

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
ENVIRONMENTAL AND LAND-BASED SCIENCE**

H B493/02

Management of the Natural Environment

HIGHER TIER

FRIDAY 25 MAY 2007

Afternoon

Time: 45 minutes

Calculators may be used.

Additional materials: Pencil
Ruler (cm/mm)



* C O P / T 3 5 2 5 *

Candidate
Name

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Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**
- There are no separate marks for the quality of written communication, but make sure that your answers are written in clear and well-structured English.

INFORMATION FOR CANDIDATES

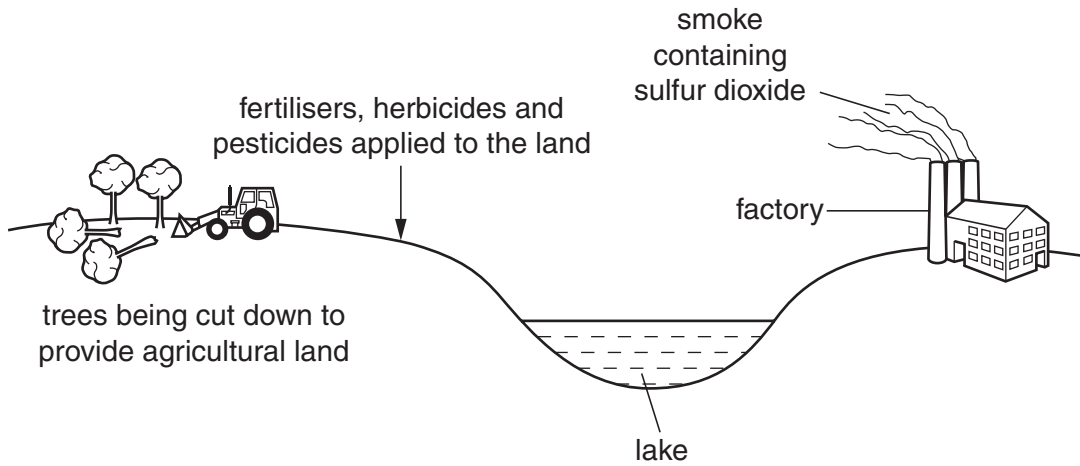
- The number of marks for each question is given in brackets [] at the end of each question or part question.
- The total number of marks is 36.

FOR EXAMINER'S USE		
		Mark
TOTAL	36	

This document consists of **14** printed pages and **2** blank pages.

Answer **all** the questions.

1 The diagram shows an area being developed for agriculture and for industry.



Which **one** of the following is most likely to cause an increase in plant growth?

- A fertilisers
- B herbicides
- C pesticides
- D smoke

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

2 A green belt is an area around towns where building is restricted to protect the environment from urban development.

Who can overturn these restrictions?

- A the county council
- B the government
- C the local council
- D the parish council

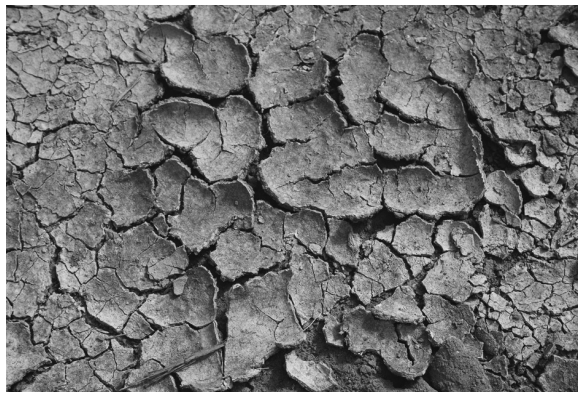
Answer **A, B, C or D** [1]

3 Which is **not** a renewable and sustainable source of energy on farms?

- A burning straw to heat water for the farm house
- B growing oil seed rape to make bio diesel for the tractor
- C using manure to produce methane for heating animal houses
- D using a natural gas heater to sterilise dairy equipment

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

4 The photograph shows cracks in a type of soil. These cracks appeared after a period of dry weather.



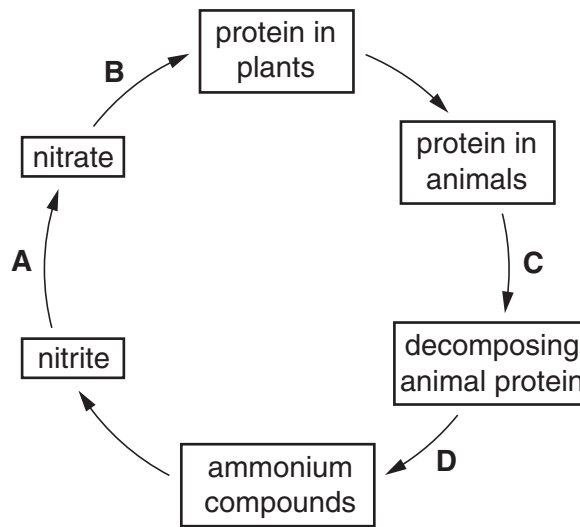
© iStockphoto / John Sigler

Which type of soil is shown in the photograph?

- A clay soil
- B humus-rich soil
- C loam soil
- D sandy soil

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

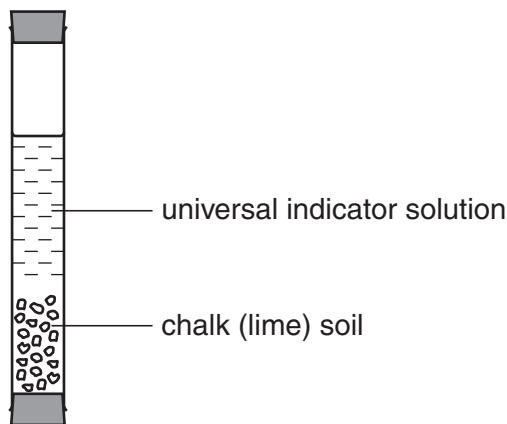
5 The diagram shows part of the nitrogen cycle.



Which arrow, **A**, **B**, **C** or **D**, represents nitrification?

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

6 The drawing shows a completed soil test on a sample from a chalk (lime) soil.



What colour would the universal indicator solution be?

Circle the correct answer.

dark blue

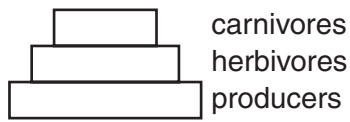
blue-green

dark red

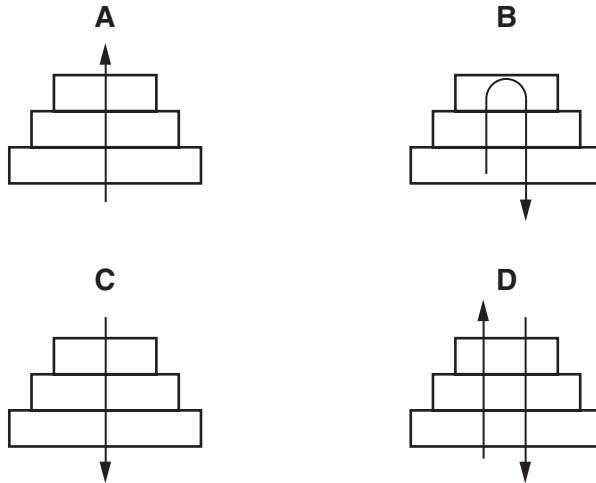
pale yellow

[1]

7 The diagram represents a pyramid of biomass within a food web.



Which pyramid shows the correct direction of energy flow through the food web?



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

8 Plants need nutrients from the soil.

Look at the table.

The shaded areas show the soil pH range at which each nutrient is readily available.

nutrients	pH	4.0	5.0	6.0	7.0	8.0	9.0	10.0
sulfur								
calcium								
potassium								
phosphorus								
nitrogen								

Why are nutrients sometimes unavailable in acid soils?

- A** They become insoluble.
- B** They combine with lime.
- C** They dissolve in acid.
- D** They leach away at high pH.

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

9 Farmers are given grants for conservation of the environment.

Which of the following best describes conservation?

- A** changing the environment
- B** managing the environment
- C** preserving the environment
- D** supporting the environment

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

7
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PLEASE DO NOT WRITE ON THIS PAGE

10 The picture shows a tractor that is in use on farms today.

Farm machinery is larger and more powerful than it was 20 years ago.



© OCR

(a) The use of heavy machinery has an impact on the environment.

Describe **two** possible effects that the use of heavy machinery might have on the soil.

.....

.....

.....

..... [2]

(b) The photograph shows a large tractor fitted with special tyres.



© OCR

Explain how these tyres help reduce damage to the soil.

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

(c) The photograph shows a tractor fitted with a large spray boom.



© iStockphoto.com/Arpad Benedek

Explain how using such a large spray boom helps reduce damage to the soil.

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

- 11 The picture shows two students doing field work on a rocky seashore in summer. The students must complete a risk assessment before starting work.



© OCR

Suggest **two** possible hazards when doing field work on a rocky shore in summer.

For each hazard, suggest a control measure to reduce the risk.

Put your answers in the table below.

hazard	control measure

[4]

12 (a) The picture shows a polytunnel which uses ICT to control the temperature of the internal environment.



© OCR

Heat captured during the day is collected and re-circulated around the polytunnel at night.

Explain how the use of ICT systems in polytunnels has environmental benefits.

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

(b) This information is taken from an advertisement for a polytunnel

- Each polytunnel measures 42m x 15m.
- Two tunnels produce the same amount of crops as 1 hectare of land.
- The double skinned tunnels are sealed and sterilised so no pesticides are needed.
- Because the crops have ideal conditions their productivity is high.
- Salad plants can be harvested in only 40 days.
- Exotic crops, usually imported, can be grown in these conditions.

Suggest **two** implications this intensive system might have for the environment, including local urbanisation and leisure.

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

13 'Rootmore' is an organic product that helps plant growth.

It contains a fungus which lives in the roots and acts as extra root hairs.

The table shows the results of an experiment on leeks using 'Rootmore'.

	untreated leeks	leeks treated with 'Rootmore'	percentage difference (%)
average length (cm)	13.1	14.7	+12
average circumference (cm)	6.5	8.1	
average mass (g)	137.0	163.0	+19

(a) Why is 'Rootmore' classed as organic?

.....
 [1]

(b) Calculate the missing percentage difference of the **circumference** at harvest.

Choose the correct answer from the list below.

- A 2.5%
- B 14.6%
- C 24.6%
- D 124.6%

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

(c) Another way of recording how well the leeks have grown is to grade them using a scale of 0 - 5:

0 = very poor

5 = excellent

Comment on this method of assessment compared with the methods used to collect the data shown in the table.

.....

 [2]

- (d) The experiment was carried out by gardeners throughout the country. The leeks were grown in field conditions during the summer of 2003.

Describe and explain **two** factors that had to be controlled to help make the experiment a fair test.

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

- 14 Scientists have produced strains of GM (genetically modified) crop plants.

- (a) How do **genetically modified** crops differ from traditional crops?

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

- (b) Describe **one** environmental concern that people have about growing GM crops.

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

- 15 Explain the possible environmental consequences of applying excess chemical fertilisers.

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..... [3]

16 'Knowledge of science improves food production'.

Use an example to support this statement.

.....

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.....

..... [3]

END OF QUESTION PAPER

15
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