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Monday 21 May 2012 – Morning

GCSE ENVIRONMENTAL AND LAND-BASED SCIENCE

B493/04 Management of the Natural Environment (Higher Tier)



Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:

- Electronic calculator
- Pencil
- Ruler (cm/mm)

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. 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).
- 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 **12** pages. Any blank pages are indicated.

| | |
|--------------------|--|
| For Examiner's Use | |
| TOTAL | |

Answer **all** the questions.

- 1 The photograph shows a field being sprayed 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 |
|---|--|
| <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">fertiliser</div> | <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">builds up in food chains, so damaging predators</div> |
| <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">herbicide</div> | <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">causes excessive plant growth in streams and rivers, so reducing light levels</div> |
| <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">pesticide</div> | <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">kills some plants needed by animals, so reducing biodiversity</div> |
| | <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">prevents sunlight reaching leaves, so reducing photosynthesis</div> |

[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

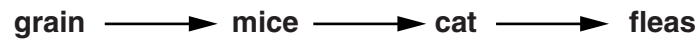
B denitrating

C nitrifying

D nitrogen fixing

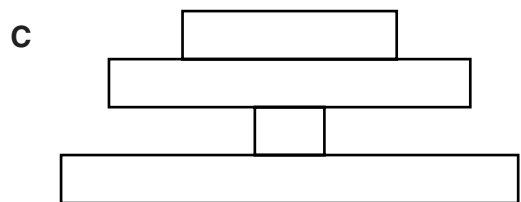
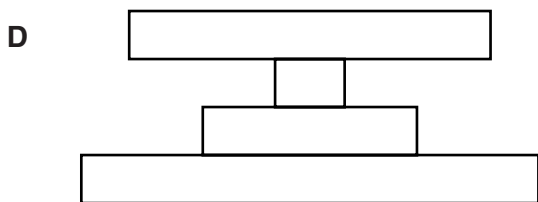
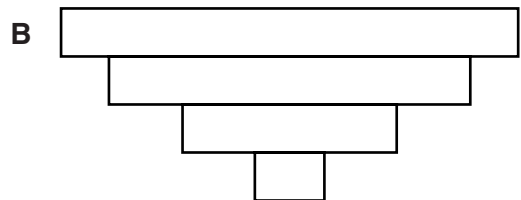
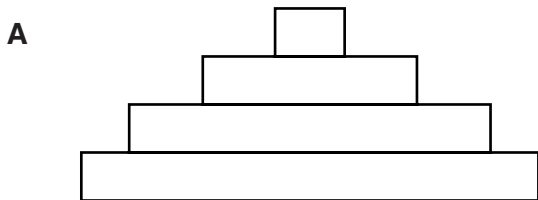
Answer **A, B, C** or **D** [1]

6 Here is a food chain.



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 The photographs show two different ditches.

Ditch B has many plants growing in it.

ditch A



ditch B



Suggest **two** farming practices, other than poor ditch maintenance, that could have resulted in **excessive** plant growth in ditch B.

Explain your answers.

.....

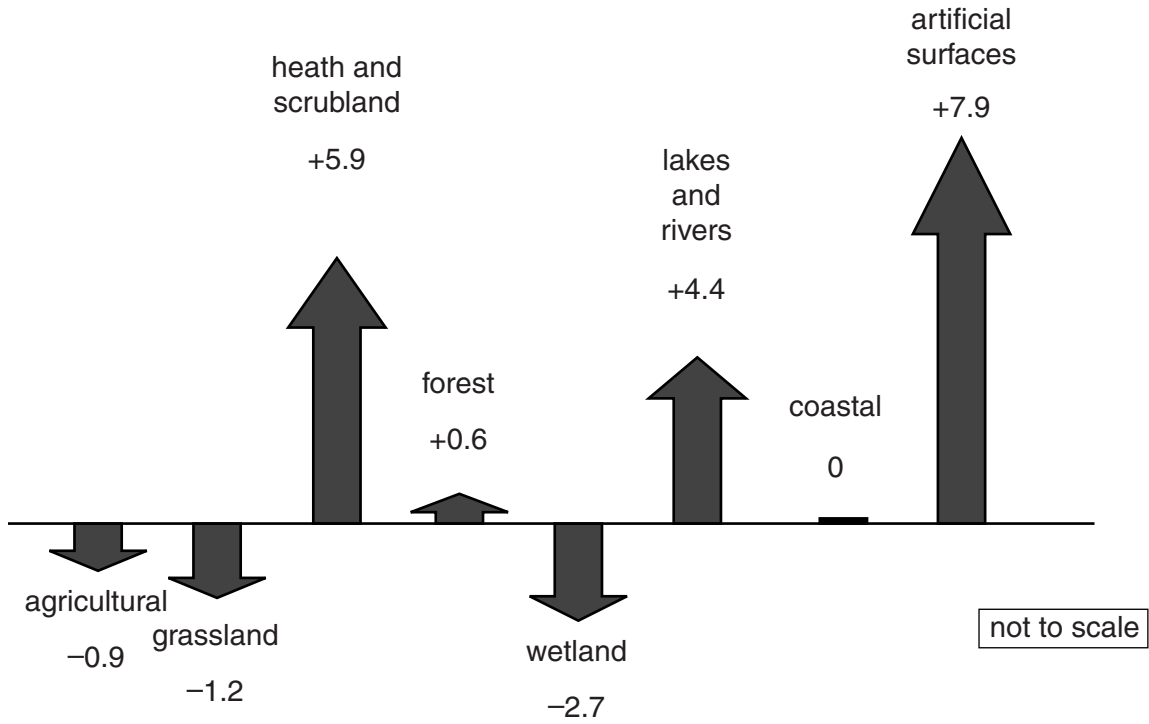
.....

.....

..... [2]

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

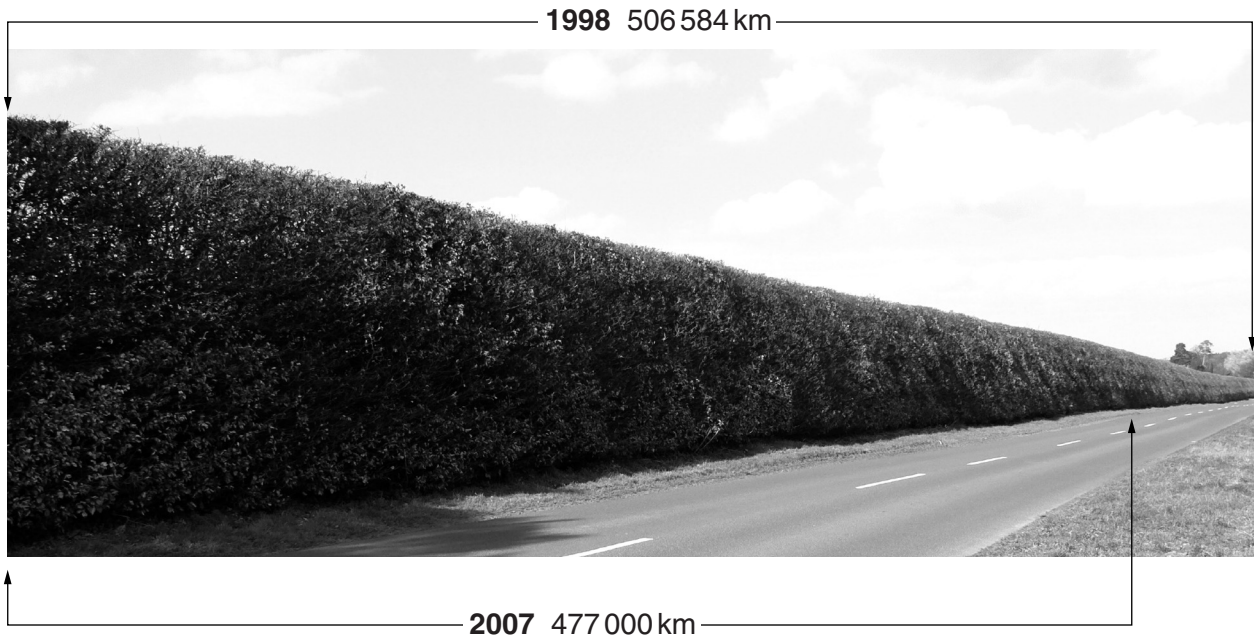
changes in European ecosystems between 1990 and 2006



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

- 1
 - 2
- [2]

13 The picture represents the total length of managed hedgerows in the UK in 1998 and 2007.



(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



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