

Wednesday 30 May 2012 – Afternoon

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.

OCR supplied materials:
None

Other materials required:

- Pencil
- Ruler (cm/mm)

Duration: 1 hour



Candidate
forename

Candidate
surname

Centre number

Candidate number

MODIFIED LANGUAGE

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 The photographs show two different landscapes.

landscape **A**
moorland



landscape **B**
golf course



- (a) A scientist concludes that landscape **B** has a lower biodiversity than landscape **A**.

Put ticks (✓) in the boxes next to the **two** most likely reasons for the scientist's conclusion.

Artificial ecosystems have fewer habitats.

☐

Golf courses use a lot of herbicides.

☐

Golf courses use high levels of irrigation.

☐

Golf buggies produce high levels of pollution.

☐

Grass is a poor food source for animals.

☐

Moorland soils are acidic.

☐

Recreation is bad for biodiversity.

☐

[2]

(b) A scientist stated that landscape **B** is likely to have more fertile soil than landscape **A**.

Put a tick (✓) in the box next to the most suitable reason for this statement.

Golf courses are often built on reclaimed land.

☐

Golf courses use high levels of irrigation.

☐

Golf courses use large quantities of artificial fertiliser.

☐

Grass is kept short through regular mowing.

☐

Soil is compacted by trampling.

☐

[1]

- 2 There is a difference between preservation and conservation.

Explain the difference between preservation and conservation in relation to the natural environment.

.....

.....

..... [2]

- 3** Jersey Royal potatoes are a protected variety that can only be grown on the Island of Jersey.

(a) A website states the following facts:

Jersey has an annual agricultural production of £50 million.

The annual value of Jersey Royal potato production is £35 million.

99% of Jersey Royal production is sold in the UK.

- (i)** Calculate the percentage contribution of Jersey Royal potatoes to Jersey's total annual agricultural production.

A 30%

B 66%

C 70%

D 74%

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

- (ii)** Calculate the value of Jersey Royal production sold in the UK.

Answer £ million [1]

(b) The DEFRA website contains the following description of this variety of potato.

Jersey Royal Potatoes have been produced exclusively on the island for over 100 years. The sheltered nature of the island and rapidly warming soils mean crops can be grown earlier than anywhere else in the British Isles.

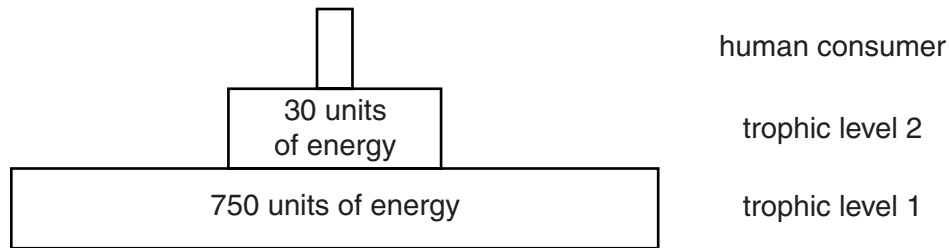
Using this information and your knowledge of soil science, predict the soil type the potatoes are grown in.

Justify your prediction.

.....

 [2]

- 4 The diagram shows a pyramid of energy for a production system on a farm.



- (a) Which **one** of the following crops or products is at **trophic level 2**?

Put a **ring** around your answer.

beef oil seed rape tomatoes wheat

Give a reason for your answer.

.....
 [1]

- (b) Work out the percentage of the energy in trophic level 1 that is transferred to trophic level 2.

Show your working.

Answer % [2]

- (c) Explain why energy is lost as it is transferred from trophic level 1 to trophic level 2.

.....

 [2]

- (d) Explain how the transfer of energy between trophic level 1 and trophic level 2 could be made more efficient.

.....
 [1]

- 5** Slurry is a liquid fertiliser composed of animal dung and urine.

Slurry is an important alternative to inorganic fertiliser.

Farmers can save a lot of money using slurry if it is applied at the right time and in the right place.

- (a)** A case study produced by the Environment Agency shows that a saving of 40% can be made on fertiliser cost by applying slurry to the land.

A farmer spends £250 per hectare per year on inorganic fertiliser.

How much will the farmer save per hectare per year by changing to the use of slurry?

Answer [1]

- (b)** A farmer has decided to use slurry to save money.

The farmer must carry out a risk assessment to identify risks to the environment and to the farm workers, before he uses slurry.

Complete the table for three of these risks.

risk assessment

risk	effect of failure to control risk	recommended action to reduce risk

[3]

- (c)** The farmer has carried out a cost review and a risk assessment on the use of slurry on the farm.

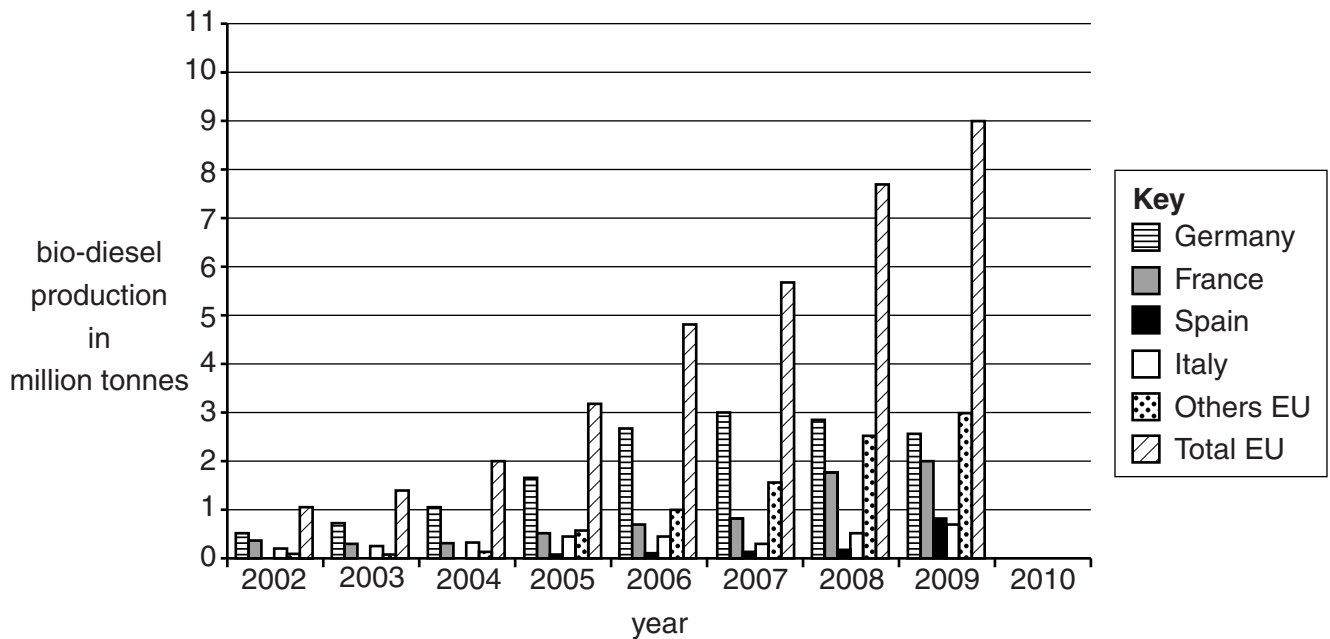
The farm is in a 'nitrate sensitive area' (NSA).

Suggest how NSA regulations may affect the use of slurry on the farm.

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 [2]

6 The bar chart shows the production of bio-diesel by countries within the European Union (EU).



(a) Use the bar chart to estimate what the total EU bio-diesel production was in **2010**.

Answer million tonnes [1]

(b) Describe the trends in bio-diesel production in **Germany** between 2002 and 2009.

Suggest reasons for these trends.

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..... [4]

(c) (i) How many million tonnes of bio-diesel did the EU produce in 2004?

A 0.2

B 0.4

C 1.1

D 2.0

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

(ii) The EU production of bio-diesel in 2004 required 2.6 million hectares of arable land.

It is predicted that to meet demand in 2020, the total EU production of bio-diesel will need to be 25 million tonnes.

Calculate how much land would be needed to meet the demand for bio-diesel in 2020.

Answer [1]

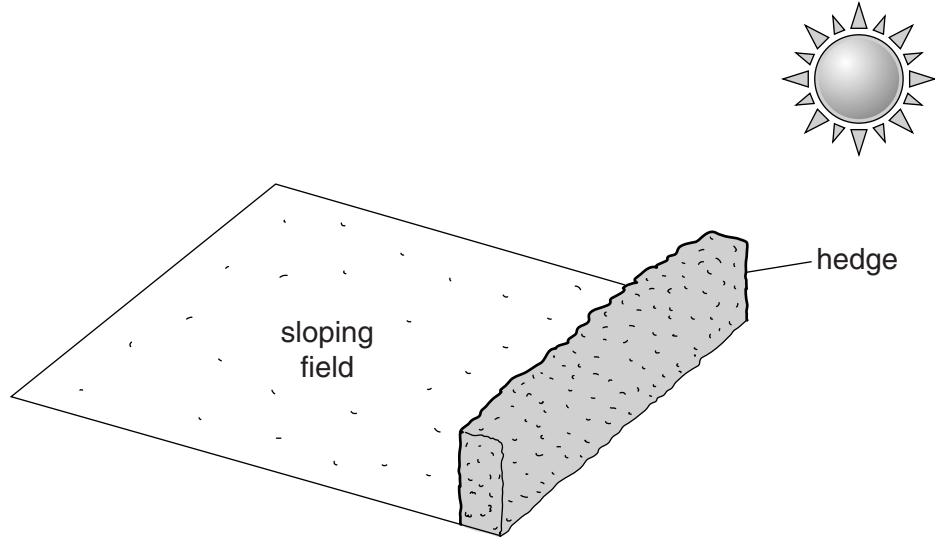


[6]

- 8 A land owner has a grant to plant a new hedge at the bottom of a sloping field.

The position of the hedge is shown on the diagram.

The field is normally used for growing crops.



Suggest and explain **two** effects the positioning of the hedge may have on future crop growth.

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..... [4]

- 9 It has been estimated that 70% of the worldwide consumption of fresh water is used for agriculture.

This is of concern to scientists as it is predicted that supplies of fresh water will be limited in future years.

A vegetable producer in the UK wants to reduce the amount of water used for irrigation.

Describe and explain changes that could be made to reduce water use, without changing the crops grown.



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

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..... [6]

- 10 Farmers use large machines as they are more cost effective.

The use of large machines affects the soil.

Describe how manufacturers and farmers can reduce the effects on the soil of using large machines.

Explain why it is important to reduce these effects.



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

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..... [6]

END OF QUESTION PAPER

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