

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education  
March 2008

**SCIENCE A**  
**Unit Biology B1a (Human Biology)**

**BLY1AP**



**BIOLOGY**  
**Unit Biology B1a (Human Biology)**

Wednesday 5 March 2008 Morning Session

**For this paper you must have:**

- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed: 30 minutes

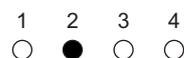
**Instructions**

- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1a' printed on it.
- Attempt **one Tier only**, either the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

**Instructions for recording answers**

- Use a **black ball-point pen**.

- For each answer **completely fill in the circle** as shown:



- Do **not** extend beyond the circles.

- If you want to change your answer, **you must** cross out your original answer, as shown:



- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown:



**Information**

- The maximum mark for this paper is 36.

**Advice**

- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

---

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.  
The Higher Tier starts on page 14 of this booklet.

---

**FOUNDATION TIER**

**SECTION ONE**

Questions **ONE** to **SIX**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

---

**QUESTION ONE**

The drawing shows a man's head and face.

The head has organs which contain receptors.



Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** on the drawing.

- A** contains light receptors
- B** contains receptors sensitive to some liquid chemicals
- C** contains sound receptors
- D** contains receptors sensitive to some gaseous chemicals

---

**QUESTION TWO**

This question is about drugs.

Match substances, **A**, **B**, **C** and **D**, with the numbers 1–4 in the table.

- A** cannabis
- B** painkiller
- C** antibiotic
- D** statin

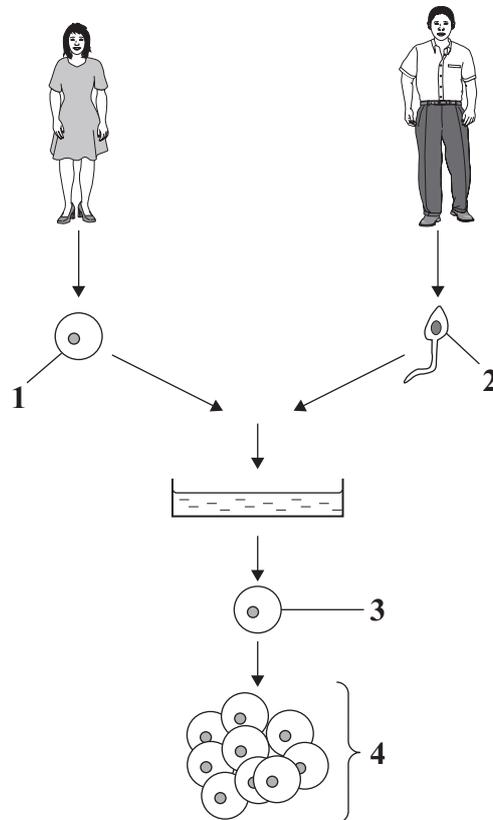
	<b>Information</b>
<b>1</b>	kills bacteria in the body
<b>2</b>	may lead to addiction to hard drugs
<b>3</b>	lowers the level of cholesterol in the blood
<b>4</b>	relieves some of the symptoms of the disease

**Turn over for the next question**

**Turn over ►**

**QUESTION THREE**

This question is about IVF (in-vitro fertilisation).



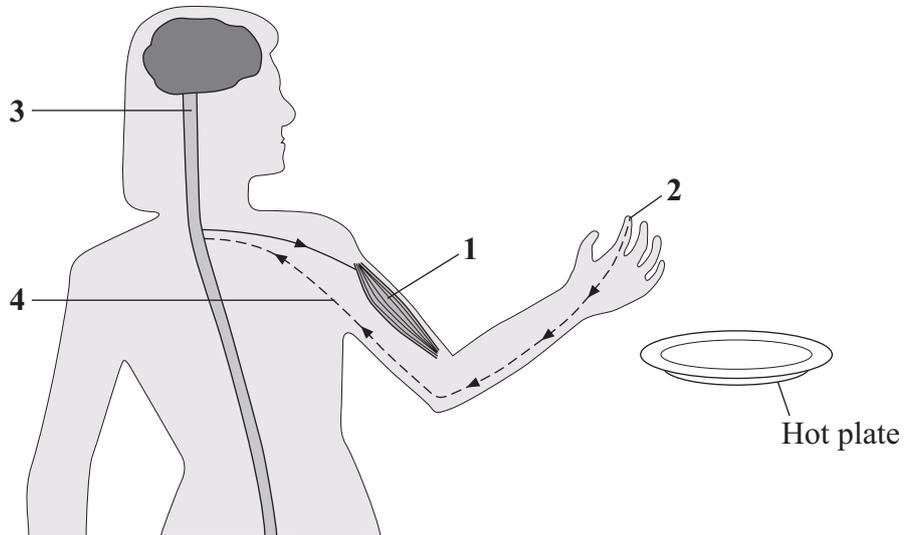
Match structures, **A**, **B**, **C** and **D**, with the numbers **1–4** on the diagram.

- A** egg
- B** embryo
- C** fertilised egg
- D** sperm

**QUESTION FOUR**

When we touch something hot, we quickly pull our hand away.

The diagram shows some of the structures involved in this reflex action.



Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** on the diagram.

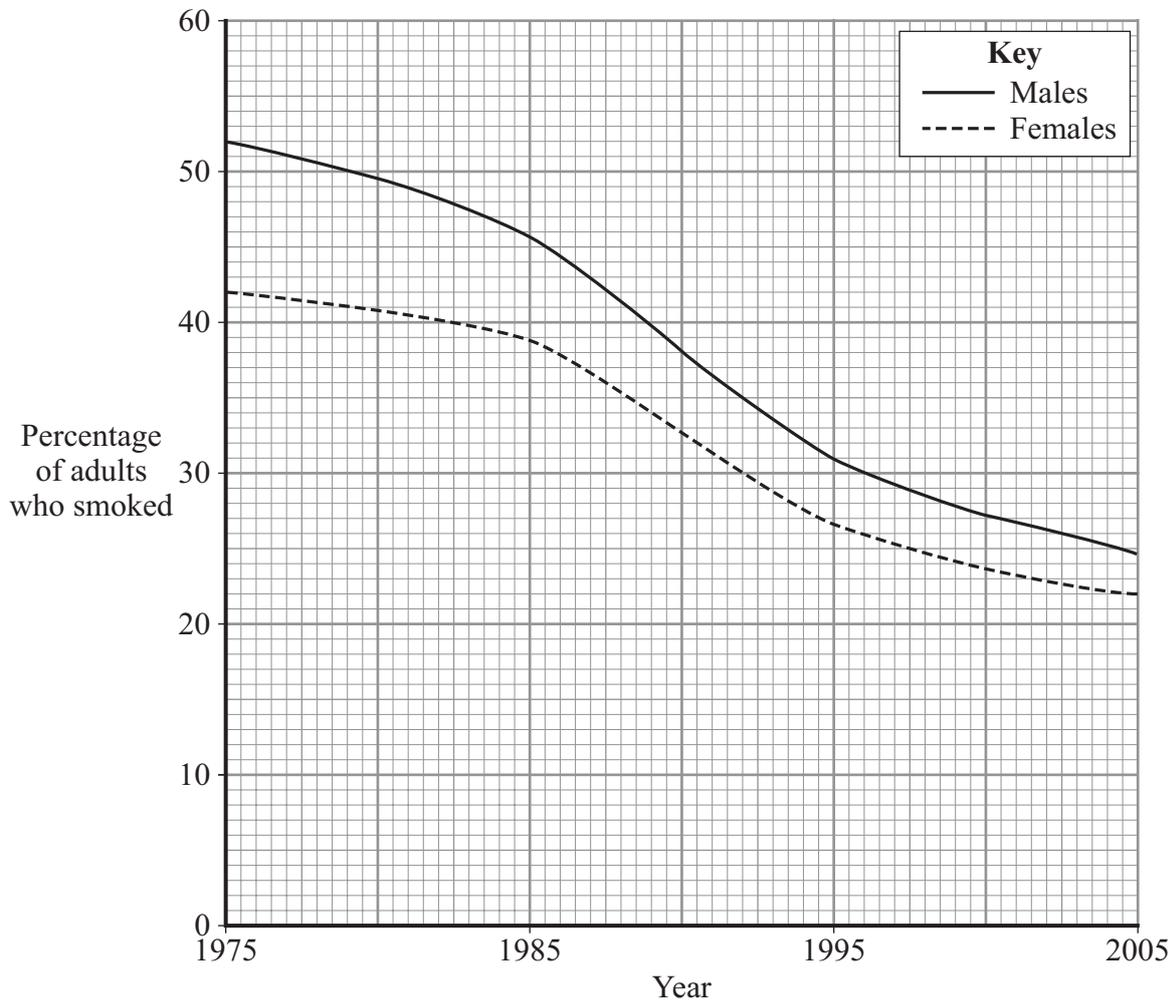
- A** muscle
- B** neurone
- C** central nervous system
- D** receptor

**Turn over for the next question**

**Turn over ►**

### QUESTION FIVE

A survey was carried out between 1975 and 2005 to find the changes in the percentages of adults who smoked. The graph shows the results of the survey.



Match figures, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

- A** 10
- B** 20
- C** 31
- D** 78

<b>1</b>	the percentage of males who smoked in 1995
<b>2</b>	the greatest difference between the percentages of males who smoked and females who smoked
<b>3</b>	the percentage of females who did not smoke in 2005
<b>4</b>	the change in the percentage of females who smoked between 1975 and 2005

**QUESTION SIX**

Read the passage:

Hundreds of years ago, smallpox killed thousands of people.

Edward Jenner noticed that milkmaids often caught cowpox from cows. He also noticed that the milkmaids did **not** catch smallpox. Jenner had the idea that cowpox gave people protection against catching smallpox.

To test his idea, he collected the pus from cowpox sores and injected it into a healthy boy.

He then injected the boy with smallpox.

The boy did **not** develop smallpox.

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

- A** a hypothesis
- B** a result
- C** an investigation
- D** the initial observation

<b>Information</b>	
<b>1</b>	Jenner's idea that cowpox gave protection against catching smallpox
<b>2</b>	Jenner injected a boy with cowpox and then injected him with smallpox
<b>3</b>	Jenner noticed that milkmaids did not catch smallpox
<b>4</b>	the boy did not develop smallpox

**Turn over for the next question**

**Turn over ►**

---

**SECTION TWO**

Questions **SEVEN** to **NINE**.

Each of these questions has four parts.

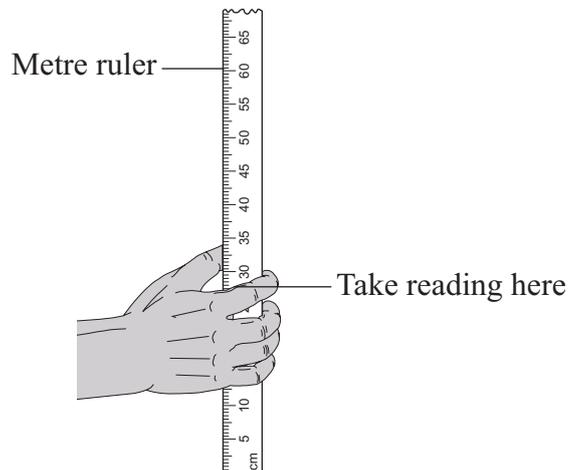
In each part choose only **one** answer.

Mark your choices on the answer sheet.

---

**QUESTION SEVEN**

A class compared reaction times in people of different age and sex. They tested 5 people in each category. A ruler was dropped between the fingers of each person. The person would catch it as quickly as possible once they saw it being dropped. A reading was taken from the ruler at the point where it was caught. The greater the distance the ruler fell the slower the reaction time.



The results are shown in the table below.

Age in years	Average point at which ruler was caught in cm	
	Males	Females
10	23	23
15	20	19
20	18	18
30	20	25
40	24	26
50	32	34
60	44	46

- 
- 7A** The average point at which the ruler was caught by a 30 year old male was . . .
- 1 18 cm.
  - 2 20 cm.
  - 3 24 cm.
  - 4 25 cm.
- 7B** Based on the results of the experiment, which of the following is correct?
- 1 At all ages, females have faster reaction times than males.
  - 2 At all ages, females have slower reaction times than males.
  - 3 Females aged 50 and 60 have slower reaction times than males of the same age.
  - 4 Between 10 and 20 years of age, the reaction time of males and females is the same.
- 7C** One way in which the reliability of the results in this experiment could be improved would be to . . .
- 1 test more males and females in each age group.
  - 2 test males and females who are older than 60 and younger than 10.
  - 3 use a ruler which measures in inches rather than centimetres.
  - 4 use a 50 cm ruler.
- 7D** Which receptors detect that the ruler has been dropped?
- 1 light
  - 2 sound
  - 3 temperature
  - 4 touch

**QUESTION EIGHT**

Thalidomide is a drug.

**8A** What was thalidomide originally used for?

- 1 to treat morning sickness
- 2 as a sleeping pill
- 3 to treat diabetes
- 4 to reduce high blood pressure

A new drug called prednisolone was trialled on leprosy patients. 12 500 patients were given prednisolone and 12 500 patients were given a placebo. 70 % of the patients given prednisolone reported an improvement in their health.

**8B** The patients given the placebo were used as a . . .

- 1 control group.
- 2 continuous group.
- 3 dependent group.
- 4 variable group.

**8C** How many of the patients given prednisolone reported an improvement in health?

- 1 700
- 2 875
- 3 7000
- 4 8750

**8D** In which group of people must prednisolone rather than thalidomide be used for treating leprosy?

- 1 men aged 21–45
- 2 boys aged 5–16
- 3 women aged 15–45
- 4 girls aged 5–12

**Turn over for the next question**

**Turn over ►**

**QUESTION NINE**

A student noted down:

- the different foods she had eaten in one day
- the amount of salt each one contained
- the percentage of the recommended maximum daily amount of salt to which this was equivalent.

<b>Food</b>	<b>Amount of salt in food in grams</b>	<b>% of recommended maximum daily amount of salt</b>
Cornflakes	0.2	3.3
Bread and butter	0.9	15.0
Tinned spaghetti	2.5	41.7
Half a tin of soup	2.0	33.3
Chicken in pastry	1.3	21.7
Tinned curry	2.0	33.3
Tinned peas	0.7	11.7
Tinned rice pudding	1.0	16.7

**9A** The data would best be displayed as . . .

- 1 a line graph.
- 2 a scatter graph.
- 3 a bar chart.
- 4 two lines on the same graph.

**9B** What was the range for the amount of salt in the different foods that she had eaten?

- 1 0.2 g to 2.0 g
- 2 0.2 g to 2.5 g
- 3 0.2 g to 1.0 g
- 4 1.0 g to 2.0 g

**9C** The recommended maximum daily amount of salt is 6 g.

How much more than the recommended maximum daily amount of salt did the student eat?

1 3.6 g

2 4.6 g

3 8.6 g

4 10.6 g

**9D** Too much salt in the diet can lead to . . .

1 diabetes.

2 high blood cholesterol.

3 high blood pressure.

4 irregular periods.

**END OF TEST**

---

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.  
The Foundation Tier is earlier in this booklet.

---

**HIGHER TIER**

**SECTION ONE**

Questions **ONE** and **TWO**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

---

**QUESTION ONE**

Read the passage:

Hundreds of years ago, smallpox killed thousands of people.

Edward Jenner noticed that milkmaids often caught cowpox from cows. He also noticed that the milkmaids did **not** catch smallpox. Jenner had the idea that cowpox gave people protection against catching smallpox.

To test his idea, he collected the pus from cowpox sores and injected it into a healthy boy.

He then injected the boy with smallpox.

The boy did **not** develop smallpox.

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

- A** a hypothesis
- B** a result
- C** an investigation
- D** the initial observation

<b>Information</b>	
<b>1</b>	Jenner's idea that cowpox gave protection against catching smallpox
<b>2</b>	Jenner injected a boy with cowpox and then injected him with smallpox
<b>3</b>	Jenner noticed that milkmaids did not catch smallpox
<b>4</b>	the boy did not develop smallpox

---

**QUESTION TWO**

This question is about the effects of substances on the body.

Match substances, **A**, **B**, **C** and **D**, with the numbers 1–4 in the table.

- A** carbon monoxide
- B** processed foods
- C** polyunsaturated fats
- D** nicotine

	<b>Effect</b>
<b>1</b>	may lead to low birth mass
<b>2</b>	may lead to increased blood pressure
<b>3</b>	may reduce blood cholesterol levels
<b>4</b>	may lead to addiction

**Turn over for the next question**

**Turn over ►**

---

**SECTION TWO**Questions **THREE** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.Mark your choices on the answer sheet.

---

**QUESTION THREE**

Thalidomide is a drug.

**3A** What was thalidomide originally used for?

- 1 to treat morning sickness
- 2 as a sleeping pill
- 3 to treat diabetes
- 4 to reduce high blood pressure

A new drug called prednisolone was trialled on leprosy patients. 12 500 patients were given prednisolone and 12 500 patients were given a placebo. 70% of the patients given prednisolone reported an improvement in their health.

**3B** The patients given the placebo were used as a . . .

- 1 control group.
- 2 continuous group.
- 3 dependent group.
- 4 variable group.

**3C** How many of the patients given prednisolone reported an improvement in health?

- 1 700
- 2 875
- 3 7000
- 4 8750

**3D** In which group of people must prednisolone rather than thalidomide be used for treating leprosy?

- 1 men aged 21–45
- 2 boys aged 5–16
- 3 women aged 15–45
- 4 girls aged 5–12

**Turn over for the next question**

**Turn over ►**

**QUESTION FOUR**

A student noted down:

- the different foods she had eaten in one day
- the amount of salt each one contained
- the percentage of the recommended maximum daily amount of salt to which this was equivalent.

<b>Food</b>	<b>Amount of salt in food in grams</b>	<b>% of recommended maximum daily amount of salt</b>
Cornflakes	0.2	3.3
Bread and butter	0.9	15.0
Tinned spaghetti	2.5	41.7
Half a tin of soup	2.0	33.3
Chicken in pastry	1.3	21.7
Tinned curry	2.0	33.3
Tinned peas	0.7	11.7
Tinned rice pudding	1.0	16.7

**4A** The data would best be displayed as . . .

- 1 a line graph.
- 2 a scatter graph.
- 3 a bar chart.
- 4 two lines on the same graph.

**4B** What was the range for the amount of salt in the different foods that she had eaten?

- 1 0.2 g to 2.0 g
- 2 0.2 g to 2.5 g
- 3 0.2 g to 1.0 g
- 4 1.0 g to 2.0 g

**4C** The recommended maximum daily amount of salt is 6 g.

How much more than the recommended maximum daily amount of salt did the student eat?

**1** 3.6 g

**2** 4.6 g

**3** 8.6 g

**4** 10.6 g

**4D** Too much salt in the diet can lead to . . .

**1** diabetes.

**2** high blood cholesterol.

**3** high blood pressure.

**4** irregular periods.

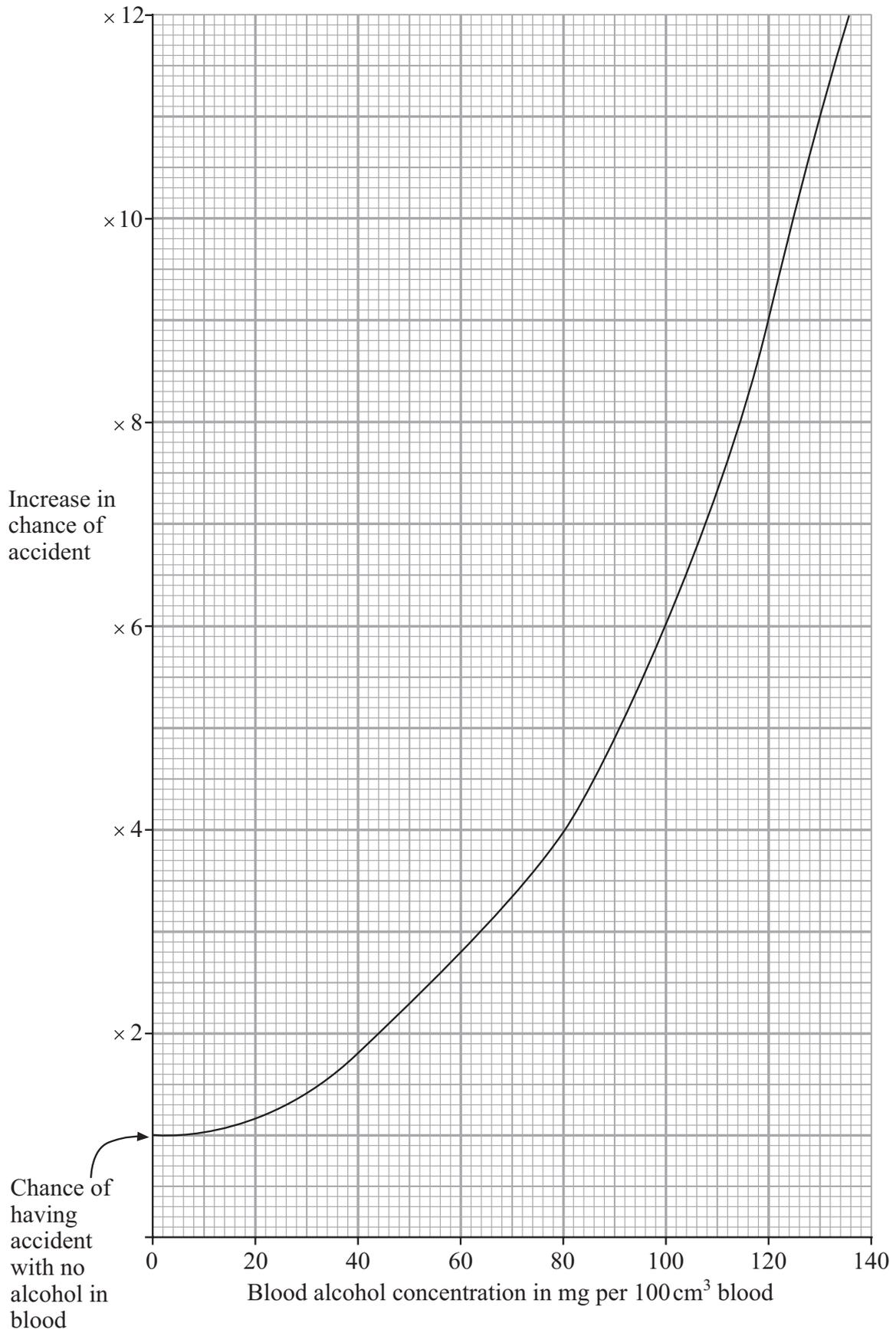
**Turn over for the next question**

**Turn over ►**

**QUESTION FIVE**

Alcohol can affect how well people drive a car.

The graph shows the effect of blood alcohol on the chance of a person having an accident when driving.



---

**5A** Which of the following organs are most likely to be damaged when a person drinks alcohol?

- 1 liver and brain
- 2 liver and kidneys
- 3 brain and ovaries
- 4 brain and heart

**5B** Drinking wine raises the blood alcohol concentration by 20 mg per 100 cm<sup>3</sup> of blood for each standard glass drunk.

What is the increase in the chance of an accident if a person drinks 5 standard glasses of wine?

- 1 4 times
- 2 6 times
- 3 30 times
- 4 100 times

**5C** The data shows that . . .

- 1 the risk of accident is directly proportional to blood alcohol concentration.
- 2 the risk of accident is inversely proportional to blood alcohol concentration.
- 3 as the concentration of alcohol increases, the risk of accident increases more rapidly.
- 4 there is a linear relationship between the risk of accident and blood alcohol concentration.

**5D** The relationship between blood alcohol concentration and the increased chance of an accident is mainly due to the alcohol causing . . .

- 1 a coma.
- 2 unconsciousness.
- 3 addiction.
- 4 slower reactions.

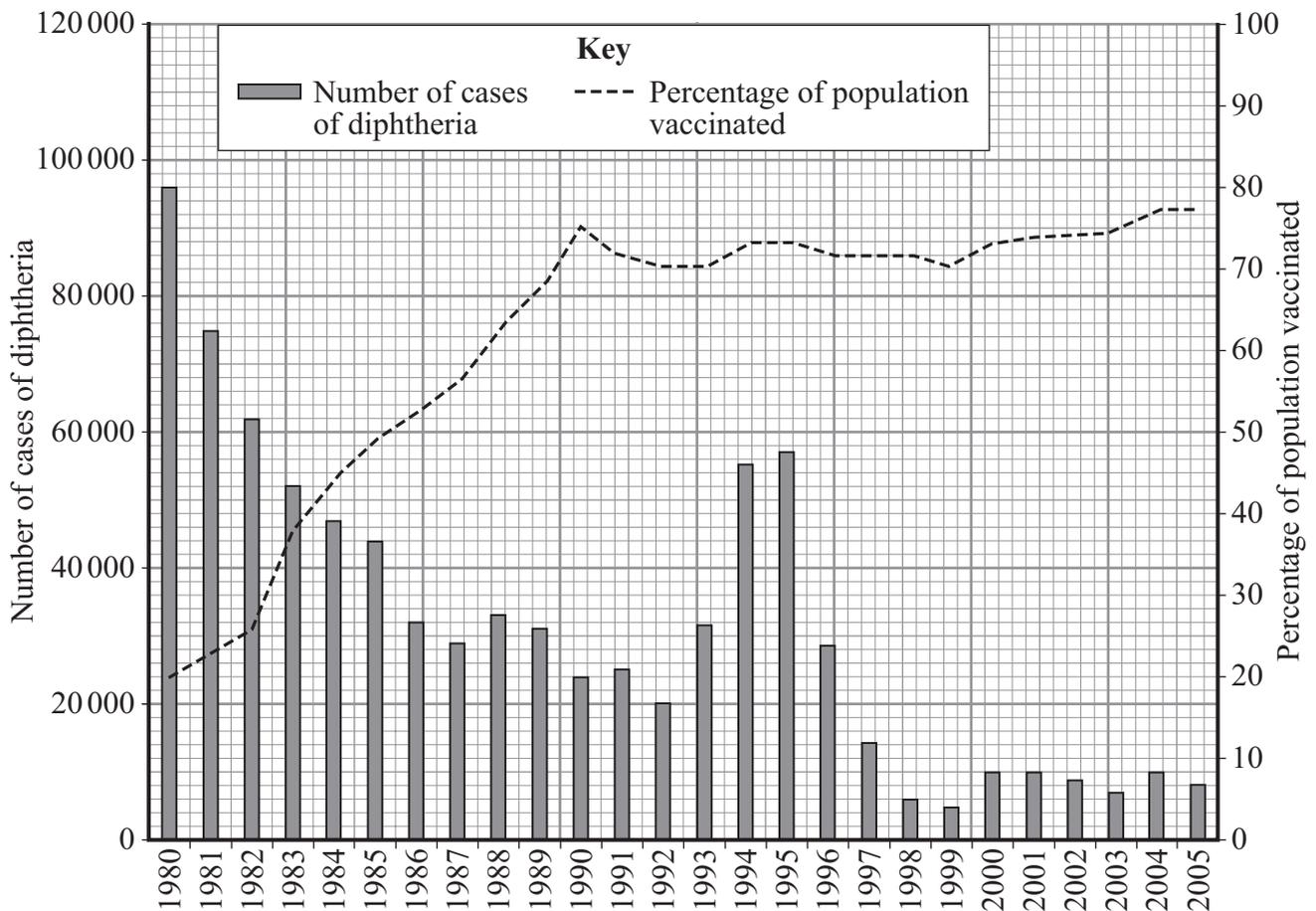
Turn over ►

## QUESTION SIX

This question is about vaccination.

- 6A** Which one of the following describes how vaccination helps to protect the body from disease?
- 1 It causes white blood cells to ingest pathogens.
  - 2 It stimulates white blood cells to produce antibodies.
  - 3 It prevents pathogens from multiplying.
  - 4 It stimulates the white blood cells to produce toxins.
- 6B** What is the main reason why some people refuse to be vaccinated against any disease-causing pathogen?
- 1 The way in which vaccines work is not understood.
  - 2 The body can protect itself against diseases without vaccinations.
  - 3 There are drugs that are effective in treating diseases caused by pathogens.
  - 4 Some vaccines may have side effects.

The graph was produced by the World Health Organisation (WHO). It shows the number of cases of diphtheria and the percentage of the population vaccinated against diphtheria.



Source: adapted from World Health Organisation (WHO), [www.who.int/en,2007](http://www.who.int/en,2007)

- 6C** The graph shows that . . .
- 1 the higher the percentage of the population vaccinated, the fewer the number of cases of diphtheria.
  - 2 increasing the percentage of the population vaccinated will eliminate diphtheria.
  - 3 since 1990, the percentage of the population vaccinated has remained between 70 % and 80 %.
  - 4 an increase of 20% of the population vaccinated reduces the number of cases of diphtheria by approximately 20 000.
- 6D** What was the annual rate of decrease in the number of cases of diphtheria from 1980 to 1985?
- 1 8 600
  - 2 8 800
  - 3 10 400
  - 4 52 000

**Turn over for the next question**

**Turn over ►**

**QUESTION SEVEN**

Blood cholesterol levels are influenced by several factors.

**7A** The most important factor in maintaining a healthy heart is . . .

- 1 a high LDL level in the blood.
- 2 a low HDL level in the blood.
- 3 a balanced level of unsaturated and saturated fats in the blood.
- 4 a balanced level of HDL and LDL in the blood.

A study of 1081 children showed that 8% had a high blood cholesterol. Analysis revealed the data shown in the table.

<b>Number of hours spent watching television each day</b>	<b>Increased risk of high blood cholesterol</b>
Less than 2	× 1
2–4	× 2.2
More than 4	× 4.8

**7B** This research suggests that . . .

- 1 television advertisements are linked to bad eating habits.
- 2 a high cholesterol level in the blood is caused by watching too much television.
- 3 the consequence of watching television is to lower levels of cholesterol in children.
- 4 in identifying children at risk of high cholesterol, one factor could be the number of hours they watch television.

**7C** In order to establish a link between high cholesterol level, watching television and family history, which would be a suitable control group?

- 1 children with a family history of high cholesterol levels and who watch more than 4 hours of television a day
- 2 children with a family history of high cholesterol levels and who watch less than 2 hours of television a day
- 3 children with a family history of low cholesterol levels and who watch more than 4 hours of television a day
- 4 children with a family history of low cholesterol levels and who watch less than 2 hours of television a day

**7D** Which of the following factors is most affected by watching TV for more than 4 hours a day?

- 1 diet
- 2 metabolic rate
- 3 LDL level
- 4 HDL level

**Turn over for the next question**

**Turn over ►**

---

**QUESTION EIGHT**

This question is about hormones that control the menstrual cycle.

**8A** The hormone which stimulates an egg to mature is produced by the . . .

- 1 blood.
- 2 ovary.
- 3 pituitary gland.
- 4 womb.

**8B** Some contraceptive pills contain high levels of oestrogen.

How do these contraceptives work?

- 1 They stop the lining of the womb from becoming thick.
- 2 They inhibit LH production.
- 3 They cause the lining of the womb to break down.
- 4 They inhibit FSH production.

**8C** Fertility drugs . . .

- 1 stimulate oestrogen production.
- 2 stimulate FSH production.
- 3 stimulate LH production.
- 4 stimulate the pituitary gland.

**8D** Some couples need IVF treatment in order to have children.

Which one of the following is an ethical problem that may occur as a result of IVF?

- 1 The treatment is suitable only for certain types of women.
- 2 The treatment is very expensive.
- 3 There is a high failure rate.
- 4 Unused embryos are destroyed.

---

**QUESTION NINE**

Some drugs are used in medicine because they affect reflex pathways.

**9A** In the 1940s, the drug curare was introduced because it prevents muscles from contracting, thereby making surgery easier.

At what place in a reflex action does curare most probably act?

- 1 the junction of receptors and sensory neurones
- 2 between relay neurones in the brain
- 3 the junction of a motor neurone and a sensory neurone
- 4 the junction of a muscle and motor neurone

Dentists inject the drug procaine into gums so that they can drill into teeth without causing pain.

**9B** What is the most probable reason for procaine preventing pain?

- 1 It prevents impulses passing along the sensory neurones to the brain.
- 2 It blocks the synapses between sensory neurones and motor neurones.
- 3 It makes the tissue of the gums numb.
- 4 It prevents the brain from interpreting impulses from the teeth.

**9C** What would be the best way of investigating the effects of drugs such as procaine on the human nervous system?

- 1 test the effects of drugs on animals
- 2 test the effects of drugs on healthy human volunteers
- 3 observe the effects of drugs on addicts
- 4 test the effects of drugs on people with diseases of the nervous system

**9D** A manufacturer tests a new drug that affects the nervous system and makes claims about its effectiveness.

The credibility of the claim is decreased because . . .

- 1 the drug was tested on a wide range of age groups.
- 2 the drug was tested only by the manufacturer.
- 3 some of the test subjects were given placebos.
- 4 only volunteers were used in the test.

**END OF TEST**

**There are no questions printed on this page**