

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GCSE  
B681/02  
ENVIRONMENTAL AND LAND-BASED  
SCIENCE**

**Management of the Natural  
Environment (Higher Tier)  
FRIDAY 16 JUNE 2017: Morning  
DURATION: 1 hour  
plus your additional time allowance  
MODIFIED ENLARGED 24pt**

<b>Candidate forename</b>						<b>Candidate surname</b>				
<b>Centre number</b>						<b>Candidate number</b>				

**Candidates answer on the Question Paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Pencil**

**Ruler (cm/mm)**

**Calculator**

**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. 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.**

## **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.**

**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 \_\_\_\_\_  
\_\_\_\_\_

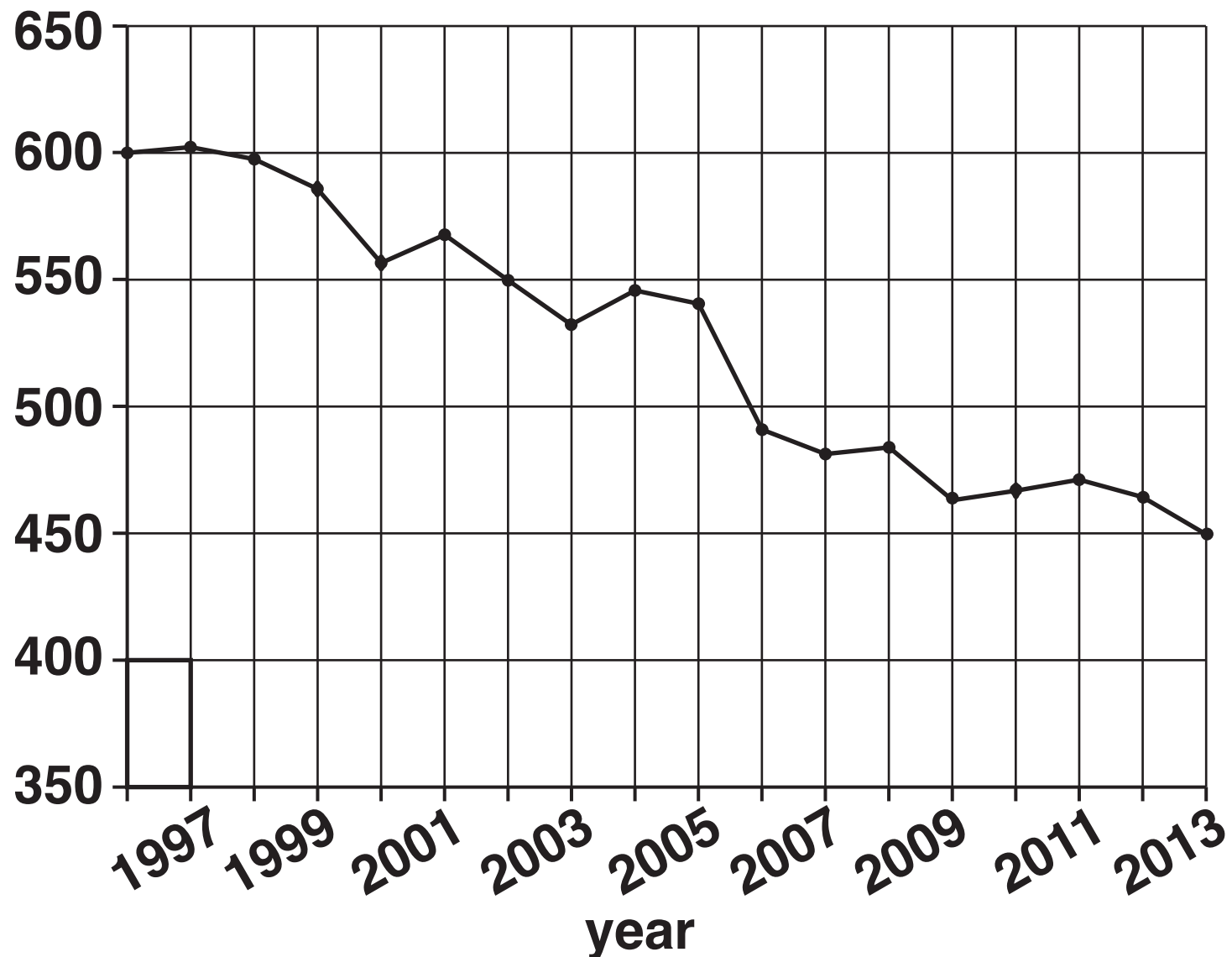
[3]

[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

total number  
employed (thousands)



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

Show your working.

percentage change = \_\_\_\_\_ % [2]

**(b) Official data shows that between 1996 and 2013 there was a slight increase in the amount of production (yield) on UK farms.**

**Explain how changes on farms might have made this possible.**



**The quality of written communication will be assessed in your answer to the question.**

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**[6]**

**(c) How might the changes in employment numbers affect the character of the countryside?**

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**[3]**

**[TOTAL: 11]**





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.**

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

**(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]**

**6 A company wants to open a quarry.**

**The company has submitted plans to the local authority.**

## Local residents are against these plans.

**As a local resident, outline your objections to the plan AND its impact on the local ecosystem.**



**The quality of written communication will be assessed in your answer to the question.**

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[6]

**[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?**

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**[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]**

- 9 (a) Changes to weather patterns in the UK have resulted in a change in the amount of rainfall.  
In some areas there may be a water shortage.**

**The land based industries are a major user of the country's water resource.**

**Describe ways in which the land based industries can use water more efficiently AND reduce the amount that is wasted.**



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[6]

**(b) Extreme weather conditions have also resulted in a number of communities experiencing flooding.**

**Give THREE ways in which the management or use of the land may help to prevent these problems from occurring.**

**1** \_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

**3** \_\_\_\_\_

\_\_\_\_\_

**[3]**

**[TOTAL: 9]**

**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.**

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**[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).**

[illegible]



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