

<b>Candidate Forename</b>		<b>Candidate Surname</b>	
---------------------------	--	--------------------------	--

<b>Centre Number</b>						<b>Candidate Number</b>				
----------------------	--	--	--	--	--	-------------------------	--	--	--	--

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B493/02**

**ENVIRONMENTAL AND  
LAND-BASED SCIENCE**

**Management of the Natural Environment  
(Higher Tier)**

**WEDNESDAY 26 MAY 2010: Morning**

**DURATION: 45 minutes**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**Candidates answer on the Question Paper**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Electronic calculator**

**Pencil**

**Ruler (cm/mm)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully and make sure that you know what you have to do before starting your answer.**
- **Answer ALL the questions.**
- **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).**

## **INFORMATION FOR CANDIDATES**

- **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 36.**

**Answer ALL the questions.**

- 1 A group of students are going to carry out a fieldwork exercise.**

**A RISK ASSESSMENT is always needed before students do any fieldwork in school.**

**The risk assessment states that:**

**‘FIELDWORK SHOULD BE CARRIED OUT IN GROUPS OF TWO OR THREE PUPILS’.**

**Why is this instruction included?**

- A pupils can exchange information**
- B there is less habitat disturbance**
- C there is safety in numbers**
- D the work can be done more quickly**

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

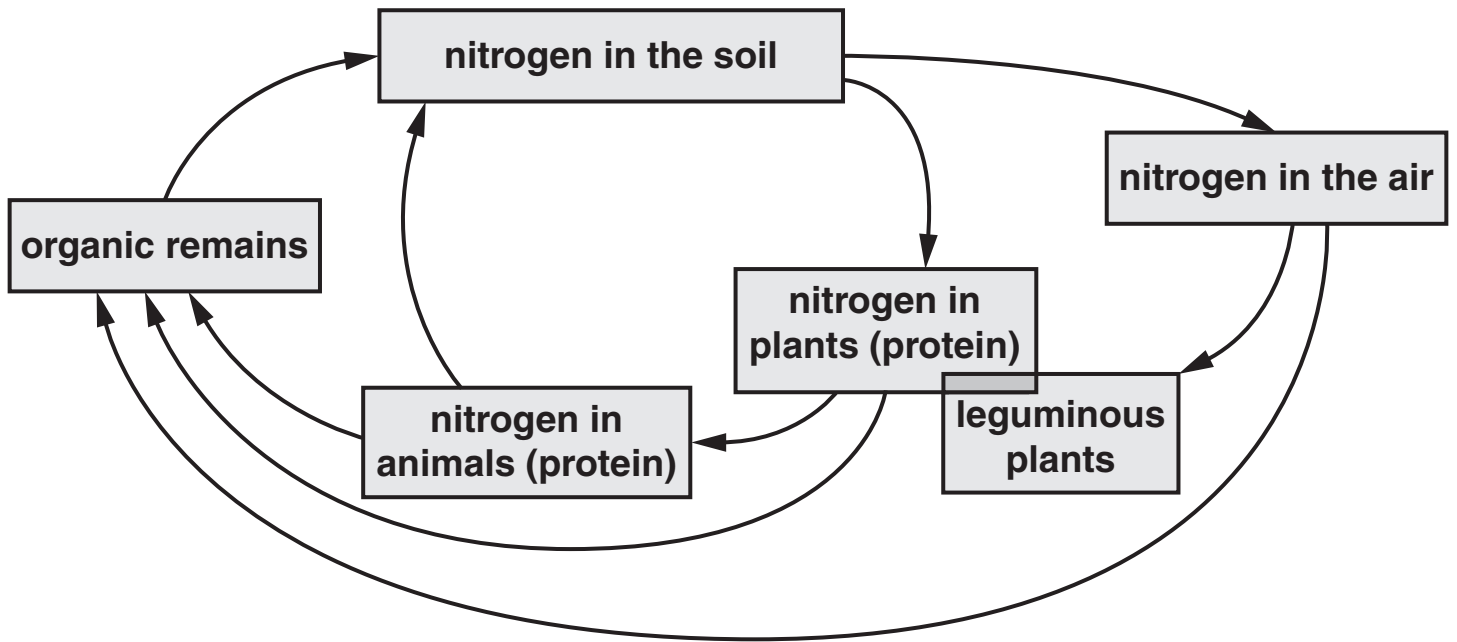
**2 Food can be produced from GM (genetically modified) crops.**

**Why might growing these crops cause long term harm to the environment?**

- A GM pollen might affect the air quality.**
- B GM crops might invade the hedgerows.**
- C GM crops might cause visual pollution.**
- D GM crops might breed with wild species.**

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

**3 The diagram shows part of the nitrogen cycle.**



**Place D on the part of the diagram that represents the process of DECAY.**

**Place F on the part of the diagram that represents the process of NITROGEN FIXATION.**

**Make sure the D and the F are clearly visible. [2]**

#### 4 Coastlines are always changing.

The shingle spit at the coastal town of Chichester and the chalk cliffs at the top of the beach at Beachy Head are two coastal landmarks in Sussex.

The possible CAUSES OF CHANGE and the PROCESSES INVOLVED are listed below.

<u>CAUSE OF CHANGE</u>	<u>PROCESS INVOLVED</u>
chemical action	deposition
tidal action	erosion
wave action	precipitation
wind action	suspension

Write the correct CAUSE OF CHANGE and the correct PROCESS INVOLVED for each landmark.

Choose from the lists above.

#### SHINGLE SPIT, CHICHESTER

cause of change \_\_\_\_\_

process involved \_\_\_\_\_

#### CHALK CLIFFS, BEACHY HEAD

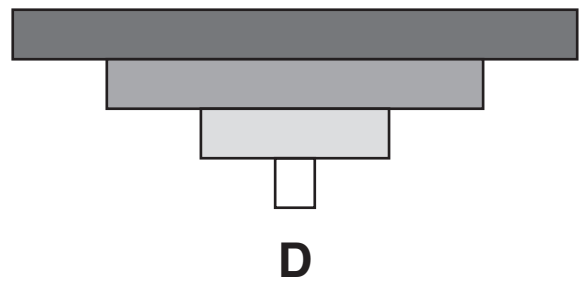
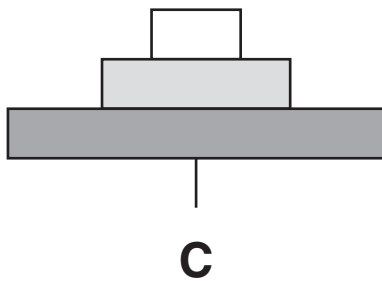
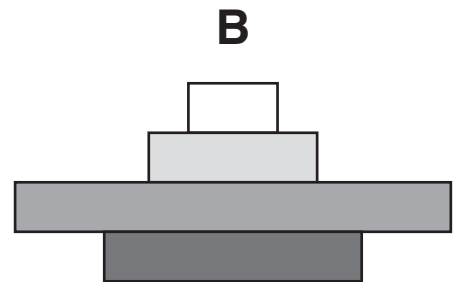
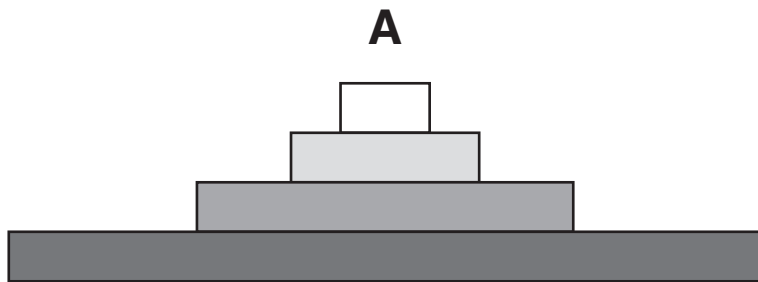
cause of change \_\_\_\_\_

process involved \_\_\_\_\_

[2]

5 Below are four ecological pyramids.

One represents a PYRAMID OF NUMBERS for oceans, lakes and grassland.



Which diagram represents the pyramid of numbers for oceans, lakes and grassland?

Answer A, B, C or D \_\_\_\_\_ [1]

**6 The photograph shows a UK ecosystem.**



**Which ecosystem is illustrated by the photograph?**

- A coniferous woodland**
- B deciduous woodland**
- C ley grassland**
- D lowland heathland**
- E moorland**

**Answer A, B, C, D or E \_\_\_\_\_ [1]**



**7 Nitrate fertiliser can leach into rivers causing EUTROPHICATION.**

**The stages in eutrophication are**

- **algae are encouraged to grow (green slime)**
- **when the algae die microbes break them down**
- **this uses up oxygen**
- **fish and other organisms that need oxygen then die.**

**River authorities test water quality so eutrophication can be controlled.**

**Nitrate-testing requires taking water samples and carrying out tests in labs.**

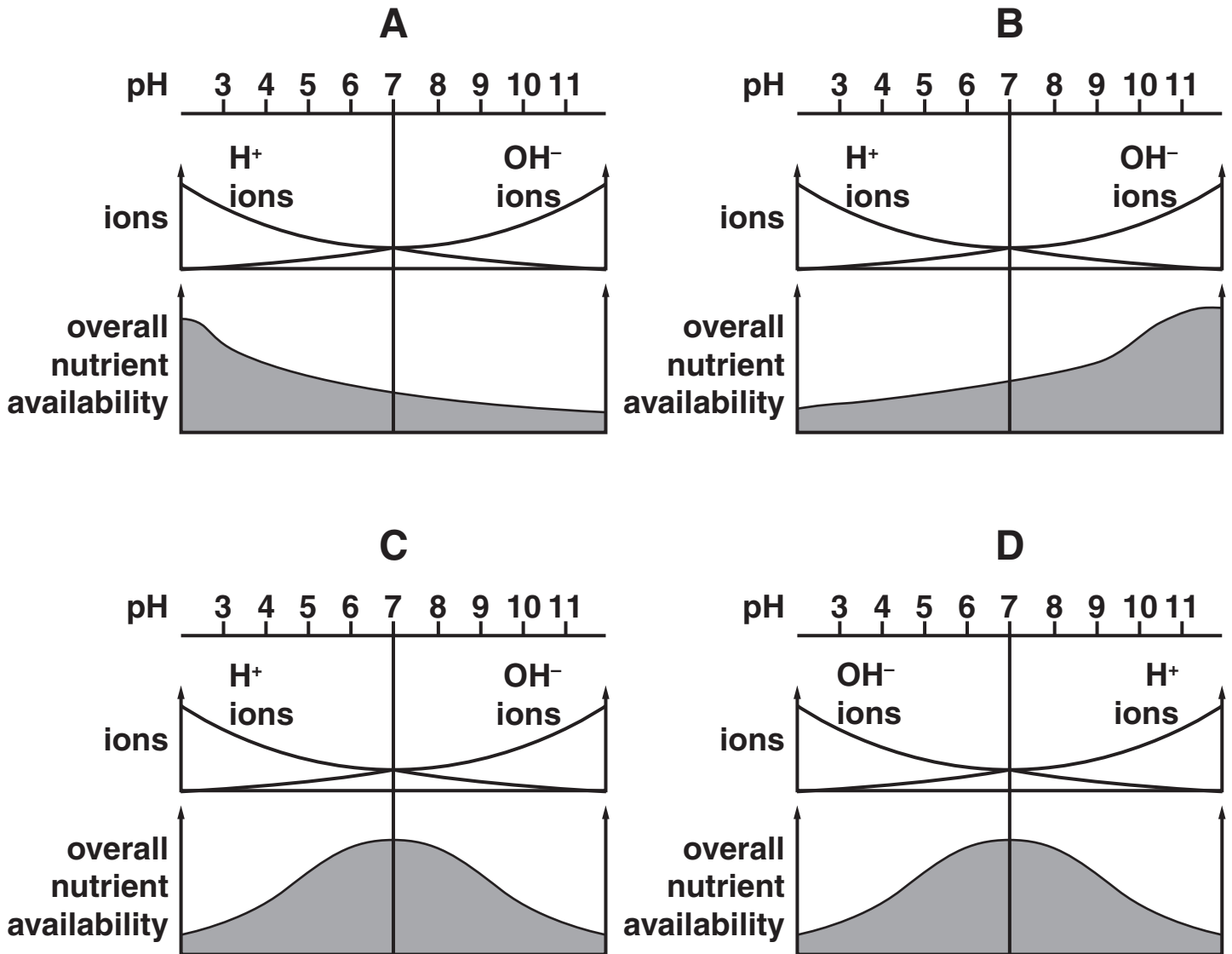
**ICT, using probes, can give immediate indications of river conditions.**

**Which probe should be used to give EARLY SIGNS of eutrophication?**

- A water clarity probe**
- B oxygen probe**
- C pH probe**
- D temperature probe**

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

8 The diagrams show the relationship between pH, the concentration of two ions and the overall nutrient availability.



Which of the diagrams shows the correct relationship between pH, ions and the availability of nutrients to plants?

Answer A, B, C or D \_\_\_\_\_ [1]

**9 Slugs are a garden pest.**

**They can be controlled by putting down a poisonous bait.**

**(a) Suggest an environmental risk of controlling slugs by poisonous bait.**

---

---

[1]

**(b) Suggest how the gardener can reduce this risk when using poisonous bait.**

---

---

[1]

10 Here is an advert for 'Slug Gone'.

## **Slug Gone**

**ENVIRONMENTALLY FRIENDLY**  
multi purpose **GrowAid** pure wool pellets  
ideal for organic gardening

have the big advantage of ...

- 100% natural goodness
- rich organic source of nitrogen
- soil conditioner
- wool pellet blanket will not blow away
- safe for animals and children

**GrowAid**

**It is a natural method for the control of slugs and weeds.**

**Pellets made of wool fibre are put on the ground around plants.**

**The pellets absorb water and form a 'carpet' layer on the soil surface.**

**The wool fibres irritate the slug's 'foot' so the slug does not go near the plant.**

**(a) Explain why 'Slug Gone' can be called 'organic'.**

\_\_\_\_\_ [1]  
\_\_\_\_\_

**(b) Explain how 'Slug Gone' controls weeds around the plant.**

\_\_\_\_\_ [1]  
\_\_\_\_\_

**11 The photographs show a gorse bush and a close up of some of its branches.**



**Gorse grows on heaths, moorland and on exposed cliff tops.**

**State ONE adaptation it shows to living in EXPOSED places and explain how this is beneficial.**

**adaptation to exposed place \_\_\_\_\_**

\_\_\_\_\_

**benefit to plant \_\_\_\_\_**

\_\_\_\_\_ [2]

## 12 Parakeets

- were brought to England from India
- have escaped from captivity
- are very common in southern England
- live in parks and woods
- live on a diet of fruit, berries, nuts and seeds

Explain TWO ways the parakeets could upset the present balance of species in parks and woods.

---

---

---

[2]

13 Tyres recommended for use on heavy machinery are designed to avoid compaction of the soil. They have shallow treads and are wide.

Write down one other feature of this type of tyre which will help to reduce compaction.

---

[1]

## 14 Soil can be classified by mineral particle size.

A key can be used to identify soils by mineral particle size.

For example:

- |   |   |         |
|---|---|---------|
| 1 | mineral particle less than 0.002 mm             | clay    |
|   | mineral particle more than 0.002 mm             | go to 2 |
| 2 | mineral particle over 2.0 mm                    | gravel  |
|   | mineral particle between 2.0 mm<br>and 0.002 mm | sand    |

Different percentages of mineral particles give soils different textures.

These textures can be recognised by touch, feel and sight.

Farmers sometimes need to identify soil types without using any equipment.

Construct a simple key, similar to the one above, which could be used to identify soil samples from their TEXTURE as clay, gravel, or sand.

[3]

15 The Countryside Stewardship Scheme requires that farm hedges are cut only from October to March.

The table compares FARM TYPES and when their HEDGES ARE CUT.

FARM TYPE	PERCENTAGE OF HEDGES CUT			
	JAN– MARCH	APRIL– JUNE	JULY– SEPT	OCT– DEC
cereals	37	0	20	43
other crops	39	1	19	41
pigs & poultry	33	3	13	51
dairy	26	0	23	51
sheep	30	1	13	56
mixed	36	0	15	49

Choose from the list below to answer the following questions.

CEREALS

OTHER CROPS

PIGS & POULTRY

DAIRY

SHEEP

MIXED

(a) Which farm type has the highest record of cutting hedges OUTSIDE the required period?

\_\_\_\_\_ [1]



**(b) The Countryside Stewardship Scheme recommends that farm hedges be cut every 2 or 3 years.**

**The table compares FARM TYPES and the FREQUENCY OF HEDGE CUTTING.**

FARM TYPE	PERCENTAGE OF HEDGES CUT			
	TWICE A YEAR	ONCE A YEAR	ONCE EVERY 2 OR 3 YEARS	NEVER
cereals	2	26	60	12
other crops	1	26	52	12
pigs & poultry	0	37	46	17
dairy	0	46	44	10
sheep	1	41	35	23
mixed	1	41	47	11

**Which TWO farm types have a higher percentage of hedges cut once a year than the recommended once every 2 or 3 years?**

\_\_\_\_\_ and \_\_\_\_\_ [1]

16 The table compares FARM SIZE and WHEN THEIR HEDGES ARE CUT.

		PERCENTAGE OF HEDGES CUT			
FARM SIZE	NUMBER OF FARMS IN SAMPLE	JAN–MARCH	APRIL–JUNE	JULY–SEPT	OCT–DEC
large	496	32	0	20	48
medium	235	27	1	17	55
small	607	35	1	16	48
<b>ALL FARMS</b>	<b>1338</b>	<b>33</b>	<b>1</b>	<b>17</b>	<b>49</b>

(a) Which farm size has the highest NUMBER of farms that cut hedges in the Oct–Dec period?

Show how you get your answer.

---

[1]

(b) The table compares **FARM SIZE** and the **FREQUENCY OF HEDGE CUTTING**.

FARM SIZE	NUMBER OF FARMS IN SAMPLE	PERCENTAGE OF HEDGES CUT			
		TWICE A YEAR	ONLY ONCE A YEAR	ONCE EVERY 2 OR 3 YEARS	NEVER
large	501	1	35	55	9
medium	240	0	40	49	11
small	625	2	37	44	18
<b>ALL FARMS</b>	<b>1366</b>	<b>1</b>	<b>37</b>	<b>49</b>	<b>?</b>

What percentage of ALL FARMS never cut their hedges?  
 Show your working.

\_\_\_\_\_ [1]

**17 Animals are adapted to the ecosystems in which they live.  
If their ecosystem changes they do not survive well.**

**Look at the table opposite.**

**(a) Using the data in the table suggest which mammal is most at risk during the NEXT 25 years.**

**Explain your answer.**

\_\_\_\_\_ [1]  
\_\_\_\_\_

**(b) Which of these mammals was the most common 25 years ago?**

**Show how you get your answer.**

\_\_\_\_\_ [1]

				<b>MAIN REASON FOR DECLINE</b>	
<b>MAMMAL</b>	<b>POPULATION IN 2010</b>	<b>PERCENTAGE DECLINE IN UK BETWEEN 1985 AND 2010</b>	<b>HABITAT LOSS</b>	<b>COMPETITION WITH SIMILAR SPECIES</b>	
harvest mouse	1.4 million	71	✓		
hazel dormouse	45 000	3	✓		
hedgehog	1.3 million	21	✓		
mountain hare	442 000	13		✓	
red squirrel	121 000	64		✓	
water vole	875 000	88		✓	

**18 Sunflowers can be cultivated in two ways, monoculture cultivation or mixed cultivation.**

**Define 'monoculture' and describe TWO effects it has had on the landscape.**

**definition** \_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_ **[3]**

**19 This is an advert for tackling climate change while providing fuel for a growing population.**

**At Shell we know how to think creatively.....**

**fuel from straw**

**fuel from woodchips**

**fuel from algae**

**fuel from hydrogen**

**energy from wind-farms**

**energy from coal gasification**

**Select ONE of the ideas from the list and state TWO reasons why it might help solve the problem.**

**idea** \_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_ [2]

**20 Beavers are medium sized mammals living in streams.**

**Beavers used to live wild in the UK.**

**They**

- **provided skin for fur coats.**
- **were classed as fish so could be eaten on Fridays.**
- **were hunted to extinction in the 1500's.**
- **are herbivores, eating mainly leaves and bark from trees that they cut down with their large teeth.**

**Defra plan to allow the introduction of beavers into several sites in the UK.**

**Should they be reintroduced? Argue the case for OR against.**

---

---

---

---

---

---

---

---

---

---

**[3]**

**END OF QUESTION PAPER**



**BLANK PAGE**

**BLANK PAGE**

**BLANK PAGE**



## **Copyright Information**

**OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website ([www.ocr.org.uk](http://www.ocr.org.uk)) after the live examination series.**

**If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.**

**For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.**

**OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.**