Paper Reference(s) 5BI1H/01

Edexcel GCSE

Biology/Science
Unit B1: Influences on Life
Higher Tier

Tuesday 15 May 2012 – Morning

Time: 1 hour plus your additional time allowance

Centre No.								
Candidate No.								
Surname								
Initial(s)								
Signature								
Paper Reference	5	B	I	1	H	/	0	1

V40235A

PEARSON

INSTRUCTIONS TO CANDIDATES

- Write your centre number, candidate number, surname, initials and your signature in the boxes on page 1. Check that you have the correct question paper.
- Use BLACK ink or ball-point pen.
- Answer ALL questions.
- Answer the questions in the spaces provided – there may be more space than you need.

MATERIALS REQUIRED FOR EXAMINATION

Calculator, ruler

ITEMS INCLUDED WITH QUESTION PAPERS

Nil

(More instructions on page 3)

INFORMATION FOR CANDIDATES

- The total mark for this paper is 60.
- The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.
- Questions labelled with an ASTERISK (*) are ones where the quality of your written communication will be assessed – you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.

ADVICE TO CANDIDATES

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

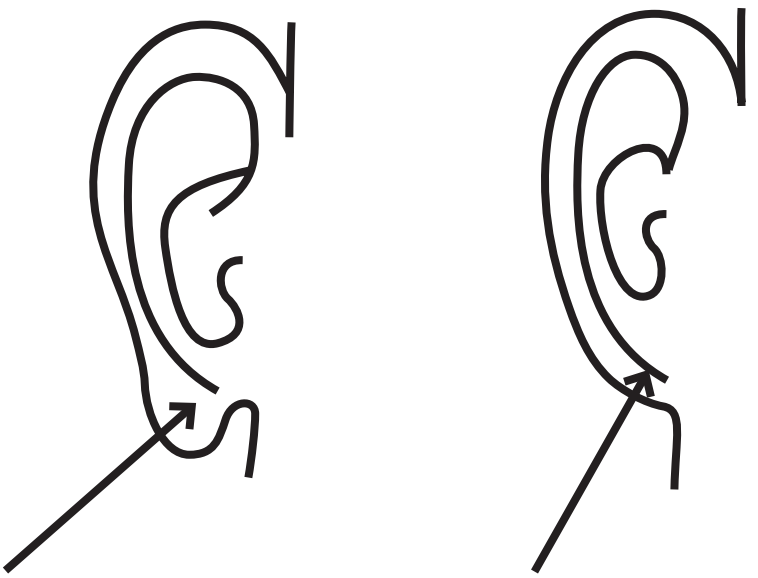
(Turn over)

ANSWER ALL QUESTIONS.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

INHERITANCE

1 (a) The earlobes of an individual are detached or attached. This is determined by the alleles inherited from their parents.



detached earlobe **attached earlobe**

(Question continues on next page)

An individual with attached earlobes must have inherited two recessive alleles from each of their parents and will have the genotype ee.

(i) State the genetic term used to describe an individual with the genotype ee for attached earlobes. (1 mark)

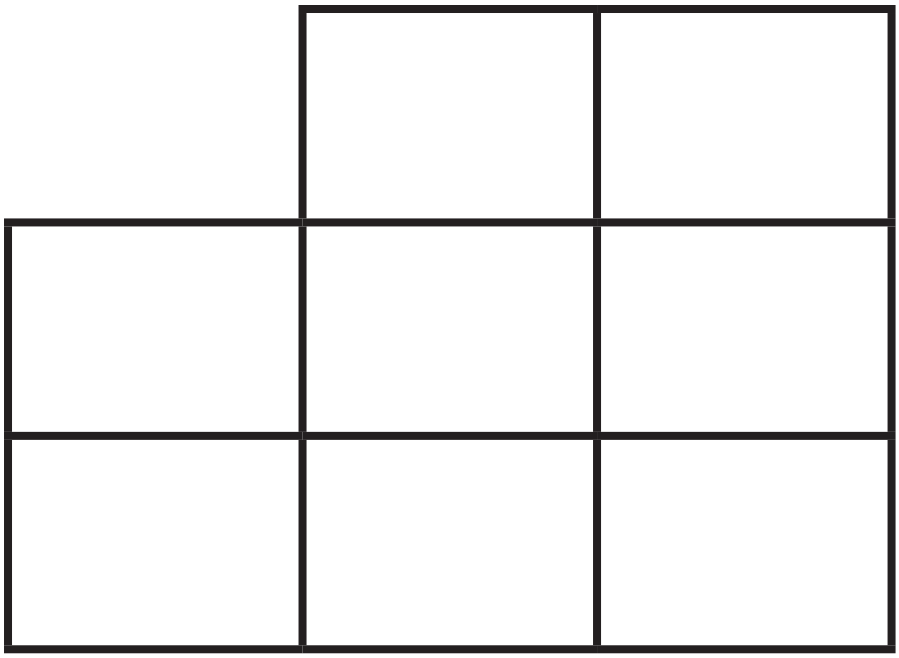
(ii) A female with the genotype ee has attached earlobes and a male with the genotype Ee has detached earlobes.

(Question continues on next page)

Complete the Punnett square to show the gametes and genotypes of the offspring for this female and male. (2 marks)

female gametes

male gametes



(iii) State the probability of the offspring having detached earlobes. (1 mark)

(Question continues on next page)

(iv) What is the percentage probability of a homozygous dominant mother and homozygous recessive father producing a child with attached earlobes?

Put a cross (☒) in the box next to your answer. (1 mark)

☐ A 0%

☐ B 25%

☐ C 75%

☐ D 100%

(Question continues on next page)

(b) Cystic fibrosis is a genetic disorder that is caused by the inheritance of two recessive alleles.

Describe the symptoms of cystic fibrosis. (3 marks)

(Continue your answer on next page)

Q1

(Total 8 marks)

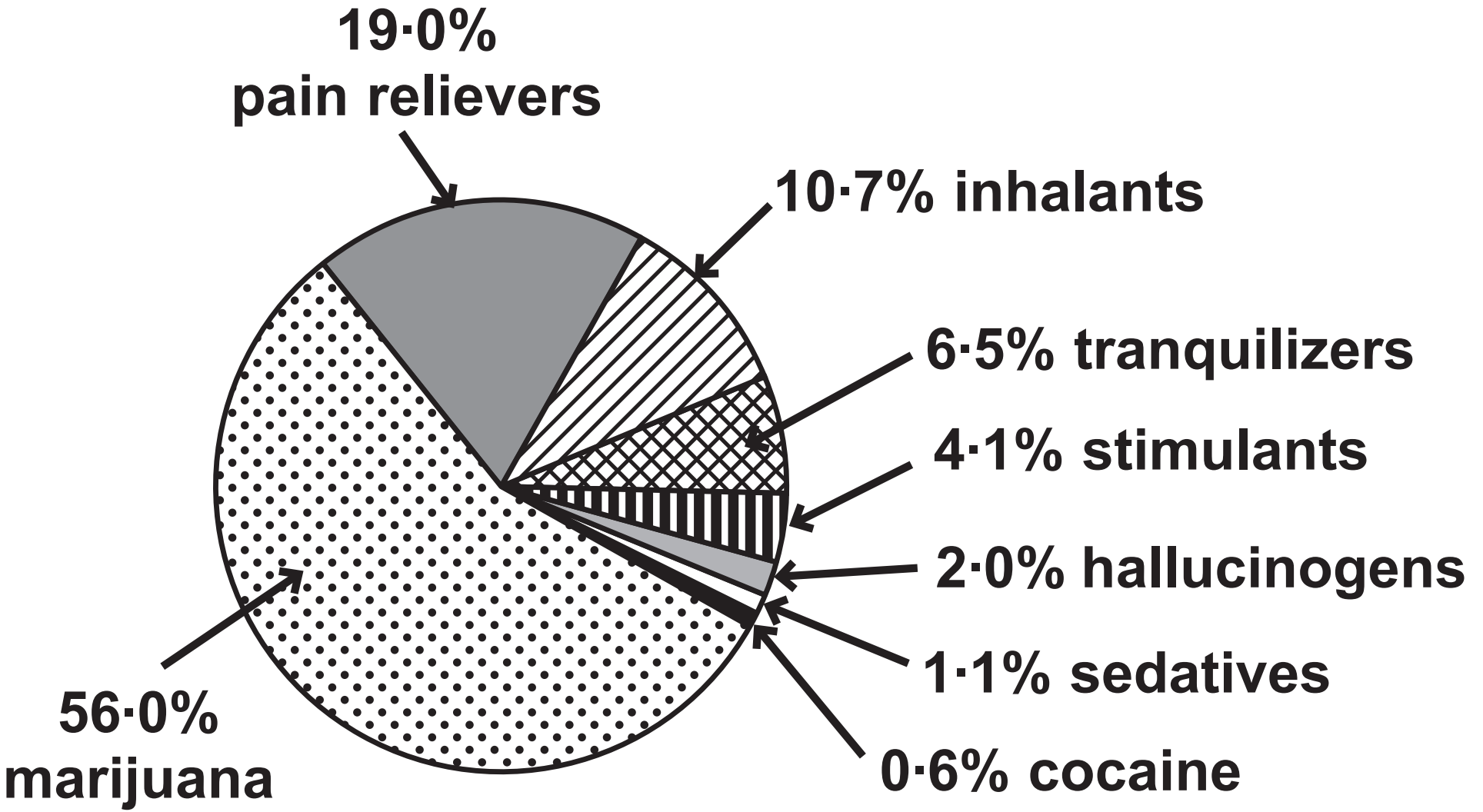
(Questions continue on next page)

DRUGS

2 In the USA, 2·7 million people admitted using illegal drugs.

The pie chart on page 11 shows the percentage of these people using different illegal drugs.

(Question continues on next page)



(Question continues on next page)

(Turn over)

(a) (i) Calculate the number of people who admitted using marijuana illegally. (2 marks)

answer = _____ million people

(Question continues on next page)

(ii) Suggest ONE reason why the information in the pie chart may not be reliable. (1 mark)

(Question continues on next page)

(b) Marijuana is often smoked with tobacco.

Suggest why combining tobacco with marijuana makes it more difficult to give up smoking marijuana. (2 marks)

(Question continues on next page)

(c) (i) Which of these drugs is a stimulant?

Put a cross (☒) in the box next to your answer. (1 mark)

☐ A alcohol

☐ B caffeine

☐ C LSD

☐ D morphine

(Question continues on next page)

(ii) Explain how stimulants affect reaction times.
(2 marks)

Q2

(Total 8 marks)

(Questions continue on next page)

BLOOD GLUCOSE

3 Humans regulate the glucose concentration of their blood.

A scientist recorded the blood glucose concentration of an individual over a seven-hour period.

The results are shown in the table.

TIME OF DAY	BLOOD GLUCOSE CONCENTRATION / mg PER 100 cm^3
06.00	76
07.00	77
08.00	124
09.00	91
10.00	83
11.00	81
12.00	79
13.00	130

(Question continues on next page)

(a) (i) Describe the trend in blood glucose concentration for this seven-hour period.
(2 marks)

(Question continues on next page)

(ii) Suggest reasons for the changes in blood glucose concentration. (2 marks)

(Question continues on next page)

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Excess blood glucose is converted into

☐ A glucagon in the liver

☐ B glucagon in the pancreas

☐ C glycogen in the liver

☐ D glycogen in the pancreas

(1 mark)

(Question continues on next page)

(b) (i) Scientists have discovered that a high body mass index (BMI) is a risk factor that may cause Type 2 diabetes.

Calculate the BMI for a female who has a mass of 67·5 kg and a height of 1·50 m. (2 marks)

$$\text{BMI} = \frac{\text{mass in kg}}{(\text{height in metres})^2}$$

answer = _____

(Question continues on next page)

(ii) Explain how a Type 2 diabetic can regulate their blood glucose concentration. (3 marks)

(Continue your answer on next page)

Q3

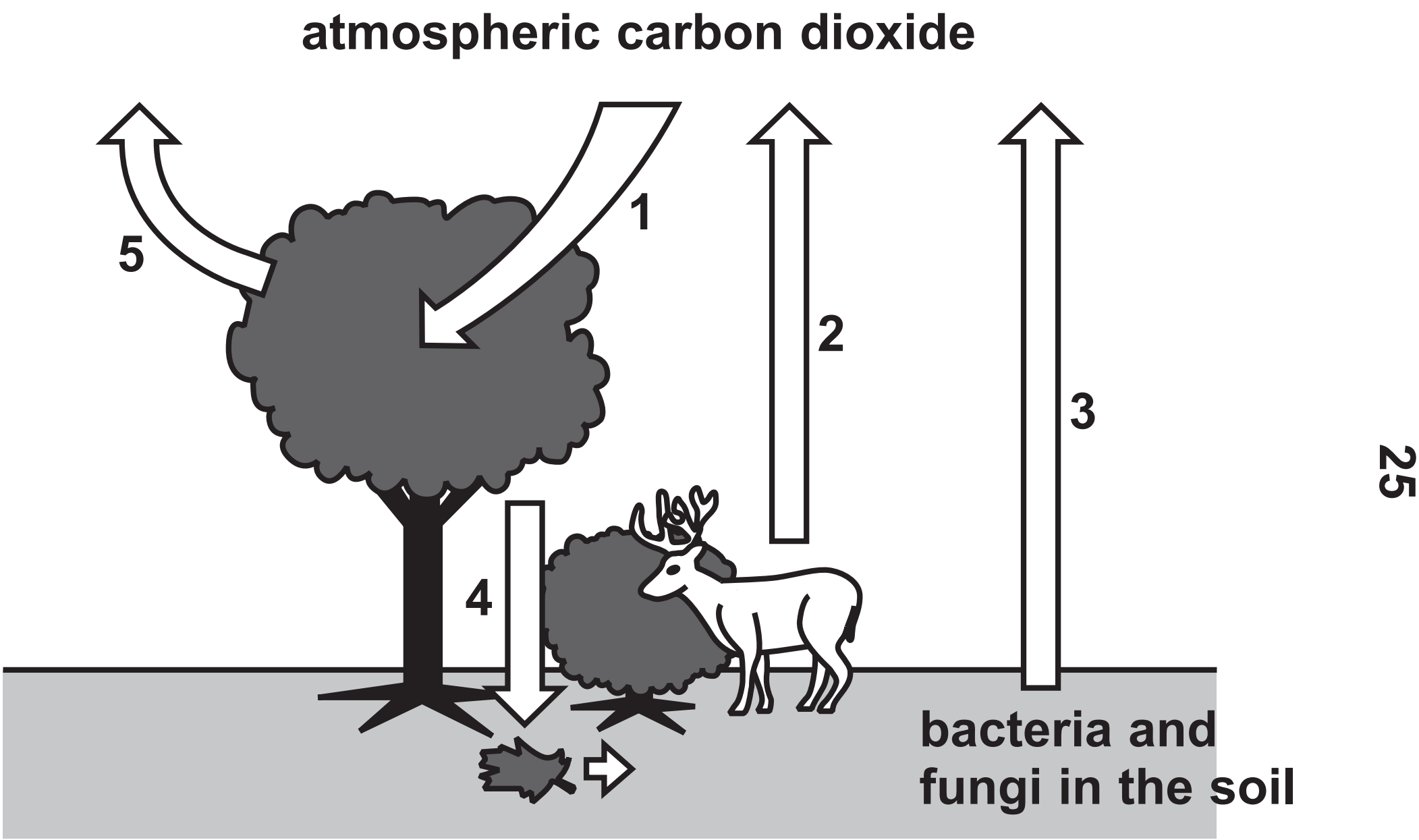
(Total 10 marks)

(Questions continue on next page)

ENVIRONMENT CYCLING

4 (a) The diagram on page 25 shows the processes involved in the carbon cycle. Each process is numbered.

(Question continues on next page)



25

(Question continues on next page)

(Turn over)

(i) What is the name of process 1?

Put a cross (☒) in the box next to your answer. (1 mark)

☐ A decomposition

☐ B denitrification

☐ C photosynthesis

☐ D respiration

(Question continues on next page)

(ii) Describe the numbered processes that return carbon dioxide back into the atmosphere. (3 marks)

(Question continues on next page)

(b) The human population is increasing.

Explain how this could change the concentration of carbon dioxide in the atmosphere. (2 marks)

(Question continues on next page)

(c) Air quality can be monitored using indicator species.

Name an indicator species used to monitor air quality. (1 mark)

_____

_____

(Question continues on next page)

(d) The overuse of fertilisers can cause eutrophication.

Explain the effects of eutrophication that may lead to the death of aquatic animals. (3 marks)

(Continue your answer on next page)

Q4

(Total 10 marks)

(Questions continue on next page)

TEMPERATURE REGULATION

5 (a) (i) Conditions in the human body must be regulated to maintain a stable internal environment.

Name the process that maintains a stable internal environment. (1 mark)

_____

_____

(Question continues on next page)

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The temperature that enzymes work most effectively in the human body is

☐ A 31 °C

☐ B 33 °C

☐ C 35 °C

☐ D 37 °C

(1 mark)

(Question continues on next page)

(b) Receptor cells in the skin detect temperature changes in the external environment.

Explain how this information is transmitted to the brain.
(4 marks)

(Continue your answer on next page)

(Question continues on next page)

*(c) In the UK, the external temperature can drop below 0 °C.

Explain how the human body maintains a stable internal temperature when the external temperature is 0 °C. (6 marks)

(Continue your answer on next page)

(Continue your answer on next page)

Q5

(Total 12 marks)

(Questions continue on next page)

CONTROLLING INFECTIONS

6 (a) Athlete's foot fungus is a pathogen.

(i) Describe how athlete's foot fungus is spread. (1 mark)

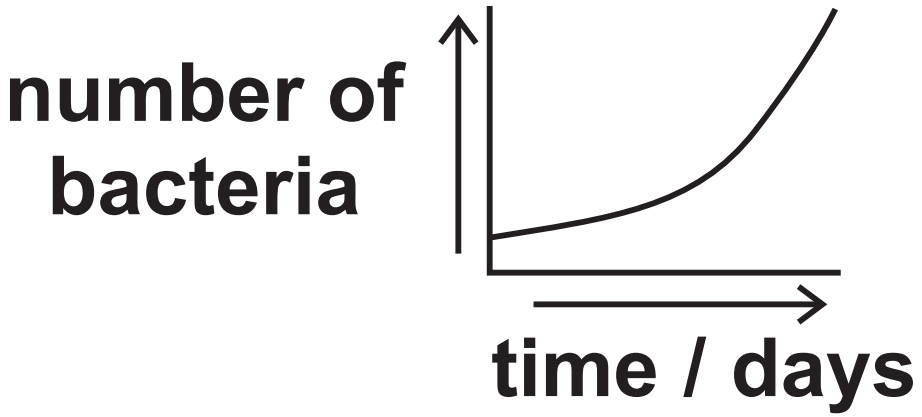
(Question continues on next page)

(ii) State the type of medication that can be used to treat this pathogen. (1 mark)

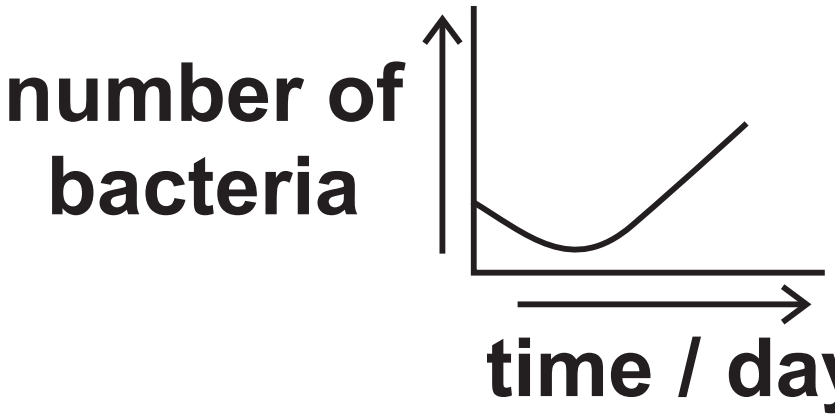
(Question continues on next page)

(b) The graphs show the effect of three different antibiotics on bacterial growth.

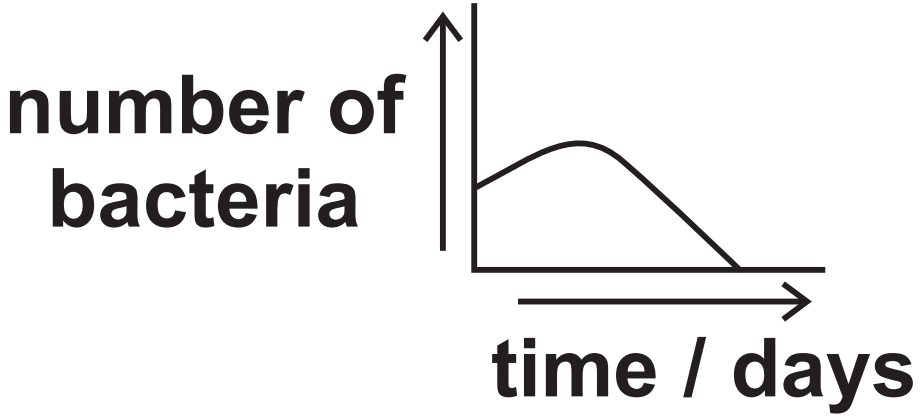
antibiotic A added



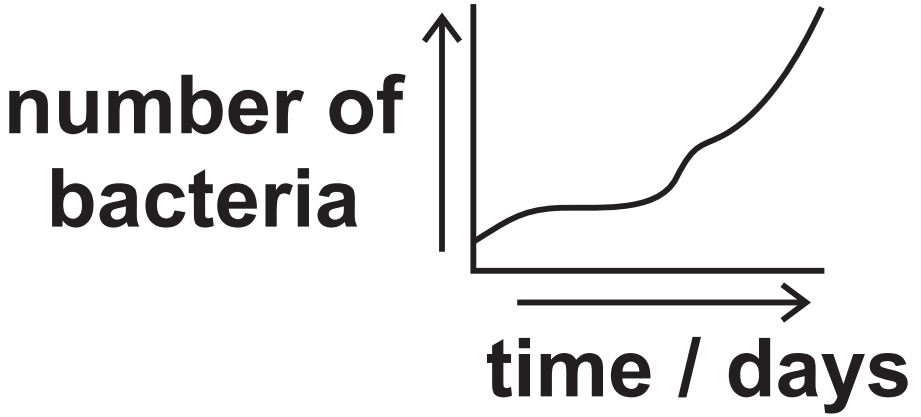
antibiotic B added



antibiotic C added



no antibiotic added



41

(Question continues on next page)

(i) Which of the graphs on page 41 is most effective at reducing the number of bacteria?

Put a cross (☒) in the box next to your answer. (1 mark)

☐ A antibiotic A

☐ B antibiotic B

☐ C antibiotic C

☐ D no antibiotic

(Question continues on next page)

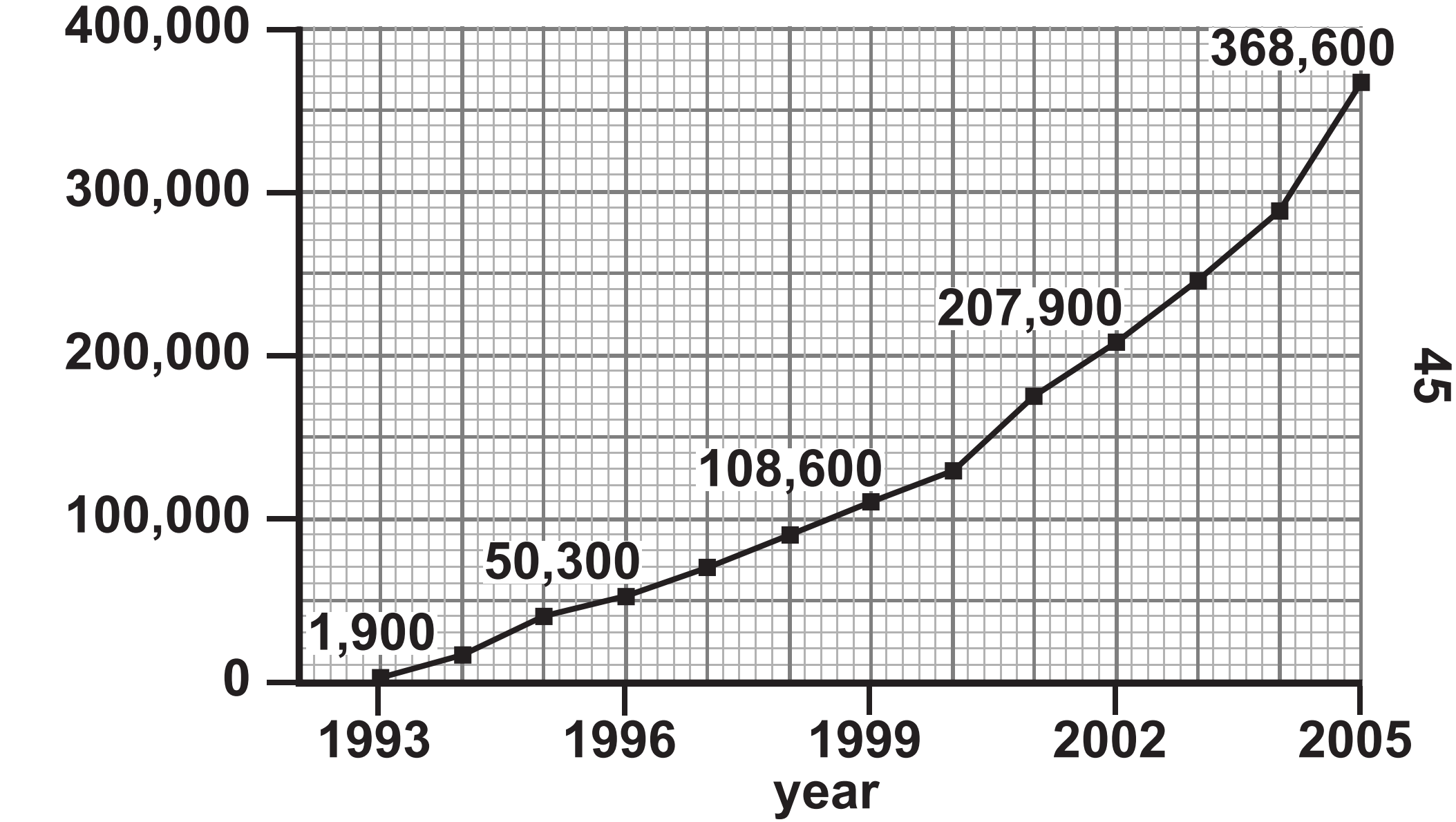
(ii) Explain how chemical defence mechanisms in the body reduce the chance of infection. (3 marks)

(Continue your answer on next page)

*(c) MRSA is a bacterial infection.

The graph on page 45 shows the number of cases of hospital patients with MRSA infections from 1993 to 2005.

(Question continues on next page)



(Question continues on next page)

(Turn over)

Explain the trend in the graph, even though the patients were treated with antibiotics. (6 marks)

(Continue your answer on next page)

(Continue your answer on next page)

Q6

(Total 12 marks)

TOTAL FOR PAPER = 60 MARKS

END