

# Specimen Paper

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Secondary Education  
Foundation Tier

## Science A

Unit Biology B1

## Biology 1F

# F

## Biology

Unit Biology B1

**For this paper you must have:**

- a ruler.

You may use a calculator.

### Time allowed

- 60 minutes

### Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 13 should be answered in continuous prose.  
In this question you will be marked on your ability to:
  - use good English
  - organise information clearly
  - use specialist vocabulary where appropriate.

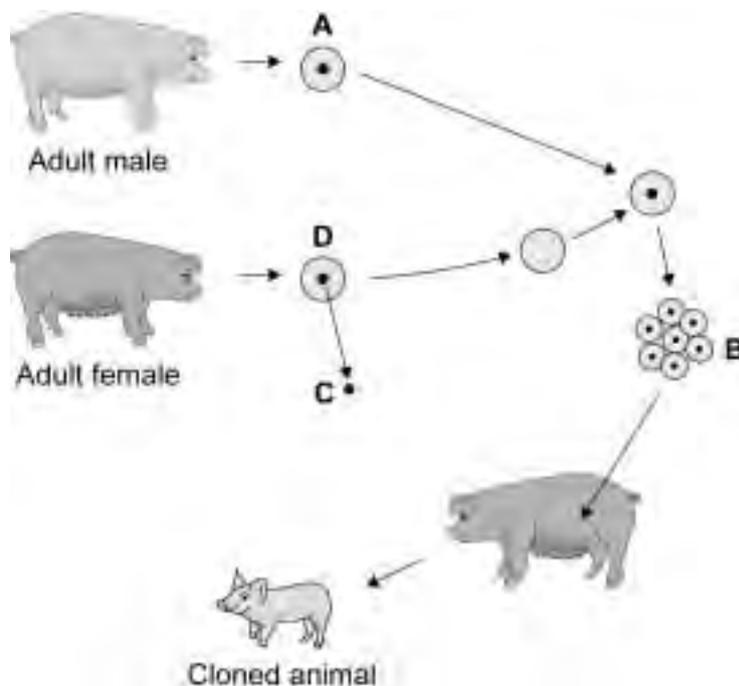
### Advice

- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
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9	
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11	
12	
13	
<b>TOTAL</b>	

Answer **all** questions in the spaces provided.

**1 (a)** The diagram shows how pigs can be cloned.



For each question write the correct letter in the box.

Which structure, **A**, **B**, **C** or **D** is:

**1 (a) (i)** an egg cell

(1 mark)

**1 (a) (ii)** a nucleus

(1 mark)

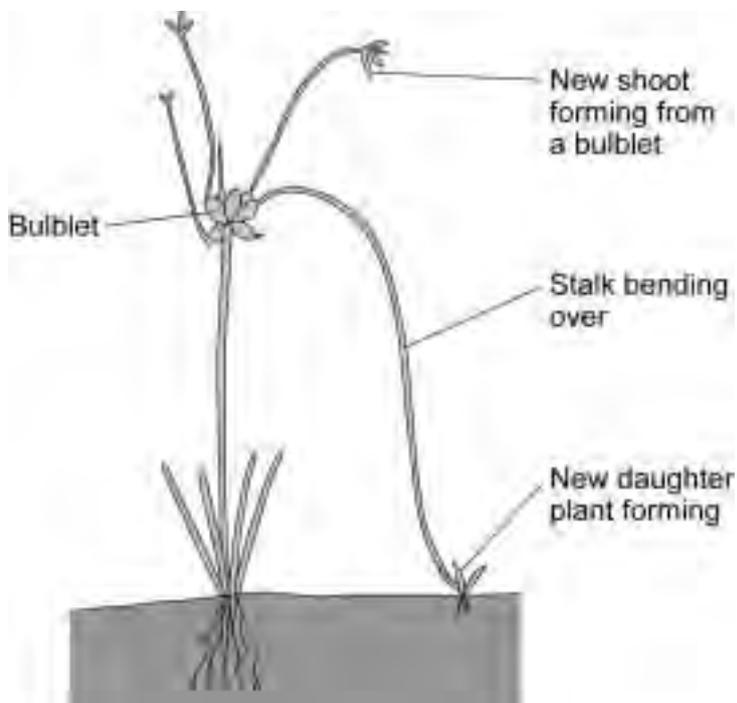
**1 (a) (iii)** an embryo?

(1 mark)

1 (b) Walking onion plants grow a bunch of bulblets (tiny bulbs).

The bulblets start to grow and the stalks bend over with the weight of the new growth.

This makes the onion plant seem to walk across the garden.



Producing plants in this way is called asexual reproduction.

Use words from the box to complete the following sentences.

chromosome

clone

gamete

gene

parent

Asexual reproduction needs only one .....

Asexual reproduction does not involve production of a .....

The daughter plant is called a .....

(3 marks)

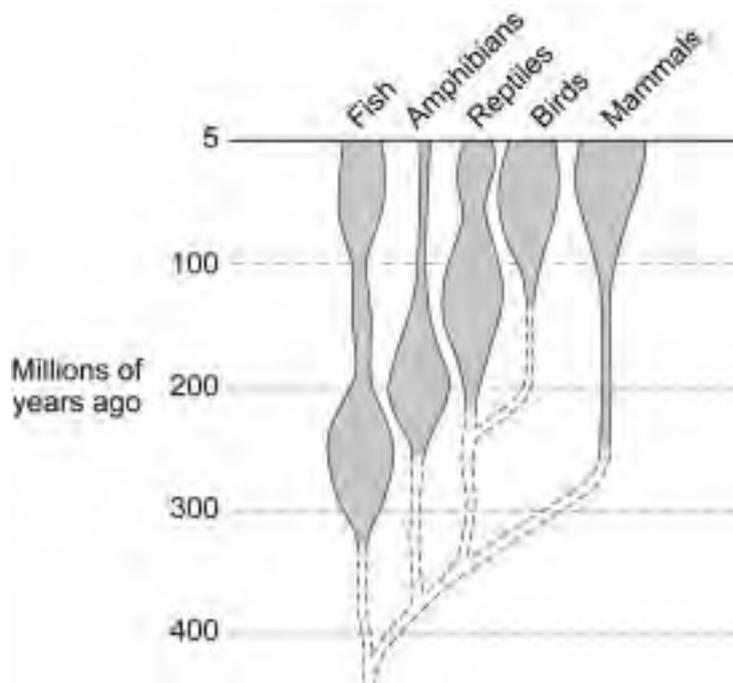
6

**Turn over for the next question**

**Turn over** ▶

2 The diagram shows how the number of species in different vertebrate groups changed between 400 million years ago and 5 million years ago.

The wider a block is, the more species there are.



2 (a) Which group had most species 200 million years ago?

.....  
(1 mark)

2 (b) To which group are birds most closely related?

.....  
(1 mark)

2 (c) Complete the following sentence.

A study of fossils gives evidence for the theory of .....  
(1 mark)

3
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- 3 Gardeners often collect fallen leaves in autumn and place them on compost heaps.



- 3 (a) Over the next year the leaves decay.

Which living things cause leaves to decay?

.....  
 .....

(1 mark)

- 3 (b) The leaves decay more quickly in summer than in winter.

Give **one** reason why.

.....  
 .....

(1 mark)

- 3 (c) The compost heap has holes in its sides to allow gases to enter.

Which gas is needed for decay?

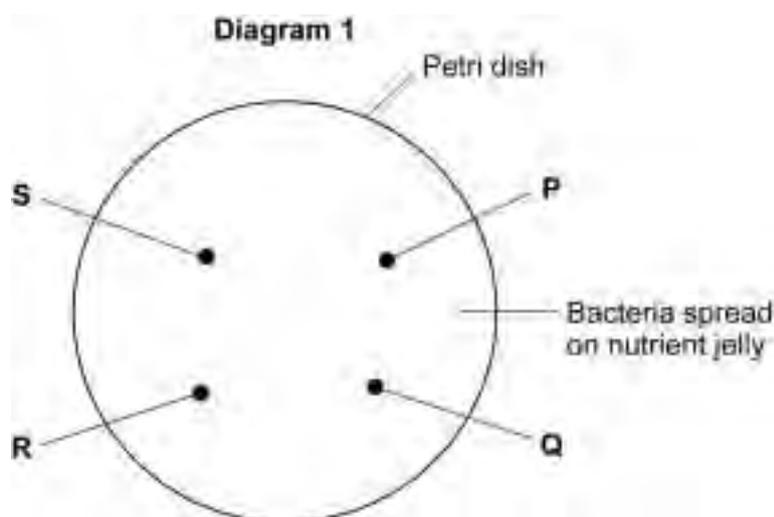
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(1 mark)

**Turn over for the next question**

**Turn over** ►

- 4 Students investigated how well antibacterial mouthwashes worked. They tested four different mouthwashes, **P**, **Q**, **R** and **S**.
- They spread bacteria on nutrient jelly in a Petri dish.
  - They soaked identical discs of filter paper in mouthwashes **P**, **Q**, **R** or **S**.
  - They placed the discs on the growing bacteria as shown in **Diagram 1**.
  - They covered the Petri dish.
  - They incubated the Petri dish for two days.



- 4 (a) The nutrient jelly was heated to 120 °C before being poured into the Petri dish.

Why is this necessary?

Tick (✓) **one** box.

Statement	Tick (✓)
To make bacteria grow more quickly.	<input type="checkbox"/>
To kill microorganisms.	<input type="checkbox"/>
To make the nutrients dissolve.	<input type="checkbox"/>

(1 mark)

- 4 (b) What is the maximum temperature at which bacteria should be incubated in a school laboratory?

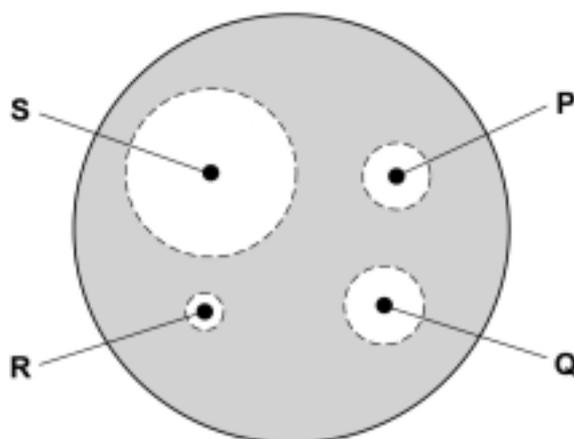
Tick (✓) **one** box.

Temperature	Tick (✓)
15 °C	
25 °C	
37 °C	

(1 mark)

- 4 (c) **Diagram 2** shows the appearance of the Petri dish after two days.

**Diagram 2**



Which mouthwash, **P**, **Q**, **R** or **S**, kills most bacteria?

Give **one** reason for your answer.

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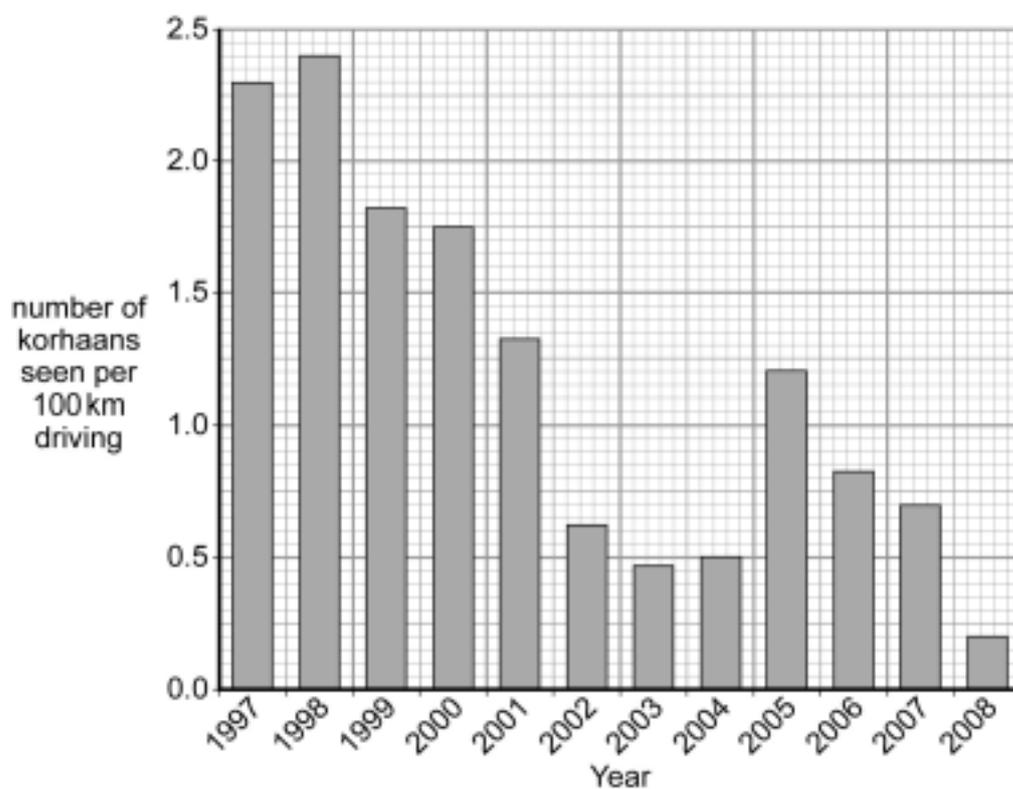
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(2 marks)

- 5 The photograph shows a bird called the korhaan. Korhaans live in South Africa.



- Scientists have studied changes in the numbers of korhaans since 1997.
- The scientists asked volunteer drivers to record the number of korhaans they see for every 100 km they drive on particular roads.
- The bar chart shows changes in the numbers of korhaans seen by the volunteers between the start of 1997 and the end of 2008.



- 5 (a)** This method of counting korhaans could have led to an inaccurate estimate of the number of korhaans.

Explain how.

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.....

(2 marks)

- 5 (b)** Which statement best describes the change in the number of korhaans between 1997 and 2008?

Tick (✓) **one** box.

Statement	Tick (✓)
There was a steady fall in the number of korhaans.	
The number of korhaans went up and down, but there was an overall fall in numbers.	
The number of korhaans went up and down, and there was no overall trend.	

(1 mark)

- 5 (c)** Korhaans live only amongst tall vegetation in areas of the country where there are few people.

Which is the most likely explanation for the change in the numbers of korhaans between 1997 and 2008?

Tick (✓) **one** box.

Statement	Tick (✓)
Many korhaans have been killed by cars.	
Many korhaans have been killed by people for food.	
The habitat of the korhaans is disappearing.	

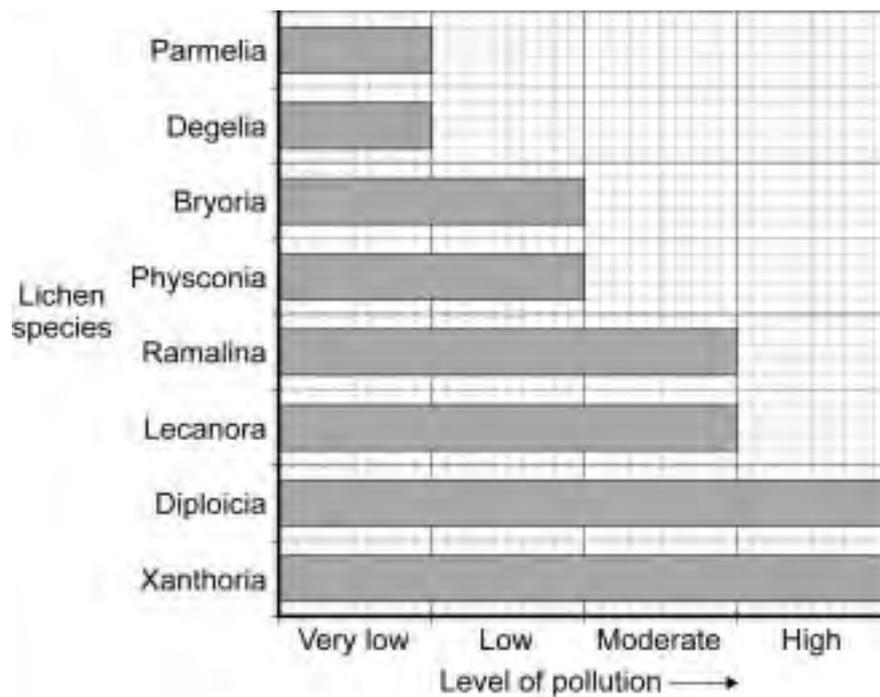
(1 mark)

6 Lichens are pollution indicators.

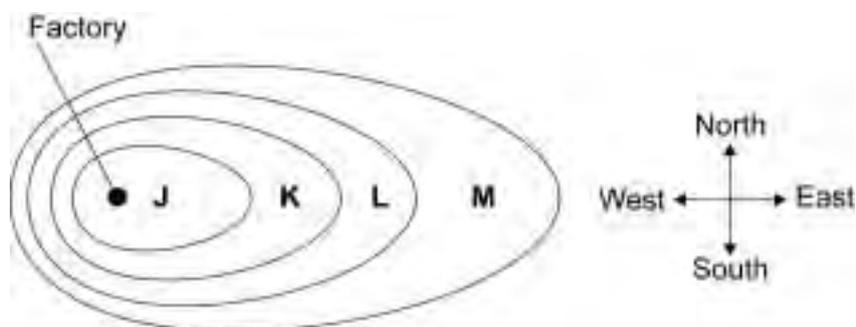
6 (a) Complete the following sentence.

Lichens are indicators of the gas .....  
(1 mark)

The chart shows how much pollution different lichens can tolerate.



- 6 (b) The diagram shows the areas, J, K, L and M, in which different lichen species grew around a factory. The factory burns coal.



- 6 (b) (i) In which direction does the wind blow the pollution from the factory?

Tick (✓) **one** box.

Wind direction	Tick (✓)
From the factory towards the north	
From the factory towards the east	
From the factory towards the south	
From the factory towards the west	

(1 mark)

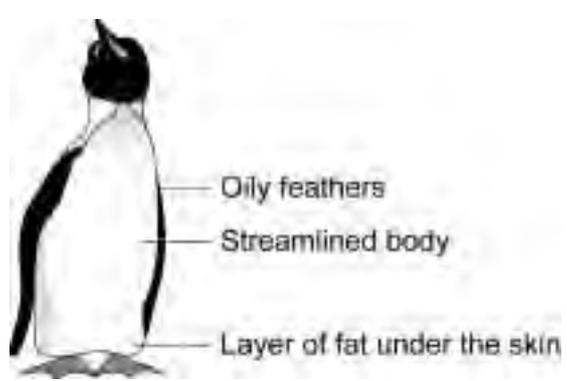
- 6 (b) (ii) Which row in the table shows a correct distribution of lichens?

Tick (✓) **one** row.

Lichen in area J	Lichen in area K	Lichen in area L	Lichen in area M	Tick (✓)
Xanthoria	Diploicia	Parmelia	Ramalina	
Degelia	Bryoria	Lecanora	Xanthoria	
Xanthoria	Lecanora	Bryoria	Parmelia	

(1 mark)

7 Emperor penguins have adaptations that help them to survive in very cold antarctic conditions.



Emperor penguins catch fish in the sea.

Use this information and information from the drawing to explain how the Emperor penguin is adapted to survive in the antarctic.

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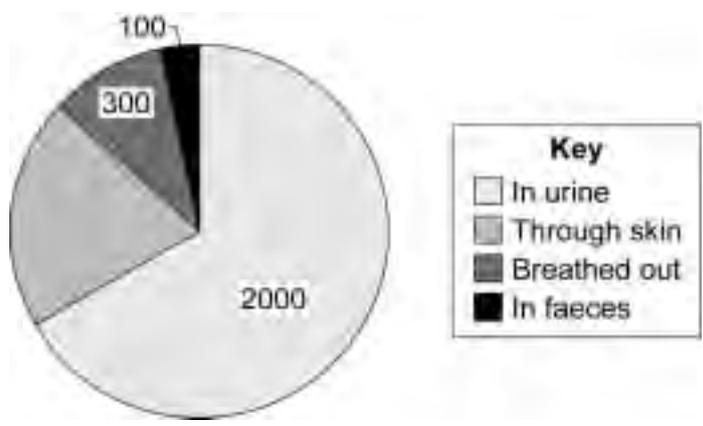
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(3 marks)

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8 Water is lost from the body in several ways.  
The pie chart shows the volume of water lost, in  $\text{cm}^3$ , by a man on a cold day.



8 (a) (i) The total volume of water lost by the man was  $3000 \text{ cm}^3$ .

How much water was lost through the skin?

Volume of water lost through skin ..... $\text{cm}^3$   
(1 mark)

8 (a) (ii) The same man lost  $1200 \text{ cm}^3$  of water through the skin on a warm day.

Give **one** reason for the different volumes of water lost on the two days.

.....  
.....  
(1 mark)

8 (b) To maintain water balance in the body, the total volume of water taken in must equal the total volume of water lost.

Give **two** ways this is achieved on a hot day, when compared to a cold day.

Tick (✓) **two** boxes.

- The volume of water in the urine decreases.
- The volume of water in the faeces increases.
- The volume of water taken as food or drink increases.
- The volume of water breathed out decreases.

(2 marks)

Turn over ▶

4
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**9** Dr Semmelweiss collected data about the number of deaths in the two maternity wards in the hospital where he worked.

- From 1833 to 1838 there were the same number of doctors and midwives delivering babies in both **Ward 1** and **Ward 2**.
- From 1839 to 1847 medical students and doctors delivered babies in **Ward 1**; midwives delivered babies in **Ward 2**.

Dr Semmelweiss also noticed that doctors often came straight from examining dead bodies to the delivery ward.

The table shows the number of patients and the number of deaths in the two wards.

Years	Ward	Number of patients	Number of deaths	Death rate as deaths per 1000 patients
1833–1838	Ward 1	23 509	1505	64.0
	Ward 2	13 097	731	55.8
1839–1847	Ward 1	20 204	1989	98.4
	Ward 2	17 791	691	

**9 (a) (i)** Use the formula

$$\text{death rate} = \frac{\text{number of deaths} \times 1000}{\text{number of patients}}$$

to calculate the death rate for **Ward 2** in the years 1839–1847.

.....

.....

Death rate = .....deaths per thousand  
(2 marks)

**9 (a) (ii)** Suggest a hypothesis for the difference in the death rates on **Ward 1** and **Ward 2** in the years 1839–1847.

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(2 marks)

**9 (b)** Antibiotics are now used in hospitals.

What is an antibiotic, and what does it do?

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.....  
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(2 marks)

**9 (c)** MRSA is causing problems in hospitals.

Give **one** reason why.

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(1 mark)

**9 (d)** How can the work of Semmelweiss help to reduce the problems caused by MRSA?

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(1 mark)

8

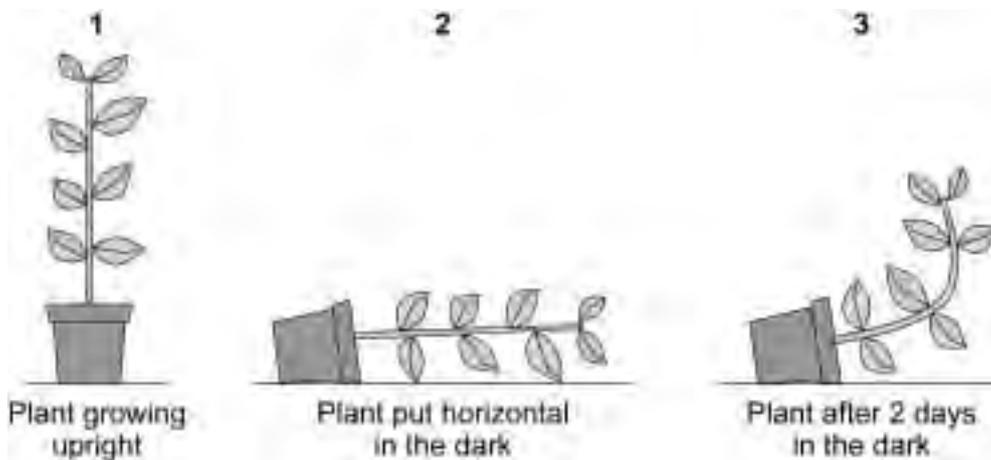
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ANSWER IN THE SPACES PROVIDED**

**10** A student grew a plant in an upright pot. She then put the pot in a horizontal position and left the plant in the dark for two days. Diagram 3 shows the potted plant after two days in the dark.



Explain fully why the plant responded in this way.

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(4 marks)

4

**Turn over for the next question**

**Turn over** ▶

**11** Many diseases are caused by viruses. Children are given vaccines to protect them against viral disease.

**11 (a)** Complete the following sentences.

It is difficult to kill viruses inside the body because

viruses .....

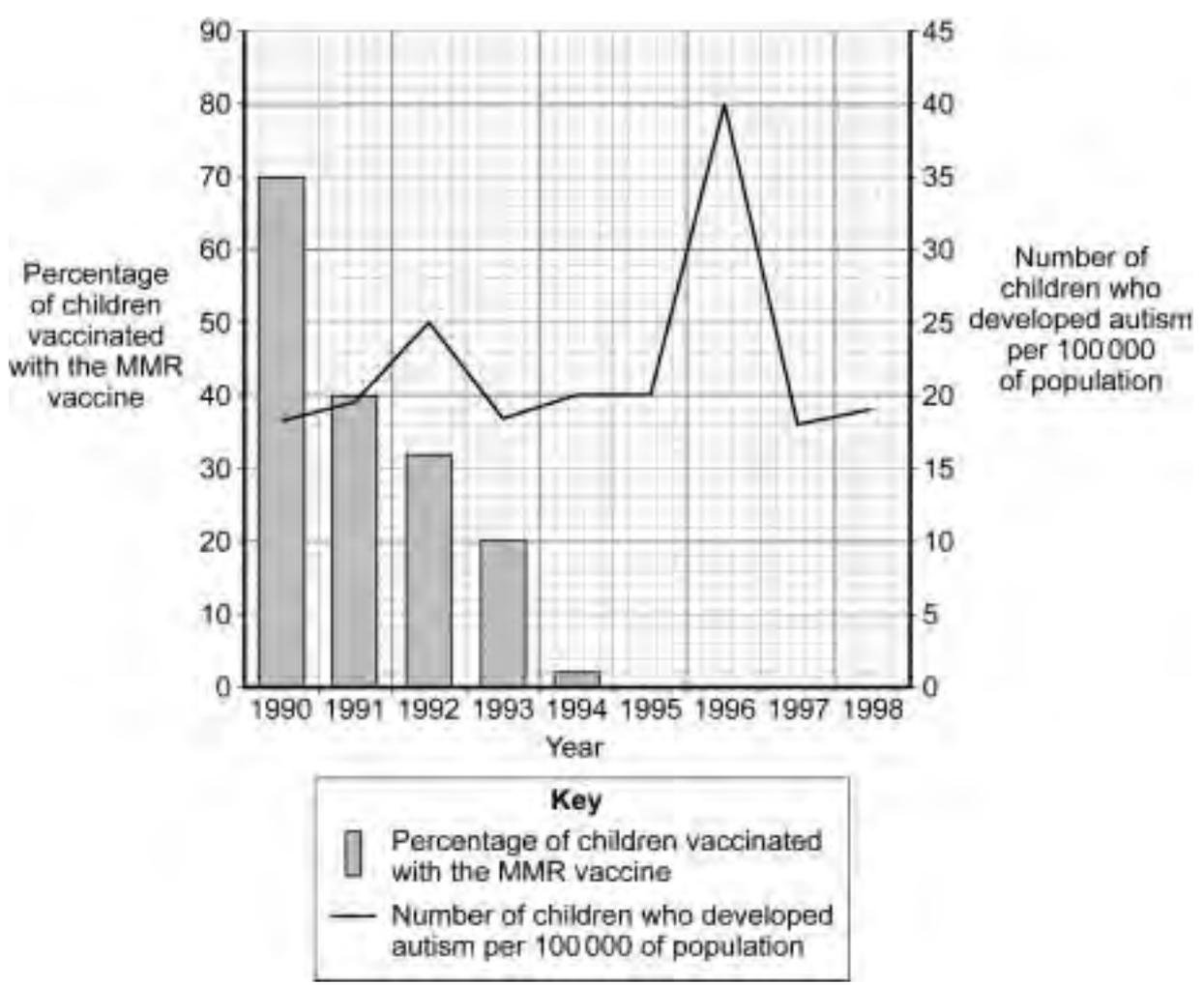
A vaccine contains an ..... form of the virus.

The vaccine stimulates the white blood cells to produce .....

(3 marks)

**11 (b)** In the 1990s many people thought that the MMR vaccine caused autism in some children. This is why the Japanese government stopped using the MMR vaccine.

The graph gives information about the percentage of Japanese children who developed autism during the 1990s.



**11 (b)** The data in the graph support the view that there is **no** link between MMR vaccination and autism.

Explain why.

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(4 marks)

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**Turn over for the next question**

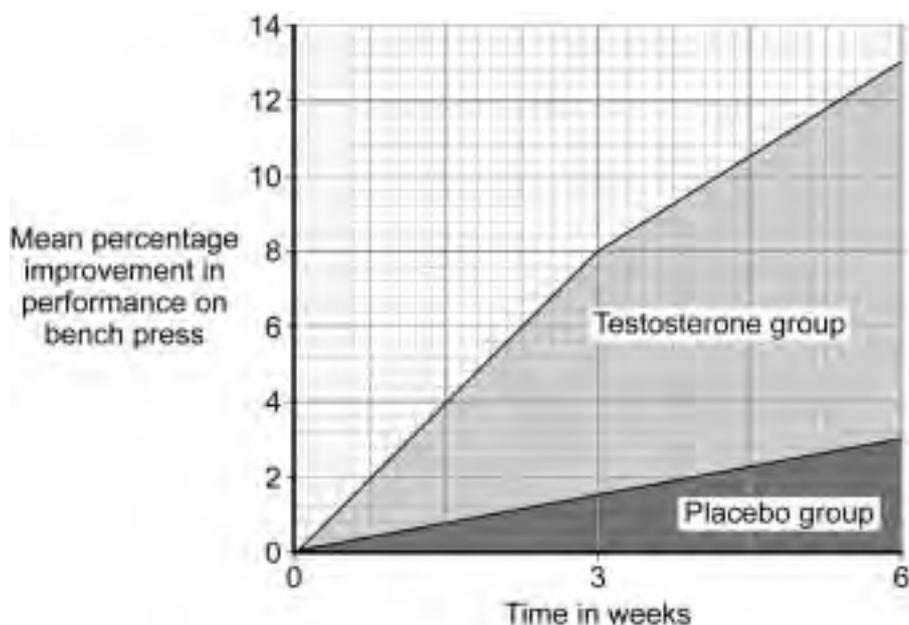
**Turn over** ▶

**12** Some athletes use drugs containing the steroid testosterone to improve their performance.

In an investigation:

- scientists monitored the performance of 18 male athletes over a 6 week training programme
- 9 athletes were given weekly injections of testosterone with the dose of 3.5 milligrams per kilogram of body mass, for 6 weeks
- the other 9 athletes were given a placebo
- the athletes' performance on a bench press exercise was measured at 3 weeks and 6 weeks.

The graph shows the results of the investigation.



**12 (a)** The data would have been better presented as a bar chart.

Give a reason why.

.....

.....

(1 mark)

**12 (b)** Suggest what was given as a placebo in this investigation.

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(1 mark)

12 (c) Describe the results of the investigation.

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(2 marks)

12 (d) Most internet advertisements for testosterone state that athletes need to use testosterone for at least 10 weeks to significantly improve performance.

Do the results of this investigation support the statement in the advertisements?

Give **one** reason for your answer.

.....

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(1 mark)

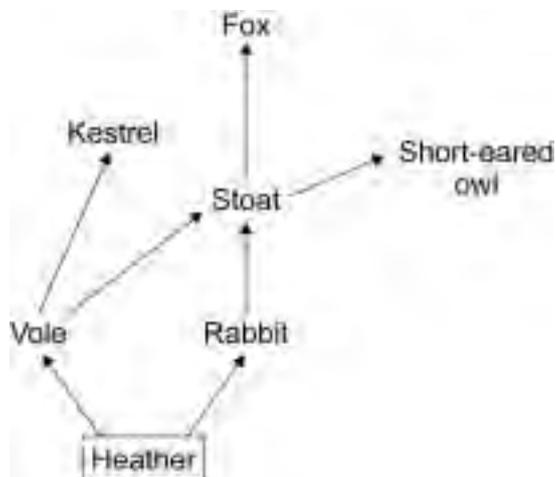
**Turn over for the next question**

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**Turn over** ▶

13 In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

The diagram below shows a food web for some of the organisms that live on moorland.



Only a small percentage of the Sun’s energy captured by the heather is eventually incorporated into the body tissues of the fox.

Explain, as fully as you can, what happens to the rest of the energy captured by the heather.

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(6 marks)

END OF QUESTIONS

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Question 12 David Cohen, *Steroids boost performance in just weeks*, © New Scientist Magazine 12 August 2004

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