

Candidate forename						Candidate surname					
Centre number						Candidate number					

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE

B493/04

**ENVIRONMENTAL
AND LAND-BASED SCIENCE**

**Management of the Natural Environment
(Higher Tier)**

MONDAY 21 MAY 2012: Morning

DURATION: 45 minutes

plus your additional time allowance

MODIFIED ENLARGED

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Electronic calculator

Pencil

Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **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).**

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.**

BLANK PAGE

Answer ALL the questions.

1 Farmers spray their fields with pesticide.

Pesticides are useful as they kill organisms that damage crops.

However, the use of pesticides have an effect on the environment.

Put ticks (✓) in the boxes next to the TWO pieces of advice which would REDUCE the impact of pesticides on the environment.

Increase the concentration of the pesticide.

☐

Leave an unsprayed strip around the field edges.

☐

Only spray when it is raining.

☐

Spray twice, not once, a year.

☐

Spray when the air is still.

☐

Use more than one type of spray.

☐

[2]

- 2 Some chemicals are used by farmers to improve the yield of their crops.**

If these chemicals are not used carefully they can cause harm.

Draw THREE lines to connect each CHEMICAL to the HARM IT CAN CAUSE.

CHEMICAL

HARM IT CAN CAUSE

fertiliser

**builds up in food chains, so
damaging predators**

**causes excessive plant growth
in streams and rivers, so
reducing light levels**

herbicide

**kills some plants needed
by animals, so reducing
biodiversity**

pesticide

**prevents sunlight reaching
leaves, so reducing
photosynthesis**

[2]

3 Which TWO sources of energy listed below are renewable?

Put ticks (✓) in the boxes next to the two correct answers.

coal

☐

crops

☐

natural gas

☐

nuclear

☐

oil

☐

peat

☐

solar

☐

[2]

4 Soils have different characteristics.

Put ticks (✓) in the boxes next to the TWO true statements about CLAY SOIL.

It does not swell or shrink.

☐

It feels sticky when wet.

☐

It retains nutrients.

☐

Its particles do not stick together.

☐

It tends to be very acidic.

☐

It warms up quickly in spring.

☐

Water runs through it quickly.

☐

[2]

5 Some processes in the nitrogen cycle involve bacteria.

Which type of bacteria returns nitrogen to the atmosphere?

A denitrifying

B denitrating

C nitrifying

D nitrogen fixing

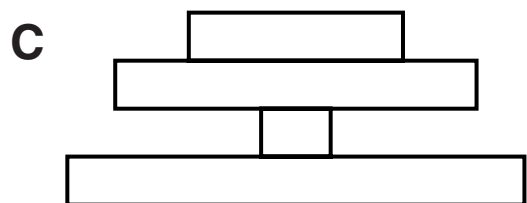
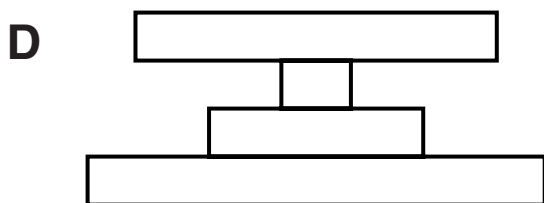
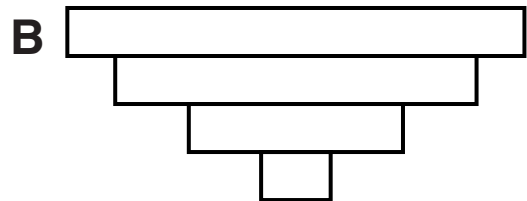
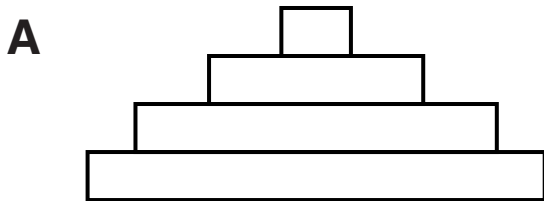
Answer A, B, C or D _____ [1]

6 Here is a food chain.

GRAIN → MICE → CAT → FLEAS

The food chain can be represented as a PYRAMID OF BIOMASS.

Which is the pyramid of biomass for this food chain?



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

- 7 Weeds in a field can be controlled by using chemicals or by using cultural methods.**

Suggest TWO advantages of using a chemical weed killer.

1 _____

2 _____

_____ **[2]**

- 8 Some students are asked to find the mass of water in a sample of soil.**

They:

- 1. weigh an evaporating dish**
- 2. put some soil in the evaporating dish and weigh the dish and soil**
- 3. put the evaporating dish and soil into an oven at 60°C for two hours**
- 4. reweigh the evaporating dish and soil**
- 5. repeat steps 3 and 4 until the mass does not change**
- 6. calculate the mass of water in the soil.**

(a) Explain why step 5 is needed.

[1]

(b) How can the students calculate the mass of the water in the soil?

[1]

- 9 Green belts are protected areas of undeveloped land around towns or cities.**

Give TWO reasons for having green belts.

1 _____

2 _____

_____ **[2]**

- 10 The table shows European electricity production in gigawatts (GW) for some sources of renewable energy.

The values for **2005** and **2010** are ACTUAL values.

The values for **2015** and **2020** are PREDICTED values.

renewable energy sources	European electricity production in GW			
	actual production		predicted production	
	2005	2010	2015	2020
solar	2.2	26.1	57.9	91.4
tidal	0.2	0.2	0.4	2.1
wind	40.4	84.9	142.9	213.4
biomass	15.7	22.6	32.3	43.3

- (a) Suggest TWO reasons why the actual production for **2020** may be different from the predicted values in the table.

Explain your answers.

[2]

(b) Calculate the percentage increase in tidal power from 2005 to 2020.

Show your working.

Answer _____ % [2]

(c) Suggest why tidal power makes such a small contribution to electricity production.

_____ **[1]**

- 11 This question is about two different ditches, A and B, at the edges of farmers fields. Ditch B has many more plants growing in it than Ditch A.**

Suggest TWO farming practices, other than poor ditch maintenance, that could have resulted in EXCESSIVE plant growth in ditch B.

Explain your answers.

[2]

QUESTION 12 BEGINS ON PAGE 16

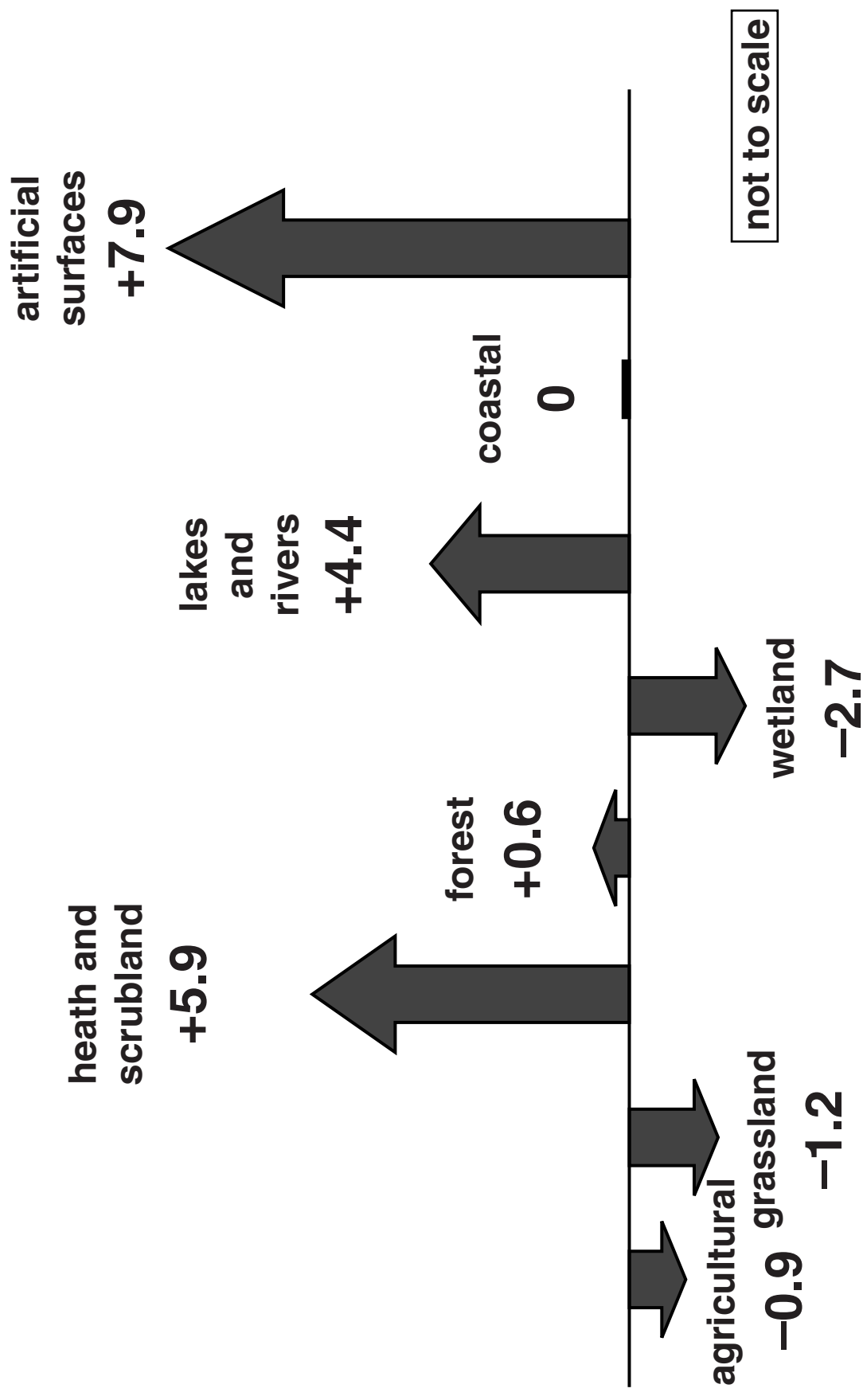
12 The chart (opposite) shows the percentage changes in European ecosystems between 1990 and 2006.

Suggest TWO ways that local and national governments may influence changes in land use.

1 _____

2 _____
_____ **[2]**

CHANGES IN EUROPEAN ECOSYSTEMS BETWEEN 1990 AND 2006



**13 This question is about the management of hedgerows.
The total length of managed hedgerows in the UK in
1998 and 2007 is given below:**

1998: 506 584 km

2007: 477 000 km

**(a) By how many km had the length of managed
hedgerows decreased between 1998 and 2007?**

Answer _____ km [1]

**(b) By what PERCENTAGE had the length of managed
hedgerows decreased between 1998 and 2007?**

A 0.58%

B 5.8%

C 58%

D 94.2%

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

14 The table shows the percentage loss of permanent grassland between 2005 and 2008.

year	total % loss of permanent grassland	% lost to temporary grass (ley)	% lost to crops	% lost to uncropped land
2005	0.79	0.24	0.51	0.04
2006	0.56	0.10	0.43	0.03
2007	0.69	_____	0.59	0.02
2008	0.42	0.06	0.34	0.02

(a) Complete the table by filling in the missing figure for the change to temporary grass (ley) in 2007.

[1]

(b) Calculate the mean percentage loss of permanent grassland between 2005 and 2008.

Answer _____ % [1]

15 A teacher wants to use ICT to monitor conditions in the school pond.

(a) List TWO environmental conditions that could be monitored.

1 _____

2 _____ **[1]**

(b) Explain how ICT can be used to monitor environmental conditions.

_____ **[2]**

16 GM crops have attracted a lot of publicity.

THE DAILY BARK

GM protesters trash farmers crop

Angry protesters have destroyed a genetically modified crop.

The destruction of the crop came after a meeting of people who are against GM crops.

Following a heated meeting, the crowd moved into the field.....

Some people have strong views about growing GM crops.

Give arguments for AND against GM crops.

[4]

END OF QUESTION PAPER

BLANK PAGE

BLANK PAGE

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.