

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
ENVIRONMENTAL AND LAND-BASED
SCIENCE**

B493/02

Management of the Natural Environment (Higher Tier)

Candidates answer on the question paper.
A calculator may be used for this paper.

OCR supplied materials:
None

Other materials required:

- Pencil
- Ruler (cm/mm)

**Monday 24 January 2011
Afternoon**

Duration: 45 minutes



Candidate forename		Candidate surname	
-----------------------	--	----------------------	--

Centre number						Candidate number				
---------------	--	--	--	--	--	------------------	--	--	--	--

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **36**.
- This document consists of **20** pages. Any blank pages are indicated.

Answer **all** the questions.

1 The photograph shows a flooded field.



The photograph shows a field that has become flooded after a period of heavy rain.

Which **one** of the following soil types is most likely to be found in this field?

- A loam based soil
- B peat based soil
- C sandy soil
- D soil rich in clay
- E soil rich in gravel

Answer **A, B, C, D** or **E** [1]

2 Here are the logos for some conservation bodies.



Which of the following does a conservation body **not** do?

- A carry out education
- B make protection laws
- C manage nature reserves
- D protect natural habitats
- E research environments

Answer **A, B, C, D** or **E** [1]

3 Which **two** of the following are **not** normally found in a deciduous wood?

- A ash tree
- B blackberry
- C bluebells
- D heather
- E horse chestnut tree
- F oak tree
- G pine tree

Answer **A, B, C, D, E, F** or **G** and[1]

4 These are characteristics of different types of woodland:

- **provides a rich and varied ecosystem**
- **higher light levels in spring**
- **the natural habitat of most native birds and plants**
- **trees grow quickly**

Write the characteristic in the column beneath the woodland it best describes.

deciduous woodland	coniferous woodland

[2]

- 5 The photograph shows a large field with no hedges.



Some farmers have removed hedges to make their fields bigger.

Choose **two** reasons why farmers remove hedges.

- A large fields are more biodiverse
- B hedges look more attractive
- C hedges need maintaining
- D hedges provide a windbreak
- E bigger machinery can be used
- F soil erosion is increased

Answer **A, B, C, D, E** or **F** and[2]

6 Which one of the following is **not** a form of organic weed control?

- A hand weeding
- B hoeing
- C mulching
- D spraying

Answer **A, B, C** or **D** [1]

7 Some farmers use organic methods to produce food crops.

Choose **two** reasons why farmers use these methods.

- A Organic foods are worth more in the shops.
- B Organic foods have higher nutritional quality.
- C Organic foods keep fresher for longer.
- D Organic food production requires less labour.
- E Organic methods cause less harm to the environment.
- F Organic methods produce higher yields.

Answer **A, B, C, D, E** or **F** and[2]

8 The humus content of a soil can be found by carrying out the following steps:

- Take a sample of dry soil.
- Record the mass of the dry soil sample.
- Strongly heat the soil sample to burn all the organic material.
- Reweigh the sample to see how much mass it has lost.
- Repeat until mass is constant.

(a) Why must you start with a dry soil sample?

.....
..... [1]

(b) Why must you keep heating and reweighing until the mass becomes constant?

.....
..... [1]

9 The photograph shows planting on the side of a new section of motorway.



(a) Planting improves the appearance of motorways.

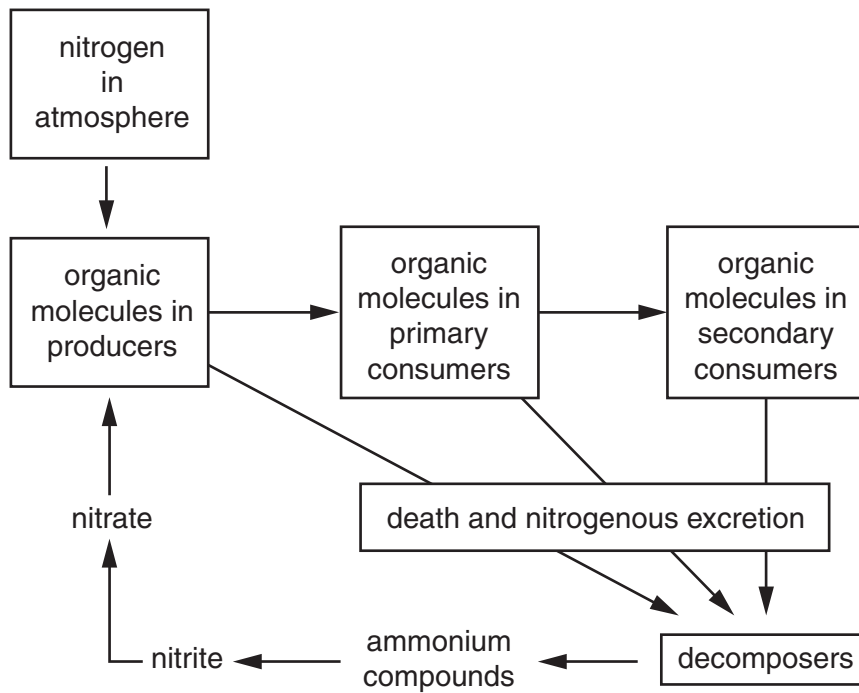
Suggest **one** other advantage of planting on the side of a motorway.

..... [1]

(b) Suggest **one** disadvantage of planting on the side of a motorway.

..... [1]

10 The diagram shows part of the nitrogen cycle.



Bacteria are involved in the nitrogen cycle.

Explain the role of the following types of bacteria.

nitrogen fixing

.....

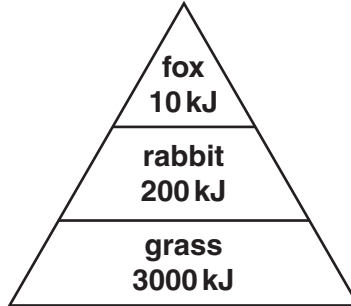
nitrifying

..... [2]

11 Here is a simple food chain:

grass → **rabbit** → **fox**

The food chain can be represented as a pyramid of energy which shows the productivity at each level in a fixed time period.



The amount of energy gets less as it passes along the food chain.

Explain **two** ways that energy is lost from the food chain.

- 1
-
- 2
- [2]

12 The photograph shows a wind turbine.



Some people have objected to wind turbines being built near their homes.

(a) Suggest **two** reasons why people might object to wind turbines.

.....
..... [1]

(b) Government policy during 2000 to 2010 supported wind turbine development to provide 'green energy'.

Now Government policy is promoting other low-carbon energy sources.

Explain why wind is now less favoured and other 'green energy' sources are preferred.

.....
..... [1]

13 The photograph shows a cactus.



Look at the photograph.

Explain **two** adaptations the cactus has that helps it survive in a hot, dry environment.

1

.....

2

..... [2]

14 Quadrats can be used to estimate the number of plants growing in a field.

Five students used quadrats to investigate daisies growing on the school field.

The table shows their results.

student	quadrat 1	quadrat 2	quadrat 3	quadrat 4	total	mean
A	6	3	9	6	24	(b)
B	8	9	4	11	(a)	8
C	4	4	5	3	16	4
D	0	12	8	0	20	5
E	6	9	4	9	28	7

(a) What is the total number of plants counted by student **B**?

answer [1]

(b) Calculate the mean number of daisies in each quadrat counted by student **A**.

answer [1]

(c) The school field has an area of $10\,000\text{ m}^2$.
The mean number of daisies from all of the quadrats is 6.
Each quadrat has an area of 0.25 m^2 .

Use this information to calculate the total number of daisies on the school field.

answer [1]

15 Squirrels feed on nuts and leaves.

The diagram shows the energy flow through a squirrel.



The 150 units of food energy are changed into heat and waste, and used for growth.

(a) How many units of energy are used for growth?

- A** 15
- B** 31
- C** 52
- D** 83

Answer **A, B, C** or **D** [1]

(b) What percentage of the food energy is changed into waste?

- A** 15.1%
- B** 25.2%
- C** 55.3%
- D** 75.4%

Answer **A, B, C** or **D** [1]

- 16 Some of Britain's bird populations are falling.

The table shows the decline of three birds from 1998 to 2008.

bird	percentage decline
skylarks	75%
turtle doves	85%
lapwings	50%

If the 1998 population of turtle doves was 50 000, what was the size of the population in 2008?

answer [1]

17 Growing the same crop on the same piece of land year after year is called monoculture.

Explain why monoculture may be bad for the soil.

.....

.....

.....

..... [2]

18 The photograph shows a tractor with double wheels at the rear.



The farmer has fitted double wheels to the tractor to reduce soil compaction.

Why does the farmer need to reduce soil compaction?

.....

.....

.....

..... [3]

19 The photograph shows a disused section of a canal.



The local council has to make a decision on what to do with the area.

The suggestions are:

- drain it and make it into a skateboard park
- fill it in and make it into a public garden
- make it into a fishing pond
- put an island in the centre and make it into a boating lake.

Choose **one** of the suggestions.

.....

Describe how your choice affects the **natural** environment.

.....
.....
.....
.....
.....
..... [3]

END OF QUESTION PAPER



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.