

**Friday 16 June 2017 – Morning**

**GCSE ENVIRONMENTAL AND LAND-BASED SCIENCE**

**B681/02** Management of the Natural Environment (Higher Tier)

Candidates answer on the Question Paper.

**OCR supplied materials:**

None

**Other materials required:**

- Pencil
- Ruler (cm/mm)
- Calculator

**Duration:** 1 hour



|                       |  |                      |  |
|-----------------------|--|----------------------|--|
| Candidate<br>forename |  | Candidate<br>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. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

**INFORMATION FOR CANDIDATES**

- The quality of written communication is assessed in questions marked with a pencil (✎).
- 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 **50**.
- This document consists of **12** pages. Any blank pages are indicated.

Answer **all** the questions.

- 1 The land based industries are considered to have an important part to play in providing the country with sources of alternative energy.

Energy crops can be grown as a source of alternative energy.

Which of the following is the most likely reason why a land owner might choose to invest in energy crops?

- A Energy crops do not cause visual pollution.
- B Predicted profits for energy crops are higher than other crops.
- C Energy crops are 'carbon neutral'.
- D Energy production by energy crops is reliable.

Choose **A, B, C** or **D** ..... [1]

**[Total: 1]**

- 2 An understanding of the nitrogen cycle is important for farmers if they are to maximise yield.

Describe **two** ways in which the farmer could **increase** the amount of nitrogen which is available to plants.

1 .....

.....

2 .....

.....

**[2]**

**[Total: 2]**

3 (a) A commercial orchard is an example of an artificial ecosystem.

The biodiversity in this ecosystem will be different from a natural ecosystem.

Give **two** reasons for this difference

1 .....

.....

2 .....

.....

[2]

(b) A commercial orchard is a form of intensive production.

Give **three** environmental disadvantages of this intensive production.

1 .....

.....

2 .....

.....

3 .....

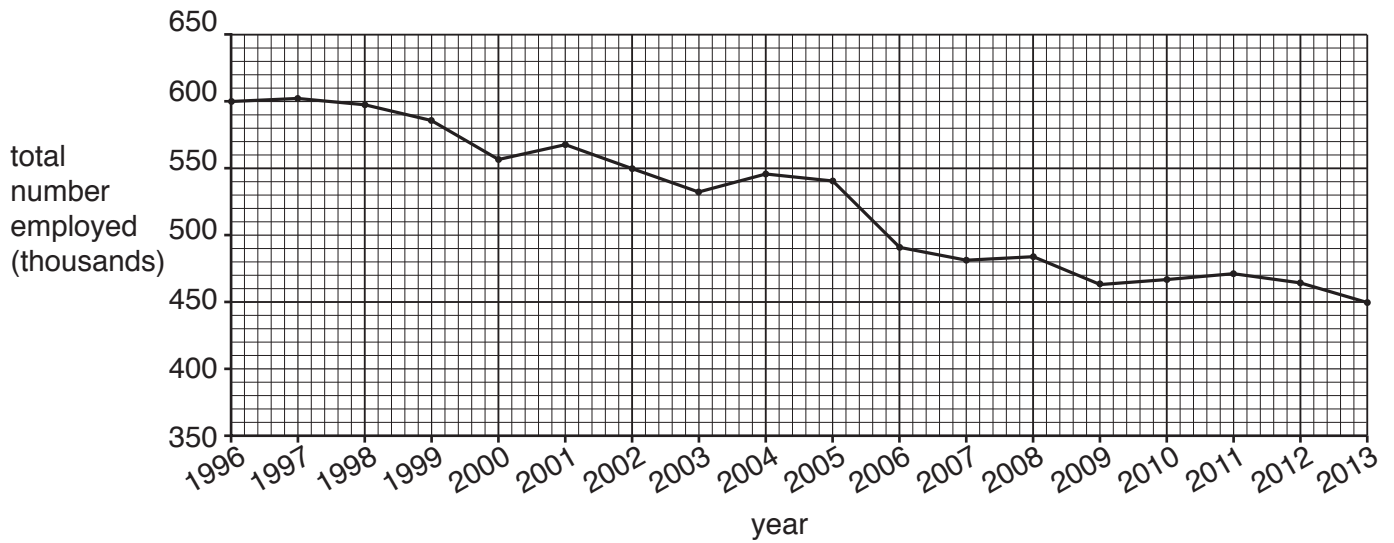
.....

[3]

[Total: 5]

- 4 The graph shows the total number of people employed on farms in the UK between 1996 and 2013.

**Total farm employment 1996–2013**



- (a) Calculate the percentage change in the number of people employed in farming between 1996 and 2013.

Show your working.

percentage change = ..... % [2]



- 5 A local conservation group keeps records on the number of water birds using its nature reserve. They use the information to monitor the changes in population in the short term and long term. Here are results for 2014.

| Species        | Sample size | % Change 2013–2014 | % Change 1995–2013 |
|----------------|-------------|--------------------|--------------------|
| Mute swan      | 255         | –6                 | 28                 |
| Greylag goose  | 215         | 34                 | 215                |
| Canada goose   | 492         | 25                 | 66                 |
| Shelduck       | 147         | 9                  | –9                 |
| Gadwall duck   | 39          | –26                | 99                 |
| Mallard duck   | 1329        | –1                 | 14                 |
| Tufted duck    | 157         | –22                | 32                 |
| Goosander duck | 41          | –20                | –19                |

- (a) Which species showed the greatest increase in numbers between 2013 and 2014?

..... [1]

- (b) Give **two** reasons why the conservation body might **not** be concerned about the change in Mallard duck numbers.

1 .....

.....

2 .....

.....

[2]

(c) Which bird species should the conservation body be **most** concerned about?

Using the data from the table, give reasons for your answer.

.....

.....

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 6]





7 Adding lime to a clay soil will change its pH, but it will also cause flocculation of the soil.

What is flocculation **and** how does it occur?

.....  
.....  
..... [2]

[Total: 2]

8 Which of the following are required by **all** soil organisms:

- A light and humus
- B light and water
- C oxygen and humus
- D oxygen and water

Choose **A, B, C** or **D** ..... [1]

[Total: 1]



10 Scientists are trialling a range of genetically modified (GM) crops.

A gene for herbicide tolerance has been introduced into crop plants.

This has been shown to increase yield by an average of 21%.

Some scientists think that they would get a similar increase in yield in this country if this characteristic was given to wheat.

(a) The current average wheat yield in the UK is 8.5 tonnes per hectare.

Calculate the yield for the new GM wheat.

Show your working.

yield = ..... tonnes per hectare [2]

(b) Describe how the 'herbicide tolerance' characteristic could be added to wheat.

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

(c) Other than herbicide tolerance, give **one** advantage and **one** disadvantage of growing a genetically modified (GM) crop.

advantage – .....  
.....  
disadvantage – .....  
.....

[2]

[Total: 7]

END OF QUESTION PAPER

**ADDITIONAL ANSWER SPACE**

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

A large rectangular area with a vertical solid line on the left side and horizontal dotted lines across the rest of the page, providing space for writing answers.



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