General Certificate of Secondary Education
June 2008

SCIENCE A   **BLY1AP**
Unit Biology B1a (Human Biology)

BIOLOGY
Unit Biology B1a (Human Biology)

Monday 23 June 2008   Morning Session

> **For this paper you must have:**
> - a black ball-point pen
> - an objective test answer sheet.
>
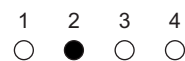> You may use a calculator.

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.
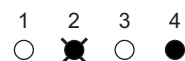
Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown:
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown:
- If you change your mind about an answer 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

This question is about IVF (in vitro fertilisation).

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

A   egg

B   embryo

C   fertilised egg

D   sperm

1	removed from the ovary
2	donated by the father
3	inserted into womb
4	divides to form a ball of cells

QUESTION TWO

Different organs produce different substances.

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

A   skin

B   liver

C   kidney

D   gland

1	produces urine
2	produces hormones
3	produces sweat
4	produces cholesterol

Turn over for the next question

Turn over ▶

QUESTION THREE

This question is about chemicals which may be taken into the body.

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

A   alcohol

B   cannabis

C   carbon monoxide

D   nicotine

1	may damage the liver and the brain
2	may cause reduced oxygen supply to the fetus
3	may lead to mental illness
4	an addictive chemical in cigarette smoke

QUESTION FOUR

This question is about reflex actions.

An insect flies near to the eyes of a boy.
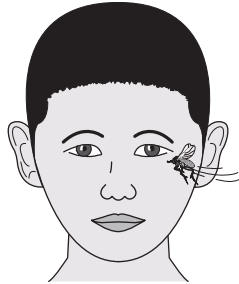
The boy blinks his eyes very quickly.

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

A   blinking

B   cells in the eye

C   insect

D   muscle in the eyelid

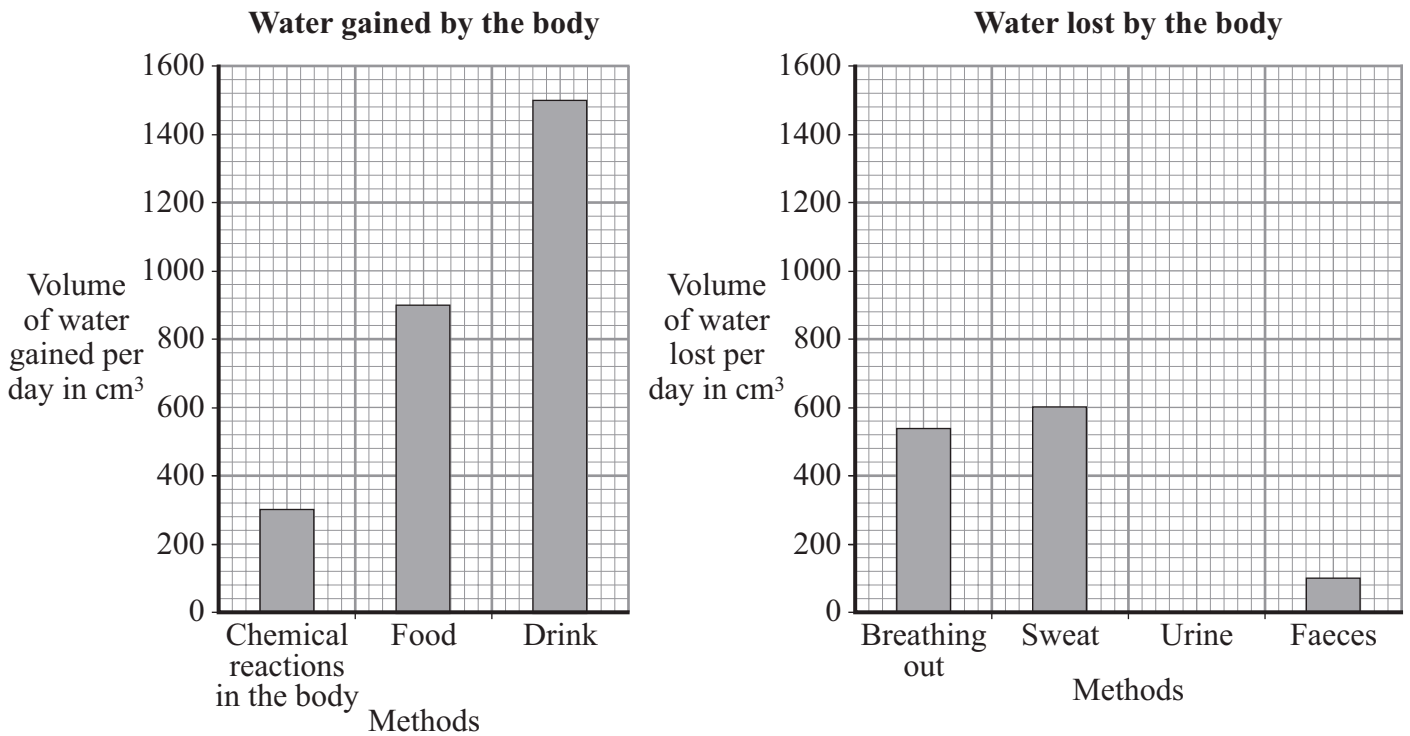| 1	effector
2	response
3	stimulus
4	receptor

Turn over for the next question

Turn over ▶

QUESTION FIVE

This question is about the water balance of the body.

The volume of water gained by the body must be the same as the volume of water lost by the body over the same time.

The bar charts show the volume of water gained and the volume of water lost per day.

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

A   540 cm³

B   1460 cm³

C   1500 cm³

D   2700 cm³

1	the volume of water gained in drinks
2	the total volume of water gained
3	the volume of water lost by breathing out
4	the volume of water that would be lost in the urine to balance the water gained by the body with the water lost

QUESTION SIX

Our bodies defend themselves naturally against infections. We also use other methods to protect ourselves against infections and to relieve the symptoms of disease.

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

A   antibiotics

B   painkillers

C   antibodies

D   vaccines

1	given to people to provide immunity
2	medicines that kill bacteria
3	produced by white blood cells
4	relieve symptoms of disease

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

Thalidomide is a drug that caused severe side effects in many people when it was first used.

7A   Thalidomide was developed . . .

    1   to relieve morning sickness.

    2   as a sleeping pill.

    3   as a painkiller.

    4   as a recreational drug.

7B   The problems arose when thalidomide was used with pregnant women.

    This was because . . .

    1   the drug had been banned for use with women who were pregnant.

    2   women were taking it without a prescription.

    3   it had not been tested with women who were pregnant.

    4   cheaper versions of the drug were being sold.

7C   The first signs of a problem were when . . .

    1   women developed morning sickness.

    2   women had multiple births.

    3   babies were born with low birth weight.

    4   babies were born with limb abnormalities.

7D   Thalidomide is now used to treat . . .

1   leprosy.

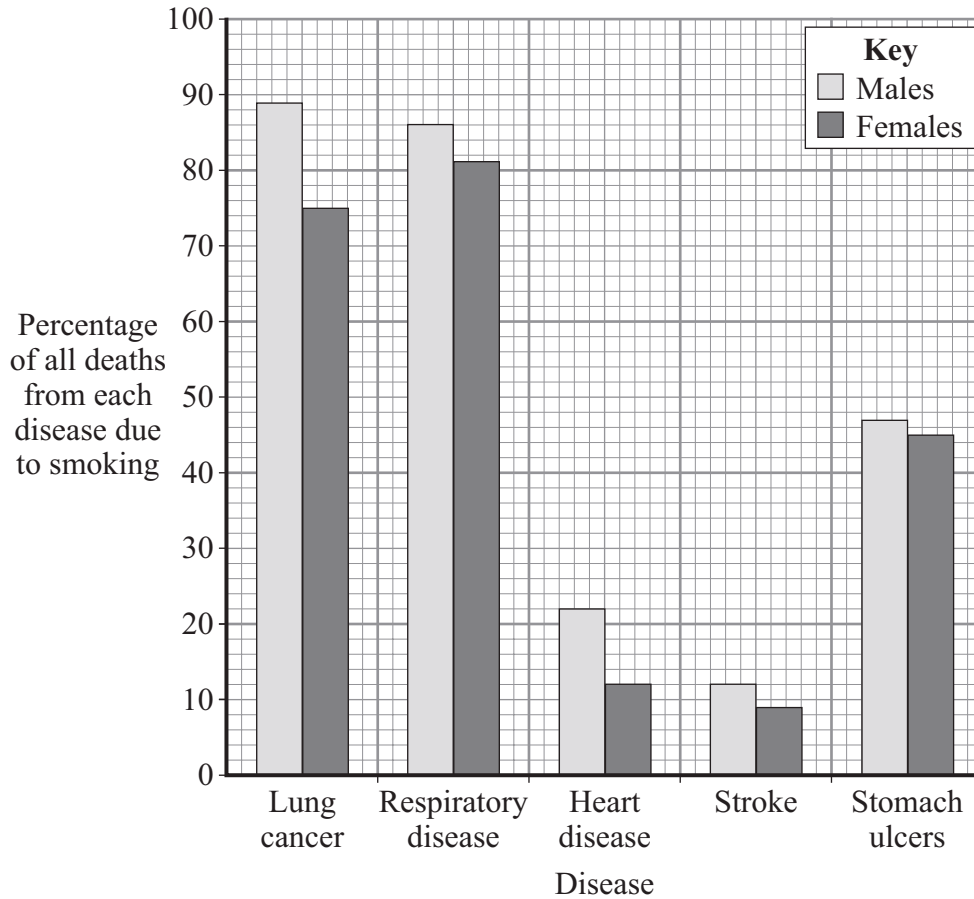**2**   diabetes.

3   rubella.

4   MRSA.

Turn over for the next question

Turn over ▶

QUESTION EIGHT

This question is about smoking and disease.

The bar chart shows the percentages of deaths due to smoking for five different diseases.

8A In women, which disease shows the highest percentage of deaths that are thought to be due to smoking?

1 lung cancer

2 respiratory disease

3 heart disease

4 stroke

8B   What percentage of deaths from respiratory disease in males is due to causes other than
smoking?

1   12

2   14

3   81

4   86

8C   The total number of women who died from stomach ulcers was 2220.

How many of these deaths were caused by smoking?

1   550

2   999

3   1110

4   1665

8D   Which is the best conclusion that can be drawn from the bar chart?

1   Smoking causes most of the deaths due to stomach ulcers.

2   The chance of dying from any of the five diseases is increased if you smoke.

3   There is a strong link between smoking and death from heart disease.

4   The chance of dying from a stroke is not increased by smoking.

Turn over for the next question

Turn over ▶

QUESTION NINE

In 1970, Linus Pauling, a famous prize-winning scientist, said that high doses of vitamin C had stopped him from getting common colds.

As a result, many people believed that taking vitamin C tablets could prevent them catching a cold. A research group looked at over 1000 people who took vitamin C tablets. It concluded that for the average person there was no advantage in taking extra vitamin C.

9A From the information given, it seems that many people believed that vitamin C could prevent a cold because of . . .

1 a proven causal link.

2 scientific evidence.

3 the status of the scientist.

4 valid and reliable evidence.

9B Why did the research group want to include as many people as possible in the research?

1 to increase the chances of the conclusion being valid

2 to increase the chances of the hypothesis being correct

3 to reduce the number of anomalous results

4 to reduce the need for placebos

9C Which of the following methods should be used by the research group to identify if a person has a cold?

1 ask people to report when they have sneezed five times in a day

2 ask people to say when they have a cold

3 have them examined by a doctor

4 measure how deeply they can breathe

9D In a further study, 300 people were given vitamin C to find out if taking vitamin C stops you from getting a cold.

- People in group **A** were given regular small doses of vitamin C for five years.
- People in group **B** were given one large dose of vitamin C each year for five years.

People in group **B** were found to have a 66% lower chance of catching colds in the five year period than people in group **A**.

The investigation could be criticised because . . .

1 a placebo was not included.

2 it is not ethical to give people different doses of vitamin C.

3 five years is too long to wait for results.

4 a 66% lower chance is not significant.

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**.

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QUESTION ONE

Our bodies defend themselves naturally against infections. We also use other methods to protect ourselves against infections and to relieve the symptoms of disease.

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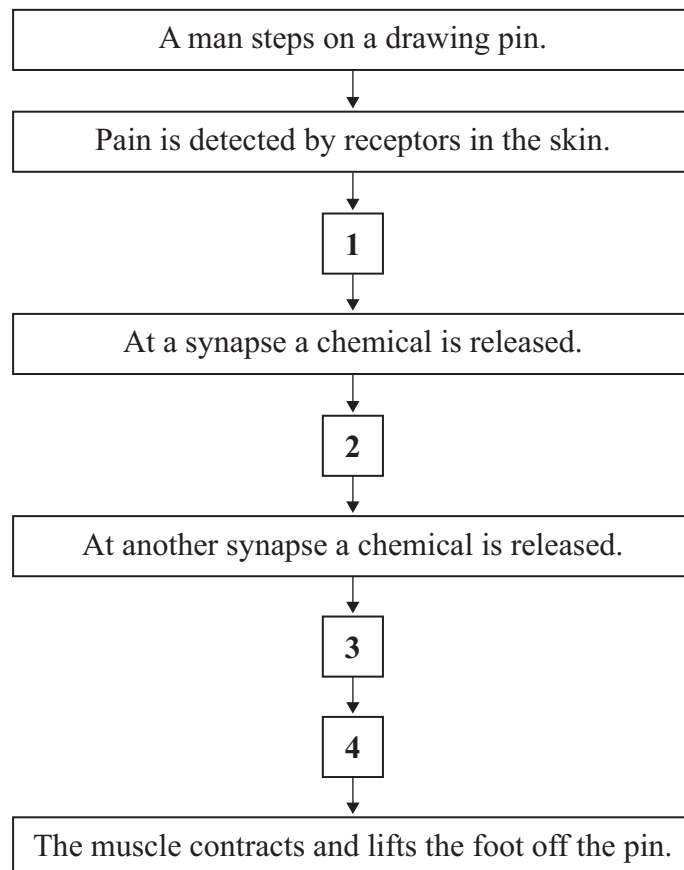| 1	given to people to provide immunity
2	medicines that kill bacteria
3	produced by white blood cells
4	relieve symptoms of disease

QUESTION TWO

Reflex actions are automatic and happen very quickly in order to protect the body from harm.
For example, if you step on a drawing pin, you pull your foot away quickly.

Match statements, **A**, **B**, **C** and **D**, with the numbers **1–4** in the flow chart to explain what happens in the nervous system.

A   an impulse reaches the effector in the leg

B   an impulse passes along a relay neurone

C   an impulse passes along a sensory neurone to the central nervous system

D   an impulse passes along a motor neurone

A man steps on a drawing pin.

↓

Pain is detected by receptors in the skin.

↓

1

↓

At a synapse a chemical is released.

↓

2

↓

At another synapse a chemical is released.

↓

3

↓

4

↓

The muscle contracts and lifts the foot off the pin.

Turn over ▶

SECTION TWO

Questions **THREE** to **NINE**.

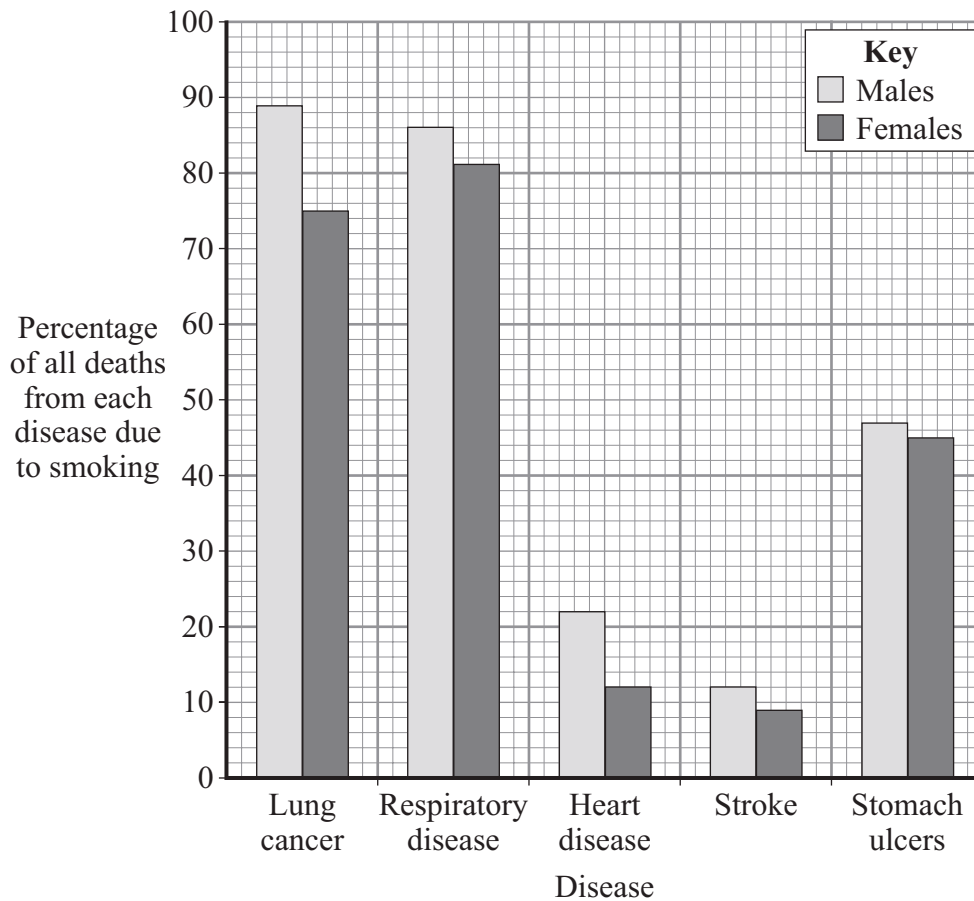Each of these questions has four parts.

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

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QUESTION THREE

This question is about smoking and disease.

The bar chart shows the percentages of deaths due to smoking for five different diseases.

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3B What percentage of deaths from respiratory disease in males is due to causes other than smoking?

1 12

2 14

3 81

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3C The total number of women who died from stomach ulcers was 2220.

How many of these deaths were caused by smoking?

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3D Which is the best conclusion that can be drawn from the bar chart?

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Turn over for the next question

QUESTION FOUR

In 1970, Linus Pauling, a famous prize-winning scientist, said that high doses of vitamin C had stopped him from getting common colds.

As a result, many people believed that taking vitamin C tablets could prevent them catching a cold. A research group looked at over 1000 people who took vitamin C tablets. It concluded that for the average person there was no advantage in taking extra vitamin C.

4A From the information given, it seems that many people believed that vitamin C could prevent a cold because of . . .

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4B Why did the research group want to include as many people as possible in the research?

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Turn over for the next question

Turn over ▶

QUESTION FIVE

5A   During a race, a runner produces a lot of sweat.

This can be dangerous because . . .

    1   less water is lost as urine due to an increase in sweating.

    2   less energy is available for running, as more energy is used to cool the body.

    3   the ion concentration in the blood rises because more water is lost by increased sweating.

    4   the rates of chemical reactions in the body decrease.

5B   Carbohydrates are necessary in a sports drink in order to . . .

    1   replace the ions lost in sweat during a race.

    2   replace the sugars used in energy release during the race.

    3   balance the amount of water lost in sweat during the race.

    4   increase the growth of muscle during a race.

The table shows the composition of four different sports drinks, **P**, **Q**, **R** and **S**.

Drink	Glucose in g per dm^3	Ions in mg per dm^3	Fats in mg per dm^3	Protein in g per dm^3
P	110	23	0	1.2
Q	68	96	0.1	0
R	78	82	0.3	0
S	136	25	0	0.2

5C   During a race, a runner drinks 5 bottles of drink **Q**. Each bottle contains 0.5 dm^3 of the drink.

Which line correctly shows his intake of glucose and ions?

	Intake of glucose in g	Intake of ions in mg
1	17	24
2	65	95
3	170	240
4	272	384

5D   One factor which influences the rate of uptake of ions from a sports drink into an athlete's blood is the ratio of the ion concentration to the glucose concentration. The nearer this ratio is to 1:1, the greater the rate of ion uptake from the drink.

Considering **only** this factor, from which drink would the rate of ion uptake be the greatest?

1   **P**

2   **Q**

3   **R**

4   **S**

Turn over ▶

QUESTION SIX

Cholesterol is a type of fat (lipid) found in cell membranes. It is transported around the body as lipoproteins in the blood.

6A High levels of cholesterol in the blood are likely to cause disease of the . . .

 1 blood vessels.

 2 brain.

 3 liver.

 4 lungs.

6B The balance of low-density lipoproteins (LDLs) to high-density lipoproteins (HDLs) in the blood is important for good health.

 Which is the best balance for good health?

 1 high levels of HDLs and low levels of LDLs

 2 low levels of HDLs and low levels of LDLs

 3 low levels of HDLs and high levels of LDLs

 4 high levels of HDLs and high levels of LDLs

6C The amount of LDLs that the liver can remove from the blood depends on the number of LDL receptors in the cell membranes of liver cells.

 Which of the following is most likely to influence the number of LDL receptors in the cell membranes of liver cells?

 1 diet

 2 the LDL level in the blood

 3 inherited factors

 4 amount of exercise

6D Which substance is most likely to increase blood cholesterol levels?

1 monounsaturated fat

2 polyunsaturated fat

3 saturated fat
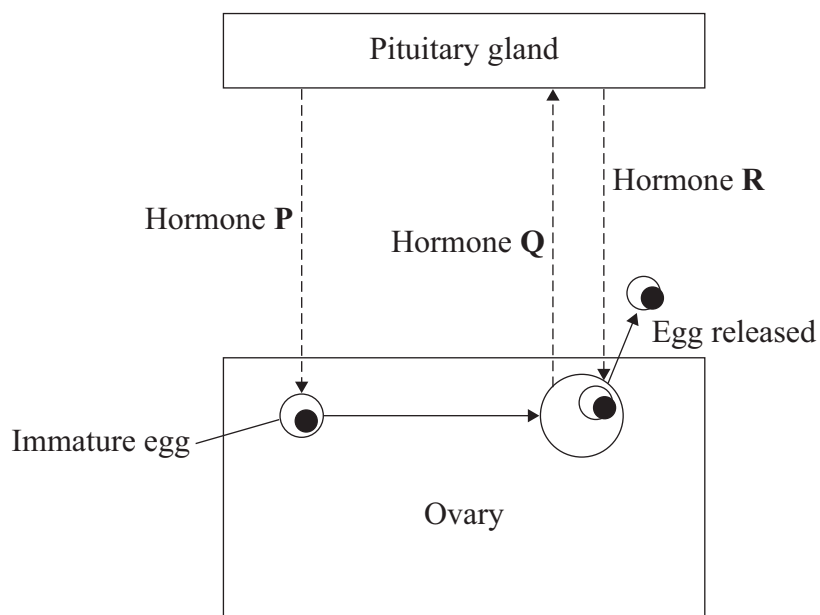
4 statins

Turn over for the next question

Turn over ▶

QUESTION SEVEN

Hormones produced in the body control the menstrual cycle.

The diagram shows how some hormones are involved in controlling the menstrual cycle.

7A   Which line correctly identifies hormones **P**, **Q**, and **R**?

	P	**Q**	**R**
1	FSH	oestrogen	LH
2	LH	oestrogen	FSH
3	FSH	LH	oestrogen
4	oestrogen	FSH	LH

7B   Oral contraceptives contain hormones that . . .

   1   inhibit FSH production.

   2   stimulate LH production.

   3   prevent sperm cells from fertilising.

   4   stimulate the pituitary gland to release more oestrogen.

7C   Fertility drugs involve the use of . . .

   1   FSH to stimulate eggs to mature.

   2   LH to stimulate oestrogen production.

   3   FSH to stimulate the release of eggs.

   4   oestrogen to stimulate LH production.

7D   IVF treatment usually involves giving a woman . . .

   1   FSH only.

   2   oestrogen only.

   3   LH and oestrogen.

   4   FSH and LH.

Turn over for the next question

Turn over ▶

QUESTION EIGHT

Measles is now an uncommon disease because millions of children have been given the MMR vaccine. The MMR vaccine is still used even though cases of measles are rare.

8A   Measles vaccine contains . . .

    1   antibodies.

    2   antitoxins.

    3   white blood cells.

    4   a weakened virus.

8B   If a child catches measles and then recovers, that child will **not** catch measles again because . . .

    1   the child can be vaccinated.

    2   the virus can no longer enter the body.

    3   white blood cells will quickly produce the same antibodies again.

    4   white blood cells will surround the virus.

MMR vaccination began in Japan in 1988. There was concern about a possible link between MMR and autism, so MMR vaccination ended in 1993.

The graph shows the percentage of children who were vaccinated with MMR and the number of children who developed autism.
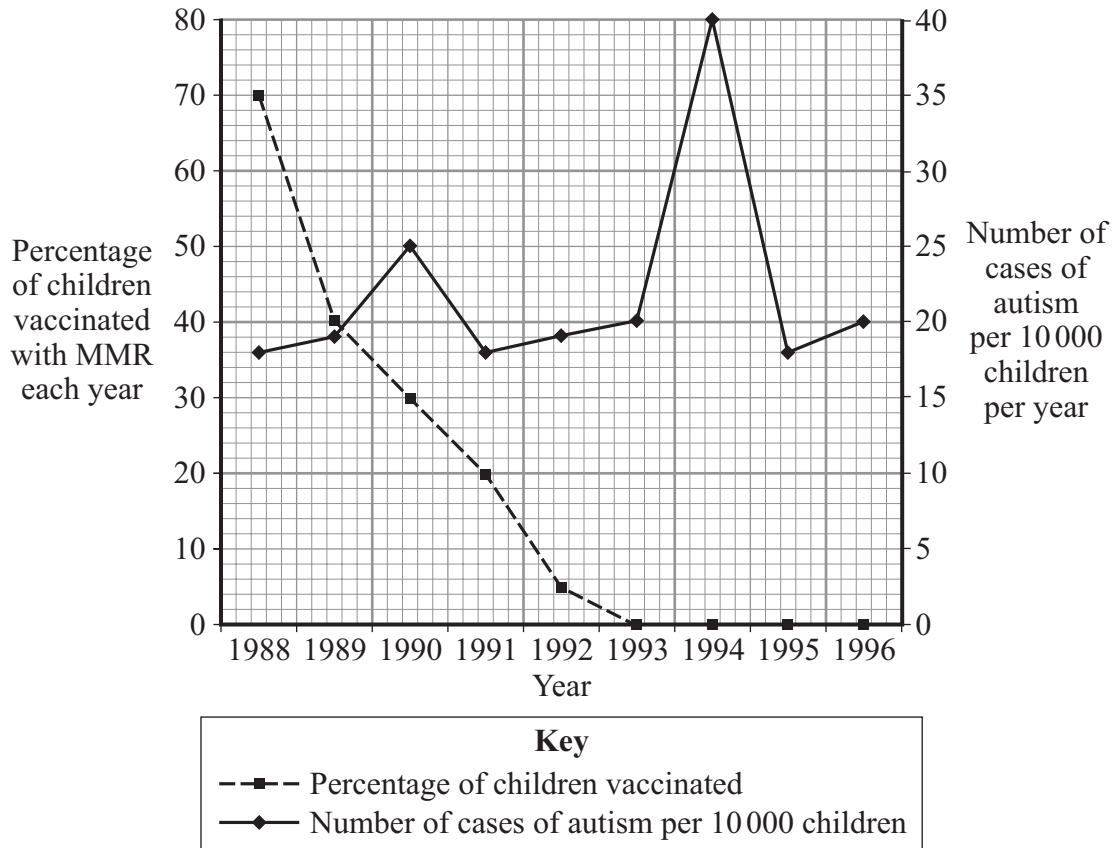
8C How many cases of autism would be expected in a city with a population of 50 000 children in 1990?

1   25

2   30

3   125

4   250

8D Does the data in the graph suggest that the MMR vaccine was causing autism?

1   yes, because the number of cases of autism falls as the vaccination rate falls

2   yes, because the rate of autism rises even when there was no MMR given

3   no, because the two graphs cross in 1989

4   no, because the rate of autism rises after the MMR vaccination had stopped

Turn over ▶

QUESTION NINE

Testing a new drug on healthy humans is regarded as essential before making it widely available for the treatment of patients.

9A   Drug trials do **not** . . .

  1   establish how effective a drug is at treating a particular illness.

  2   find out what method is best for giving the patient the drug.

  3   identify any possible side effects that result from being given the drug.

  4   prove that a drug is completely safe for use by the general public.

9B   During drug trials, some patients are given a placebo.

   Who knows which patients are being given the placebo?

  1   the patients only

  2   the doctors only

  3   both patients and doctors

  4   neither patients nor doctors

In 2006, six healthy young men suffered massive unexpected reactions to the drug TGN1412 given to them in a UK drug trial. Their reactions were severe enough to make some of them critically ill.

9C   The severe reaction to the drug that was observed with the six male volunteers had not been seen when the drug was given to laboratory animals.

   This suggests that . . .

  1   all drugs will produce reactions of this magnitude if not administered correctly.

  2   it is important to use animals whose body chemistry is as similar as possible to that of humans.

  3   testing drugs on animals should be stopped altogether.

  4   testing drugs on animals is a waste of resources.

9D   Appropriate doses of a drug need to be established through clinical trials before the drug can be marketed. This is done by trialling new drugs on human volunteers.

   Which of the following would reduce the risks to volunteers?

  1   giving all volunteers a different dose of the drug at the same time as each other

  2   giving all volunteers increasing doses of the drug at the same time as each other

  3   giving each volunteer a different dose of the drug at the same time as each other

  4   giving each volunteer a different dose of the drug at a different time from the others

END OF TEST