (0 marks)	6	**Relevant points include:** identification of desired characteristics / gene mapping isolation of genes responsible insertion of genes into other organisms replication of organism (tissue culture) requirement for specialist equipment sterility of conditions controlled growing environment description of tissue culture process – meristem separation, use of auxins etc.
				Total	**50**	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553