

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

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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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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 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 |

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 | <p>[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)</p> <p>[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)</p> <p>[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)</p> <p>[Level 0] Insufficient or irrelevant Science. Answer not worthy of credit. (0 marks)</p> | 6 | <p>Relevant points include:</p> <p>Advantages:</p> <ul style="list-style-type: none"> 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 <p>Disadvantages:</p> <ul style="list-style-type: none"> 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 | <p>[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)</p> <p>[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)</p> <p>[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)</p> <p>[Level 0] Insufficient or irrelevant Science. Answer not worthy of credit. (0 marks)</p> | 6 | <p>Relevant points include:</p> <ul style="list-style-type: none"> 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 <p>Accept:</p> <ul style="list-style-type: none"> size of quadrat how to identify species percentage cover / abundance |

| Question | | CBT Question Numbers | Answer | Mark | Guidance |
|----------|--|----------------------|---|-----------|--|
| 14 | | 16 | <p>[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)</p> <p>[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)</p> <p>[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)</p> <p>[Level 0] Insufficient or irrelevant Science. Answer not worthy of credit. (0 marks)</p> | 6 | <p>Relevant points include:</p> <ul style="list-style-type: none"> 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 | |

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