

Environmental and Land-Based Science

General Certificate of Secondary Education

Unit **B493/02**: Management of the Natural Environment (Higher Tier)

Mark Scheme for January 2011

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, 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.

© OCR 2011

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

| | | |
|---------------|---|---------------------------------------------------------------|
| / | = | alternative and acceptable answers for the same marking point |
| (1) | = | separates marking points |
| not | = | answers which are not worthy of credit |
| reject | = | answers which are not worthy of credit |
| ignore | = | statements which are irrelevant |
| allow | = | answers that can be accepted |
| () | = | words which are not essential to gain credit |
| — | = | underlined words must be present in answer to score a mark |
| ecf | = | error carried forward |
| AW | = | alternative wording |
| ora | = | or reverse argument |
| OWTTE | = | or words to that effect |

| Question | | Expected Answer | Mark | Rationale/Additional Guidance | | | | | | |
|-----------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------|--------------------------------------|--------------------|-------------------------------|-----------------------------------------------------|---|---------------------------------------------------------------------------------|
| 1 | | D (soil rich in clay) | 1 | | | | | | | |
| 2 | | B (make protection laws) | 1 | | | | | | | |
| 3 | | D and G (heather and pine tree) | 1 | both answers required for the mark can be in either order | | | | | | |
| 4 | | <table border="1"> <thead> <tr> <th>deciduous woodland</th> <th>coniferous woodland</th> </tr> </thead> <tbody> <tr> <td>provides a rich and varied ecosystem</td> <td rowspan="3">trees grow quickly</td> </tr> <tr> <td>higher light levels in spring</td> </tr> <tr> <td>the natural habitat of most native birds and plants</td> </tr> </tbody> </table> | deciduous woodland | coniferous woodland | provides a rich and varied ecosystem | trees grow quickly | higher light levels in spring | the natural habitat of most native birds and plants | 2 | all correct = 2 marks two or three correct = 1 mark one correct = 0 marks |
| deciduous woodland | coniferous woodland | | | | | | | | | |
| provides a rich and varied ecosystem | trees grow quickly | | | | | | | | | |
| higher light levels in spring | | | | | | | | | | |
| the natural habitat of most native birds and plants | | | | | | | | | | |
| 5 | | C (hedges need maintaining) E (bigger machinery can be used) | 2 | one mark for each answer can be in either order | | | | | | |
| 6 | | D (spraying) | 1 | | | | | | | |
| 7 | | A (organic foods are worth more in the shops) E (organic methods cause less harm to the environment) | 2 | one mark for each answer can be in either order | | | | | | |
| 8 | (a) | to get an accurate result as water has mass | 1 | | | | | | | |
| 8 | (b) | to ensure that all the organic material has been burnt away | 1 | | | | | | | |

| Question | | Expected Answer | Mark | Rationale/Additional Guidance |
|----------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 9 | (a) | increase biodiversity OWTTE provide habitats windbreak noise reduction | 1 | allow stops sun blinding drivers prevents soil erosion not: absorbs rainwater / absorbs pollution / overgrow / looks better |
| 9 | (b) | animals / plants could cause hazards / distraction animals could be killed / injured by traffic | 1 | allow could fall <u>onto road</u> not: can crash into / maintenance / damage road |
| 10 | | <i>nitrogen fixing:</i> fix atmospheric nitrogen / nitrogen gas / N ₂ into ammonia / ammonium compounds (1) <i>nitrifying:</i> ammonium compounds into more complex compounds / nitrate (1) | 2 | allow nitrates in fixation allow into nitrates |
| 11 | | <i>any two from:</i> inefficiency of energy transfer lost as heat goes out as faeces respiration substances in urine to detritivores to decomposers movement reproduction | 2 | allow not all of organism is eaten |
| 12 | (a) | unsightly noisy can harm birds | 1 | two reasons needed for mark. |
| 12 | (b) | negative point about wind and justification for an alternative | 1 | reject change in Government. allow take up space / visual if qualified |

| Question | | Expected Answer | Mark | Rationale/Additional Guidance |
|----------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13 | | <p>two from: stem stores water pleated stem can swell up when water is available leaves as spines / no leaves so less area for water loss wide green stem for photosynthesis thick waxy covering to retain water (many) shallow roots to collect (surface) water</p> | 2 | <p>allow take in CO₂ at night. allow spines to prevent being eaten allow large vacuole to store water</p> <p>not: roots go straight down / long roots</p> |
| 14 | (a) | 32 | 1 | |
| 14 | (b) | 6 | 1 | |
| 14 | (c) | <p>240 000</p> <p>10 000 divided by 0.25 = 40 000 multiplied by 6 = 240 000</p> <p>OR</p> <p>6 multiplied by four = 24 multiplied by 10 000 = 240 000</p> | 1 | calculation not required for mark. |
| 15 | (a) | A (15) | 1 | |
| 15 | (b) | C (55.3) | 1 | |
| 16 | | <p>7 500</p> <p>85% of 50 000 is 42 500 50 000 minus 42 500 = 7 500</p> | 1 | calculation not required for mark. |

| Question | Expected Answer | Mark | Rationale/Additional Guidance |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17 | <p>two from: reduces fertility if no improvement done removes particular nutrients (named) for (named crop) removes nutrients from one depth damages soil structure as organic material decreases – leading to faster erosion build up of pests / diseases associated with one crop more likely</p> | 2 | allow requires more fertiliser |
| 18 | <p>compaction can reduce drainage / water cannot penetrate seeds unable to root fertiliser unable to penetrate air content reduced deep grooves / ruts</p> | 3 | <p>one mark for each reason OR up to maximum marks for detail allow clogged up (if qualified) not: easier / harder for crops to grow not: hard to plough not: reference to light or food not: stops soil being damaged</p> |
| 19 | <p>no mark for choice of suggestion, marks for effects: greater / lesser variety of habitat greater / lesser variety of plants therefore greater / lesser variety of animals</p> | 3 | |
| | Total | [36] | |

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

OCR Customer Contact Centre

14 – 19 Qualifications (General)

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

© OCR 2011