

**Monday 14 January 2013 – Morning**

**GCSE ENVIRONMENTAL AND LAND-BASED SCIENCE**

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

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

**Duration:** 1 hour

**OCR supplied materials:**  
None

**Other materials required:**

- Pencil
- Ruler (cm/mm)



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**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**

- Your 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 **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Weed control is important for farmers and growers.

Mulching is used in some situations.

In addition to weed control, there are other advantages of using a mulch.

Which **two** of the following are possible advantages of using a mulch?

A pleasing decorative effect

B easy to transport

C cheap to buy

D reduces biodiversity

E retains water in soil

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

**2** Oysters are shell fish.

Wild oysters are harvested by trawling the seabed.

Commercial oyster farming happens in many areas of the UK.

In oyster farming, young oysters are grown-on in large net bags attached to posts in an estuary.

It is easier to collect the oysters from the bags rather than from the seabed.



Which **one** of the following is the best advantage of oyster farming?

- A** less damage to local seabeds
- B** less opportunity for predators to eat them
- C** less risk of diseases spreading in the oysters
- D** less visual pollution on an oyster farm

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

3 The Royal Horticultural Society set out a plan for vegetable plots based on a four-year crop rotation.

<b>Year one</b>	
plot 1:	Legumes
plot 2:	Brassicas
plot 3:	Potatoes
plot 4:	Onions and roots

<b>Year two</b>	
plot 1:	Brassicas
plot 2:	Potatoes
Plot 3:	Onions and roots
Plot 4:	Legumes

<b>Year three</b>	
Plot 1:	Potatoes
Plot 2:	Onions and roots
Plot 3:	Legumes
Plot 4:	Brassicas

<b>Year four</b>	
Plot 1:	Onions and roots
Plot 2:	Legumes
Plot 3:	Brassicas
Plot 4:	Potatoes

This system helps to reduce pest and disease problems.

Give **two** other reasons why these crops are grown in this order.

1 .....

.....

2 .....

.....

[2]

- 4 Under the Environmental Stewardship Scheme, farmers often leave uncultivated margins around the edges of their fields.

These margins are not sprayed with chemicals such as pesticides or herbicides.

Suggest why field margins are encouraged under the Environmental Stewardship Scheme.

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.....

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..... [2]

5 A farm park has just purchased a new bull.

The previous owner says that the bull is very placid and likes people.

The new owners plan to allow the public to see the bull.



Complete a risk assessment for this situation.

One example has been done for you.

<b>Hazard</b>	<b>Level of risk high (3), medium (2), low (1)</b>	<b>Likelihood of happening high (3), medium (2), low (1)</b>	<b>Risk rating (level × likelihood)</b>	<b>Action needed</b>
Public climb into field	2	2	4	Signs, better fencing

[4]

- 6 Approximately 8% of the land area in the UK is designated as Sites of Special Scientific Interest (SSSI).

This designation puts certain responsibilities on the landowner.

Outline **three** responsibilities of the landowner with an SSSI.

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..... [3]

7 Many farmers grow crops which are converted into biofuels for use by cars and lorries.

Oilseed rape is one crop widely used for biofuels.

Describe the **advantages** and **disadvantages** of farmers growing oilseed rape for biofuels.

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..... [3]



8 Egg production in the UK is a mixture of different production systems.

Production system	Percentage of egg-laying hens (%)	Costs of production in pence per dozen	Stocking density in hens per m <sup>2</sup>
Caged	50	62.3	13.3
Barn	5	69.9	9.0
Free Range	45	84.7	0.25

Sales data from last year shows:

Total value of all eggs sold: £868 million

Total numbers of eggs sold: 933 million dozen.

(a) What is the average selling price for a dozen eggs?

Answer ..... [1]

(b) How much profit per dozen will a farmer using the caged bird system achieve at this average price?

Answer ..... [1]

(c) Imagine that the government decided that all production of eggs would be 'free range'.

What effect would this have on the economics of egg production in the UK?

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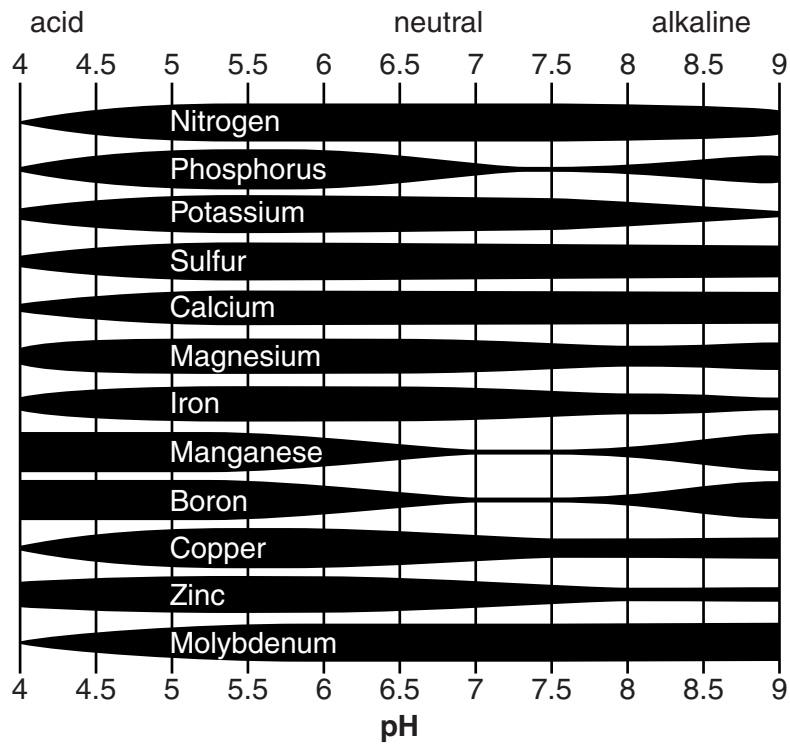
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..... [3]

9 The pH of a soil affects the availability of minerals for plant growth.



**Note:** the thicker the bar the greater the availability of each mineral at different pH values

A clay soil has a pH of 5.5.

(a) Compare the availability of nitrogen and manganese when lime is added to this soil.

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

(b) Other than pH and the availability of minerals, describe **one other** effect the addition of lime might have on this soil.

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

(c) At which pH value is there maximum availability of minerals for plants?

..... [1]

10 Water can be recycled for use in commercial glasshouses.

The quality of the recycled water is important.

The table shows the results of some research on recycled water.

Suitability for irrigation	Total soluble salts in ppm	Sodium (Na <sup>+</sup> ) content of total soluble salts (%)	pH
excellent	175	20	6.5
good	175 – 525	20 – 40	6.5 – 6.8
permissible	525 – 1400	40 – 60	6.8 – 7.0
doubtful	1400 – 2100	60 – 80	7.0 – 8.0
unsuitable	>2100	>80	>8.0

(a) What is the relationship between the suitability of water for irrigation and the salt content of the water?

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

(b) Describe problems which might arise from using recycled water for irrigating crops.

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

11 Agricultural machinery can have a major effect on the soil and the environment.

Describe **three** design features that manufacturers have incorporated into machines to reduce the impact made on the environment.

1 .....

2 .....

3 .....

[3]

12 The picture shows a living windbreak at the edge of an apple orchard.

Apple growers will often include a windbreak in their planting plan.



Describe the **advantages** and **disadvantages** of including windbreaks in the plan for an orchard.



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

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[6]

- 13 An ecologist wants to study one species of wild flower in a meadow.

Sometimes it is not possible to measure the whole population due to cost or other practical issues.

Describe the process that would be carried out to estimate the population of a wild flower species in a meadow.



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

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..... [6]



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