

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Secondary Education
Foundation Tier and Higher Tier
November 2009

Science A
Unit Biology B1a (Human Biology)
Biology
Unit Biology B1a (Human Biology)

BLY1AP
F&H

Thursday 19 November 2009 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.

1 2 3 4
○ ● ○ ○

1 2 3 4
○ ✘ ○ ●

1 2 3 4
○ ○ ✘ ✘

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 16 of this booklet.

FOUNDATION TIER

SECTION ONE

Questions **ONE** to **FIVE**.

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

Dust in the air made this boy sneeze.



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

- A** dust
- B** muscles
- C** nose
- D** sneeze

In this reflex action, the stimulus is the ... **1**

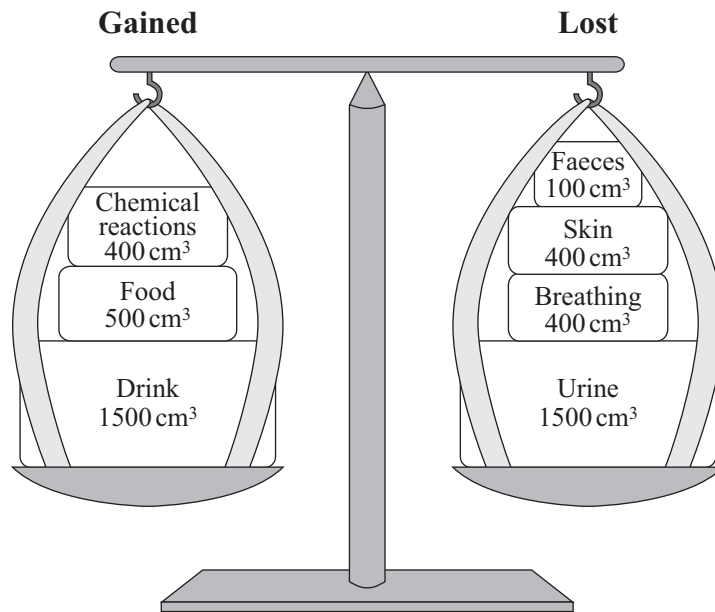
The receptors are found in the ... **2**

The response is the ... **3**

The response is brought about by the ... **4**

QUESTION TWO

The diagram represents water balance in the body.



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

- A** 100
- B** 400
- C** 900
- D** 2400

Volume of water in cm ³	
1	volume of water lost in the faeces
2	total volume of water gained
3	total volume of water gained from food and chemical reactions in the body
4	volume of water lost by sweating

Turn over ►

QUESTION THREE

Infectious diseases make us feel ill.

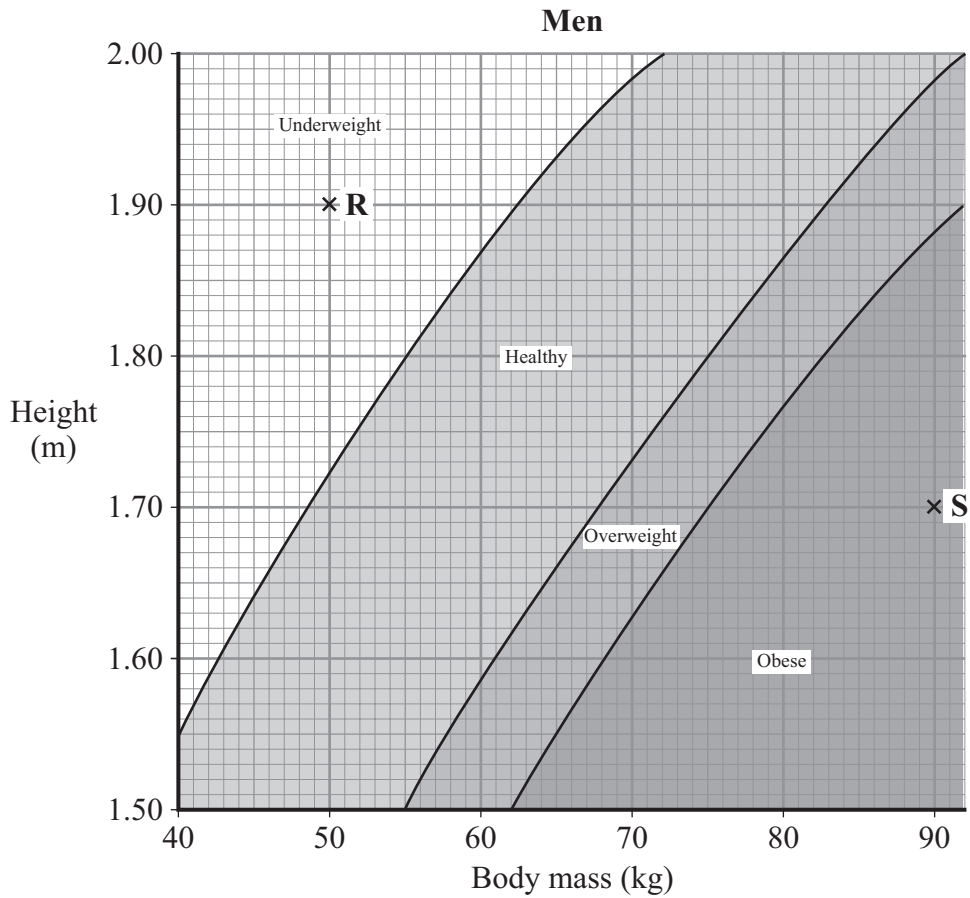
Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

- A** antibody
- B** medicine
- C** pathogen
- D** toxin

	Description
1	drug used to relieve the symptoms of a disease
2	substance produced by white blood cells
3	harmful microorganism
4	poison which makes us feel ill

QUESTION FOUR

The chart is used to find if a man is underweight, healthy or overweight.



Use the chart to match figures, **A**, **B**, **C** and **D**, with the statements 1–4 in the table.

- A** 1.72
- B** 1.90
- C** 9.00
- D** 90.00

1	the height in metres (m) of man R
2	the mass in kilograms (kg) of man S
3	the minimum mass in kilograms (kg) that a 1.6m tall man with a mass of 70kg needs to lose to become healthy
4	the tallest in metres (m) that a 50 kg man can be to be classed as healthy

Turn over ►

QUESTION FIVE

Some substances can harm the body.

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

A alcohol

B carbon monoxide

C carcinogen

D thalidomide

	Effect on body
1	reduces the amount of oxygen carried in the blood
2	may cause liver damage
3	may cause cancer
4	may cause limb abnormalities in babies

Turn over for the next question

Turn over ►

SECTION TWOQuestions **SIX** to **NINE**.

Each of these questions has four parts.

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

QUESTION SIX

John had his regular health check at his doctor's surgery.

John's blood test showed a high cholesterol level.

6A Where is cholesterol made in the body?

- 1 brain
- 2 heart
- 3 kidney
- 4 liver

6B The doctor asked John if there was a history of heart disease in his family.

The doctor needed to know this because . . .

- 1 high cholesterol diets are inherited.
- 2 high cholesterol production can be inherited.
- 3 high blood cholesterol concentrations cause weight loss.
- 4 if John's father had died of heart disease, it is certain that John would have heart disease.

The doctor asked John about his diet. John replied that he ate a lot of food from takeaways. He often ate takeaway food quickly while standing up.

6C John's diet is unhealthy because . . .

- 1 eating food quickly is bad for digestion.
- 2 takeaway foods often contain high levels of fat.
- 3 takeaway foods often contain high levels of protein.
- 4 eating food whilst standing up is bad for digestion.

6D The doctor also warned John that many takeaway meals contain high levels of salt.

Eating too much salt can be harmful because it can . . .

- 1 alter the balance between HDLs and LDLs.
- 2 clog up your arteries.
- 3 lead to diabetes.
- 4 lead to high blood pressure.

Turn over for the next question

Turn over ►

QUESTION SEVEN

Most pandemics are caused by viruses.

7A Viral diseases . . .

- 1 are usually fatal.
- 2 cannot be treated by using antibiotics.
- 3 can be treated by using thalidomide.
- 4 never produce symptoms.

Read the passage about a bird-flu vaccine trial.

The medical staff in a town in another country are being investigated about a vaccine trial that they carried out on 350 poor, homeless people last year. Investigators say that the trial involved an untested vaccine for the bird-flu virus.

The investigators claim that the homeless people were paid 2 Euros to be tested with what they thought was a normal flu vaccine. It was actually a bird-flu vaccine.

The director of a homeless centre in the town said that 21 people from his centre had died last year. The average number of deaths at the homeless centre is 8 in a year.

7B How many more deaths than the average were there in the homeless centre in the year of the trial?

- 1 8
- 2 13
- 3 21
- 4 29

7C The medical staff probably chose this group of people for the vaccine trial because they were . . .

- 1 poor.
- 2 homeless.
- 3 suffering from flu.
- 4 immune to normal flu.

7D New strains of pathogens may cause pandemics because . . .

- 1 it is impossible to produce a vaccine for them.
- 2 unhygienic practices in hospitals are increasing.
- 3 people are not aware of how dangerous they are.
- 4 most people are not immune to them.

Turn over for the next question

Turn over ►

QUESTION EIGHT

Smoking cannabis may affect health.

8A Cannabis . . .

- 1 is a very addictive drug.
- 2 is a legal drug.
- 3 is a recreational drug.
- 4 contains nicotine.

The table shows the results of a survey about cannabis smoking and depression.

How many times cannabis was used in the past year	Men		Women	
	Number in survey	% who got depression	Number in survey	% who got depression
Fewer than 5	523	9	7	19
Between 5 and 50	60	10	46	17
1 to 4 times each week	73	12	32	31
Daily	73	15	37	68

8B 60 men in the survey used cannabis between 5 and 50 times per year.

How many of these men got depression?

- 1 6
- 2 10
- 3 50
- 4 70

8C Which pattern is shown by all the data in the table?

- 1 Cannabis has a greater effect on men than on women.
- 2 Cannabis has a greater effect on women than on men.
- 3 Men and women are affected equally by cannabis.
- 4 Increased use of cannabis always results in an increase in the percentage of users who get depression.

8D Which of the following is a true statement?

- 1 The data proves that smoking cannabis causes depression.
- 2 The data provides evidence of a link between smoking cannabis and depression.
- 3 The data shows that there is no link between smoking cannabis and depression.
- 4 There were too few people in the survey to draw a reliable conclusion.

Turn over for the next question

Turn over ►

QUESTION NINE

A student designed an investigation to test two hypotheses about operating a remote-controlled car round a circuit.

Hypothesis 1

16-year-old boys would operate the car at a faster speed than 16-year-old girls.

Hypothesis 2

Boys and girls would make the same number of mistakes while operating the car.

This is the design of the student's investigation.

- Give a brief demonstration on how to operate the car.
- Let the person practise for one minute.
- Put the car at the starting point.
- When the person is ready, say 'go' and start the stopwatch.
- While the person operates the car, record the number of mistakes made and the time taken to complete the circuit.

She tested 27 boys and 28 girls.

9A The student got her idea for her second hypothesis from one of her teachers. This teacher said, 'some friends of mine have told me that nowadays both boys and girls operate remote-controlled cars'.

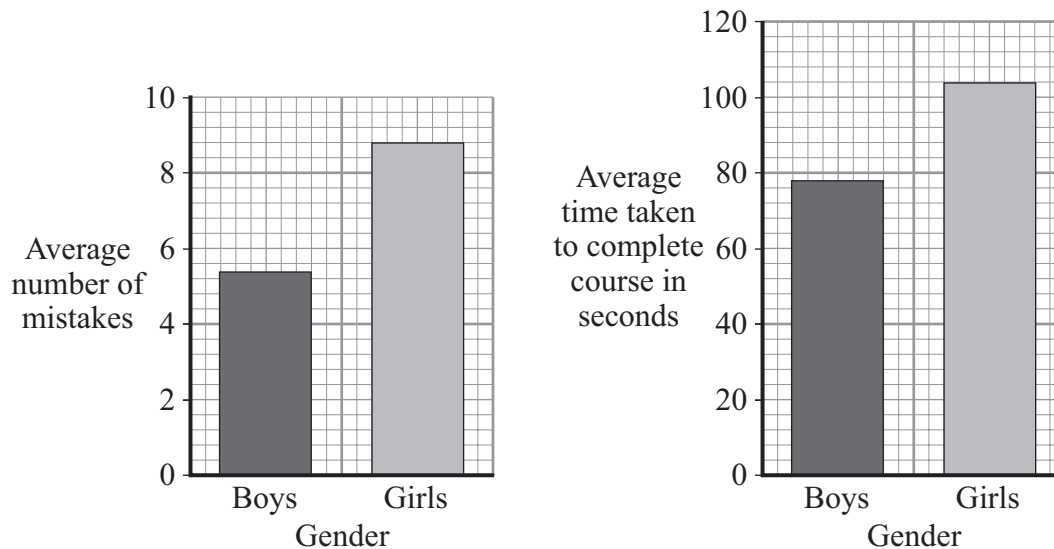
The teacher's statement is an example of . . .

- 1 hearsay.
- 2 a model.
- 3 a theory.
- 4 a survey.

9B Which variable was **not** the same for both groups of pupils?

- 1 age of the pupils
- 2 number of pupils
- 3 practice time
- 4 length of the course

The graphs show the student's results.



9C What was the difference between the average number of mistakes made by boys and the average number of mistakes made by girls?

- 1 1.7
- 2 3.2
- 3 3.4
- 4 3.6

9D Which of the following is supported by the student's data?

- 1 hypothesis 1 only
- 2 hypothesis 2 only
- 3 both hypothesis 1 and hypothesis 2
- 4 neither hypothesis 1 nor hypothesis 2

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

Some substances can harm the body.

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

- A** alcohol
- B** carbon monoxide
- C** carcinogen
- D** thalidomide

	Effect on body
1	reduces the amount of oxygen carried in the blood
2	may cause liver damage
3	may cause cancer
4	may cause limb abnormalities in babies

QUESTION TWO

The human body defends itself against diseases caused by microorganisms.

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

A antibodies

B antitoxins

C pathogens

D vaccines

Microorganisms that can cause diseases are called . . . **1**

To kill invading organisms, white blood cells produce . . . **2**

Poisons produced by microorganisms are neutralised by . . . **3**

Immunity to a disease can be achieved by using . . . **4**

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

Smoking cannabis may affect health.

3A Cannabis . . .

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The table shows the results of a survey about cannabis smoking and depression.

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3B 60 men in the survey used cannabis between 5 and 50 times per year.

How many of these men got depression?

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3C Which pattern is shown by all the data in the table?

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Turn over for the next question

Turn over ►

QUESTION FOUR

A student designed an investigation to test two hypotheses about operating a remote-controlled car round a circuit.

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She tested 27 boys and 28 girls.

- 4A** The student got her idea for her second hypothesis from one of her teachers. This teacher said, 'some friends of mine have told me that nowadays both boys and girls operate remote-controlled cars'.

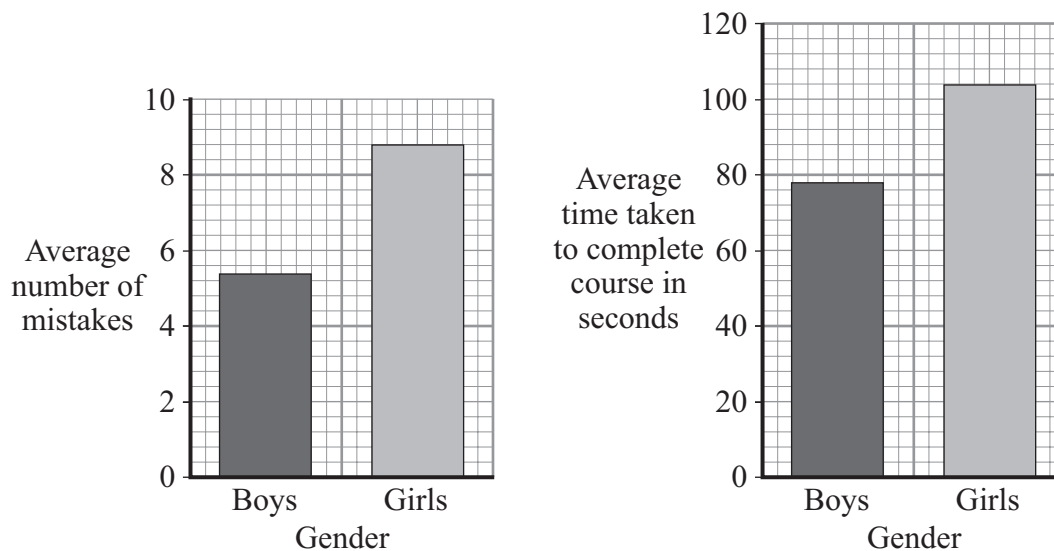
The teacher's statement is an example of . . .

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4B Which variable was **not** the same for both groups of pupils?

- 1 age of the pupils
- 2 number of pupils
- 3 practice time
- 4 length of the course

The graphs show the student's results.



4C What was the difference between the average number of mistakes made by boys and the average number of mistakes made by girls?

- 1 1.7
- 2 3.2
- 3 3.4
- 4 3.6

4D Which of the following is supported by the student's data?

- 1 hypothesis 1 only
- 2 hypothesis 2 only
- 3 both hypothesis 1 and hypothesis 2
- 4 neither hypothesis 1 nor hypothesis 2

Turn over ►

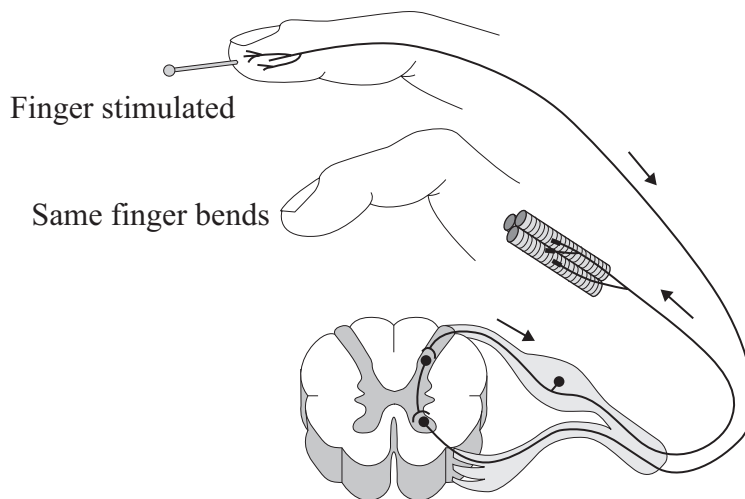
QUESTION FIVE

The body responds to stimuli.

5A The skin has receptors that are sensitive to . . .

- 1 touch and pain only.
- 2 touch and pressure only.
- 3 touch, pressure and pain only.
- 4 touch, pressure, pain and temperature changes.

The diagram shows the pathway of nerve impulses in a reflex action.



5B The sequence of structures in the reflex arc are . . .

- 1 effector → sensory neurone → motor neurone → relay neurone → receptor
- 2 effector → sensory neurone → relay neurone → motor neurone → receptor
- 3 receptor → relay neurone → sensory neurone → motor neurone → effector
- 4 receptor → sensory neurone → relay neurone → motor neurone → effector

5C Relay neurones are found in . . .

- 1 glands.
- 2 the central nervous system.
- 3 the skin.
- 4 the muscles.

5D At the synapse between each of the neurones, . . .

- 1 a chemical is released that diffuses to the next neurone.
- 2 an electric impulse passes through the solution in the synapse.
- 3 a small electric current stimulates the next neurone.
- 4 the impulse jumps to the next neurone in the muscles.

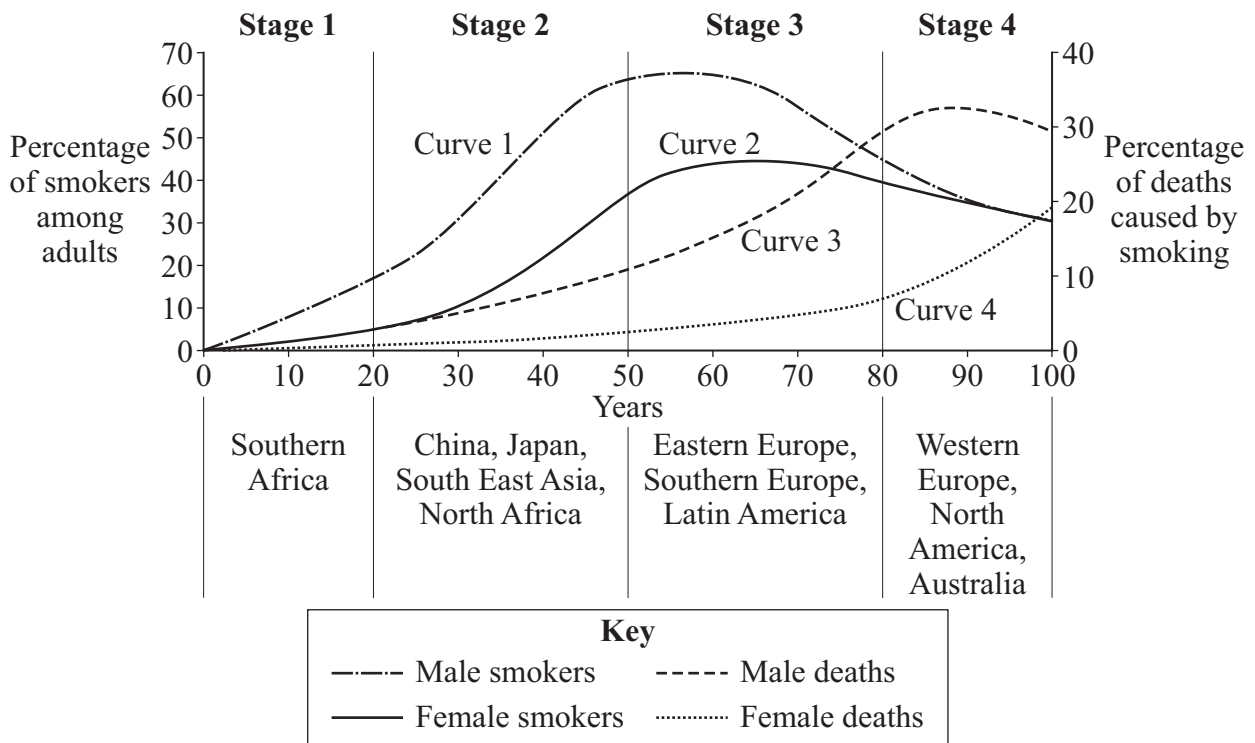
Turn over for the next question

Turn over ►

QUESTION SIX

Scientists have developed a model to show the way in which the worldwide spread of tobacco dependency can be divided into four stages. The graph shows the percentage of adult smokers and the percentage of smoking-related deaths at each stage. The names of some regions have been added to show which stage they are at.

The way in which the number of smokers in a region rises and falls is shown by curves 1 and 2. Curves 3 and 4 show the percentage of deaths due to smoking-related diseases some years later.



6A In which region does smoking among women appear to be falling?

- 1 Australia
- 2 Southern Africa
- 3 Japan
- 4 North Africa

- 6B** The percentage of deaths caused by smoking reaches a peak many years after the percentage of smokers in a region reaches a peak.

About how many years are there between these two peaks for male smokers?

- 1 15
- 2 30
- 3 40
- 4 45

- 6C** Which of the following is a correct conclusion from the data?

- 1 Female smokers have a higher chance of death due to a smoking-related disease than male smokers.
- 2 Smoking more cigarettes increases the chance of death due to a smoking-related disease.
- 3 Not all smokers die due to a smoking-related disease.
- 4 At any stage, in any country, there are likely to be more female smokers than male smokers.

- 6D** Not all regions fit this ‘tobacco dependency’ model perfectly.

Approximately 2% of Chinese women smoke.

This means that . . .

- 1 the number of Chinese female smokers will probably increase to a peak in about forty years’ time.
- 2 2% of Chinese female smokers die each year due to smoking related diseases.
- 3 smoking among Chinese females is in **Stage 1** of the tobacco dependency model.
- 4 there are more female smokers in China than in Southern Africa.

Turn over for the next question

Turn over ►

QUESTION SEVEN

Statins are drugs that affect how the liver works.

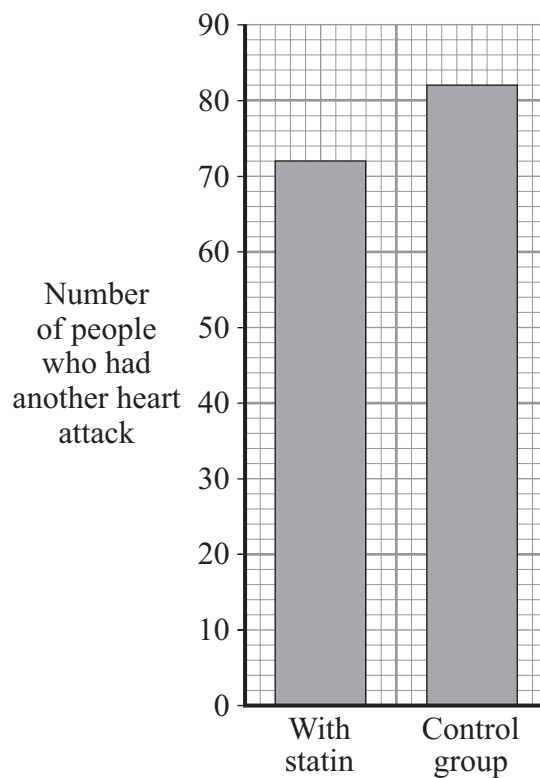
7A Statins reduce . . .

- 1 the amount of sugar in the blood.
- 2 the amount of salt in the blood.
- 3 the amount of cholesterol in the blood.
- 4 the amount of nicotine in the blood.

A new statin was trialled on patients who had previously had a heart attack.

- 300 volunteers were involved in the trial, which continued for five years.
- They were split into two equal sized groups.
- Only one group was given the drug; the other volunteers formed the control group.

The number of volunteers who had another heart attack during the five years of the trial is shown in the graph.



7B In a well-designed trial, what would the volunteers in the control group have been given instead of the test drug?

- 1 nothing
- 2 water
- 3 a different drug
- 4 a placebo

7C What conclusion can be drawn from this data?

- 1 Statins prevent heart attacks.
- 2 Statins reduce the risk of heart attacks in all people.
- 3 Statins reduce the risk of a second heart attack.
- 4 Statins have no effect on the incidence of heart attacks.

7D People who take statins should not drink grapefruit juice. A chemical in grapefruit juice inhibits the action of the liver enzyme that breaks down statins. The effect of this can be breakdown of muscle fibres and, in extreme cases, kidney failure.

What does this information suggest might happen to people who take statins and drink grapefruit juice?

- 1 The concentration of liver enzymes in the blood will increase.
- 2 The concentration of statins in the blood will increase.
- 3 The concentration of statins in the blood will decrease.
- 4 The concentration of statin breakdown products in the blood will increase.

Turn over for the next question

Turn over ►

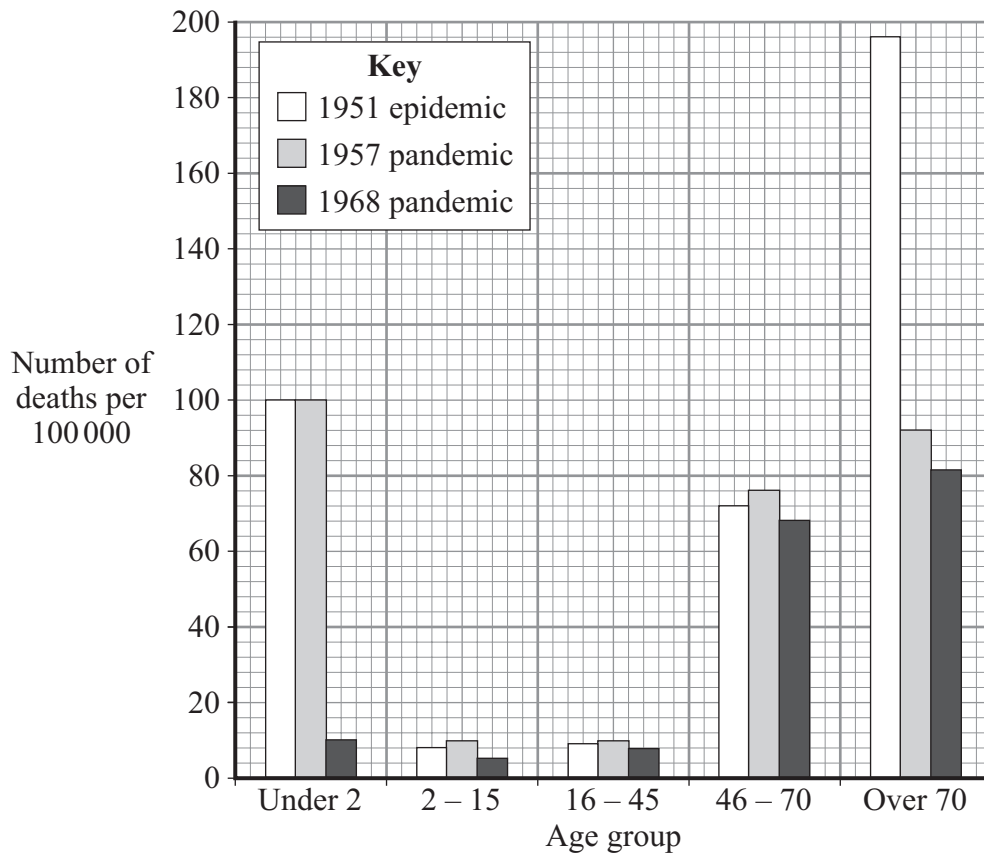
QUESTION EIGHT

Some pathogens cause epidemics and pandemics.

8A What is the difference between a pandemic and an epidemic?

- 1 An epidemic results in more deaths.
- 2 A pandemic is caused by viruses and an epidemic is caused by bacteria.
- 3 Pandemics cause deaths over a wider area.
- 4 Only an epidemic is caused by a mutation in viruses or bacteria.

The bar chart shows the number of deaths per 100 000 people, due to influenza, in three different years.



8B How many deaths per 100 000 due to influenza in the 46 to 70 age group occurred in the 1951 epidemic?

- 1 68
- 2 70
- 3 72
- 4 76

8C What conclusion can be drawn from this data?

- 1 There is no link between age and the number of deaths due to influenza.
- 2 There were fewer deaths in the 1968 pandemic than in the 1957 pandemic and the 1951 epidemic.
- 3 In each of the three outbreaks, people over 70 have the highest death rate.
- 4 During the three outbreaks there were similar death rates for each age group.

8D If a person gets influenza, the body tries to defend itself.

Which of the following statements describes the body's response?

White blood cells . . .

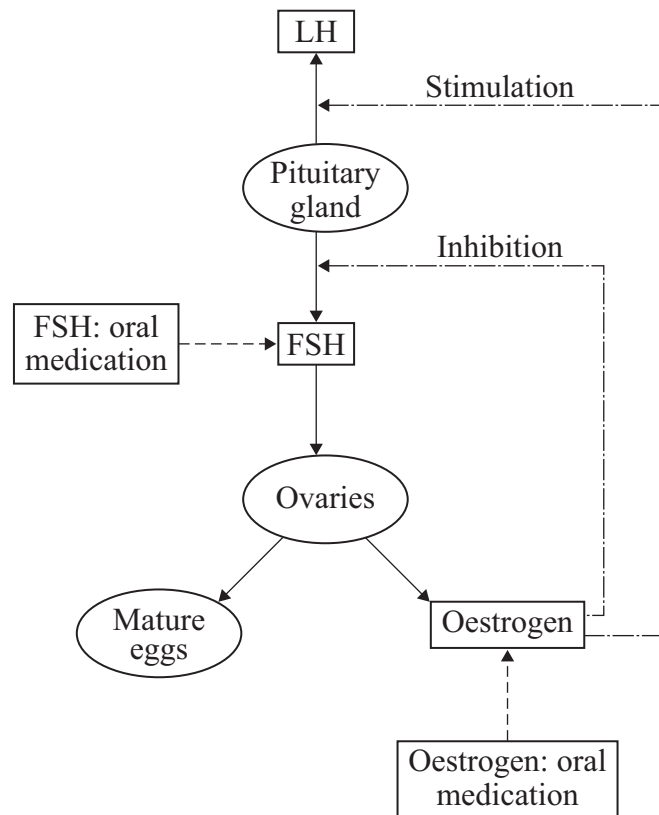
- 1 produce antitoxins which destroy the pathogen.
- 2 produce antibiotics which destroy the pathogen.
- 3 ingest the pathogens.
- 4 produce antibodies which counteract the toxins.

Turn over for the next question

Turn over ►

QUESTION NINE

The diagram shows hormones involved in the control of the menstrual cycle and fertility.



9A A woman takes pills containing oestrogen.

The effect of this will be to . . .

- 1 encourage the production of more oestrogen by the ovaries.
- 2 increase the likelihood of pregnancy by encouraging the production of LH.
- 3 inhibit FSH production and stimulate eggs to mature.
- 4 inhibit FSH production and so inhibit the maturation of eggs.

9B A woman takes pills containing FSH.

The effect of this will be to . . .

- 1 stimulate the maturation of eggs.
- 2 inhibit the maturation of eggs.
- 3 reduce oestrogen production.
- 4 reduce LH production.

9C To assist the release of several eggs, a woman should be treated with medication containing . . .

- 1 FSH only.
- 2 FSH and LH.
- 3 oestrogen only.
- 4 oestrogen and FSH.

9D Which one of the following is based on scientific rather than ethical considerations in relation to IVF procedures?

- 1 Unused but fertile eggs should be destroyed.
- 2 The number of eggs collected should give the best chance of success.
- 3 The sex of the embryo which is to be implanted should be chosen by parents.
- 4 Single mothers should be offered IVF treatment.

END OF TEST

There are no questions printed on this page