AQA GCSE SCIENCE A (BIOLOGY)

BIOLOGY



EXAM QUESTION PACK

UNIT B1a OBJECTIVE TEST BLY1AP PAPERS

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
November 2012

Science A

Unit Biology B1a (Human Biology)

Biology

Unit Biology B1a (Human Biology)

BLY1AP

F&H

Tuesday 6 November 2012 Afternoon Session

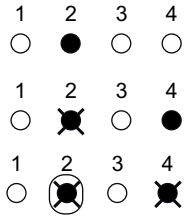
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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.

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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 **FIVE**.

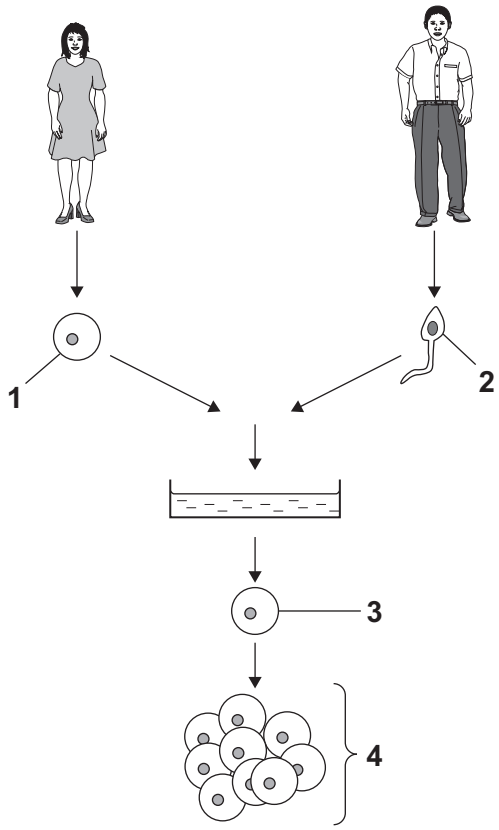
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

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

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QUESTION TWO

Many factors can cause diseases.

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

A arthritis

B diabetes

C heart disease

D high blood pressure

	Factor
1	blood sugar level is high in this disease
2	joints become worn in this disease
3	too much cholesterol causes this disease
4	too much salt in the diet causes this disease

Turn over for the next question

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QUESTION THREE

Water leaves your body from several organs.

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

A glands

B kidneys

C lungs

D skin

When you breathe out, water vapour leaves your . . . **1** . . . .

When you sweat, water leaves the surface of your . . . **2** . . . .

Water is lost in urine produced by the . . . **3** . . . .

Hormones control the total amount of water lost from the body.

Hormones are produced by . . . **4** . . . .

QUESTION FOUR

The drug thalidomide was banned because it caused limb abnormalities in human embryos.
Now thalidomide is being tested to find out if it can be used to treat people with the disease AIDS.

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

A doctors

B pregnant women

C politicians

D volunteers

The tests will be designed by . . . **1** . . . .

In the tests, the drug will first be given to . . . **2** . . . .

The drug should not be tested on . . . **3** . . . .

The final decision on whether or not the drug is allowed to be prescribed for people with AIDS will be made by . . . **4** . . . .

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QUESTION FIVE

This question is about some substances taken into the body, or produced in the body, when we are ill.

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

A antibiotics

B antibodies

C painkillers

D toxins

	Feature
1	chemicals produced by white blood cells
2	drugs taken to kill bacteria in the body
3	drugs taken to relieve the symptoms of some diseases
4	chemicals produced by bacteria

Turn over for the next question

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Section Two

Questions **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

Several factors can affect the metabolic rate in humans.

6A What is *metabolic rate*?

1 how fast someone can run

2 how much food you eat each day

3 how fast the blood flows around the body

4 how fast chemical reactions happen in the cells of the body

The table shows the body mass and metabolic rate of five different animals.

Animal	Mass in kg	Metabolic rate at rest in arbitrary units
Rabbit	2	7
Sheep	50	100
Dolphin	80	160
Pig	100	50
Cow	400	480

6B One student said: 'The heavier the animal, the higher its metabolic rate at rest.'

Which animal does **not** fit this pattern?

1 rabbit

2 dolphin

3 pig

4 cow

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6C Another student suggested: 'The number for metabolic rate is always exactly double the number for mass.'

Which animals fit this suggestion?

1 sheep and pig

2 rabbit and cow

3 pig and dolphin

4 sheep and dolphin

6D A third student said: 'The more active an animal is, the higher its metabolic rate, compared to its body mass.'

If this is true, which animal is the most active?

1 rabbit

2 dolphin

3 pig

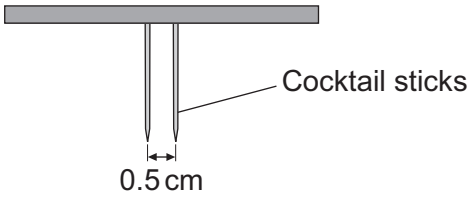
4 cow

Turn over for the next question

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QUESTION SEVEN

A class of 30 students did an investigation to find out how sensitive different parts of the body are to touch.



A student fixed the points of the two cocktail sticks 0.5 cm apart. He then pressed the sticks gently on different parts of the body of a blindfolded student. This was repeated with all 30 students.

The table below shows the number of students who were able to feel both points.

Part of the body tested	Number of students feeling both points
Forehead	15
Lip	27
Fingertip	29
Back of hand	14
Knee	9

7A What would be the best way to display these results?

1 a pie chart

2 a line graph

3 a bar chart

4 a scattergram

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7B From these results, which part of the body is most sensitive to touch?

1 knee

2 fingertip

3 lip

4 forehead

7C Some parts of the body are more sensitive to touch than other parts of the body.

This is because in these parts the skin contains more . . .

1 cells.

2 hairs.

3 muscles.

4 receptors.

7D A different class of students repeated the same experiment and got similar results.

What does this suggest?

1 The students all have sensitive skin.

2 The data collected is reliable.

3 The students made errors when collecting their data.

4 The two classes should have tested different parts of the body.

Turn over for the next question

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QUESTION EIGHT

Smoking cannabis may affect health.

8A Cannabis . . .

1 is a legal drug.

2 is a recreational drug.

3 contains nicotine.

4 is a **very** addictive drug.

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.

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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 not enough people in the survey to draw a reliable conclusion.

Turn over for the next question

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QUESTION NINE

If you take in less energy than you use, you will lose weight.
A diet book claims that a low-carbohydrate diet results in quicker weight loss and a more healthy body than a low-fat diet.

Scientists did an investigation to see if this claim is true.

- They used 120 overweight volunteers divided into two equal groups.
- Both groups were allowed 2000 kilocalories per day.
- **Group 1** was given a diet containing less than 20 g of carbohydrate per day.
- **Group 2** was given a low-fat diet containing less than 30% of energy from fat and less than 300 mg of cholesterol per day.
- Both groups were given the same exercise programmes to do at home.
- Both groups went to a weekly information meeting.

9A In what way did the scientists plan a controlled investigation?

1 All volunteers were allowed the same amount of fat per day.

2 All volunteers had the same starting weight.

3 All volunteers were given a low-cholesterol diet.

4 All volunteers were allowed the same amount of energy per day.

The results after 24 weeks are shown in the table.

	Group 1 Low carbohydrate diet	**Group 2 Low fat diet**
Percentage of volunteers who completed the trial	76%	57%
Mean change in body mass	–12.9%	–6.7%
Mean change in body fat mass	–9.4 kg	–4.8 kg
Mean change in blood high-density lipoproteins (HDL) concentration	+ 55 mg per litre	–16 mg per litre
Mean change in blood low-density lipoproteins (LDL) concentration	+ 16 mg per litre	–74 mg per litre

9B The investigation would have been more reliable if all the volunteers . . .

1 had been allowed more energy per day.

2 had done the exercise programme under supervision.

3 had lost the same amount of mass.

4 had been given the same amount of cholesterol per day.

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9C The difference in the mean change in blood HDL concentration between **Group 1** and **Group 2** was . . .

1 16 mg per litre.

2 39 mg per litre.

3 55 mg per litre.

4 71 mg per litre.

9D The data supports the diet book's claim because . . .

1 people on the low-carbohydrate diet had an increased blood LDL concentration.

2 people on the low-fat diet had a bigger decrease in blood HDL concentration.

3 people on the low-fat diet lost less body mass, on average.

4 more people on the low-carbohydrate diet completed the trial.

END OF TEST

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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**.

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QUESTION ONE

This question is about some substances taken into the body, or produced in the body, when we are ill.

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

A antibiotics

B antibodies

C painkillers

D toxins

	Feature
1	chemicals produced by white blood cells
2	drugs taken to kill bacteria in the body
3	drugs taken to relieve the symptoms of some diseases
4	chemicals produced by bacteria

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QUESTION TWO

This question is about the effects of different 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

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

Turn over for the next question

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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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Daily	73	15	37	68

3B 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

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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

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QUESTION FOUR

If you take in less energy than you use, you will lose weight.
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4B The investigation would have been more reliable if all the volunteers . . .

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4C The difference in the mean change in blood HDL concentration between **Group 1** and **Group 2** was . . .

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4D The data supports the diet book's claim because . . .

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2 people on the low-fat diet had a bigger decrease in blood HDL concentration.

3 people on the low-fat diet lost less body mass, on average.

4 more people on the low-carbohydrate diet completed the trial.

Turn over for the next question

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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 because of an increase in sweating.

2 less energy is available for running, because 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 needed in sports drinks 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.

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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 row of the table below 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 affecting 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**

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QUESTION SIX

This question is about reflex actions.

6A Which of the following describes reflex actions the best?

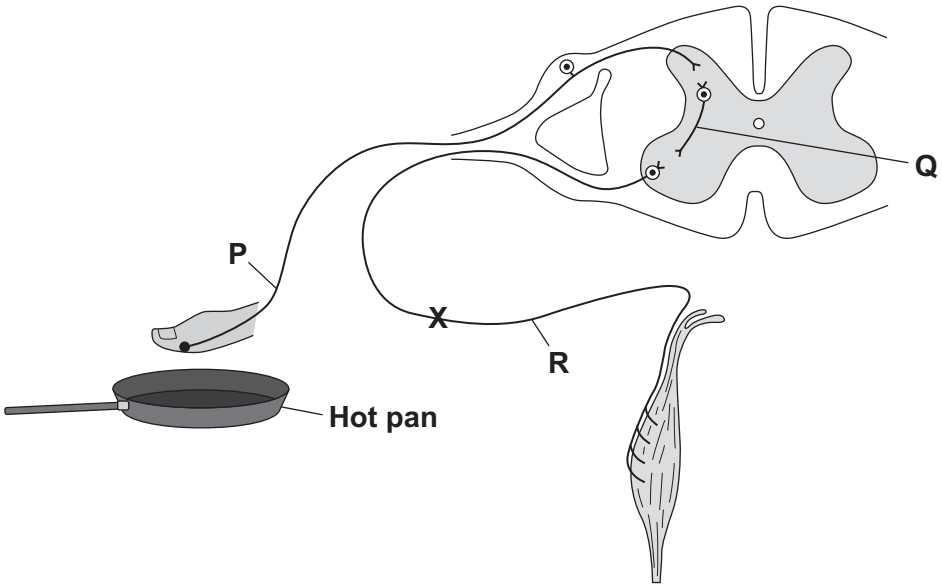
1 They are coordinated by both the brain and the spinal cord.

2 They are rapid, voluntary responses to a stimulus.

3 They involve receptors, effectors and neurones.

4 They always involve receptors and muscles.

A person accidentally touches a hot pan.
Her hand automatically moves away from the pan.
The diagram shows the parts involved in this action.



6B What types of neurone are **P** and **R**?

1 **P** is a relay neurone, **R** is a sensory neurone

2 **P** is a motor neurone, **R** is a sensory neurone

3 **P** is a sensory neurone, **R** is a relay neurone

4 **P** is a sensory neurone, **R** is a motor neurone

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6C Which row in the table shows how information passes from neurone **P** to neurone **Q** and from neurone **Q** to neurone **R**?

	From P to Q	From Q to R
1	chemical	impulse
2	impulse	impulse
3	chemical	chemical
4	impulse	chemical

6D In an accident, neurone **R** was cut at the point labelled **X**.

How would this affect the person?

1 The stimulus would still be detected and the muscle would contract.

2 The stimulus would still be detected but the muscle would **not** contract.

3 The stimulus would **not** be detected and the muscle would **not** contract.

4 The stimulus would **not** be detected but the muscle would contract.

Turn over for the next question

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QUESTION SEVEN

Measles is now an uncommon disease because millions of children have been given the MMR vaccine.

7A Measles vaccine contains . . .

1 antibodies.

2 antibiotics.

3 white blood cells.

4 a weakened virus.

7B If a child catches measles and then recovers, that child will **not** catch measles again because . . .

1 the child can be vaccinated.

2 all the antibodies the child produced will remain in the blood.

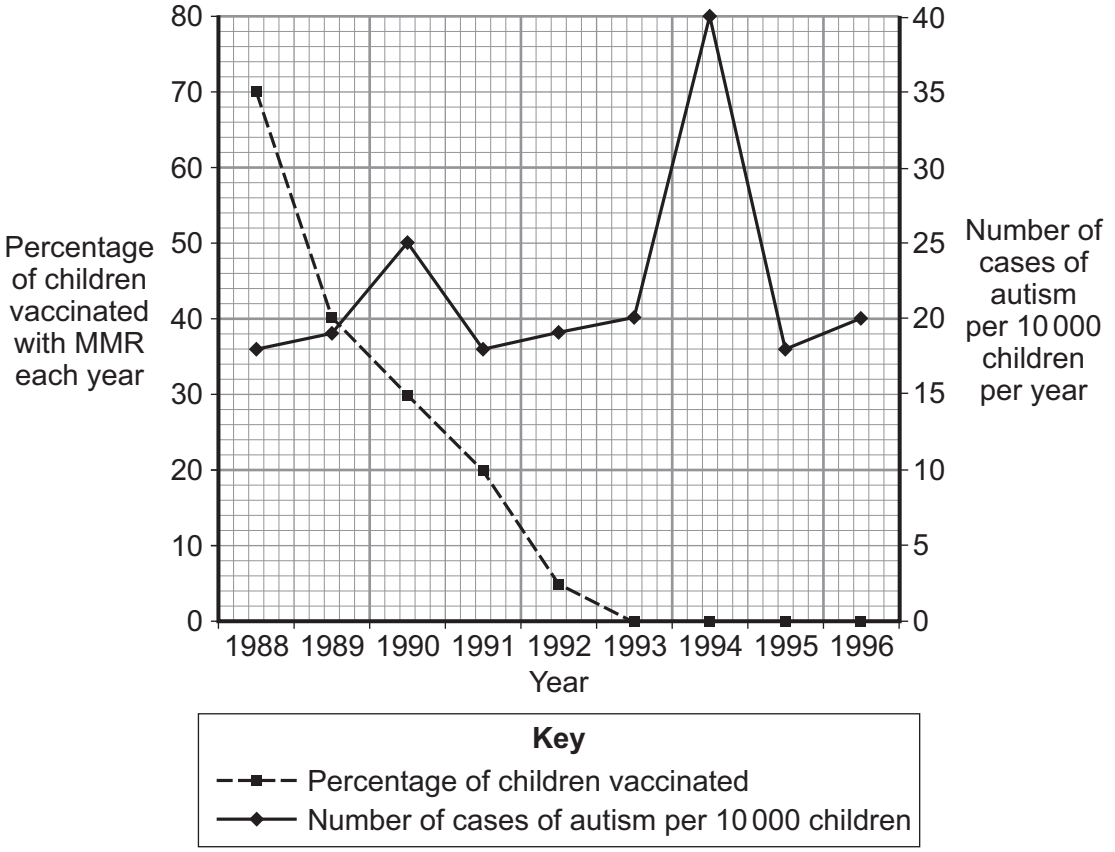
3 white blood cells will quickly produce the same antibodies again.

4 white blood cells will surround the virus.

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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 vaccinated with MMR and the number of children developing autism.



7C 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

7D Does the data in the graph suggest that the MMR vaccine was causing autism?

1 Yes, because the number of cases of autism decreased when the vaccination rate decreased.

2 Yes, because the rate of autism increased even when no MMR was given.

3 No, because the two graphs cross in 1989.

4 No, because the rate of autism increased after the MMR vaccination had stopped.

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QUESTION EIGHT

Some crocodiles live in lakes in Africa. These lakes may contain rotting meat and vegetation.

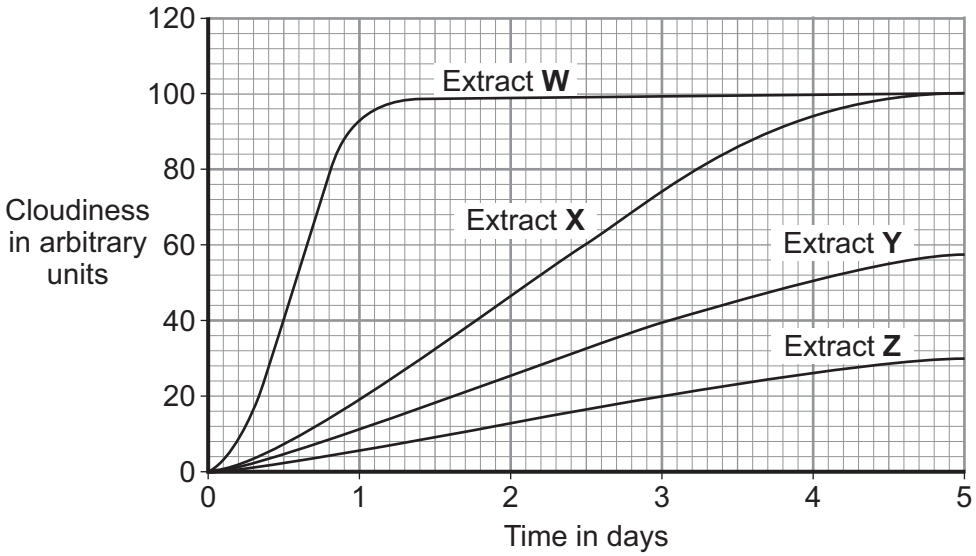
- Crocodiles often get cuts. These cuts do not get infected very often.
- When local people bathe in the same lakes, **their** cuts often become infected.

8A Which row in the table correctly identifies the two statements?

	Cuts on crocodiles rarely become infected	**Cuts on local people often become infected**
1	Theory	Hypothesis
2	Hypothesis	Theory
3	Observation	Observation
4	Hypothesis	Observation

- A researcher took a sample of crocodile blood and made four extracts, **W**, **X**, **Y** and **Z**, from the blood.
- He added these extracts to MRSA bacteria in tubes of nutrient solution.
- The tubes were kept in a warm place for five days.
- When bacteria grew, the nutrient solution went cloudy.

The graph shows how the cloudiness of the nutrient solutions changed over the five days.



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8B The researcher decided to purify one of the extracts to isolate the bacteria-killing chemical.

Which extract would he be most likely to choose to purify?

1 Extract **W**

2 Extract **X**

3 Extract **Y**

4 Extract **Z**

8C After several pure chemicals had been isolated from one extract, the chemicals were trialled.

The table shows four stages in the trialling of a new chemical.

Stage	Trialled on
P	human volunteers who do not have a disease
Q	cell cultures
R	animals
S	humans who do have a disease

Which is the correct sequence for these stages?

1 **R** → **S** → **Q** → **P**

2 **Q** → **P** → **S** → **R**

3 **Q** → **R** → **P** → **S**

4 **S** → **P** → **R** → **Q**

8D Volunteers in trials of new chemicals . . .

1 should always be paid for taking part.

2 should always be told about the risks of side-effects.

3 should be able to choose whether to take the new chemical or a placebo.

4 should be told whether they have been given the placebo or the new chemical.

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QUESTION NINE

There are several ways of helping infertile women to become pregnant.

These include:

- IVF (in vitro fertilisation)
- FET – implanting frozen embryos from previous IVF treatments into the womb
- COH/IUI – treating the woman with 'fertility drugs' to release several eggs, then inserting sperm into the womb.

9A What is the main difference between COH/IUI and IVF?

1 Fertilisation happens inside the woman in COH/IUI.

2 'Fertility drugs' are not used in IVF.

3 Sperm are not used in IVF.

4 Embryos are not formed in COH/IUI.

9B Which hormones are normally used as 'fertility drugs'?

1 FSH only

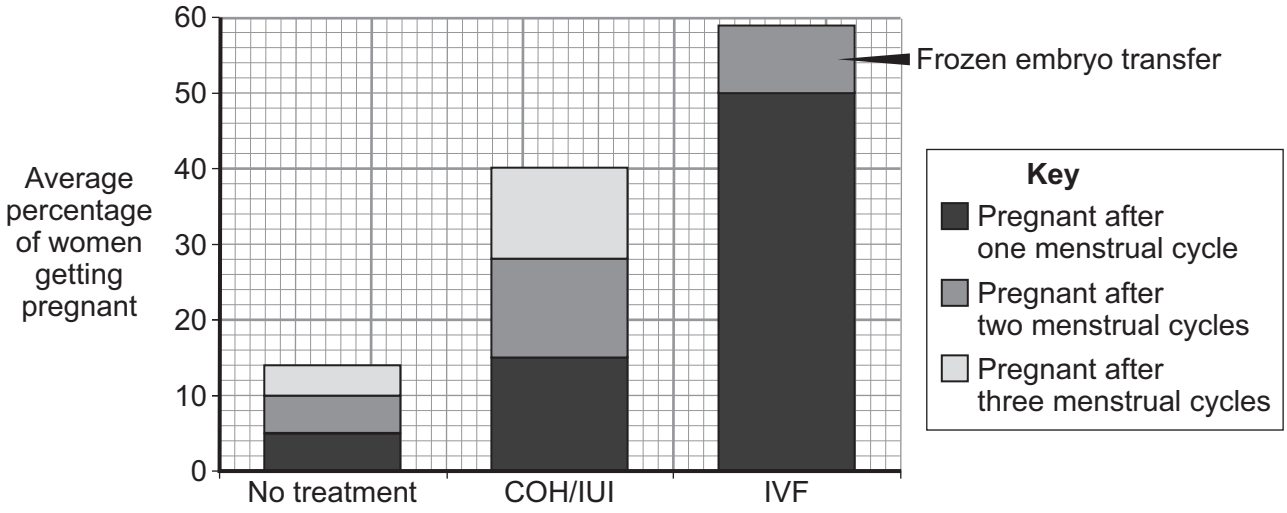
2 FSH and oestrogen

3 FSH and LH

4 LH and oestrogen

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The graph shows the average percentage of women getting pregnant after one, two and three menstrual cycles.



9C IVF treatment increases the chance of getting pregnant after one menstrual cycle.

By how much does IVF treatment increase the chance?

1 4 times

2 5 times

3 10 times

4 60 times

9D What is the most probable reason for the higher success rate of IVF compared with COH/IUI?

1 More 'fertility drugs' are used in IVF.

2 Doctors can choose the best embryos to use.

3 More eggs are produced in IVF.

4 Doctors can examine the sperm before the sperm are used.

END OF TEST

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2012 Examination – November Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the students' responses.

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

Foundation Tier

Question	Key		
One	**A**	egg	**1**
	B	embryo	**4**
	C	fertilised egg	**3**
	D	sperm	**2**
Two	**A**	arthritis	**2**
	B	diabetes	**1**
	C	heart disease	**3**
	D	high blood pressure	**4**
Three	**A**	glands	**4**
	B	kidneys	**3**
	C	lungs	**1**
	D	skin	**2**
Four	**A**	doctors	**1**
	B	pregnant women	**3**
	C	politicians	**4**
	D	volunteers	**2**
Five	**A**	antibiotics	**2**
	B	antibodies	**1**
	C	painkillers	**3**
	D	toxins	**4**

	A	B	C	D
Six	**4**	**3**	**4**	**1**
Seven	**3**	**2**	**4**	**2**
Eight	**2**	**1**	**2**	**2**
Nine	**4**	**2**	**4**	**3**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

Higher Tier

Question	Key		
One	**A**	antibiotics	**2**
	B	antibodies	**1**
	C	painkillers	**3**
	D	toxins	**4**
Two	**A**	carbon monoxide	**1**
	B	processed foods	**2**
	C	polyunsaturated fats	**3**
	D	nicotine	**4**

	A	B	C	D
Three	**2**	**1**	**2**	**2**
Four	**4**	**2**	**4**	**3**
Five	**3**	**2**	**3**	**3**
Six	**3**	**4**	**3**	**2**
Seven	**4**	**3**	**3**	**4**
Eight	**3**	**4**	**3**	**2**
Nine	**1**	**3**	**3**	**2**

The AQA UMS Conversion Calculator can be found at the following web address:

http://www.aqa.org.uk/umsconversion

OTQ3

AQA

Unit : BLY1AP BIOLOGY UNIT 1A

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : BG12

06-NOV-12

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions ONE to NINE Choose one response 1 - 4 for each of the parts A - D

QUESTION ONE		1	2	3	4
1A	antibiotics	○	○	○	○
1B	antibodies	○	○	○	○
1C	painkillers	○	○	○	○
1D	toxins	○	○	○	○

QUESTION TWO		1	2	3	4
2A	carbon monoxide	○	○	○	○
2B	processed foods	○	○	○	○
2C	polyunsaturated fats	○	○	○	○
2D	nicotine	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A egg	○	○	○	○
1B embryo	○	○	○	○
1C fertilised egg	○	○	○	○
1D sperm	○	○	○	○

QUESTION TWO	1	2	3	4
2A arthritis	○	○	○	○
2B diabetes	○	○	○	○
2C heart disease	○	○	○	○
2D high blood pressure	○	○	○	○

QUESTION THREE	1	2	3	4
3A glands	○	○	○	○
3B kidneys	○	○	○	○
3C lungs	○	○	○	○
3D skin	○	○	○	○

QUESTION FOUR	1	2	3	4
4A doctors	○	○	○	○
4B pregnant women	○	○	○	○
4C politicians	○	○	○	○
4D volunteers	○	○	○	○

QUESTION FIVE	1	2	3	4
5A antibiotics	○	○	○	○
5B antibodies	○	○	○	○
5C painkillers	○	○	○	○
5D toxins	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
June 2012

Science A

Unit Biology B1a (Human Biology)

Biology

Unit Biology B1a (Human Biology)

BLY1AP

F&H

Friday 22 June 2012 Afternoon Session

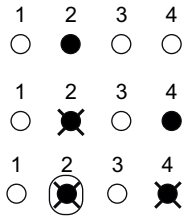
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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 16 of this booklet.

FOUNDATION TIER

Section One

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

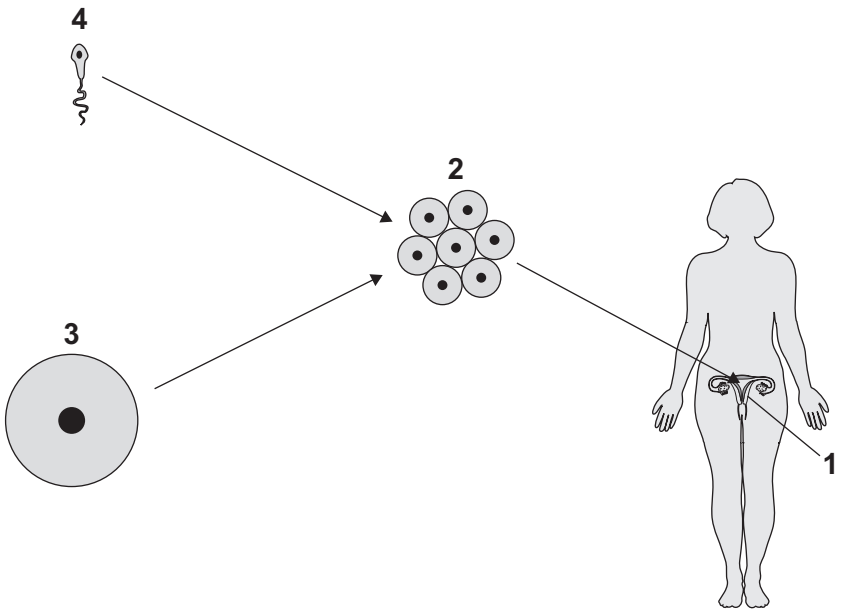
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows IVF (in vitro fertilisation).



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

A embryo

B egg

C sperm

D womb (uterus)

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QUESTION TWO

Many different factors affect our health.

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

A arthritis

B diabetes

C high blood pressure

D irregular periods in women

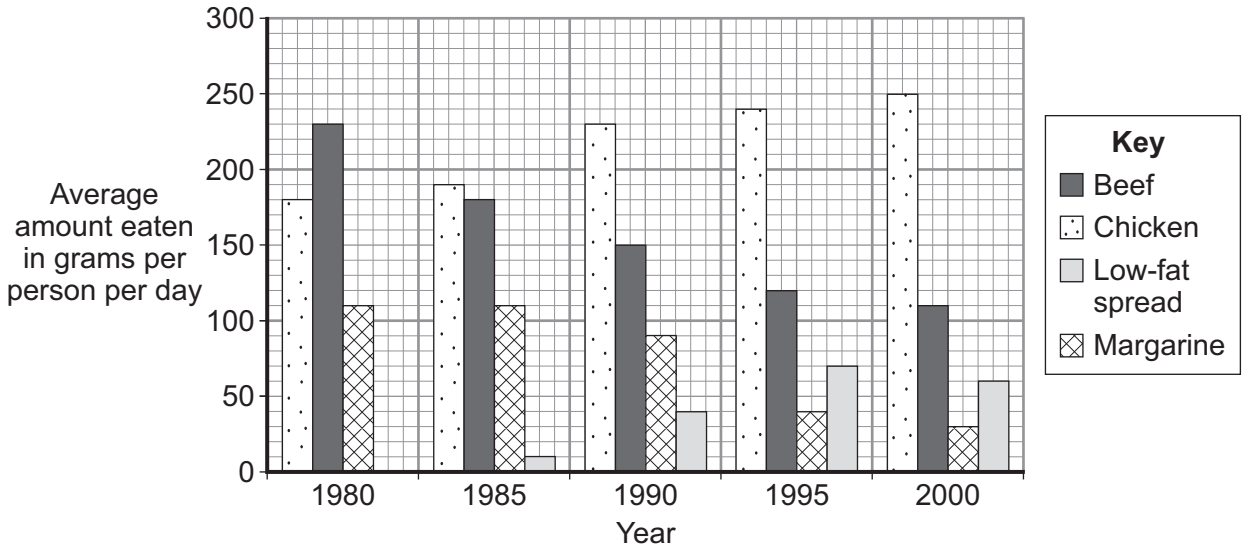
	Information
1	may be caused when a person does not have enough food
2	one symptom is high blood sugar
3	may be caused when a person has too much salt in their diet
4	one symptom is worn joints

Turn over for the next question

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QUESTION THREE

The bar chart shows changes in diets between 1980 and 2000.



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

A Beef

B Chicken

C Low-fat spread

D Margarine

1	average amount of this food eaten increased in each of the years from 1980
2	average amount of this food eaten in 1980 was 110 g per person per day
3	average amount of this food eaten increased then decreased between 1985 and 2000
4	average amount of this food eaten decreased the most between 1980 and 2000

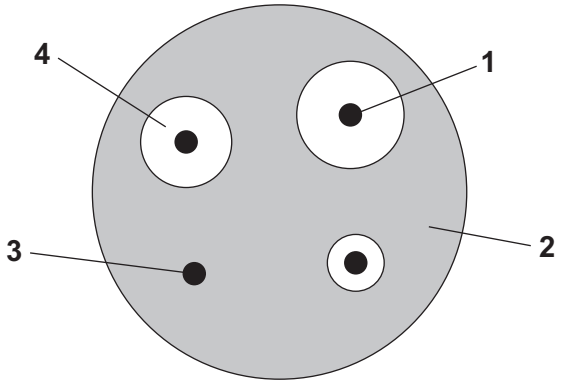
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QUESTION FOUR

Scientists investigated the effect of three different antibiotics on one type of bacterium.

- They spread a culture of the bacteria over nutrient jelly in a dish.
- They put three small paper discs, each containing a different antibiotic, on the bacteria.
- They also put a paper disc with no antibiotic on the bacteria.

The diagram shows the appearance of the dish 24 hours later.



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

A living bacteria

B killed bacteria

C contains no antibiotic

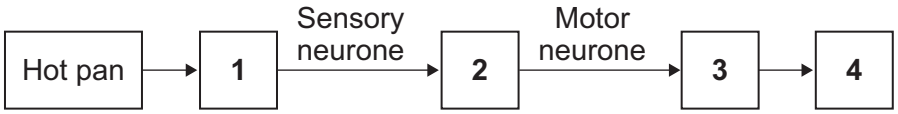
D contains the most effective antibiotic

Turn over for the next question

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QUESTION FIVE

The diagram shows a reflex action.



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

A central nervous system

B muscle

C receptor

D response

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Turn over for the next question

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Section Two

Questions **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

Most sports drinks contain water, sugar, caffeine and ions.

6A Which part of a sports drink is a source of energy for an athlete?

1 caffeine

2 ions

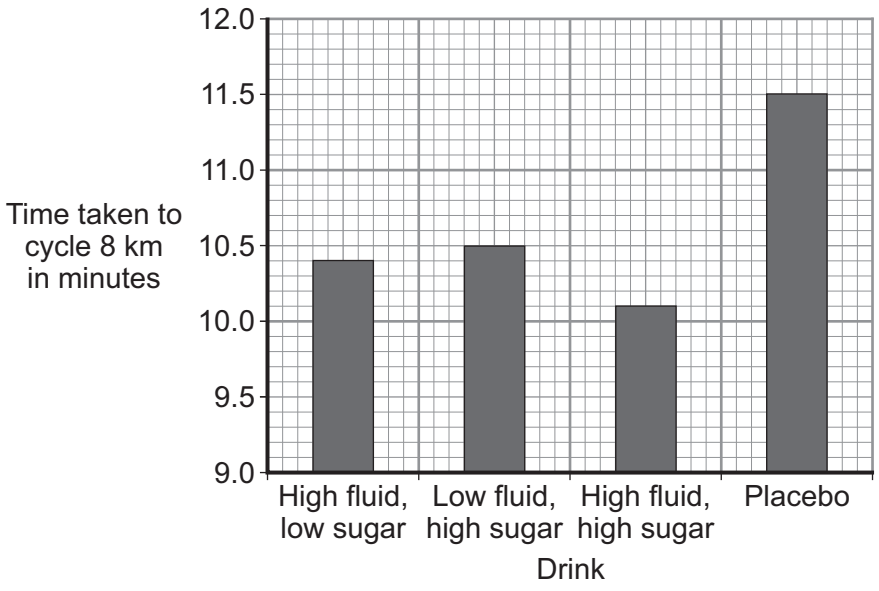
3 sugar

4 water

Four athletes were each given one of the following drinks before cycling:

- high fluid and low sugar drink
- low fluid and high sugar drink
- high fluid and high sugar drink
- a placebo drink.

The graph shows the results.



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6B The placebo would contain . . .

1 water, sugar and ions only.

2 water and sugar only.

3 water and ions only.

4 water only.

6C Look at the data for the athlete who drank the high fluid, low sugar drink.

How long did this athlete take to cycle 8 km?

1 10.2 minutes

2 10.4 minutes

3 10.5 minutes

4 10.8 minutes

6D The best drink for the athletes was the . . .

1 high fluid and low sugar drink.

2 low fluid and high sugar drink.

3 high fluid and high sugar drink.

4 placebo drink.

Turn over for the next question

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QUESTION SEVEN

Nicotine replacement therapy (NRT) can help people to stop smoking.

7A Nicotine is addictive, because it . . .

1 may cause cancer.

2 is a drug.

3 leads to lack of self control.

4 changes chemical processes in the body.

Scientists measured the concentration of nicotine in the blood, over 24 hours, for different people who:

- smoked 22 cigarettes per day

or

- chewed NRT gum tablets, each containing 4 mg of nicotine, each hour from 9.00 to 21.00

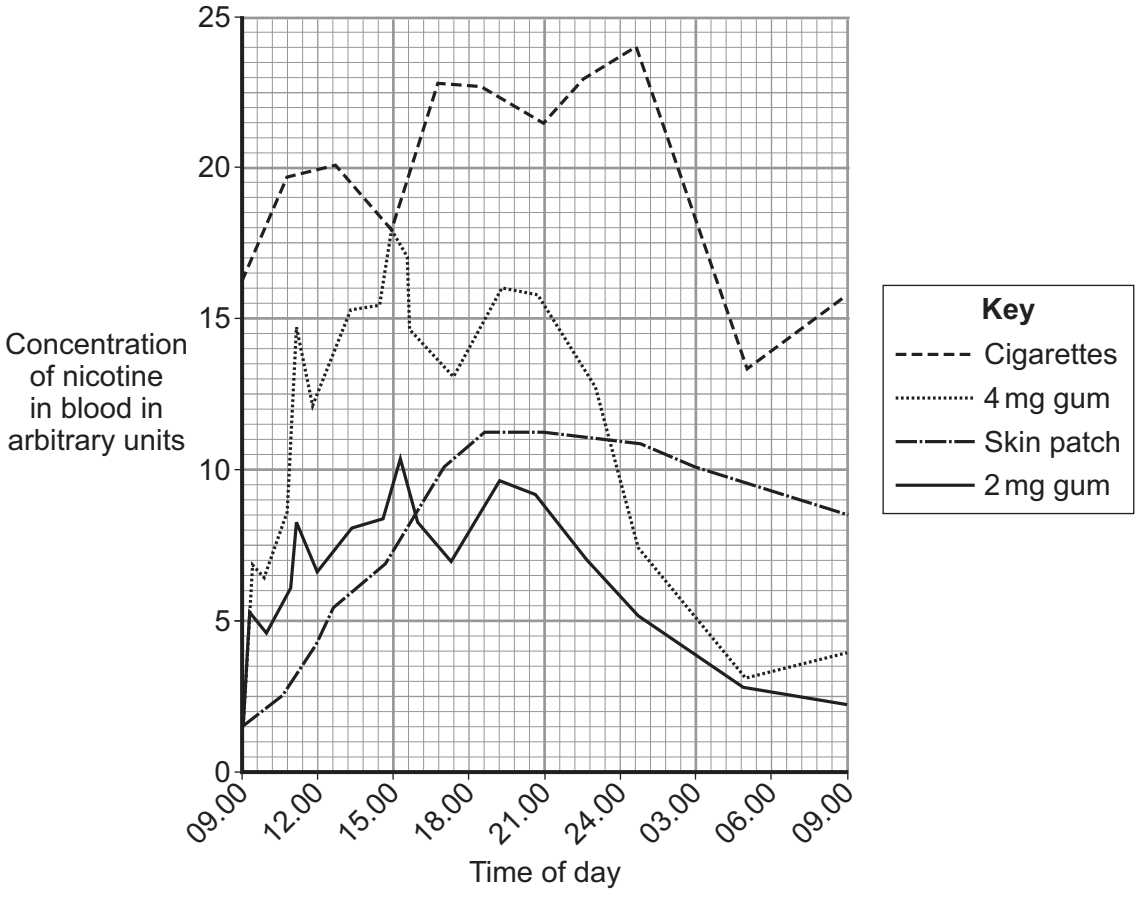
or

- used an NRT skin patch containing 21 mg of nicotine for 24 hours

or

- chewed NRT gum tablets, each containing 2 mg of nicotine, each hour from 9.00 to 21.00.

The graph shows the results.



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7B Which people had the highest concentration of nicotine in their blood for most of the day?

The people who . . .

1 smoked cigarettes.

2 used 2 mg NRT gum tablets.

3 used 4 mg NRT gum tablets.

4 used NRT skin patches.

7C It is important to keep nicotine levels constant during the night.

In which group of people did the concentration of nicotine in the blood stay nearly constant for most of the night?

The group of people who . . .

1 smoked cigarettes.

2 used 2 mg NRT gum tablets.

3 used 4 mg NRT gum tablets.

4 used NRT skin patches.

7D A person who is trying to stop smoking needs a high concentration of nicotine in the blood during the day.

From the results in the graph, which of the following would you expect to be most effective in helping a person to stop smoking?

1 gradually smoking fewer cigarettes each day

2 using 2 mg NRT gum tablets

3 using 4 mg NRT gum tablets

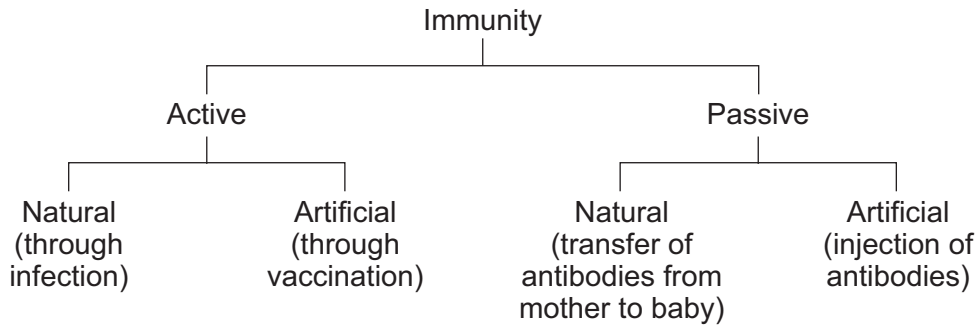
4 using NRT skin patches

Turn over for the next question

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QUESTION EIGHT

The diagram shows ways in which someone may become immune to a disease.



8A Which way of becoming immune would be achieved by breastfeeding a young child?

1 active, artificial immunity

2 passive, artificial immunity

3 active, natural immunity

4 passive, natural immunity

8B How does a vaccination make someone immune to a disease?

1 White blood cells make the correct antibody for the microorganism.

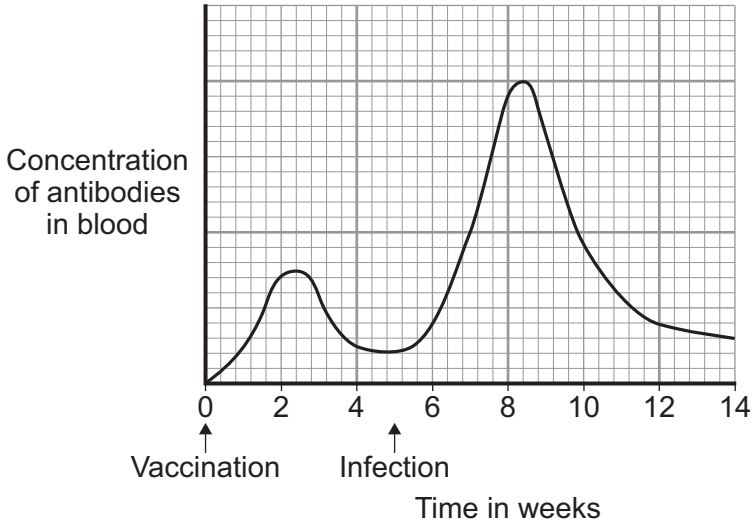
2 Pathogens produce antitoxins to neutralise poisons from the microorganism.

3 White blood cells produce pathogens to kill the microorganism.

4 Pathogens produce the correct antibody for the microorganism.

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The graph shows the concentration of antibodies in the blood after vaccination and after infection with a live microorganism, five weeks later.



8C How does vaccination help the person to become immune to the disease that the microorganism causes?

As a result of vaccination, when there is an infection, antibodies are produced . . .

1 more rapidly and in larger numbers.

2 more slowly and in larger numbers.

3 more rapidly and in smaller numbers.

4 more slowly and in smaller numbers.

8D A few weeks after vaccination with the MMR vaccine, a person is infected with the measles virus.

Which row in the table shows the effect that the measles virus will have on the concentration of antibodies in the person's blood?

	Concentration of measles antibodies	**Concentration of mumps antibodies**	**Concentration of rubella antibodies**
1	increase	increase	increase
2	no change	increase	no change
3	increase	no change	no change
4	no change	increase	increase

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QUESTION NINE

Cholesterol affects the health of the heart.

9A Cholesterol is carried around the body by . . .

1 lipoproteins.

2 monounsaturated fats.

3 saturated fats.

4 polyunsaturated fats.

9B Statins lower the concentration of . . .

1 saturated fats in the blood.

2 unsaturated fats in the blood.

3 salt in the blood.

4 cholesterol in the blood.

A company has developed a new drug. The new drug increases the concentration of HDL (high-density lipoprotein) in the blood.

The scientists designed a trial to test this new drug.

- The scientists used 15 000 people.
- Half of the people were given the new drug and a statin.
- The other half were not given the new drug. They were given the same statin.

The new drug increased the concentration of HDL in the blood.
However, there were 80 deaths in the group that took the new drug and the statin, compared with only 50 deaths in the group that took only the statin.

9C What proportion of the group taking **only** the statin died during the trial?

1 0.003

2 0.005

3 0.007

4 0.011

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9D In view of the results of the trial, the company should . . .

1 increase the number of people taking part in the trial.

2 stop the trial.

3 increase the dose of the new drug.

4 stop people taking statins.

END OF TEST

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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**.

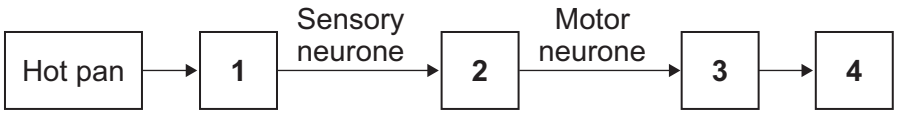
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows a reflex action.



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

A central nervous system

B muscle

C receptor

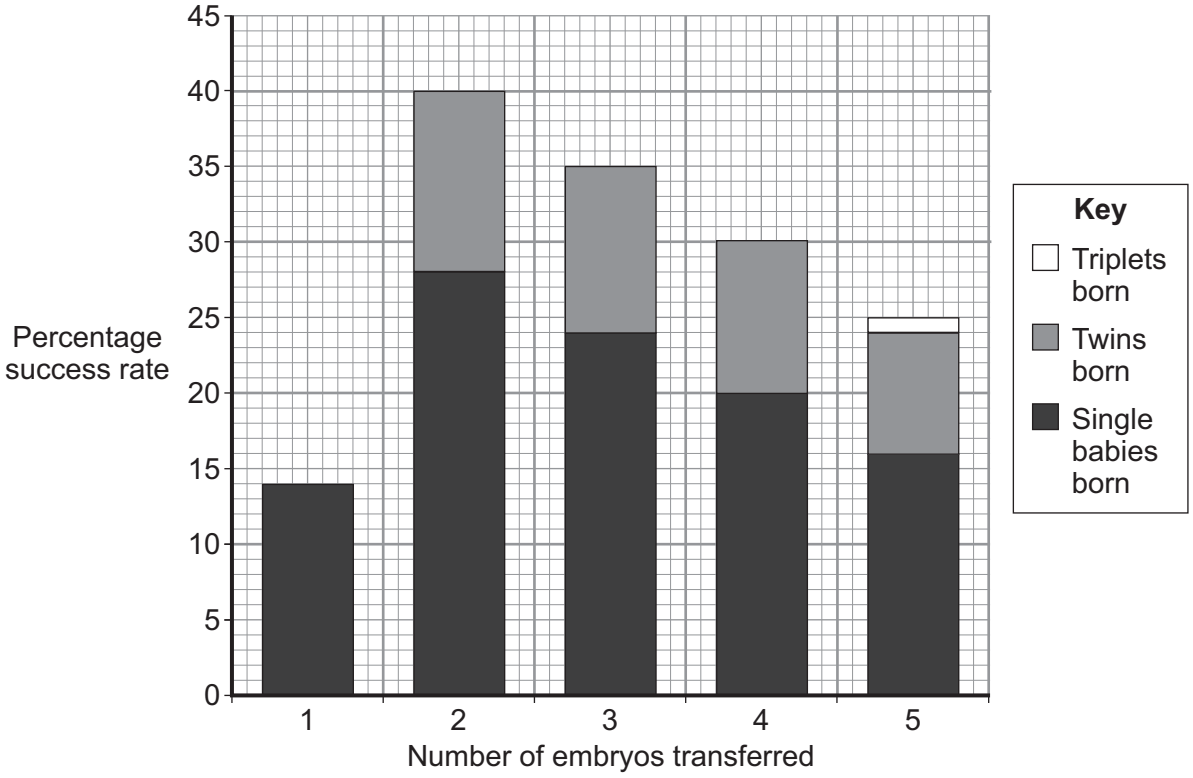
D response

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QUESTION TWO

In vitro fertilisation (IVF) treatment helps women to become pregnant.

The bar chart shows the percentage success rate for IVF when different numbers of embryos are transferred into the mother.



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

A 10

B 12

C 14

D 40

1	the maximum percentage success rate
2	the decrease in percentage success rate between the transfer of two embryos and the transfer of four embryos
3	the percentage of twins that are born when two embryos are transferred
4	the percentage success rate when one embryo is transferred

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Section Two

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

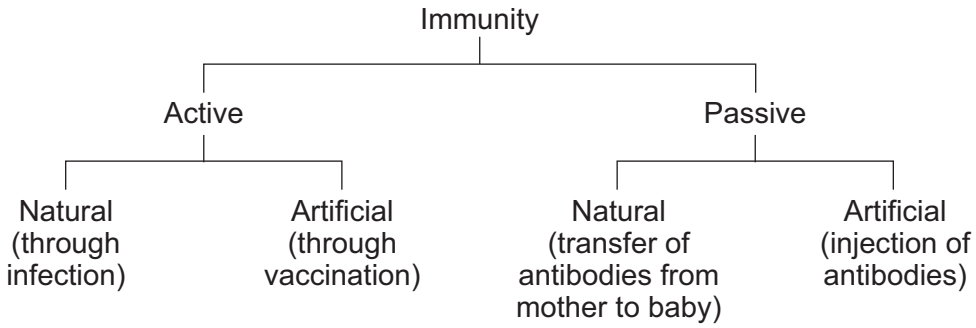
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION THREE

The diagram shows ways in which someone may become immune to a disease.



3A Which way of becoming immune would be achieved by breastfeeding a young child?

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2 passive, artificial immunity

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4 passive, natural immunity

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1 White blood cells make the correct antibody for the microorganism.

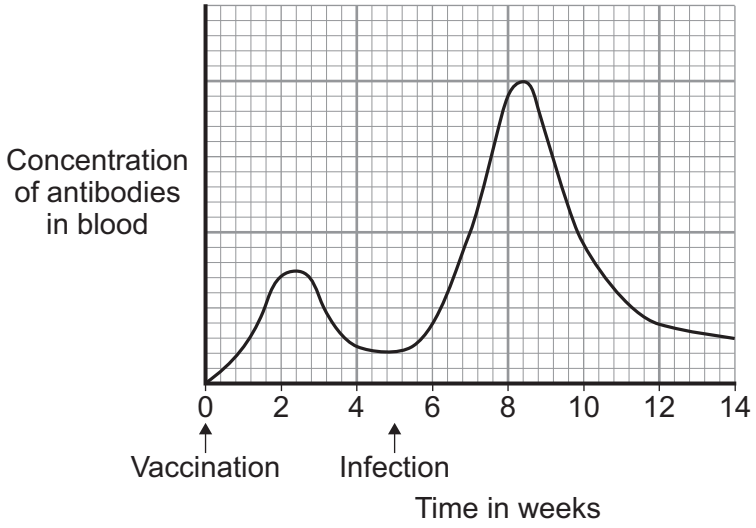
2 Pathogens produce antitoxins to neutralise poisons from the microorganism.

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4 Pathogens produce the correct antibody for the microorganism.

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3C How does vaccination help the person to become immune to the disease that the microorganism causes?

As a result of vaccination, when there is an infection, antibodies are produced . . .

1 more rapidly and in larger numbers.

2 more slowly and in larger numbers.

3 more rapidly and in smaller numbers.

4 more slowly and in smaller numbers.

3D A few weeks after vaccination with the MMR vaccine, a person is infected with the measles virus.

Which row in the table shows the effect that the measles virus will have on the concentration of antibodies in the person's blood?

	Concentration of measles antibodies	**Concentration of mumps antibodies**	**Concentration of rubella antibodies**
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2	no change	increase	no change
3	increase	no change	no change
4	no change	increase	increase

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QUESTION FOUR

Cholesterol affects the health of the heart.

4A Cholesterol is carried around the body by . . .

1 lipoproteins.

2 monounsaturated fats.

3 saturated fats.

4 polyunsaturated fats.

4B Statins lower the concentration of . . .

1 saturated fats in the blood.

2 unsaturated fats in the blood.

3 salt in the blood.

4 cholesterol in the blood.

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- Half of the people were given the new drug and a statin.
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However, there were 80 deaths in the group that took the new drug and the statin, compared with only 50 deaths in the group that took only the statin.

4C What proportion of the group taking **only** the statin died during the trial?

1 0.003

2 0.005

3 0.007

4 0.011

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4D In view of the results of the trial, the company should . . .

1 increase the number of people taking part in the trial.

2 stop the trial.

3 increase the dose of the new drug.

4 stop people taking statins.

Turn over for the next question

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QUESTION FIVE

Exercise causes changes inside the body.

5A When we exercise, we start to sweat.

This happens to . . .

1 release excess water from the body.

2 maintain the correct concentration of ions in the blood.

3 maintain the concentration of sugar in the blood.

4 maintain the correct body temperature.

5B In making up for the loss of sweat during exercise, . . .

1 cells absorb more water.

2 more water is exhaled through the lungs.

3 the urine produced by the kidneys is more concentrated.

4 the pores in the skin close.

5C Exercise can help people to control their body mass.

This is because people who exercise regularly . . .

1 need less food.

2 have a higher metabolic rate.

3 carry less mass as water.

4 are less likely to develop diabetes.

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5D The table shows the effect of sweating on the body.

Percentage of body mass lost as sweat	Effect on the body
2	Performance gets worse
4	Muscles do not work as well
5	Heat exhaustion
7	Hallucinations
10	Circulatory problems and heat stroke

If a 70 kilogram man loses 2.8 kg of sweat during a race, what effect will this have on his body?

1 He will get circulatory problems and heat stroke.

2 His muscles will not work as well.

3 He will suffer from heat exhaustion.

4 He will have hallucinations.

Turn over for the next question

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QUESTION SIX

Doctors used a double-blind trial to investigate the effect of nicotine on the level of aggression in people.

- The doctors tested 20 volunteers to find their normal level of aggression.
- 14 of the volunteers were smokers and 6 of the volunteers were non-smokers.
- Both the smokers and the non-smokers were given either nicotine or a placebo in a skin patch.
- Three hours later, all the volunteers were tested for their level of aggression.

The table shows the results.

	Contents of skin patch	Level of aggression	
		Before test	After test
Smokers	Placebo	Low	Low
		High	Low
	Nicotine	Low	Low
		High	Low
Non-smokers	Placebo	Low	Low
		High	High
	Nicotine	Low	Low
		High	High

6A Who knew what was in the patches?

1 the volunteers but not the doctors

2 the doctors but not the volunteers

3 both the doctors and the volunteers

4 neither the doctors nor the volunteers

6B One group given the placebo probably believed that the placebo contained nicotine.

Which group?

1 smokers with normally low aggression

2 smokers with normally high aggression

3 non-smokers with normally low aggression

4 non-smokers with normally high aggression

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6C The results may be considered to be . . .

1 reliable because the test lasted three hours.

2 unreliable because twenty volunteers were used.

3 precise because aggression was described as ‘high’ or ‘low’.

4 valid because volunteers were asked if they smoked or not.

6D One possible conclusion could be that . . .

1 nicotine reduces aggression in smokers.

2 smokers are more aggressive than non-smokers.

3 smokers are less aggressive than non-smokers.

4 nicotine increases aggression in non-smokers.

Turn over for the next question

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QUESTION SEVEN

Hormones control the menstrual cycle.

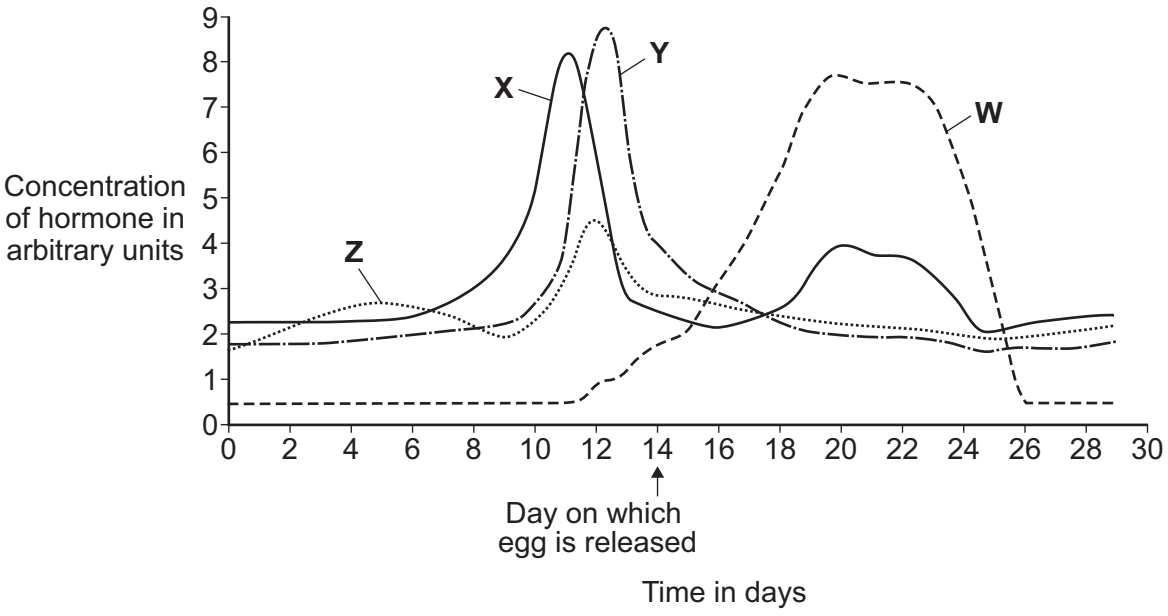
7A Which row of the table shows where oestrogen, FSH and LH are produced?

	Oestrogen	FSH	LH
1	pituitary gland	ovary	ovary
2	ovary	pituitary gland	pituitary gland
3	ovary	ovary	pituitary gland
4	pituitary gland	pituitary gland	ovary

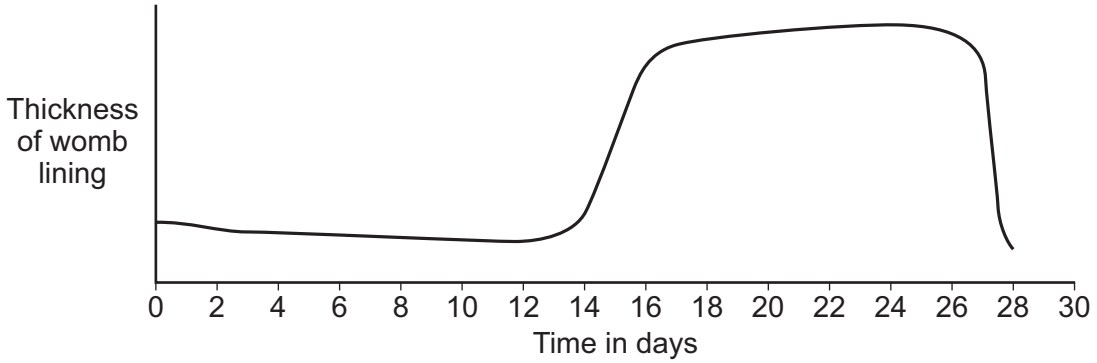
Graph 1 shows how the concentrations of four hormones, **W**, **X**, **Y** and **Z**, change during one menstrual cycle.

Graph 2 shows how the thickness of the womb lining changes during one menstrual cycle.

Graph 1



Graph 2



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7B The concentration of which hormone is most closely linked to womb thickness?

1 **W**

2 **X**

3 **Y**

4 **Z**

7C Which hormone is oestrogen?

1 **W**

2 **X**

3 **Y**

4 **Z**

7D The release of an egg from the ovary is stimulated by . . .

1 increasing levels of hormone **W**.

2 low levels of hormone **X**.

3 high levels of hormone **Y**.

4 decreasing levels of hormone **Z**.

Turn over for the next question

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QUESTION EIGHT

Overuse of antibiotics is causing problems treating infection.

8A Antibiotics kill . . .

1 all types of pathogen.

2 bacteria and viruses.

3 bacteria only.

4 viruses only.

8B Overuse of antibiotics . . .

1 decreases the risk of epidemics and pandemics.

2 causes bacteria to become resistant to antibiotics.

3 causes bacteria to mutate.

4 increases the rate of development of antibiotic-resistant strains of bacteria.

8C A new strain of bacterium might not be recognised by . . .

1 painkillers.

2 antibodies.

3 vaccines.

4 antitoxins.

8D The populations of antibiotic-resistant strains of bacteria increase because of . . .

1 mutation.

2 addiction.

3 natural selection.

4 immunity.

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Turn over for the next question

QUESTION NINE

Some infectious diseases spread rapidly.

9A What is the difference between a pandemic and an epidemic?

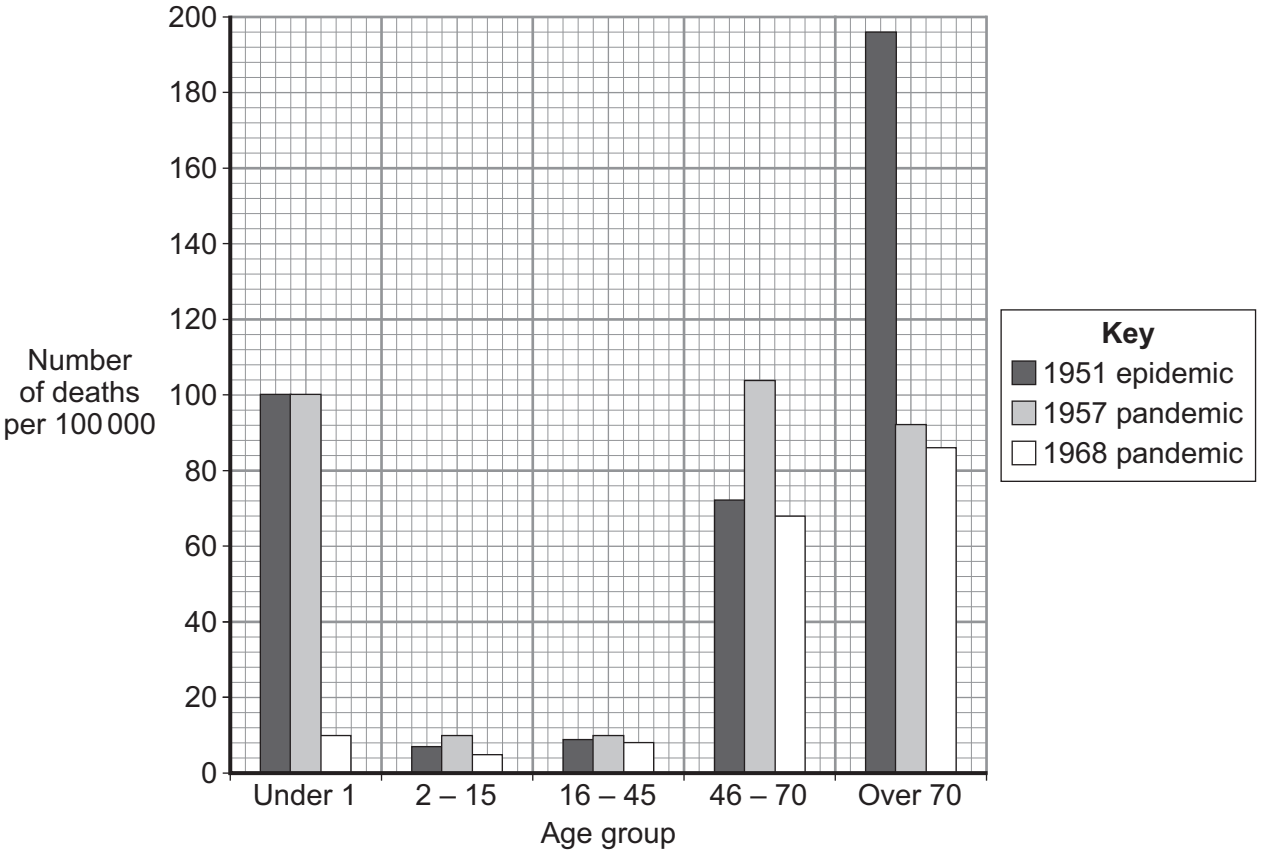
1 An epidemic causes more deaths.

2 Viruses cause a pandemic and bacteria cause an epidemic.

3 A pandemic causes deaths over a wider area.

4 Mutation in viruses or bacteria cause epidemics but do not cause pandemics.

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



9B A city had a population of 500 000 in 1957.

What was the approximate number of deaths of people aged 46 to 70 from influenza in the city in the 1957 pandemic?

1 72

2 100

3 380

4 520

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9C What conclusion can be drawn from this data?

1 There is no direct link between age and the number of deaths due to influenza.

2 During all three outbreaks there were fewer deaths in the 2 to 15 age range than in the 16 to 45 age range.

3 In each of the three outbreaks, people over 70 had the highest death rate.

4 During the three outbreaks there were similar death rates for each age group.

9D We cannot easily compare the actual number of those who died during the three outbreaks because . . .

1 the number of deaths is too small.

2 there is very little difference between the death rates in the three outbreaks.

3 the data does not give death rates.

4 there is no direct information on the proportion of age groups in the population.

END OF TEST

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There are no questions printed on this page

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2012 Examination – June Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the students' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

June 2012

Foundation Tier

Question	Key		
One	**A**	embryo	**2**
	B	egg	**3**
	C	sperm	**4**
	D	womb (uterus)	**1**
Two	**A**	arthritis	**4**
	B	diabetes	**2**
	C	high blood pressure	**3**
	D	irregular periods in women	**1**
Three	**A**	Beef	**4**
	B	Chicken	**1**
	C	Low-fat spread	**3**
	D	Margarine	**2**
Four	**A**	living bacteria	**2**
	B	killed bacteria	**4**
	C	contains no antibiotic	**3**
	D	contains the most effective antibiotic	**1**
Five	**A**	central nervous system	**2**
	B	muscle	**3**
	C	receptor	**1**
	D	response	**4**

	A	B	C	D
Six	**3**	**4**	**2**	**3**
Seven	**4**	**1**	**4**	**3**
Eight	**4**	**1**	**1**	**3**
Nine	**1**	**4**	**3**	**2**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

June 2012

Higher Tier

Question	Key		
One	**A**	central nervous system	**2**
	B	muscle	**3**
	C	receptor	**1**
	D	response	**4**
Two	**A**	10	**2**
	B	12	**3**
	C	14	**4**
	D	40	**1**

	A	B	C	D
Three	**4**	**1**	**1**	**3**
Four	**1**	**4**	**3**	**2**
Five	**4**	**3**	**2**	**2**
Six	**4**	**2**	**2**	**1**
Seven	**2**	**1**	**2**	**3**
Eight	**3**	**4**	**2**	**3**
Nine	**3**	**4**	**1**	**4**

AQA

Unit : BLY1AP BIOLOGY UNIT 1A

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 6M12

22-JUN-12

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	central nervous system	○	○	○	○
1B	muscle	○	○	○	○
1C	receptor	○	○	○	○
1D	response	○	○	○	○

QUESTION TWO		1	2	3	4
2A	10	○	○	○	○
2B	12	○	○	○	○
2C	14	○	○	○	○
2D	40	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A embryo	○	○	○	○
1B egg	○	○	○	○
1C sperm	○	○	○	○
1D womb (uterus)	○	○	○	○

QUESTION TWO	1	2	3	4
2A arthritis	○	○	○	○
2B diabetes	○	○	○	○
2C high blood pressure	○	○	○	○
2D irregular periods in women	○	○	○	○

QUESTION THREE	1	2	3	4
3A Beef	○	○	○	○
3B Chicken	○	○	○	○
3C Low-fat spread	○	○	○	○
3D Margarine	○	○	○	○

QUESTION FOUR	1	2	3	4
4A living bacteria	○	○	○	○
4B killed bacteria	○	○	○	○
4C contains no antibiotic	○	○	○	○
4D contains the most effective antibiotic	○	○	○	○

QUESTION FIVE	1	2	3	4
5A central nervous system	○	○	○	○
5B muscle	○	○	○	○
5C receptor	○	○	○	○
5D response	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
March 2012

Science A

Unit Biology B1a (Human Biology)

Biology

Unit Biology B1a (Human Biology)

BLY1AP

F&H

Thursday 1 March 2012 Morning Session

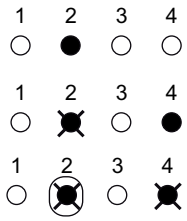
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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 16 of this booklet.

FOUNDATION TIER

Section One

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

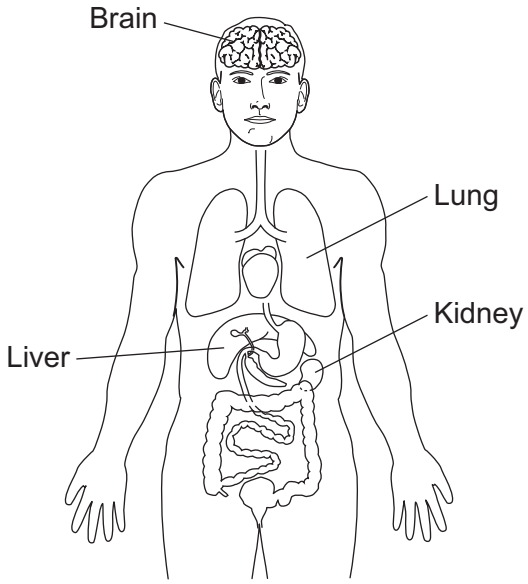
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows some of the organs inside our bodies.



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

A brain

B kidney

C liver

D lung

1	coordinates responses
2	removes carbon dioxide from the body
3	produces cholesterol
4	removes excess ions from the body

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QUESTION TWO

Drugs affect the human body.

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

A cannabis

B nicotine

C statin

D thalidomide

1	the addictive substance in tobacco smoke
2	used to reduce blood cholesterol levels
3	overuse can lead to mental illness
4	used in the treatment of leprosy

Turn over for the next question

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QUESTION THREE

In vitro fertilisation (IVF) is used to help infertile women to become pregnant.

The table gives statistics for 1 year from one clinic that gives IVF treatment.

	Age of women given IVF treatment			
	Under 35 years	35–37 years	38–39 years	40–42 years
Number of women treated	450	208	106	53
Number of single births	90	44	17	1
Number of sets of twins	24	8	4	1
Number of sets of triplets	1	0	0	0

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

A 21

B 24

C 36

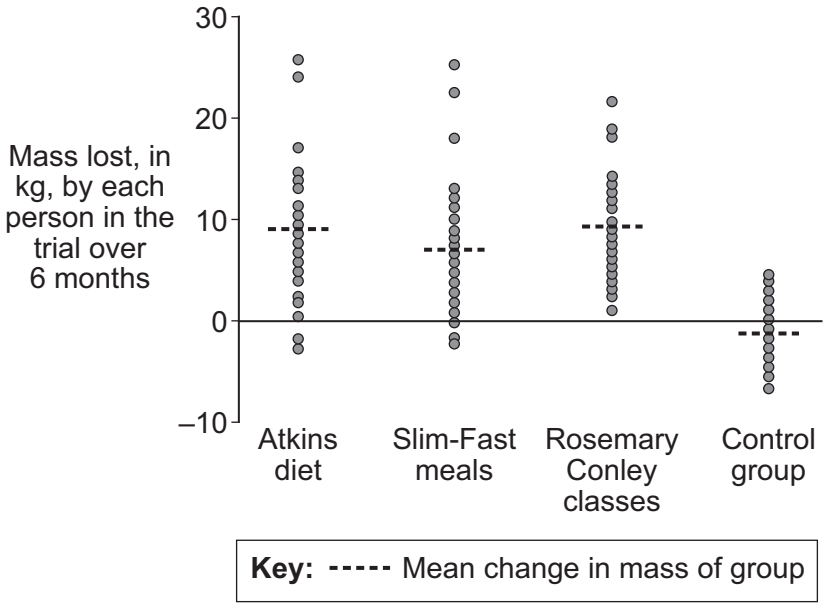
D 41

1	the number of women under 35 who had twins
2	the least successful age for having IVF treatment
3	the number of women aged 38–39 who had babies
4	the difference between the number of single births and the number of sets of twins for women aged 35–37

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QUESTION FOUR

The effects of three slimming programmes were evaluated for 6 months.
The graph shows the results of the study.



Data © BMJ, 2006, 332 1309–1314, and reproduced/amended with permission from the BMJ Publishing Group

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

A Atkins diet

B Slim-Fast meals

C Rosemary Conley classes

D Control group

1	all the people in the group lost mass
2	the only group that had an increase in mean mass
3	the group that had the largest range of results
4	the group that had a mean loss in mass of 7 kg

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QUESTION FIVE

This question is about bacteria and diseases.

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

A vaccines

B mutations

C antibiotics

D antibodies

Children are usually immunised by injecting them with . . . **1** . . . .

Immunisation causes the children's white blood cells to produce . . . **2** . . . .

Bacterial infections can be treated with drugs called . . . **3** . . . .

Some bacteria cannot be killed with drugs because the bacteria have undergone . . . **4** . . . .

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Turn over for the next question

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Section Two

Questions **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

Many people use recreational drugs.

6A Using alcohol for many years damages body organs.

Which two body organs does alcohol damage?

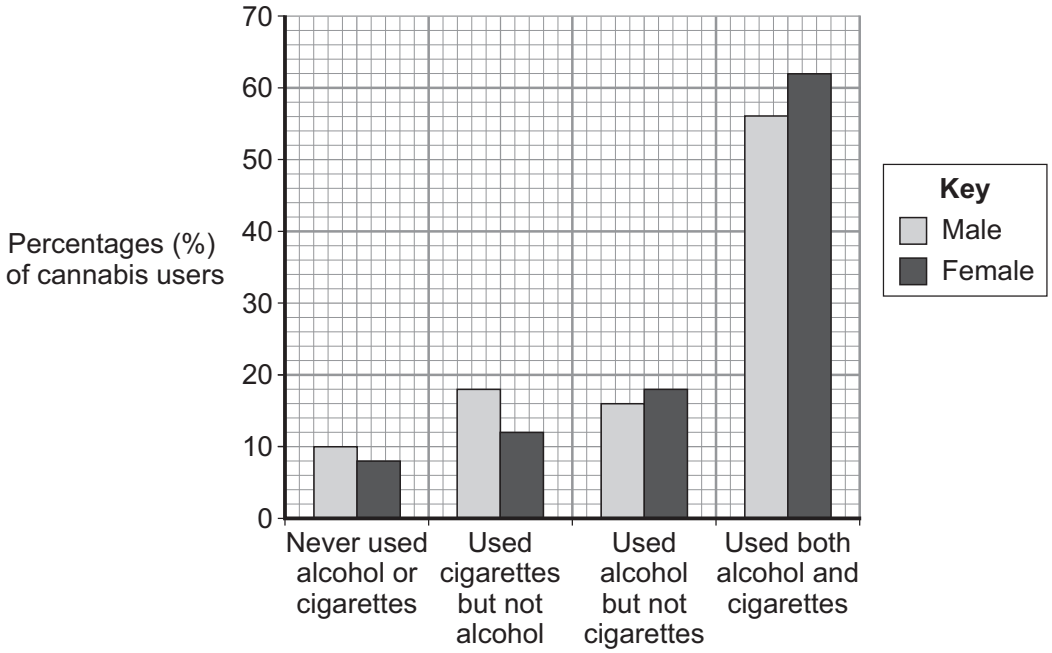
1 brain and lungs

2 liver and skin

3 lungs and skin

4 brain and liver

The bar chart shows the percentages (%) of cannabis users who used cigarettes and/or alcohol before beginning to use cannabis.



6B What percentage of males had used only cigarettes before they began using cannabis?

1 10 %

2 12 %

3 16 %

4 18 %

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6C Some females have never used cigarettes or alcohol before using cannabis. Some females have used both.

What is the difference in percentage between these two groups of females?

1 8 %

2 46 %

3 54 %

4 62 %

6D Which conclusion can be made from the data?

1 Smoking cigarettes decreases the chance that someone will smoke cannabis.

2 Drinking alcohol increases the chance that someone will smoke cannabis.

3 Drinking alcohol decreases the chance of someone smoking cannabis.

4 Smoking cigarettes increases the chance that someone will drink alcohol.

Turn over for the next question

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QUESTION SEVEN

Scientists investigated whether sports drinks improved the performance of cyclists.
The scientists used three drinks, **P**, **Q** and **R**, each containing different sweeteners.

- Eight trained cyclists each took a mouthful of drink **P**, swilled it around for 5 seconds, then spat it out without swallowing any.
- Each cyclist then pedalled for the same distance as fast as possible.
- The performance of each cyclist was then measured by recording the time taken to complete the distance.
- After recovery, each cyclist repeated the test using drink **Q** and then drink **R**.

7A The investigation could be made more reliable by . . .

1 having both male and female cyclists.

2 changing the resting time between tests.

3 giving the cyclists a larger bottle of drink.

4 asking another group of scientists to carry out the same test.

Drink **P** was a sports drink containing a sugar.
Drink **Q** was a sports drink containing a range of different sugars.
Drink **R** was a placebo containing artificial sweetener.

7B One control variable in this experiment was . . .

1 the body mass of the cyclists.

2 the length of time that the cyclists kept the drink in their mouths.

3 the type of bike that the cyclists used.

4 the type of sweetener in the drink.

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7C Which row in the table shows the best experimental design?

	Cyclist knows which drink is being tested	Scientist knows which drink is being tested
1	Yes	No
2	No	Yes
3	Yes	Yes
4	No	No

The table below shows the results of the investigation.

Drink tested	Average time taken for cyclists to complete the exercise in minutes
P	60.4
Q	62.1
R	64.6

7D Which conclusion can be made from the results in the table?

1 Just tasting a sports drink can improve performance.

2 Artificial sweeteners are as effective in improving performance as sugars in solution.

3 Drink **P** improved the performance of all cyclists.

4 The placebo was the most effective in improving performance.

Turn over for the next question

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QUESTION EIGHT

A virus causes influenza.
A new strain of influenza was identified in 2009.
The new strain spread worldwide.

8A To prevent large numbers of people becoming ill from a new strain of influenza, scientists need to develop . . .

1 a new toxin.

2 a new painkiller.

3 a new antibody.

4 a new vaccine.

8B The rapid spread of influenza over a large area is called . . .

1 an infection.

2 a pathogen.

3 an epidemic.

4 a mutation.

8C Antibiotics do not prevent the spread of new strains of influenza because . . .

1 a virus causes influenza.

2 the new strain would have become resistant to antibiotics.

3 the disease would have spread too quickly.

4 antibiotics do not work on some people.

8D If a person survives a new strain of influenza, they will not suffer from that strain again.

This is because . . .

1 the person will now have developed a vaccine.

2 the person's white blood cells will recognise that strain.

3 that strain will have died out.

4 doctors will recognise that strain.

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Turn over for the next question

QUESTION NINE

In the nineteenth century, Dr Semmelweiss investigated infection in a hospital.

He compared the number of deaths of mothers in two maternity wards.

- In **Ward 1**, mainly doctors delivered babies. These doctors also examined the bodies of dead patients.
- In **Ward 2**, midwives delivered babies. The midwives did not work in other wards.

The table shows his results.

Year	Ward 1		Ward 2	
	Number of births	Number of deaths	Number of births	Number of deaths
1842	3287	518	2659	202
1843	3060	274	2739	169
1844	3157	260	2956	68
1845	3492	241	3241	66

9A Which row in the table below shows the trends from 1842 to 1845 in the data for **Ward 1**?

	Number of births	Number of deaths
1	increased	decreased
2	decreased	increased
3	decreased then increased	decreased
4	decreased	decreased then increased

9B How does the data show that conditions in both wards were improving?

1 The number of births on each ward increased between 1842 and 1845.

2 The number of deaths on each ward decreased between 1842 and 1845.

3 The number of deaths in **Ward 1** decreased more than the number in **Ward 2**.

4 There were fewer deaths in each year in **Ward 2** than in **Ward 1**.

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9C Semmelweiss used this data to say that doctors . . .

1 should not examine bodies of dead patients.

2 should not visit maternity wards.

3 should wash their hands before examining patients.

4 should be vaccinated against infectious diseases.

9D Which of these will **not** reduce the spread of infection in hospitals?

1 using painkillers

2 using antibiotics

3 using vaccines

4 using antibodies

END OF TEST

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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

This question is about bacteria and diseases.

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

A vaccines

B mutations

C antibiotics

D antibodies

Children are usually immunised by injecting them with . . . **1** . . . .

Immunisation causes the children's white blood cells to produce . . . **2** . . . .

Bacterial infections can be treated with drugs called . . . **3** . . . .

Some bacteria cannot be killed with drugs because the bacteria have undergone . . . **4** . . . .

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QUESTION TWO

The table is from the label on a 400 gram cheese and bacon flan.

100 grams of cheese and bacon flan contains		
Total fat	16.8 g	23% of your guideline daily amount
Saturated fat	7.7 g	38% of your guideline daily amount
Sugar	2.4 g	3% of your guideline daily amount
Salt	0.8 g	15% of your guideline daily amount

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

A 5.3 g

B 9.1 g

C 9.6 g

D 33.6 g

1	the amount of fat in 100 grams of flan that is **not** saturated
2	the total amount of sugar in the 400 gram flan
3	the total amount of fat eaten if someone ate half of the flan
4	the mass of salt that is the total guideline daily amount

Turn over for the next question

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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

A virus causes influenza.
A new strain of influenza was identified in 2009.
The new strain spread worldwide.

3A To prevent large numbers of people becoming ill from a new strain of influenza, scientists need to develop . . .

1 a new toxin.

2 a new painkiller.

3 a new antibody.

4 a new vaccine.

3B The rapid spread of influenza over a large area is called . . .

1 an infection.

2 a pathogen.

3 an epidemic.

4 a mutation.

3C Antibiotics do not prevent the spread of new strains of influenza because . . .

1 a virus causes influenza.

2 the new strain would have become resistant to antibiotics.

3 the disease would have spread too quickly.

4 antibiotics do not work on some people.

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3D If a person survives a new strain of influenza, they will not suffer from that strain again.

This is because . . .

1 the person will now have developed a vaccine.

2 the person's white blood cells will recognise that strain.

3 that strain will have died out.

4 doctors will recognise that strain.

Turn over for the next question

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QUESTION FOUR

In the nineteenth century, Dr Semmelweiss investigated infection in a hospital.

He compared the number of deaths of mothers in two maternity wards.

- In **Ward 1**, mainly doctors delivered babies. These doctors also examined the bodies of dead patients.
- In **Ward 2**, midwives delivered babies. The midwives did not work in other wards.

The table shows his results.

Year	Ward 1		Ward 2	
	Number of births	Number of deaths	Number of births	Number of deaths
1842	3287	518	2659	202
1843	3060	274	2739	169
1844	3157	260	2956	68
1845	3492	241	3241	66

4A Which row in the table below shows the trends from 1842 to 1845 in the data for **Ward 1**?

	Number of births	Number of deaths
1	increased	decreased
2	decreased	increased
3	decreased then increased	decreased
4	decreased	decreased then increased

4B How does the data show that conditions in both wards were improving?

1 The number of births on each ward increased between 1842 and 1845.

2 The number of deaths on each ward decreased between 1842 and 1845.

3 The number of deaths in **Ward 1** decreased more than the number in **Ward 2**.

4 There were fewer deaths in each year in **Ward 2** than in **Ward 1**.

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4C Semmelweiss used this data to say that doctors . . .

1 should not examine bodies of dead patients.

2 should not visit maternity wards.

3 should wash their hands before examining patients.

4 should be vaccinated against infectious diseases.

4D Which of these will **not** reduce the spread of infection in hospitals?

1 using painkillers

2 using antibiotics

3 using vaccines

4 using antibodies

Turn over for the next question

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QUESTION FIVE

Some of the body's responses involve reflex actions.

5A Which of the following shows the path that an impulse takes in a reflex action?

1 receptor → effector → sensory neurone → receptor → relay neurone → motor neurone

2 receptor → effector → sensory neurone → synapse → relay neurone → motor neurone

3 receptor → sensory neurone → relay neurone → motor neurone → effector

4 receptor → sensory neurone → effector → relay neurone → motor neurone

5B The function of every synapse is to . . .

1 prevent the passage of impulses from a motor neurone to a relay neurone.

2 send impulses to the brain.

3 produce nerve impulses which stimulate a muscle to contract.

4 transfer impulses from one neurone to another.

5C Relay neurones are found in . . .

1 the spinal cord only.

2 the brain only.

3 both the spinal cord and the brain.

4 neither the spinal cord nor the brain.

5D Which of the following is true of reflex actions?

1 the brain always coordinates the response

2 reflex actions all involve the spinal cord

3 reflex actions are all triggered by external stimuli

4 reflex actions are always automatic

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Turn over for the next question

QUESTION SIX

Hormones control the menstrual cycle.

6A The release of an egg from an ovary is brought about by the production of . . .

1 FSH in the ovaries.

2 LH in the ovaries.

3 FSH in the pituitary gland.

4 LH in the pituitary gland.

6B Which hormones are used during in vitro fertilisation (IVF) treatment?

1 oestrogen and FSH only

2 FSH and LH only

3 oestrogen and LH only

4 oestrogen only

Doctors collected data about IVF treatment given to women who smoked and women who did not smoke.

The table shows the results.

	Non-smokers	**Smokers**
Number of women given IVF treatment	108	65
Mean number of hormone treatments needed to mature and release eggs for IVF treatment	3.9	4.8
Mean number of eggs released per female	11	6
Percentage of women who became pregnant after treatment	21	17

6C The findings of the study were reported in a newspaper.

Which would be the most accurate heading for the article?

1 ‘Smoking prevents you from getting pregnant’

2 ‘Evidence to link smoking to reduced pregnancy rates’

3 ‘More than a third of pregnant women smoke’

4 ‘Now there is proof that smokers are less fertile’

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6D Clomiphene is a drug given to some women as part of fertility treatment.
Clomiphene treatment results in eggs maturing in the ovaries.

Clomiphene works because clomiphene . . .

1 decreases oestrogen production, resulting in increased FSH production.

2 decreases oestrogen production, resulting in decreased FSH production.

3 increases oestrogen production, resulting in increased FSH production.

4 increases oestrogen production, resulting in decreased FSH production.

Turn over for the next question

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QUESTION SEVEN

Exercise affects body fitness.

7A Which statement is correct?

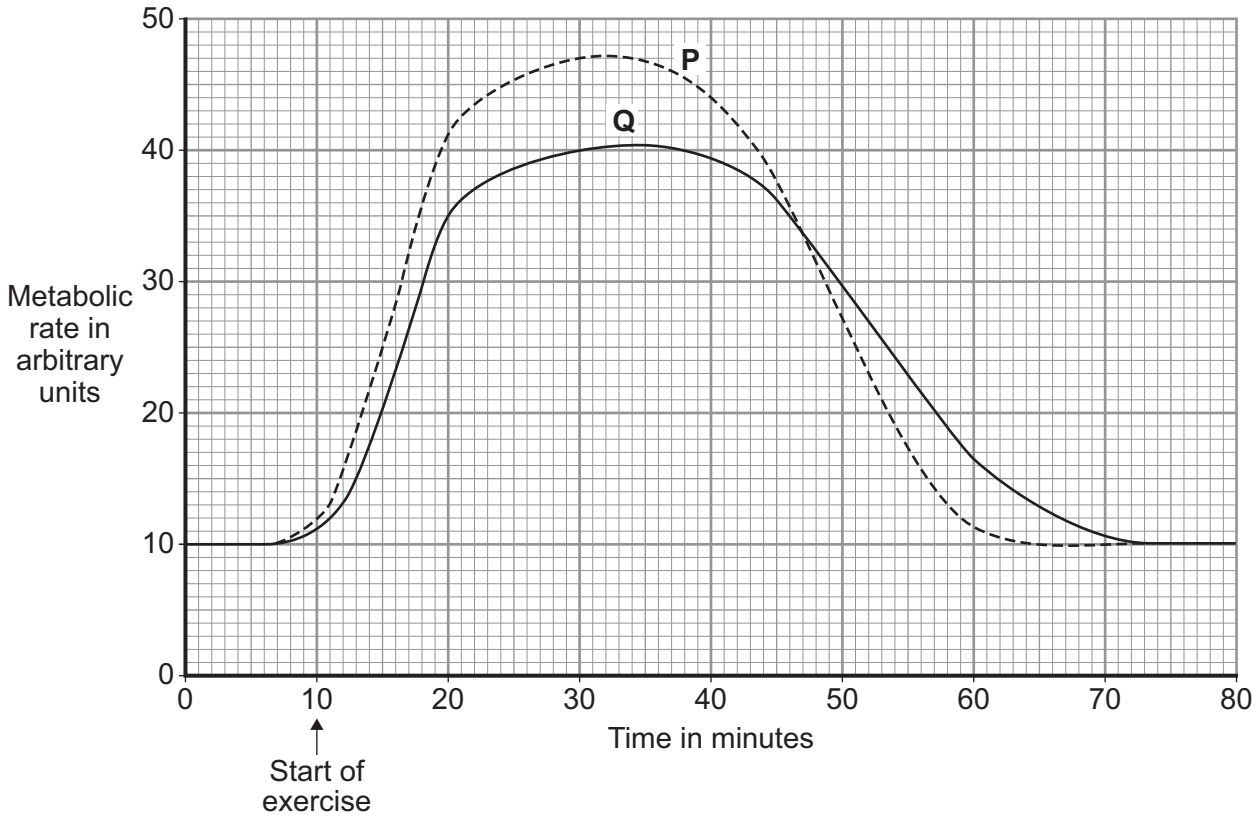
1 The less exercise you take, the more food you need to eat.

2 The colder it is, the less food you need.

3 Inherited factors may affect the rate at which we use energy from food.

4 In the developed world, most people use more energy in exercise than they get in food.

The graph shows the metabolic rate of two people, **P** and **Q**, before, during and after a 20 minute period of exercise.



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7B How long after the end of the exercise did it take for the metabolic rate of person **P** to return to resting level?

1 5 minutes

2 30 minutes

3 35 minutes

4 45 minutes

7C At the end of the exercise period, by what proportion had the metabolic rate of person **P** increased from that at resting level?

1 3 times

2 3.7 times

3 37 times

4 47 times

7D Which of the following statements is supported by the data?

1 **P**'s metabolic rate increased more and **P** recovered more quickly.

2 **P**'s metabolic rate increased less and **P** took longer to recover.

3 **Q**'s metabolic rate increased less and **Q** recovered more quickly.

4 **Q**'s metabolic rate increased more and **Q** took longer to recover.

Turn over for the next question

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QUESTION EIGHT

In 2006, six healthy young men had very big, unexpected reactions to the drug given to them in a UK drug trial. Two of the young men became very ill.

The men were paid volunteers. The volunteers were given a drug which had been tested on laboratory animals but never before on humans.

8A New drugs need to be tested on healthy humans before the drug is made available for the treatment of lots of patients.

This is because scientists need to . . .

1 find out 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 from being given the drug.

4 prove that there are no risks in giving a drug before it can be approved for general use by the public.

8B Which of the following could help to reduce the chances of large scale, unexpected reactions when testing new drugs on humans?

1 testing the drug only on patients suffering from the relevant illness rather than using healthy volunteers

2 paying the volunteers more

3 testing the drug on more volunteers

4 testing the drug on one volunteer at a time rather than starting the tests on all of them together

8C The severe reaction to the drug that was observed in the volunteers had not been seen when the drug was given to laboratory animals.

This suggests that . . .

1 the laboratory animals were given the wrong dose of the drug.

2 it is important to use animals with a similar body chemistry to that of humans in the trials.

3 testing drugs on animals should be stopped.

4 testing drugs on animals is a waste of time and money.

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8D Appropriate doses of a drug need to be found out by clinical trials before the drug can be sold. This is done by trialling a new drug on human volunteers.

Which of the following would reduce the risks to volunteers and enable medical staff to take appropriate action should any adverse effects occur?

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 the same dose of the drug at a different time from the others

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

Turn over for the next question

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QUESTION NINE

Read the information about cholesterol.

> Cholesterol is needed for human cells to function normally. The human body synthesises about 1 g per day. Another 200 to 300 mg comes from the food we eat. An adult with a mass of 68 kg has a typical total body content of 35 g of cholesterol.
>
> About 80 % of the cholesterol that passes into the intestine is reabsorbed and recycled.
>
> The ratio of total cholesterol concentration to 'good cholesterol' concentration should be much less than 5:1.

9A The total body mass of a 68 kg adult contains approximately . . .

1 0.005 % cholesterol.

2 0.05 % cholesterol.

3 0.5 % cholesterol.

4 5.0 % cholesterol.

9B Blood which has a ratio of total cholesterol concentration to 'good cholesterol' concentration of less than 5:1 could contain . . .

1 a concentration of LDL which is four times greater than the concentration of HDL.

2 a concentration of LDL which is less than four times the concentration of HDL.

3 LDL but no HDL.

4 equal concentrations of LDL and HDL.

9C Because cholesterol is re-absorbed in the intestine, . . .

1 people with high blood cholesterol concentrations cannot do anything to lower it.

2 reducing cholesterol in food intake cannot stop high levels of blood cholesterol.

3 some people do not have to synthesise any cholesterol.

4 there is a limit to the rate at which total blood cholesterol concentration can be lowered by diet change.

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9D Undesirable blood cholesterol levels may be partly due to inherited factors.

Changes to exercise programmes . . .

1 can always be used to restore the balance of good and bad cholesterol concentrations to a desirable level.

2 can always be used to reduce total cholesterol concentration to desirable levels.

3 can only partly control levels of cholesterol.

4 do not have any effect on levels of cholesterol.

END OF TEST

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There are no questions printed on this page

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2012 Examination – March Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the students' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

March 2012

Foundation Tier

Question	Key		
One	**A**	brain	**1**
	B	kidney	**4**
	C	liver	**3**
	D	lung	**2**
Two	**A**	cannabis	**3**
	B	nicotine	**1**
	C	statin	**2**
	D	thalidomide	**4**
Three	**A**	21	**3**
	B	24	**1**
	C	36	**4**
	D	41	**2**
Four	**A**	Atkins diet	**3**
	B	Slim-Fast meals	**4**
	C	Rosemary Conley classes	**1**
	D	Control group	**2**
Five	**A**	vaccines	**1**
	B	mutations	**4**
	C	antibiotics	**3**
	D	antibodies	**2**

	A	**B**	**C**	**D**
Six	**4**	**4**	**3**	**2**
Seven	**4**	**2**	**4**	**1**
Eight	**4**	**3**	**1**	**2**
Nine	**3**	**2**	**3**	**1**

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

March 2012

Higher Tier

Question	Key		
One	**A**	vaccines	**1**
	B	mutations	**4**
	C	antibiotics	**3**
	D	antibodies	**2**
Two	**A**	5.3 g	**4**
	B	9.1 g	**1**
	C	9.6 g	**2**
	D	33.6 g	**3**

	A	**B**	**C**	**D**
Three	**4**	**3**	**1**	**2**
Four	**3**	**2**	**3**	**1**
Five	**3**	**4**	**3**	**4**
Six	**4**	**2**	**2**	**1**
Seven	**3**	**3**	**2**	**1**
Eight	**3**	**4**	**2**	**4**
Nine	**2**	**2**	**4**	**3**

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OTQ3

AQA

Unit : BLY1AP **BIOLOGY UNIT 1A**

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 3G12

01-MAR-12

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	vaccines	○	○	○	○
1B	mutations	○	○	○	○
1C	antibiotics	○	○	○	○
1D	antibodies	○	○	○	○

QUESTION TWO		1	2	3	4
2A	5.3g	○	○	○	○
2B	9.1g	○	○	○	○
2C	9.6g	○	○	○	○
2D	33.6g	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A brain	○	○	○	○
1B kidney	○	○	○	○
1C liver	○	○	○	○
1D lung	○	○	○	○

QUESTION TWO	1	2	3	4
2A cannabis	○	○	○	○
2B nicotine	○	○	○	○
2C statin	○	○	○	○
2D thalidomide	○	○	○	○

QUESTION THREE	1	2	3	4
3A 21	○	○	○	○
3B 24	○	○	○	○
3C 36	○	○	○	○
3D 41	○	○	○	○

QUESTION FOUR	1	2	3	4
4A Atkins diet	○	○	○	○
4B Slim-Fast meals	○	○	○	○
4C Rosemary Conley classes	○	○	○	○
4D Control group	○	○	○	○

QUESTION FIVE	1	2	3	4
5A vaccines	○	○	○	○
5B mutations	○	○	○	○
5C antibiotics	○	○	○	○
5D antibodies	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
November 2011

Science A

Unit Biology B1a (Human Biology)

Biology

Unit Biology B1a (Human Biology)

BLY1AP

F&H

Tuesday 15 November 2011 Morning Session

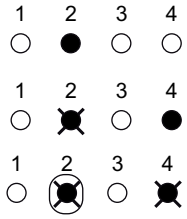
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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 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

Drugs are used to treat the condition shown in the photograph.



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

A leprosy

B limb abnormalities

C morning sickness

D difficulties in sleeping

The drug thalidomide was first developed to treat . . . **1** . . . .

Thalidomide was also given to pregnant women to treat . . . **2** . . . .

Because many women were given thalidomide, many babies were born with . . . **3** . . . .

Thalidomide is now used to treat . . . **4** . . . .

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QUESTION TWO

Infectious diseases make us feel ill.

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

A antibodies

B antibiotics

C toxins

D painkillers

Bacteria make us feel ill because bacteria produce . . . **1** . . . .

To kill bacteria, a doctor might give a patient . . . **2** . . . .

To kill bacteria, our white blood cells produce . . . **3** . . . .

To relieve disease symptoms quickly, a doctor might give a patient . . . **4** . . . .

Turn over for the next question

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QUESTION THREE

The table shows the amounts of energy, sugar and salt in 100 cm^3 of some sports drinks.

Drink	Energy in kJ	Sugar in g	Salt in mg
High sport	361	20	0
Hydrate	378	22	63
Quench	427	23	153
Unsweetened orange juice	230	13	5

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

A High sport

B Hydrate

C Quench

D Unsweetened orange juice

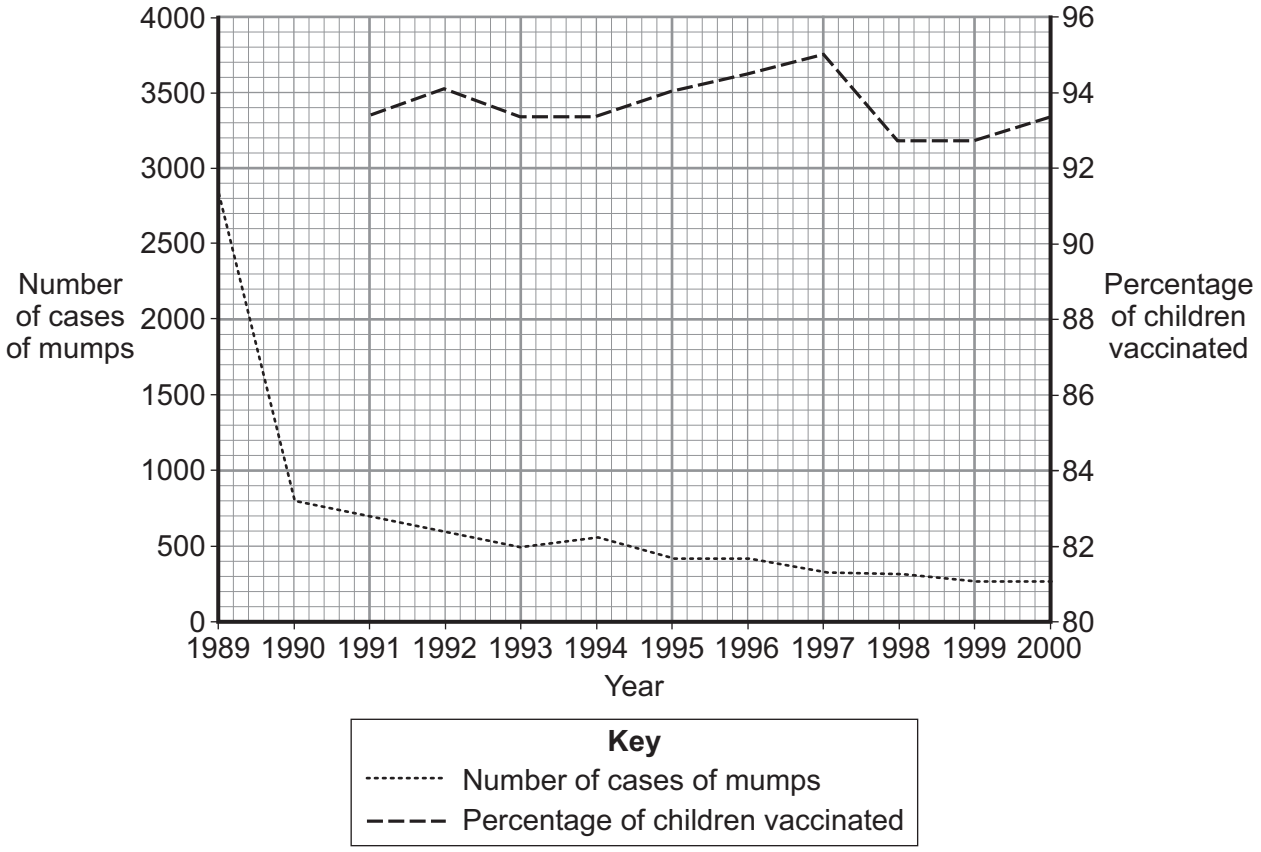
1	contains least energy
2	contains 220 g of sugar per litre
3	is most likely to cause increased body mass
4	is least likely to cause an increase in blood pressure

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QUESTION FOUR

The graph shows the number of cases of mumps in Scotland between 1989 and 2000.

The graph also shows the percentage of children vaccinated against mumps.



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

A 1991

B 1994

C 1997

D 2000

1	the year when vaccination started
2	the year when the highest percentage of children were vaccinated
3	the only year when there was an increase in the number of cases of mumps
4	the decrease in the number of cases of mumps between 1989 and 1990

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QUESTION FIVE

The flow chart shows how new drugs are tested.

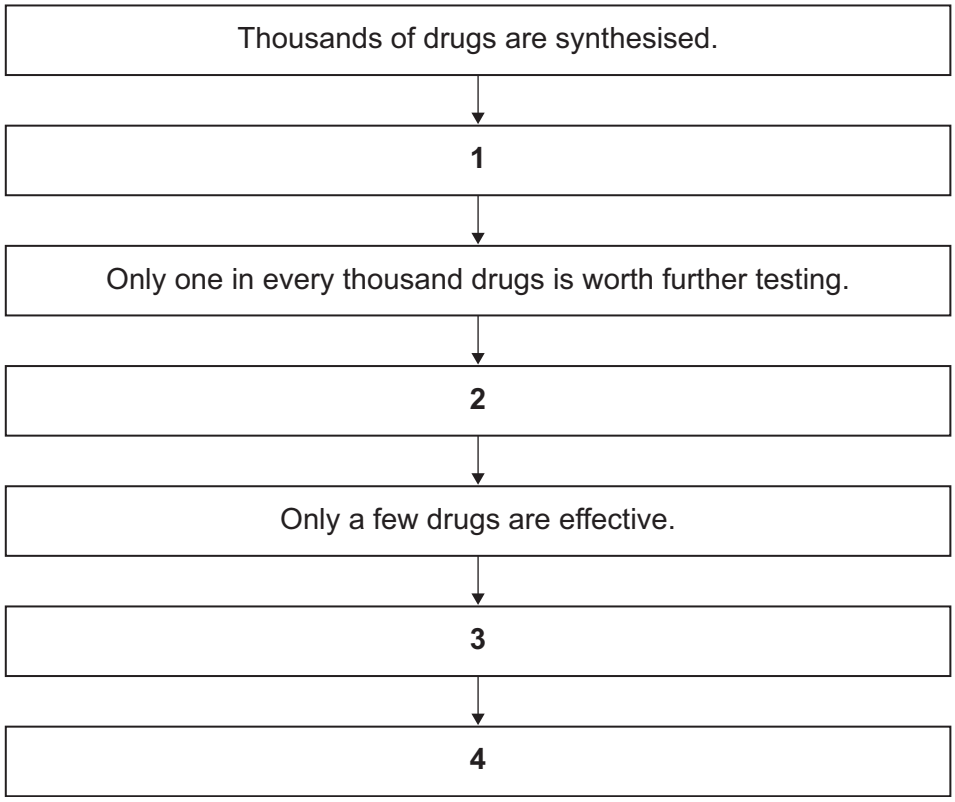
Match statements, **A**, **B**, **C** and **D**, with the stages **1**–**4** in the flow chart.

A Drugs are tested on animals to see if the drugs work.

B Low doses of drugs are tested on volunteers to detect any side effects.

C Drugs are tested on cells to see if the drugs are safe to test on organisms.

D Drugs are tested on patients to find the best dose.



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Turn over for the next question

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Section Two

Questions **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

A student was walking home after a night out with a group of friends. He stepped out into the road in front of a car. The car brakes made a screeching noise as the car tried to stop. Luckily, the student jumped back onto the pavement without thinking as soon as he was aware of the danger.



6A Which row in the table shows the sense organs that could have detected the car?

	Skin	Eyes	Nose	Tongue	Ears
1	✓	✓			
2		✓	✓	✓	
3	✓			✓	
4		✓			✓

6B The cells that detect changes in the surroundings are called . . .

1 muscles.

2 receptors.

3 stimuli.

4 synapses.

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6C Jumping back onto the pavement involved a reflex action.

All reflex actions . . .

1 involve the brain.

2 are rapid and automatic.

3 involve glands.

4 involve hormones.

6D The student's reaction time would have been slower if . . .

1 he had smoked a cigarette earlier.

2 the car had been travelling faster.

3 he had been drinking alcohol.

4 the driver had sounded his horn.

Turn over for the next question

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QUESTION SEVEN

The level of cholesterol in the blood may affect a person's health.

7A Which organ in the body makes cholesterol?

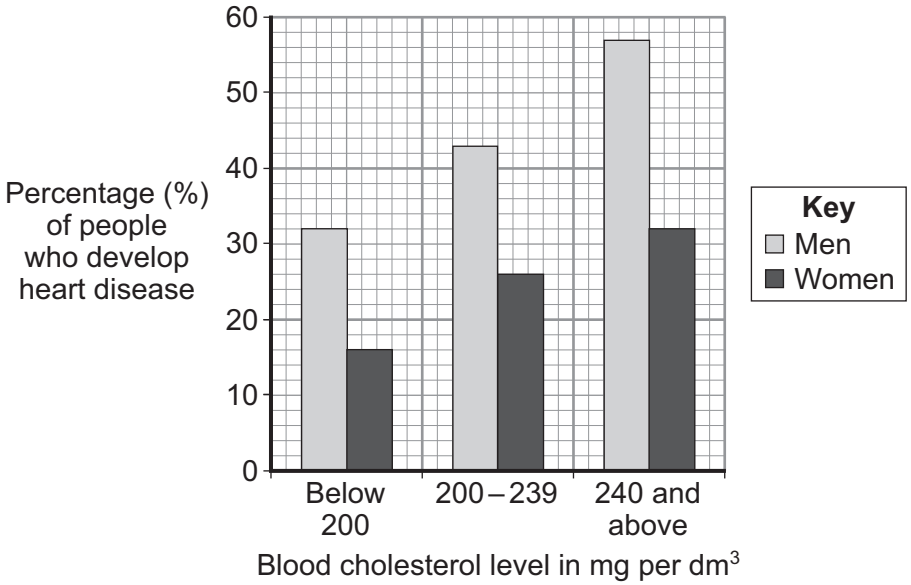
1 heart

2 kidney

3 liver

4 lung

The bar chart shows the relationship between blood cholesterol level and the chance of developing heart disease.



7B What percentage (%) of women with a blood cholesterol level of 220 mg per dm^3 develop heart disease?

1 16 %

2 26 %

3 32 %

4 42 %

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7C A man with a blood cholesterol level of 150 mg per dm^3 is more likely to develop heart disease than a woman with the same blood cholesterol level.

How much more likely?

1 1.5 times

2 2 times

3 2.5 times

4 3 times

7D Which conclusion can be made from the graph?

1 People with blood cholesterol levels above 240 mg per dm^3 will all develop heart disease.

2 People with blood cholesterol levels above 240 mg per dm^3 will not develop heart disease.

3 There is no link between blood cholesterol level and heart disease.

4 The higher the blood cholesterol level, the greater the chance of developing heart disease.

Turn over for the next question

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QUESTION EIGHT

In countries where yoghurt has been part of the diet for centuries, many people live to be 90 or even 100 years old.

A teacher asked a class to test the hypothesis that the bacteria in yoghurt improve the health of elderly people.

The students carried out the following investigation in two groups.

Group 1: Fifteen students asked their grandparents to drink 500 cm^3 of milk and eat 150 g of natural yoghurt every day for six weeks.

Group 2: Fifteen other students asked their grandparents to drink 500 cm^3 of milk every day for six weeks as a control.

After the six weeks, both sets of grandparents completed a questionnaire and the students recorded the results.

8A The experiment was not well planned because the students did not control . . .

1 the amount of milk.

2 the amount of yoghurt.

3 the age of the grandparents.

4 the length of time.

The table shows the results of the investigation.

	Group 1	**Group 2**
Number of grandparents	56	60
Number of grandparents who had heart problems	1	1
Number of grandparents who developed colds or flu	2	6
Number of grandparents who developed stomach upsets	7	10

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8B Look at the data for the grandparents who were given yoghurt.

What fraction had stomach upsets during the investigation?

1 $\frac{1}{28}$

2 $\frac{1}{10}$

3 $\frac{1}{8}$

4 $\frac{1}{4}$

8C The reliability of the investigation could have been improved by . . .

1 using yoghurt containing fruit.

2 using a larger number of grandparents.

3 giving the grandparents larger amounts of yoghurt.

4 weighing the grandparents at the start of the experiment.

8D Which conclusion can be made from the results of the investigation?

1 There is a definite link between eating yoghurt and health in grandparents.

2 There is a definite link between drinking milk and health in grandparents.

3 There is not enough evidence to link yoghurt and health in grandparents.

4 Eating yoghurt prevents stomach upsets in grandparents.

Turn over for the next question

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QUESTION NINE

Some infections can be treated with antibiotics.

9A Virus infections cannot be treated with antibiotics because . . .

1 viruses live inside body cells.

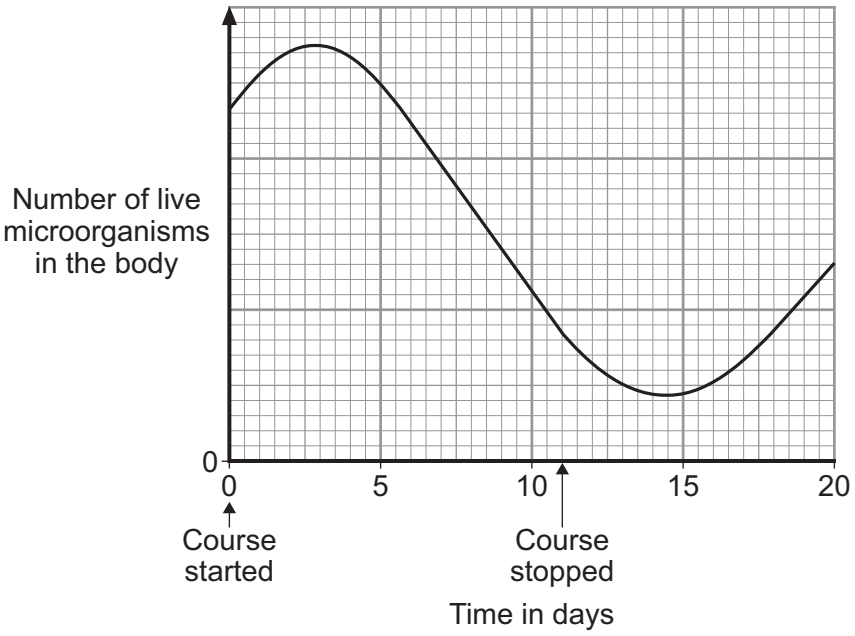
2 viruses are too small.

3 viruses have thick coats.

4 viruses are resistant.

Antibiotic tablets may be prescribed by a doctor. Patients are always told to finish the course of tablets, even though they may be feeling better.

The graph shows what happens to the number of live microorganisms in the body when someone does not finish a course of antibiotic tablets.



9B How many more days would the patient have needed to take the antibiotics to kill all the microorganisms in the body?

1 3

2 11

3 14

4 20

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9C After starting a course of antibiotics, a patient might feel more ill for two or three days.

Why?

1 Microorganisms are still multiplying in the body.

2 Antibiotics always cause side effects which make patients feel unwell.

3 Antibiotics do not kill microorganisms, antibiotics only relieve the symptoms.

4 The course of antibiotics was not completed.

9D Some microorganisms have become resistant to antibiotics.

An antibiotic-resistant population of a microorganism results from . . .

1 patients not completing their course of antibiotics.

2 toxins.

3 natural selection.

4 not enough people being vaccinated.

END OF TEST

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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

The flow chart shows how new drugs are tested.

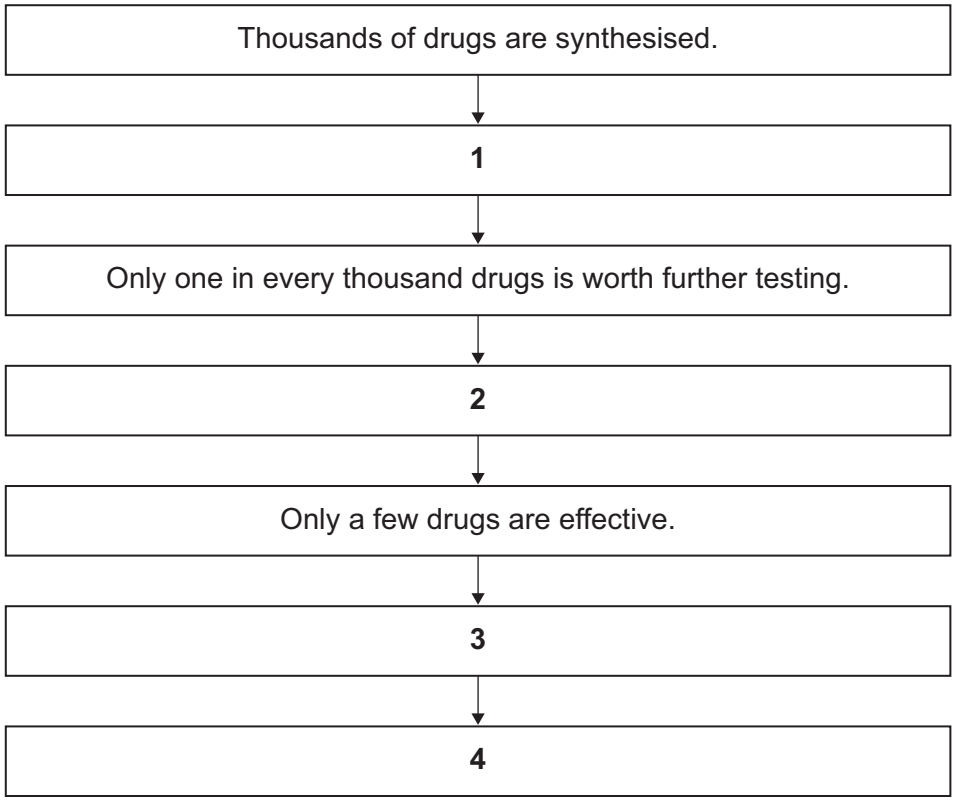
Match statements, **A**, **B**, **C** and **D**, with the stages **1**–**4** in the flow chart.

A Drugs are tested on animals to see if the drugs work.

B Low doses of drugs are tested on volunteers to detect any side effects.

C Drugs are tested on cells to see if the drugs are safe to test on organisms.

D Drugs are tested on patients to find the best dose.



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QUESTION TWO

Our weight depends on:

- inherited factors
- the amount of exercise we take
- our diet.

If our energy intake is less than 3300 kJ a day, we slowly use muscle tissue rather than fat to get our energy.

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

A higher muscle to fat ratio

B obesity

C reduced cholesterol levels, decrease in weight

D very low metabolic rate, muscle loss

1	regular exercise	2800 kJ per day, low fat diet
2	regular exercise	high energy, low fat diet
3	very little exercise	2800 kJ per day, low fat diet
4	very little exercise	high energy, high fat diet

Turn over for the next question

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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

In countries where yoghurt has been part of the diet for centuries, many people live to be 90 or even 100 years old.

A teacher asked a class to test the hypothesis that the bacteria in yoghurt improve the health of elderly people.

The students carried out the following investigation in two groups.

Group 1: Fifteen students asked their grandparents to drink 500 cm^3 of milk and eat 150 g of natural yoghurt every day for six weeks.

Group 2: Fifteen other students asked their grandparents to drink 500 cm^3 of milk every day for six weeks as a control.

After the six weeks, both sets of grandparents completed a questionnaire and the students recorded the results.

3A The experiment was not well planned because the students did not control . . .

1 the amount of milk.

2 the amount of yoghurt.

3 the age of the grandparents.

4 the length of time.

The table shows the results of the investigation.

	Group 1	**Group 2**
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3B Look at the data for the grandparents who were given yoghurt.

What fraction had stomach upsets during the investigation?

1 $\frac{1}{28}$

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4 $\frac{1}{4}$

3C The reliability of the investigation could have been improved by . . .

1 using yoghurt containing fruit.

2 using a larger number of grandparents.

3 giving the grandparents larger amounts of yoghurt.

4 weighing the grandparents at the start of the experiment.

3D Which conclusion can be made from the results of the investigation?

1 There is a definite link between eating yoghurt and health in grandparents.

2 There is a definite link between drinking milk and health in grandparents.

3 There is not enough evidence to link yoghurt and health in grandparents.

4 Eating yoghurt prevents stomach upsets in grandparents.

Turn over for the next question

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QUESTION FOUR

Some infections can be treated with antibiotics.

4A Virus infections cannot be treated with antibiotics because . . .

1 viruses live inside body cells.

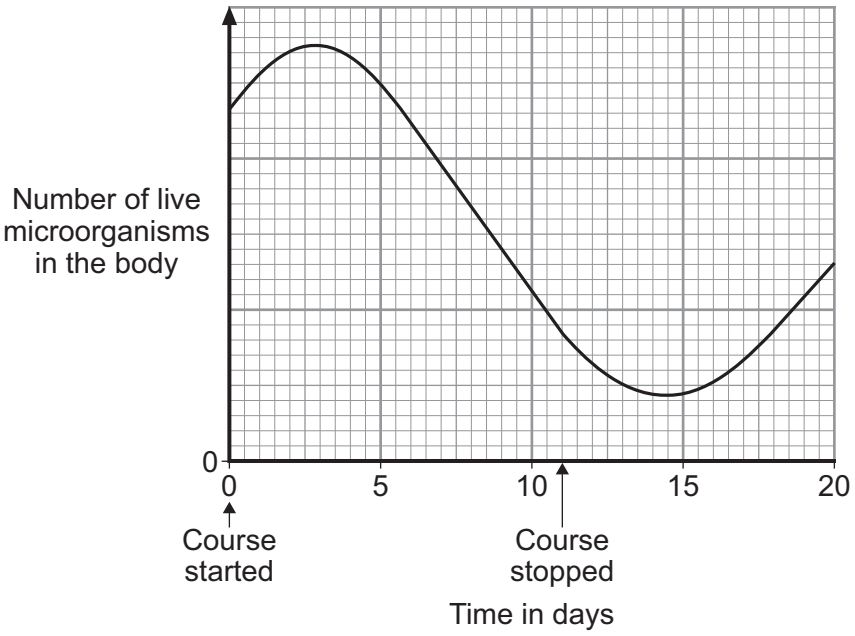
2 viruses are too small.

3 viruses have thick coats.

4 viruses are resistant.

Antibiotic tablets may be prescribed by a doctor. Patients are always told to finish the course of tablets, even though they may be feeling better.

The graph shows what happens to the number of live microorganisms in the body when someone does not finish a course of antibiotic tablets.



4B How many more days would the patient have needed to take the antibiotics to kill all the microorganisms in the body?

1 3

2 11

3 14

4 20

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4C After starting a course of antibiotics, a patient might feel more ill for a few days.

Why?

1 Microorganisms are still multiplying in the body.

2 Antibiotics always cause side effects which make patients feel unwell.

3 Antibiotics do not kill microorganisms, antibiotics only relieve the symptoms.

4 The course of antibiotics was not completed.

4D Some microorganisms have become resistant to antibiotics.

An antibiotic-resistant population of a microorganism results from . . .

1 patients not completing their course of antibiotics.

2 toxins.

3 natural selection.

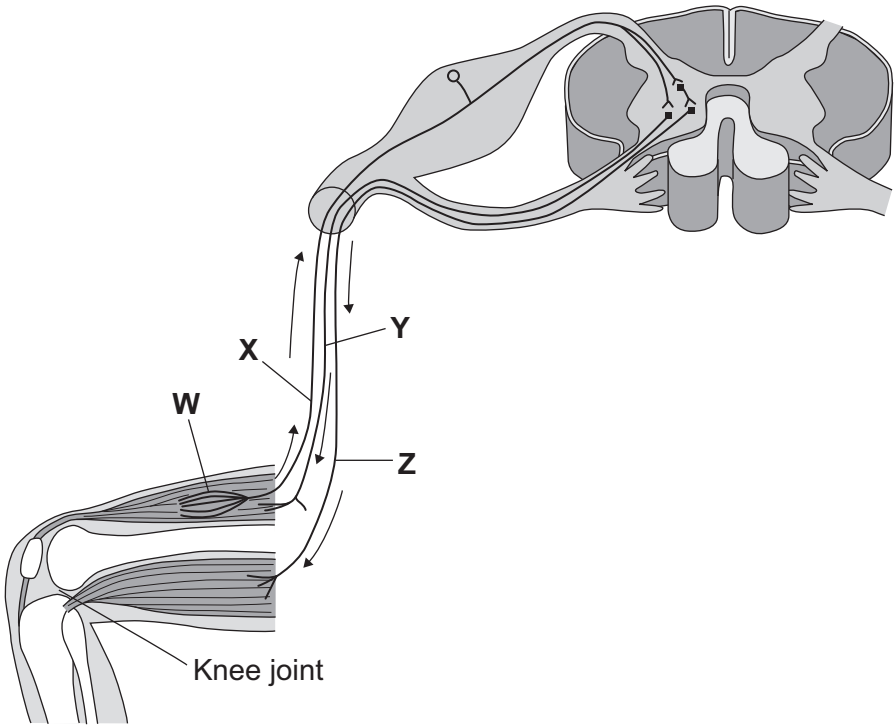
4 not enough people being vaccinated.

Turn over for the next question

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QUESTION FIVE

The diagram shows a reflex action involving muscles in the leg.



The arrows show the direction of nerve impulses.

5A Structure **W** detects stretch in the muscle.

Structure **W** is called . . .

1 an effector.

2 a receptor.

3 a sensory neurone.

4 a synapse.

5B Structure **X** is . . .

1 an effector.

2 a relay neurone.

3 a sensory neurone.

4 a synapse.

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The two muscles in the diagram are usually contracted to a small extent. Structures **Y** and **Z** are both motor neurones.

- Impulses from structure **Y** stimulate muscle contraction.
- Impulses from structure **Z** inhibit muscle contraction.

5C Which of the following is most likely to cause the leg to straighten at the knee joint?

1 impulses passing only along neurone **Y**

2 impulses passing only along neurone **Z**

3 impulses passing along both neurone **Y** and neurone **Z**

4 no impulses passing along neurones **Y** and **Z**

5D When the leg has straightened at the knee joint, . . .

1 impulses will move along **X** only.

2 impulses will move along **Y** only.

3 impulses will move along **X** and **Y** but not along **Z**.

4 no impulses will move along **X** or **Y** or **Z**.

Turn over for the next question

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QUESTION SIX

Diabetes is linked to body mass index (BMI).

BMI is calculated using the formula:

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

A 15 year old girl is 1.61 metres tall, with a mass of 58 kg.

6A Use the formula to calculate her BMI.

Her BMI is . . .

1 0.04

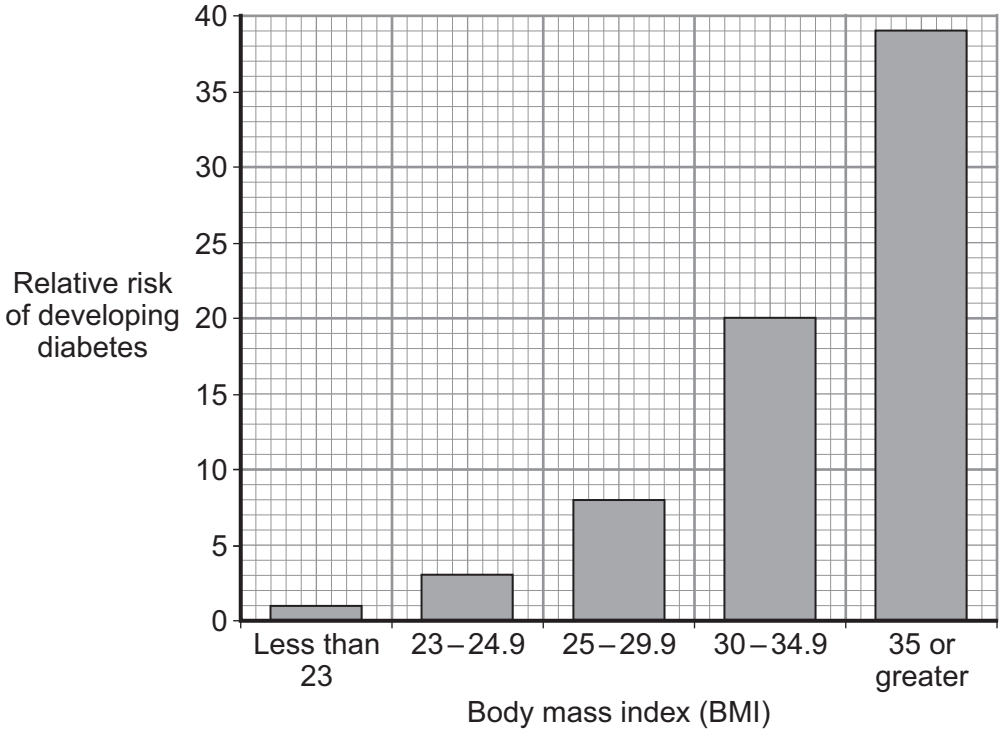
2 18.0

3 22.4

4 36.0

The bar chart shows the link between BMI and the relative risk of developing diabetes.

A relative risk of 1 is the normal risk of developing diabetes.



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6B One conclusion that can be made from this bar chart is that . . .

1 heavy people usually develop diabetes.

2 an increase in BMI from 24 to 25 increases the risk of developing diabetes by three times.

3 a person with a BMI of 36 will develop diabetes.

4 a person with a BMI of 20 might develop diabetes.

6C An athlete has a BMI of 32. However, her risk of developing diabetes is likely to be less than 20 times the normal risk.

The most likely reason for this is that she . . .

1 is very short.

2 is fit and healthy.

3 has a lot of muscle compared to fat.

4 has a high metabolic rate.

6D A doctor saw a person with a BMI of 35. The doctor advised the person to take statins. Statins affect the levels of LDL and HDL in the blood.

For a healthy heart there should be . . .

1 high levels of LDL and HDL.

2 a high level of LDL and a low level of HDL.

3 a high level of HDL and a low level of LDL.

4 low levels of LDL and HDL.

Turn over for the next question

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QUESTION SEVEN

In vitro fertilisation (IVF) is used to treat infertility.

7A IVF involves using . . .

1 FSH to stimulate the maturation of eggs and LH to stimulate egg release.

2 LH to stimulate the maturation of eggs and FSH to stimulate egg release.

3 FSH to stimulate the maturation of eggs and oestrogen to stimulate egg release.

4 LH to stimulate the maturation of eggs and oestrogen to stimulate egg release.

The table shows the percentage success rate of fertility treatment and the percentage of multiple births in relation to the age of the woman.

	Age of woman				
	Younger than 35	35–37	38–39	40–42	42+
Percentage of fertility treatments resulting in live births	28.2	23.6	18.3	10.6	3.2
Multiple births as a percentage of these live births	28.4	23.1	18.5	12.4	3.7

7B 16 000 women aged below 35 were given fertility treatment.

How many multiple births were recorded from these women?

1 451

2 454

3 1281

4 4512

7C The evidence in the table is from survey results from 85 clinics from all over England.

The evidence should be given as results from individual clinics because . . .

1 individual clinics may not have recorded some of their failures.

2 it is important to identify the more successful clinics.

3 older people tend to have fewer multiple births.

4 the success rate falls with increased age of the mother.

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7D The National Institute for Clinical Excellence has suggested rules for deciding who should be allowed fertility treatment.

Which of the following is an acceptable reason to refuse a woman fertility treatment?

1 The couple have been trying to start a family for only three years.

2 The woman has already had one unsuccessful attempt at treatment.

3 The woman is 48 years old.

4 The couple are not married.

Turn over for the next question

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QUESTION EIGHT

Doctors disagree about whether children should be given the MMR vaccine or whether children should be vaccinated against the three diseases separately.

Each method of vaccination needs a booster injection.

MMR vaccination therefore requires two injections.

Vaccinating for the three diseases separately requires six injections.

8A Vaccinating a child to give protection against a particular disease involves . . .

1 causing the child to get the disease so that the child can develop antibodies.

2 injecting dead pathogens or inactive pathogens.

3 injecting the correct antibodies.

4 injecting white blood cells to produce the correct antibodies.

8B Vaccination gives a child protection from later infection by a particular pathogen because . . .

1 the vaccine causes the production of relevant antitoxins.

2 pathogens can no longer enter the body.

3 the body rapidly produces the correct antibodies if infected again.

4 the vaccine is toxic to pathogens entering the body.

8C Which of the following is a valid reason, based on fact, for supporting the use of MMR vaccinations in preference to the three separate vaccinations?

1 By 1995, 90 countries were using MMR vaccinations.

2 MMR vaccinations are compulsory in the USA.

3 Separate vaccinations require six injections with various time intervals; MMR needs only two.

4 Every MMR vaccination results in a severe reaction straight after the injection.

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8D Many parents are worried about the perceived risks associated with MMR.

Which of the following facts is most likely to help parents decide to have their children vaccinated with MMR?

1 Child death rates from measles fell by 60 % between 1999 and 2007 following a widespread programme of MMR vaccinations.

2 Some parents have reported reactions which they believe to be related to the MMR vaccine 3 years after it was given to their children.

3 Doctors cannot guarantee that an MMR vaccination will give 100 % protection against the three diseases.

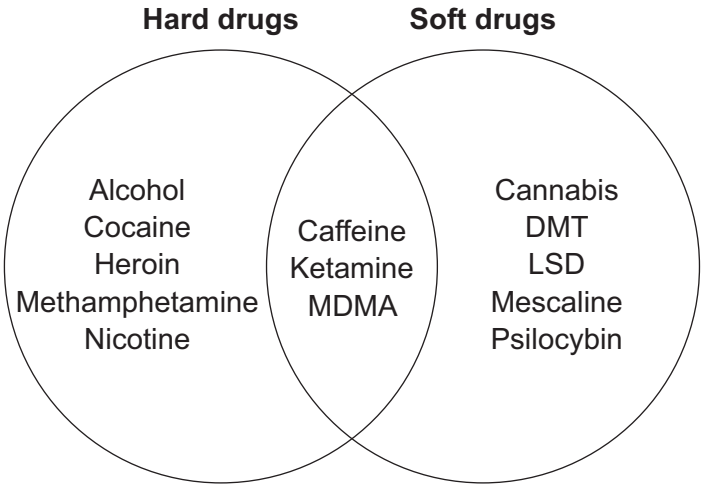
4 Swaziland does not use MMR and had no cases of measles reported in 2005.

Turn over for the next question

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QUESTION NINE

Most drugs can be classified as hard drugs or soft drugs.
The diagram shows the classification of some different drugs.



9A The diagram shows that . . .

1 hard drugs are legal but soft drugs are illegal.

2 all drugs can be classified as ‘hard’ or ‘soft’.

3 hard drugs are illegal but soft drugs are legal.

4 the classification of drugs depends on more than one factor.

9B People who smoke tobacco may have withdrawal symptoms when they try to give up smoking.

What is the cause of these symptoms?

1 Regular smokers get used to the effects of nicotine so need more nicotine to get the same effect.

2 People who give up smoking often feel sick, may shake and put on weight.

3 Nicotine causes changes in chemical processes of the body.

4 Tobacco smoke contains carcinogenic substances which damage cells in the lungs.

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The table shows some of the symptoms of giving up smoking.

Symptom	How long the symptom lasts after giving up smoking
Anxiety	2–4 weeks
Decreased heart rate	More than 10 weeks
Depression	Less than 3 weeks
Increased aggression	4 weeks
Increased appetite	More than 10 weeks
Restless sleep	Less than 1 week
Poor concentration	1 week

9C Which conclusion does the information in the table support?

1 Smoking may help you to lose weight.

2 Smoking makes concentration worse.

3 Smoking makes someone more aggressive.

4 Smoking tends to slow down the heart rate.

9D Which row in the table shows the symptoms that may last for at least three weeks after giving up smoking?

	Symptom				
	Anxiety	**Decreased heart rate**	**Depression**	**Increased aggression**	**Restless sleep**
1	✓		✓	✓	
2		✓		✓	✓
3			✓	✓	✓
4	✓	✓		✓	

END OF TEST

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There are no questions printed on this page

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2011 Examination – November Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the students' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

November 2011

Foundation Tier

Question	Key		
One	**A**	leprosy	**4**
	B	limb abnormalities	**3**
	C	morning sickness	**2**
	D	difficulties in sleeping	**1**
Two	**A**	antibodies	**3**
	B	antibiotics	**2**
	C	toxins	**1**
	D	painkillers	**4**
Three	**A**	High sport	**4**
	B	Hydrate	**2**
	C	Quench	**3**
	D	Unsweetened orange juice	**1**
Four	**A**	1991	**1**
	B	1994	**3**
	C	1997	**2**
	D	2000	**4**
Five	**A**	Drugs are tested on animals to see if the drugs work	**2**
	B	… tested on volunteers to detect any side effects	**3**
	C	… are tested on cells to see if the drugs are safe to test on organisms	**1**
	D	Drugs are tested on patients to find the best dose	**4**

	A	**B**	**C**	**D**
Six	**4**	**2**	**2**	**3**
Seven	**3**	**2**	**2**	**4**
Eight	**3**	**3**	**2**	**3**
Nine	**1**	**1**	**1**	**3**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

November 2011

Higher Tier

Question	Key		
One	**A**	Drugs are tested on animals to see if the drugs work	**2**
	B	… tested on volunteers to detect any side effects	**3**
	C	… are tested on cells to see if the drugs are safe to test on organisms	**1**
	D	Drugs are tested on patients to find the best dose	**4**
Two	**A**	higher muscle to fat ratio	**2**
	B	obesity	**4**
	C	reduced cholesterol levels, decreases in weight	**1**
	D	very low metabolic rate, muscle loss	**3**

	A	**B**	**C**	**D**
Three	**3**	**3**	**2**	**3**
Four	**1**	**1**	**1**	**3**
Five	**2**	**3**	**3**	**4**
Six	**3**	**4**	**3**	**3**
Seven	**1**	**3**	**2**	**3**
Eight	**2**	**3**	**3**	**1**
Nine	**4**	**3**	**1**	**4**

The AQA UMS Conversion Calculator can be found at the following web address:

http://www.aqa.org.uk/umsconversion

GCSE SCIENCE

AQA

Unit : BLY1AP BIOLOGY UNIT 1A

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : BG11

15-NOV-11

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	Drugs are tested on animals to see if the drugs work	○	○	○	○
1B	Low dose drug tested on volunteers to detect side effects	○	○	○	○
1C	Drugs tested on cells to see if safe to test on organisms	○	○	○	○
1D	Drugs are tested on patients to find the best dose	○	○	○	○

QUESTION TWO		1	2	3	4
2A	higher muscle to fat ratio	○	○	○	○
2B	obesity	○	○	○	○
2C	reduced cholesterol levels, decrease in weight	○	○	○	○
2D	very low metabolic rate, muscle loss	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	leprosy	○	○	○	○
1B	limb abnormalities	○	○	○	○
1C	morning sickness	○	○	○	○
1D	difficulties in sleeping	○	○	○	○

QUESTION TWO		1	2	3	4
2A	antibodies	○	○	○	○
2B	antibiotics	○	○	○	○
2C	toxins	○	○	○	○
2D	painkillers	○	○	○	○

QUESTION THREE		1	2	3	4
3A	High sport	○	○	○	○
3B	Hydrate	○	○	○	○
3C	Quench	○	○	○	○
3D	Unsweetened orange juice	○	○	○	○

QUESTION FOUR		1	2	3	4
4A	1991	○	○	○	○
4B	1994	○	○	○	○
4C	1997	○	○	○	○
4D	2000	○	○	○	○

QUESTION FIVE		1	2	3	4
5A	Drugs are tested on animals to see if the drugs work	○	○	○	○
5B	Low dose drug tested on volunteers to detect side effects	○	○	○	○
5C	Drugs tested on cells to see if safe to test on organisms	○	○	○	○
5D	Drugs are tested on patients to find the best dose	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
June 2011

Science A

Unit Biology B1a (Human Biology)

Biology

Unit Biology B1a (Human Biology)

BLY1AP

F&H

Tuesday 28 June 2011 Morning Session

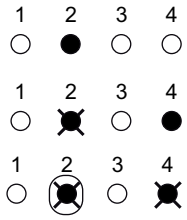
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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 **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

Drugs have different uses.

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

A statins

B painkillers

C heroin and cocaine

D tobacco and alcohol

1	legal and recreational drugs
2	very addictive drugs
3	used to lower blood cholesterol levels
4	used to relieve disease symptoms

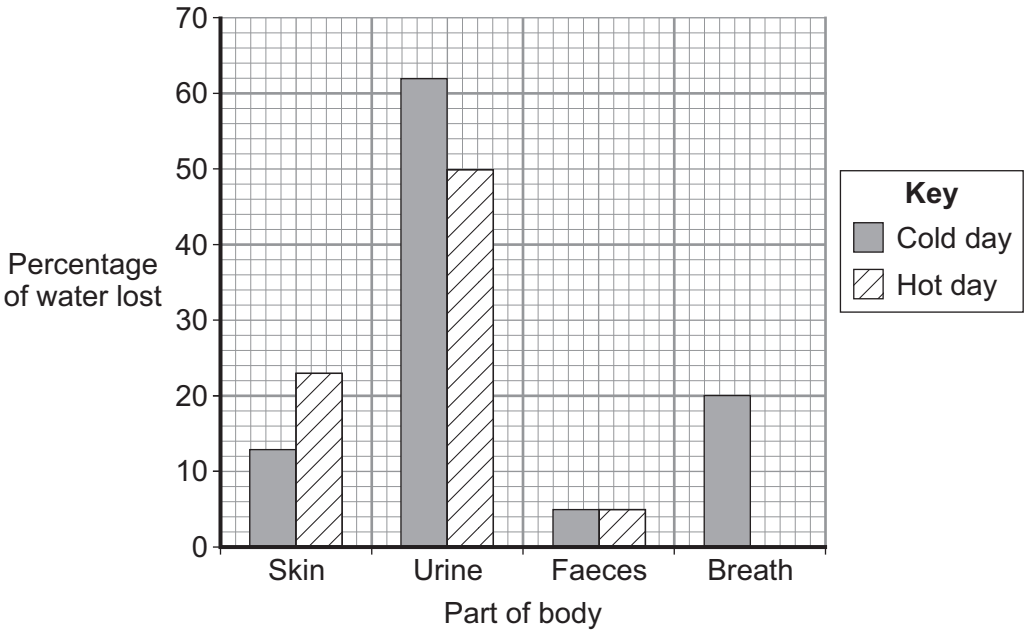
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QUESTION TWO

The bar chart shows the percentages of water lost from different parts of a man's body on a cold day and on a hot day.

The bar for the percentage of water lost in breath on a hot day has **not** been plotted.

The man's total water loss on each day was 1000 cm^3.



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

A 12

B 13

C 22

D 62

1	the percentage of water lost through the skin on a cold day
2	the difference in the percentages of water lost in the urine on a cold day and on a hot day
3	the highest percentage of water lost
4	the percentage of water lost in breath on a hot day

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QUESTION THREE

Drugs must be safe for people to use.

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

A if the drugs have any side effects

B the best dose for the drug

C if the drug is toxic

D if the effect of the drug is only psychological

New drugs may be tested on animals in a laboratory to find out . . . **1** . . . .

The drugs are tested on a few humans to find out . . . **2** . . . .

Placebos are given to some patients to find out . . . **3** . . . .

The drugs are tested on large numbers of humans to find out . . . **4** . . . .

QUESTION FOUR

Semmelweiss did research that saved the lives of thousands of mothers and their babies.

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

A experiment

B hypothesis

C observation

D result

1	He noticed that in one ward many mothers were dying.
2	He had an idea that doctors might be carrying disease to the mothers.
3	He asked the doctors to wash their hands before treating mothers.
4	The death rate of mothers was reduced.

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QUESTION FIVE

This question is about human organs.

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

A kidney

B liver

C ovary

D pituitary gland

	Function
1	produces cholesterol
2	produces FSH
3	produces oestrogen
4	produces urine

Turn over for the next question

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Section Two

Questions **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

This question is about the effect of obesity on health and life expectancy.

6A Which of these diseases is linked to obesity?

1 measles

2 heart disease

3 lung cancer

4 leprosy

A study was carried out to see if there was a link between waist size and early death.

The waist sizes of 200 000 men were checked for ten years. Over the ten years, the men had a normal lifestyle.

7000 of these men died during the study.

6B Which factor was controlled in this study?

1 waist size

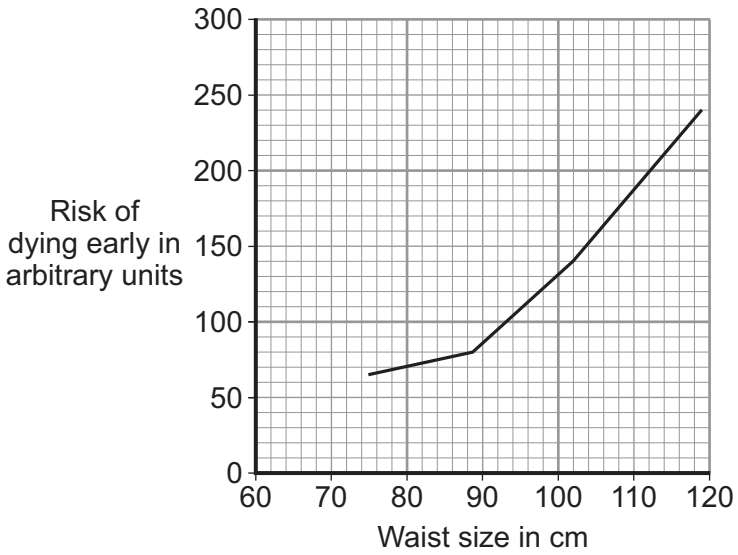
2 diet

3 gender

4 exercise

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The graph shows the results of the study. A risk of 100 means that the person has a normal life expectancy. A risk greater than 100 means that the person has a lower than normal life expectancy.



6C From the graph, what waist size is linked to a normal life expectancy?

1 76 cm

2 84 cm

3 93 cm

4 112 cm

6D The graph shows that . . .

1 a man with a waist size of 110 cm will die before a man with a waist size of 90 cm.

2 increasing body mass in men increases the risk of dying early.

3 more men have larger waist sizes.

4 increasing waist size in men increases the risk of dying early.

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QUESTION SEVEN

Several factors affect the risk of heart disease.

The table shows how different occupations and the risk factors for heart disease are linked.

Risk factor	Percentage of occupational group at risk of heart disease				
	Professional	Semi-professional	Self-employed	Semi-skilled	Unskilled
Smoking	18	22	26	28	35
Less than 30 minutes of exercise per week	28	30	28	30	35
Drinking over 4 units of alcohol per day	34	37	34	36	34
Drinking over 8 units of alcohol on at least one day per week	18	19	18	20	18
High blood pressure	25	27	25	29	28
High total cholesterol	66	65	67	65	60
Being overweight	43	43	38	39	39
Obesity	21	20	27	24	23

7A Which occupational group take least exercise on average?

1 professional

2 semi-professional

3 semi-skilled

4 unskilled

7B Which risk factor affects all occupational groups the most?

1 smoking

2 drinking over 4 units of alcohol per day

3 high total cholesterol

4 obesity

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7C For which risk factor is there the least variation between the different occupational groups?

1 smoking

2 drinking over 8 units of alcohol on at least one day per week

3 high blood pressure

4 being overweight

7D To which occupational group would it be best to target an anti-smoking campaign?

1 professional

2 semi-professional

3 self-employed

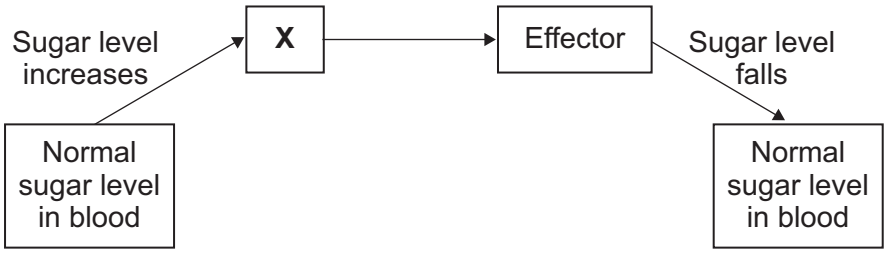
4 unskilled

Turn over for the next question

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QUESTION EIGHT

The diagram shows what happens to sugar levels in the blood after a meal.



8A Structure **X** is sensitive to increases in blood sugar levels.

Structure **X** is a . . .

1 synapse.

2 relay neurone.

3 motor neurone.

4 receptor.

8B Structure **X** sends information to the effector in the blood stream.

This information is sent as . . .

1 a hormone.

2 an enzyme.

3 a synapse.

4 a nerve impulse.

8C All effectors are . . .

1 glands.

2 neurones.

3 target organs.

4 muscles.

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8D Sometimes, the organs controlling blood sugar concentration do not work properly and the sugar levels in the blood stay high.

This condition is called . . .

1 arthritis.

2 diabetes.

3 heart disease.

4 rubella.

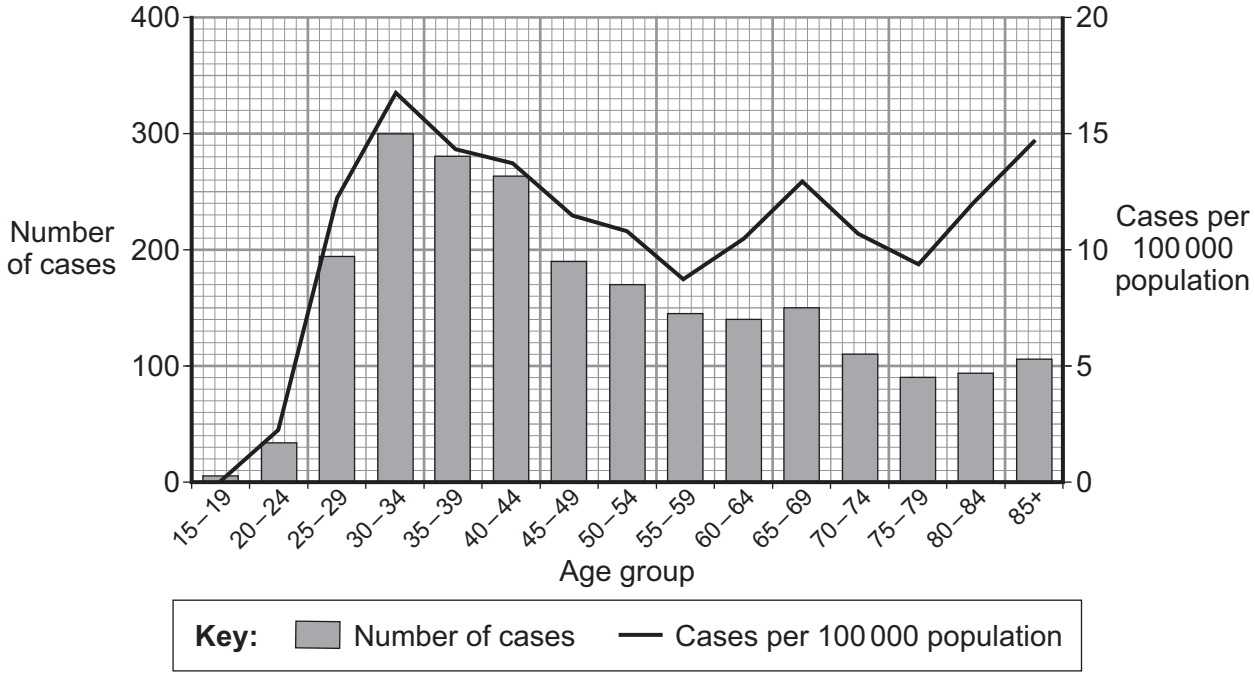
Turn over for the next question

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QUESTION NINE

A virus causes cervical cancer. Sexual intercourse transmits the virus.

The graph shows the number of cases of cervical cancer diagnosed in England in 2005.



9A Which age group had the highest number of cases of cervical cancer?

1 15–19

2 30–34

3 40–44

4 85+

9B A city has 500 000 inhabitants.

How many women aged 65–69 would have been diagnosed with cervical cancer in 2005?

1 13

2 65

3 150

4 260

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9C The government has started a programme of vaccination against the cervical cancer virus. The programme starts with the vaccination of 14-year-old girls.

From the information in the graph, what is the reason for starting with this age group?

The girls in this age group . . .

1 are used to being vaccinated.

2 get booster doses of other vaccines at school.

3 have mainly not yet started their menstrual cycles.

4 have mainly not yet been infected with the virus.

9D Many parents do not agree with girls of 14 being vaccinated against the cervical cancer virus.

An ethical reason for this would be that the parents . . .

1 think vaccination might encourage the girl to have underage sex.

2 do not know how the vaccine works.

3 are afraid of side-effects.

4 cannot afford vaccination.

END OF TEST

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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

This question is about human organs.

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

A kidney

B liver

C ovary

D pituitary gland

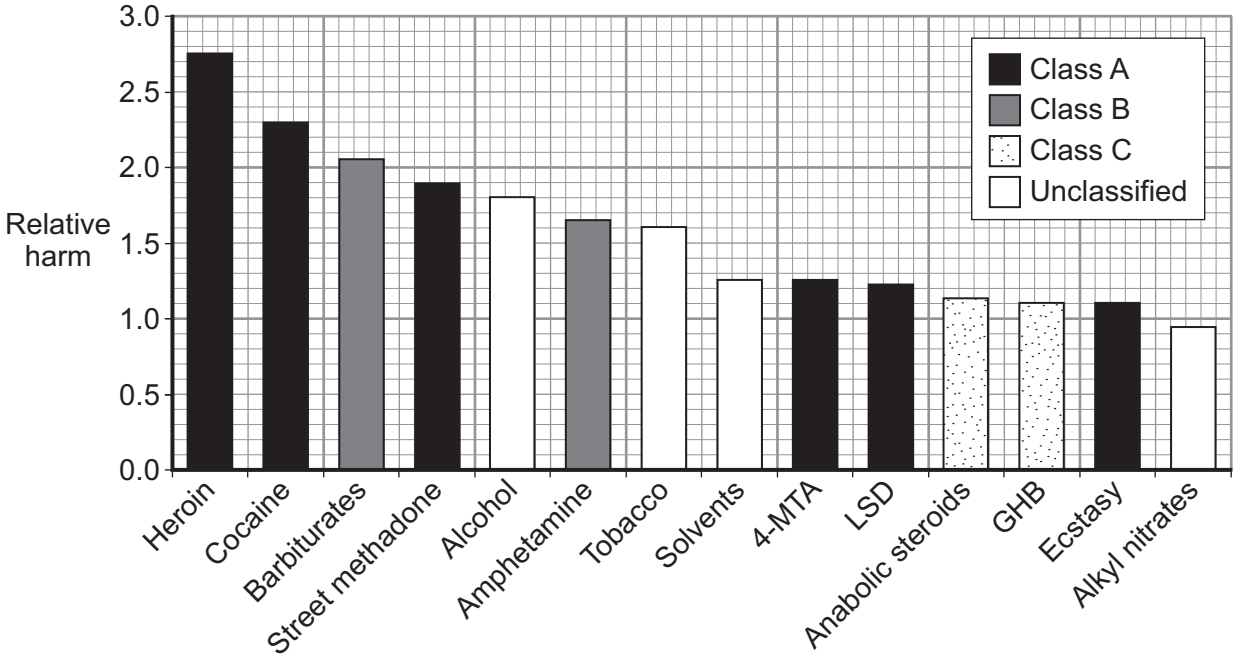
	Function
1	produces cholesterol
2	produces FSH
3	produces oestrogen
4	produces urine

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QUESTION TWO

A group of scientists was asked to rate recreational drugs according to the harm that these drugs cause. The scientists used a scale 1–3, with 3 being the most harmful.

The results are shown in the graph.



The government classifies drugs as Class A, Class B, Class C or unclassified.

Class A drugs are the most harmful, and unclassified drugs are the least harmful.

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

A alcohol

B ecstasy

C heroin

D tobacco

1	a drug with a relative harm of 1.6
2	a drug that scientists think the government should put into a less harmful class
3	the drug unclassified by the government that scientists think is more harmful than one substance in Class B
4	the most harmful Class A drug

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Section Two

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

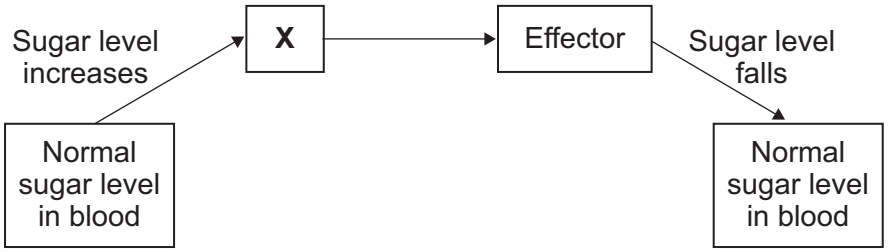
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION THREE

The diagram shows what happens to sugar levels in the blood after a meal.



3A Structure **X** is sensitive to increases in blood sugar levels.

Structure **X** is a . . .

1 synapse.

2 relay neurone.

3 motor neurone.

4 receptor.

3B Structure **X** sends information to the effector in the blood stream.

This information is sent as . . .

1 a hormone.

2 an enzyme.

3 a synapse.

4 a nerve impulse.

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3C All effectors are . . .

1 glands.

2 neurones.

3 target organs.

4 muscles.

3D Sometimes, the organs controlling blood sugar concentration do not work properly and the sugar levels in the blood stay high.

This condition is called . . .

1 arthritis.

2 diabetes.

3 heart disease.

4 rubella.

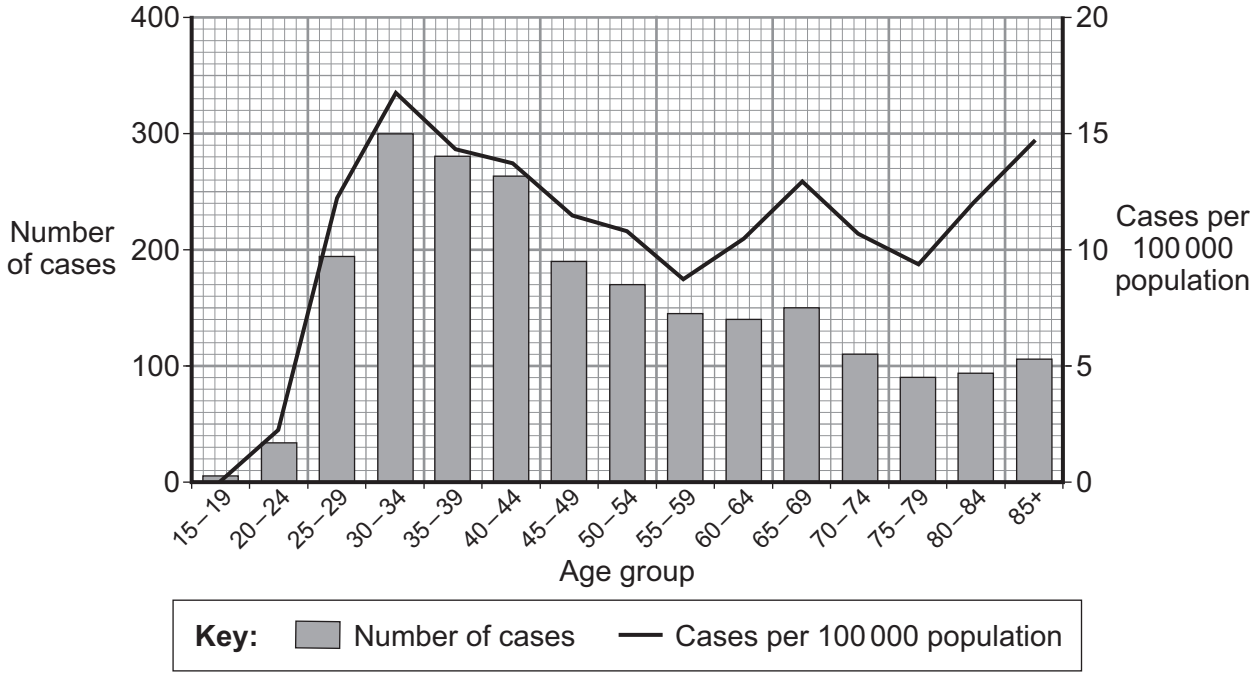
Turn over for the next question

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QUESTION FOUR

A virus causes cervical cancer. Sexual intercourse transmits the virus.

The graph shows the number of cases of cervical cancer diagnosed in England in 2005.



4A Which age group had the highest number of cases of cervical cancer?

1 15–19

2 30–34

3 40–44

4 85+

4B A city has 500 000 inhabitants.

How many women aged 65–69 would have been diagnosed with cervical cancer in 2005?

1 13

2 65

3 150

4 260

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4C The government has started a programme of vaccination against the cervical cancer virus. The programme starts with the vaccination of 14-year-old girls.

From the information in the graph, what is the reason for starting with this age group?

The girls in this age group . . .

1 are used to being vaccinated.

2 get booster doses of other vaccines at school.

3 have mainly not yet started their menstrual cycles.

4 have mainly not yet been infected with the virus.

4D Many parents do not agree with girls of 14 being vaccinated against the cervical cancer virus.

An ethical reason for this would be that the parents . . .

1 think vaccination might encourage the girl to have underage sex.

2 do not know how the vaccine works.

3 are afraid of side-effects.

4 cannot afford vaccination.

Turn over for the next question

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QUESTION FIVE

The poster is part of a campaign to reduce the amount of antibiotics used.



5A Antibiotics kill . . .

1 bacteria only.

2 viruses only.

3 both bacteria and viruses.

4 all types of pathogen.

5B Overuse of antibiotics . . .

1 causes bacteria to mutate.

2 causes bacteria to become resistant to antibiotics.

3 increases the rate of development of antibiotic-resistant strains of bacteria.

4 decreases the risk of epidemics and pandemics occurring.

5C A new strain of bacterium might not be recognised by . . .

1 antibodies.

2 antitoxins.

3 painkillers.

4 vaccines.

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5D The proportion of antibiotic-resistant bacteria in a population increases because of . . .

1 addiction.

2 immunity.

3 mutation.

4 natural selection.

Turn over for the next question

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QUESTION SIX

Sometimes, athletes train in hot countries. The athletes need to get used to hot conditions.

In an investigation:

- eight athletes did three different physical exercises before starting to train in hot conditions
- the sweat from the athletes was analysed after each exercise
- the athletes trained in hot conditions for ten days
- the athletes repeated the three different exercises that they had done before training in hot conditions
- the athletes' sweat was analysed after each exercise.

6A The athletes were told that it did not matter if they ate a lot of salt (containing sodium ions) during the 10 days of training in hot conditions.

The athletes could eat a lot of salt because the excess sodium ions . . .

1 are removed by sweating.

2 are removed by the kidneys.

3 cannot be carried by the blood.

4 cannot enter the blood.

6B The athletes were told that they must not go without sodium ions in their diet because . . .

1 the athletes would lack the energy to carry out their exercises.

2 the athletes' blood would become too concentrated.

3 the athletes' body cells would not work efficiently.

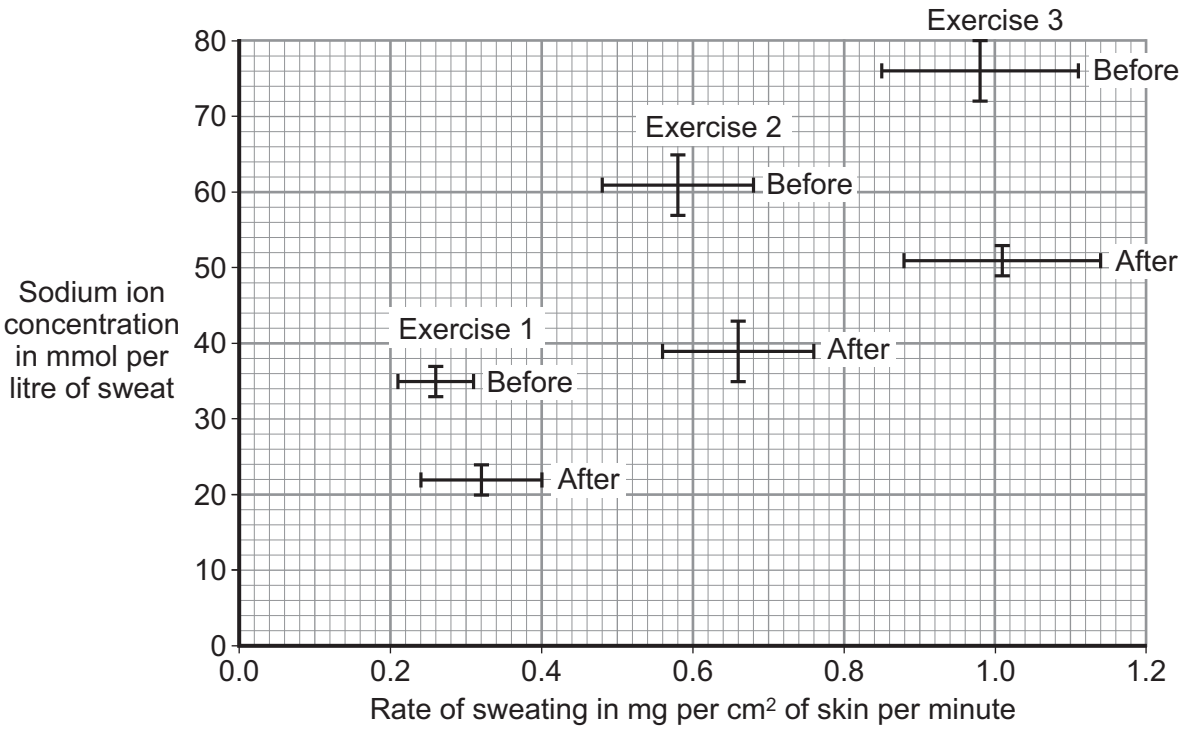
4 the athletes' blood pressure would increase.

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The graph below shows the results of the investigation for each of the three exercises before and after 10 days of training in hot conditions.

The bars at each plot show:

- the range of the rate of sweating (horizontal bar)
- the range of the concentration of sodium ions in the sweat (vertical bar).



6C The data suggests that for each of the three physical exercises after 10 days of training in hot conditions, . . .

1 there was a large difference in the sodium ion concentration but not in the rate of sweating.

2 there was a large difference in the rate of sweating but not in the sodium ion concentration.

3 there was a large difference in the sodium ion concentration and a large difference in the rate of sweating.

4 there was no difference in the sodium ion concentration and no difference in the rate of sweating.

6D The best conclusion from the graph is that . . .

1 training in hot conditions increases the concentration of sodium ions in sweat.

2 an increase in the rate of sweating reduces the concentration of sodium ions lost in sweat.

3 the rate of sweating is decreased by training in hot conditions.

4 training in hot conditions reduces the concentration of sodium ions lost in sweat.

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QUESTION SEVEN

A protein called 'C-reactive protein' is found in the blood. High levels of blood C-reactive protein have been linked to heart attacks.

In 2006, a double-blind trial was started to see if a new statin could lower levels of blood C-reactive protein.

7A In the trial, people with low levels of blood cholesterol but high levels of blood C-reactive protein were chosen because . . .

1 low levels of blood cholesterol are not linked to heart attacks.

2 cholesterol would react with protein.

3 statins do not affect people with low levels of blood cholesterol.

4 cholesterol is needed for the statins to have an effect.

7B The double-blind trial would have included . . .

1 both the patient and the doctor knowing who is getting the placebo.

2 the patient, but not the doctor knowing who is getting the placebo.

3 the doctor, but not the patient knowing who is getting the placebo.

4 neither the patient nor the doctor knowing who is getting the placebo.

7C The trial was planned to last for five years. The trial was stopped after less than 2 years because the risk of heart attack was reduced by 54 % in the group given the new statin.

The decision to stop the trial was because . . .

1 statins are known to reduce heart attacks and strokes.

2 the researchers decided that the drug was not working.

3 it was unfair on the people taking the placebo to continue taking part in the trial.

4 the scientists ran out of money.

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7D The trials were supported financially by the company that produced the drug.

This means that the results . . .

1 might be less reliable than if they had been supported by the National Health Service.

2 might be less reliable than if they had been supported by a university.

3 might be biased.

4 should be disregarded even though many patients' lives were saved.

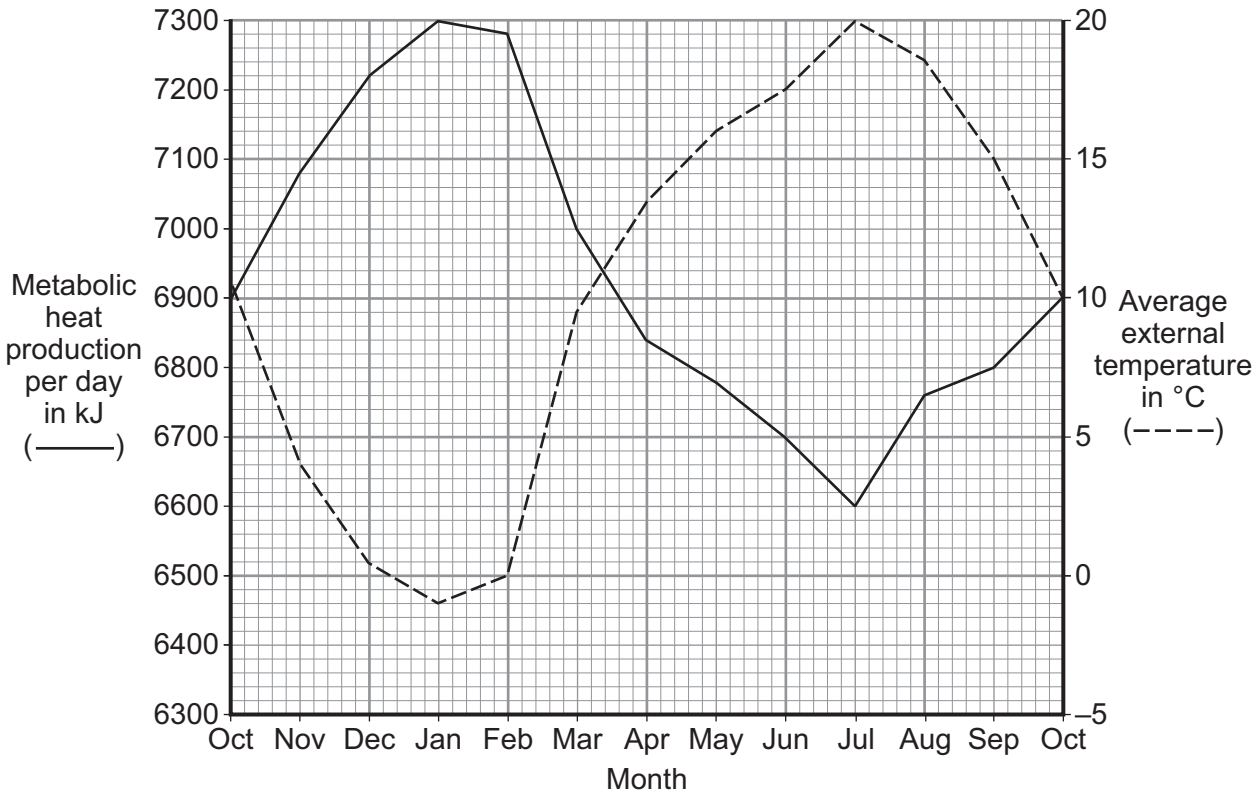
Turn over for the next question

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QUESTION EIGHT

A scientist called Gessler investigated the effect of external temperature on his own metabolic rate.
He used the amount of heat produced by his body as a measure of his metabolic rate.
He made sure that he kept his daily level of activity the same during his experiment.
He calculated the average daily heat production for each month.

The results are shown on the graph.



8A What was the average (mean) daily metabolic heat production in kJ in August?

1 6600

2 6760

3 7140

4 9000

8B During which month would you expect Gessler's food consumption to be highest?

1 January

2 April

3 July

4 November

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8C The graph shows . . .

1 no relationship between average external temperature and metabolic rate.

2 that metabolic rate is directly proportional to environmental temperature.

3 an inverse relationship between metabolic rate and environmental temperature.

4 that metabolic rate is affected by a factor other than average external temperature.

8D What would be the effect on Gessler's body mass if his daily energy intake was kept the same throughout the year?

His body mass would . . .

1 increase when his metabolic heat production increased.

2 stay constant throughout the year.

3 decrease in summer and increase in winter.

4 decrease in winter and increase in summer.

Turn over for the next question

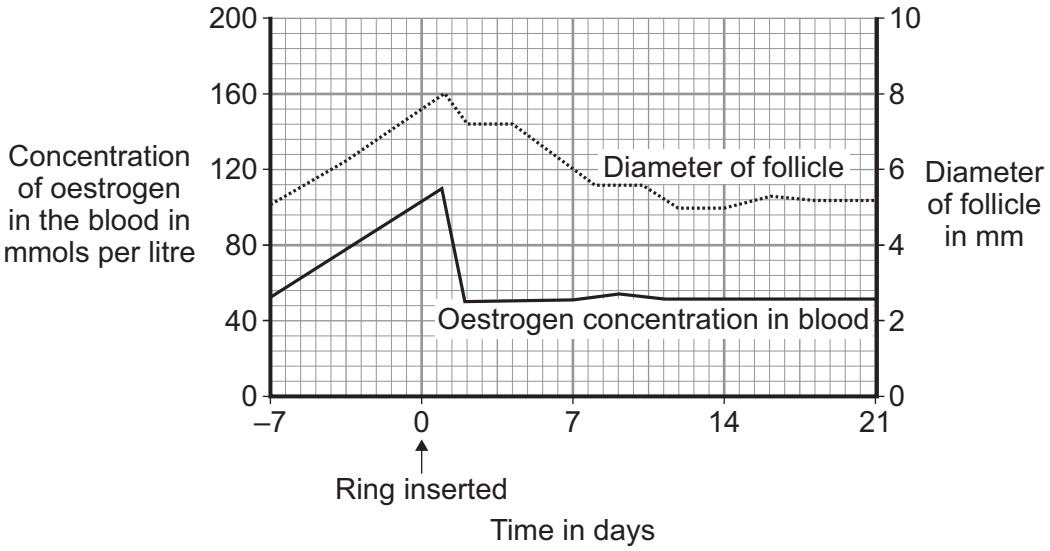
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QUESTION NINE

The ring is a new method of contraception. The ring is inserted into the vagina and releases very low doses of contraceptive hormones for 3 weeks. The woman then removes the ring and inserts a new ring one week later.

A follicle is a spherical structure in the ovary. Inside a follicle, an egg matures. As the egg matures, the follicle enlarges. When the egg is mature, the follicle bursts and releases the egg.

The graph shows the effects of using the ring method.



9A In a normal menstrual cycle, . . .

1 FSH stimulates LH production.

2 FSH stimulates oestrogen production.

3 oestrogen stimulates FSH production.

4 oestrogen inhibits LH production.

9B Using information from the graph and your own knowledge, hormones from the ring most probably . . .

1 stimulate oestrogen production.

2 inhibit LH production.

3 inhibit FSH production.

4 stimulate the production of both FSH and LH.

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9C The ring prevents a woman from becoming pregnant by . . .

1 preventing the sperm from entering the womb.

2 preventing the thickening of the womb lining.

3 preventing eggs from maturing.

4 destroying the follicles.

9D The ring has a lower failure rate than most contraceptive pills.

The most probable reason for this is that . . .

1 hormones are released from the ring at a fairly constant rate.

2 hormones from the ring enter the blood.

3 hormones from the ring affect the pituitary gland.

4 hormones from the ring affect the womb.

END OF TEST

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2011 Examination – June Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

June 11

Foundation Tier

Question	Key		
One	**A**	statins	3
	B	painkillers	4
	C	heroin and cocaine	2
	D	tobacco and alcohol	1
Two	**A**	12	2
	B	13	1
	C	22	4
	D	62	3
Three	**A**	if the drugs have any side effects	2
	B	the best dose for the drug	4
	C	if the drug is toxic	1
	D	if the effect of the drug is only psychological	3
Four	**A**	experiment	3
	B	hypothesis	2
	C	observation	1
	D	result	4
Five	**A**	kidney	4
	B	liver	1
	C	ovary	3
	D	pituitary gland	2

	A	B	C	D
Six	**2**	**3**	**3**	**4**
Seven	**4**	**3**	**2**	**4**
Eight	**4**	**1**	**3**	**2**
Nine	**2**	**2**	**4**	**1**

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

June 11

Higher Tier

Question	Key		
One	**A**	kidney	4
	B	liver	1
	C	ovary	3
	D	pituitary gland	2
Two	**A**	alcohol	3
	B	ecstasy	2
	C	heroin	4
	D	tobacco	1

	A	B	C	D
Three	**4**	**1**	**3**	**2**
Four	**2**	**2**	**4**	**1**
Five	**1**	**3**	**1**	**4**
Six	**2**	**3**	**1**	**4**
Seven	**1**	**4**	**3**	**3**
Eight	**2**	**1**	**3**	**4**
Nine	**2**	**3**	**3**	**1**

The AQA UMS Conversion Calculator can be found at the following web address:

http://www.aqa.org.uk/umsconversion

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GCSE SCIENCE

AQA

Unit : BLY1AP **BIOLOGY UNIT 1A**

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 6M11

28-JUN-11

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	kidney	○	○	○	○
1B	liver	○	○	○	○
1C	ovary	○	○	○	○
1D	pituitary gland	○	○	○	○

QUESTION TWO		1	2	3	4
2A	alcohol	○	○	○	○
2B	ecstasy	○	○	○	○
2C	heroin	○	○	○	○
2D	tobacco	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A statins	○	○	○	○
1B painkillers	○	○	○	○
1C heroin and cocaine	○	○	○	○
1D tobacco and alcohol	○	○	○	○

QUESTION TWO	1	2	3	4
2A 12	○	○	○	○
2B 13	○	○	○	○
2C 22	○	○	○	○
2D 62	○	○	○	○

QUESTION THREE	1	2	3	4
3A if the drugs have any side effects	○	○	○	○
3B the best dose for the drug	○	○	○	○
3C if the drug is toxic	○	○	○	○
3D if the effect of the drug is only psychological	○	○	○	○

QUESTION FOUR	1	2	3	4
4A experiment	○	○	○	○
4B hypothesis	○	○	○	○
4C observation	○	○	○	○
4D result	○	○	○	○

QUESTION FIVE	1	2	3	4
5A kidney	○	○	○	○
5B liver	○	○	○	○
5C ovary	○	○	○	○
5D pituitary gland	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
March 2011

Science A

Unit Biology B1a (Human Biology)

Biology

Unit Biology B1a (Human Biology)

BLY1AP

F&H

Wednesday 2 March 2011 Morning Session

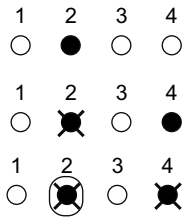
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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 **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

Drugs have many different uses.

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

A cocaine

B nicotine

C statin

D thalidomide

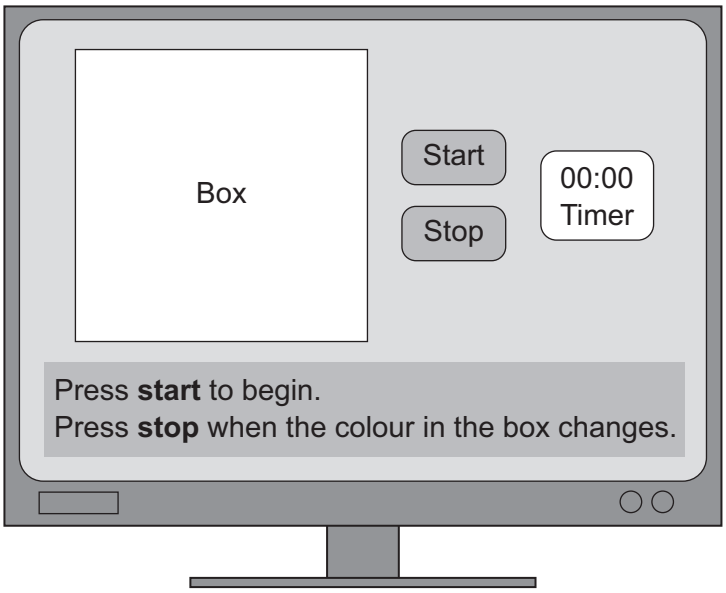
1	a drug developed for use as a sleeping pill
2	the addictive drug in tobacco smoke
3	an illegal addictive drug
4	a drug used to lower the concentration of cholesterol in the blood

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QUESTION TWO

A computer is used to measure a person's reaction time.

The diagram shows the computer screen.



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

A an effector

B a receptor

C a response

D a stimulus

The change in colour of the box is . . . **1** . . . .

The change in colour of the box is detected by . . . **2** . . . .

Pressing **stop** is . . . **3** . . . .

The muscle used to press **stop** is . . . **4** . . . .

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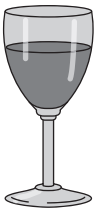
QUESTION THREE

Doctors are worried about the amount of alcohol drunk by teenagers.

The recommended maximum number of units of alcohol per week is:

- 14 units for a female
- 21 units for a male.

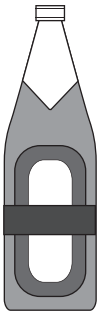
The diagram shows the number of units of alcohol in different drinks.



Glass of wine
2 units



Bottle of alcopop
2 units



½ litre of cider
2 units



Measure of vodka
1 unit

The table shows the amount of alcohol that some teenagers drink.

Isabelle drinks 2 alcopops and 2 vodkas at a party.	**Nathan** drinks 15 half-litre glasses of cider and 5 vodkas each week.	**Graham** drinks 3 half-litres of cider each week.	**Alison** drinks 2 glasses of wine every night.

Use the above information to match the number of units, **A**, **B**, **C** and **D**, with the statements **1**–**4** in the table.

A 2 units

B 5 units

C 6 units

D 14 units

1	the number of units in a bottle of alcopop
2	**Nathan's** average number of units each day
3	the number of units more than the recommended maximum that **Alison** (a female) drinks each week
4	the total number of units that **Isabelle** had at the party

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QUESTION FOUR

The drug thalidomide was banned because it caused limb abnormalities in human embryos.
Now thalidomide is being tested to find out if it can be used to treat people with the disease AIDS.

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

A doctors

B pregnant women

C politicians

D volunteers

The tests will be designed by . . . **1** . . . .

In the tests, the drug will first be given to . . . **2** . . . .

The drug should not be tested on . . . **3** . . . .

The final decision on whether the drug is allowed to be prescribed for people with AIDS will be made by . . . **4** . . . .

QUESTION FIVE

We control conditions inside our bodies.

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

A liver

B pituitary gland

C kidney

D skin

1	produces the hormone FSH
2	gets rid of excess heat
3	removes excess water from the blood
4	produces cholesterol

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Section Two

Questions **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

A healthy diet has the correct balance of different foods.

6A In a balanced diet, which food is needed in the smallest amount?

1 carbohydrate

2 fats

3 proteins

4 vitamins

Scientists evaluated four slimming plans.

The results are shown in the table.

Slimming plan		Percentage weight loss (%)	
		Maximum	**Long term**
W	12 week very low energy diet using only slimming foods	15.3	8.4
X	12 week very low energy diet using both slimming foods and usual foods	14.1	8.4
Y	12 week very low energy diet and going to slimming classes	21.8	9.0
Z	17 week very low energy diet and going to slimming classes	19.2	9.3

6B One difference between slimming plan **W** and slimming plan **X** was . . .

1 the length of the slimming plan.

2 the amount of energy in the diet.

3 the use of slimming foods.

4 the use of usual foods.

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6C Which slimming plan was most effective in the long term?

1 **W**

2 **X**

3 **Y**

4 **Z**

6D What was the effect of slimming classes on maximum weight loss?

1 The longer the slimming plan continued, the more the weight loss increased.

2 Slimming classes did not affect maximum weight loss if the people were on a very low energy diet.

3 Slimming classes made the slimming plan twice as effective.

4 Slimming classes always increased maximum weight loss.

Turn over for the next question

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QUESTION SEVEN

Read this account of a students investigation.

I first tested three drinks, **X**, **Y** and **water**, on two friends, Pete and Raj, to find out which drink was best to use when jogging.

- I tested their reactions using a reaction timer.
- They jogged for 30 minutes, during which they drank 1 dm^3 of drink **X**.
- I then tested their reactions again in the same way.

After they had rested, they did the complete test again:

- with drink **Y**
- then with **water**
- then with **no drink**.

7A How could the student have improved his investigation?

1 by getting the two friends to jog for 1 hour

2 by testing ten friends

3 by using five different drinks

4 by asking the two friends to drink 2 dm^3 of each drink

The student's results are shown in the table.

	Reaction time in seconds				
	Before jogging	**Drink X**	**Drink Y**	**Water**	**No drink**
Pete	1.2	1.3	0.9	1.3	1.6
Raj	1.4	1.5	1.1	1.4	1.7

7B For drink **X**, what is the difference between the reaction times before jogging and after jogging?

1 0.1 seconds

2 0.2 seconds

3 0.3 seconds

4 0.4 seconds

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7C Using these results, which is the best advice for people running in a competitive race?

1 do not drink at all

2 use drink **X**

3 use drink **Y**

4 drink only **water**

7D Sports drinks should contain ions to replace those lost mainly by . . .

1 breathing.

2 eating.

3 sweating.

4 urinating.

Turn over for the next question

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QUESTION EIGHT

'Processed food' may affect cholesterol levels in the blood.

8A 'Good' cholesterol is . . .

1 high-density lipoprotein.

2 low-density lipoprotein.

3 mono-unsaturated fat.

4 saturated fat.

8B 'Bad' cholesterol is found in large amounts in . . .

1 mono-unsaturated fats.

2 polyunsaturated fats.

3 saturated fats.

4 unsaturated fats.

8C Lowering the concentration of cholesterol in the blood helps to prevent . . .

1 arthritis.

2 diabetes.

3 heart disease.

4 leprosy.

8D Which row in the table shows the fat content and salt content of **most** processed foods?

	Fat content	**Salt content**
1	low	low
2	high	low
3	low	high
4	high	high

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Turn over for the next question

QUESTION NINE

Read the newspaper article published in 2009.

Swine Flu: How Serious a Threat?

The World Health Organisation says that a new strain of virus, the swine flu virus, has killed 150 people in Mexico. This shows that the virus can pass from human to human. One expert says that he expects the outbreak to develop into a pandemic.

9A A pandemic is an outbreak of a disease . . .

1 confined to a town.

2 confined to a region.

3 that will **not** spread.

4 that will spread all over the world.

9B The swine flu virus makes us ill because the virus . . .

1 produces antibodies.

2 produces toxins.

3 reproduces rapidly.

4 slows down our reactions.

9C The swine flu virus made many people ill because . . .

1 people were **not** immune to the swine flu virus.

2 painkillers do **not** work on viral diseases.

3 scientists had **not** produced a new antibiotic.

4 new strains of a virus are always more powerful than existing strains.

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9D Scientists have developed a swine flu vaccine.

This vaccine works because it . . .

1 destroys the virus.

2 produces antitoxins.

3 engulfs the virus.

4 stimulates the production of antibodies.

END OF TEST

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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

We control conditions inside our bodies.

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

A liver

B pituitary gland

C kidney

D skin

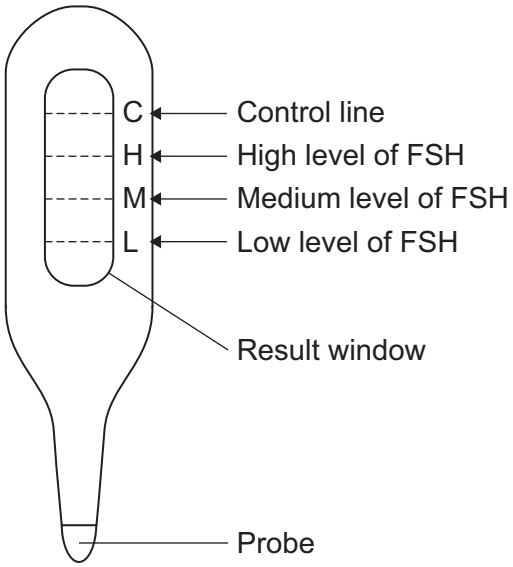
1	produces the hormone FSH
2	gets rid of excess heat
3	removes excess water from the blood
4	produces cholesterol

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QUESTION TWO

Diagram 1 shows an instrument used to test FSH concentration in urine.

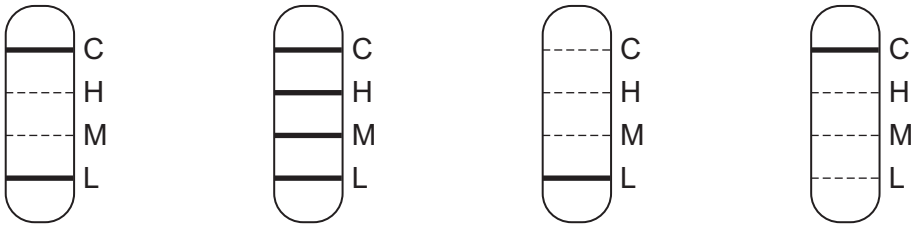
Diagram 1



The probe is put in a urine sample. After 30 minutes, dark lines may show in the result window. The control line shows when the test has been done correctly.

Diagram 2 shows the result windows of four tests, **A**, **B**, **C** and **D**.

Diagram 2



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

1	shows that the test was not done properly
2	shows the FSH level between the end of menstruation and egg release
3	shows a test on urine from a male
4	shows the FSH level at the end of the menstrual cycle

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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

'Processed food' may affect cholesterol levels in the blood.

3A 'Good' cholesterol is . . .

1 high-density lipoprotein.

2 low-density lipoprotein.

3 mono-unsaturated fat.

4 saturated fat.

3B 'Bad' cholesterol is found in large amounts in . . .

1 mono-unsaturated fats.

2 polyunsaturated fats.

3 saturated fats.

4 unsaturated fats.

3C Lowering the concentration of cholesterol in the blood helps to prevent . . .

1 arthritis.

2 diabetes.

3 heart disease.

4 leprosy.

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3D Which row in the table shows the fat content and salt content of **most** processed foods?

	Fat content	**Salt content**
1	low	low
2	high	low
3	low	high
4	high	high

Turn over for the next question

QUESTION FOUR

Read the newspaper article published in 2009.

Swine Flu: How Serious a Threat?

The World Health Organisation says that a new strain of virus, the swine flu virus, has killed 150 people in Mexico. This shows that the virus can pass from human to human. One expert says that he expects the outbreak to develop into a pandemic.

4A A pandemic is an outbreak of a disease . . .

1 confined to a town.

2 confined to a region.

3 that will **not** spread.

4 that will spread all over the world.

4B The swine flu virus makes us ill because the virus . . .

1 produces antibodies.

2 produces toxins.

3 reproduces rapidly.

4 slows down our reactions.

4C The swine flu virus made many people ill because . . .

1 people were **not** immune to the swine flu virus.

2 painkillers do **not** work on viral diseases.

3 scientists had **not** produced a new antibiotic.

4 new strains of a virus are always more powerful than existing strains.

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4D Scientists have developed a swine flu vaccine.

This vaccine works because it . . .

1 destroys the virus.

2 produces antitoxins.

3 engulfs the virus.

4 stimulates the production of antibodies.

Turn over for the next question

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QUESTION FIVE

It is important to keep the internal conditions of the body constant.

5A Water and ions are both lost from the body in . . .

1 breath and sweat.

2 breath and urine.

3 breath, sweat and urine.

4 sweat and urine.

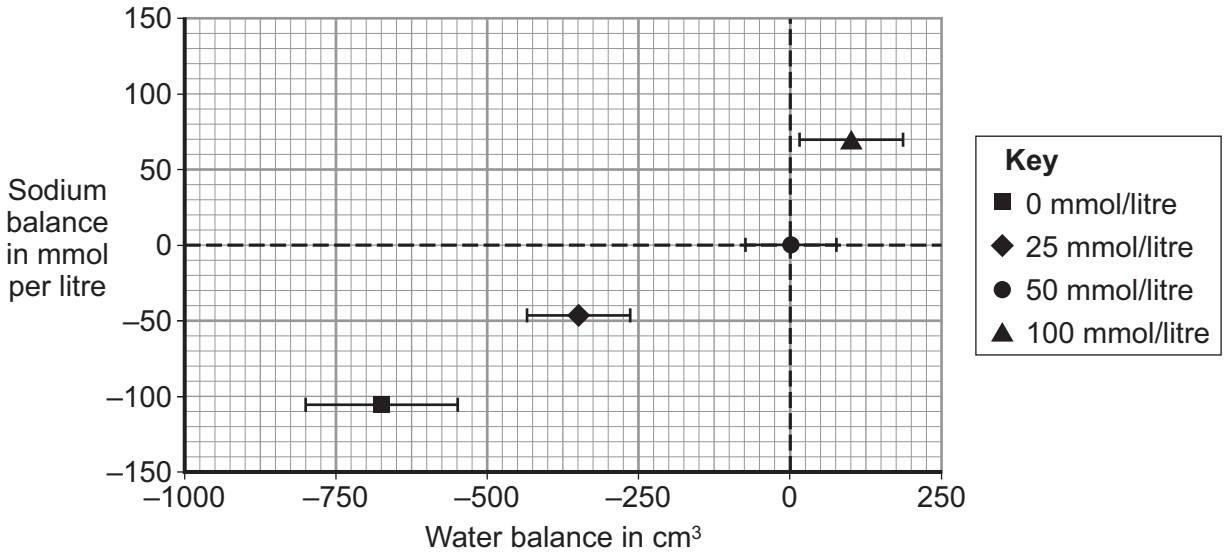
Scientists carried out an investigation to find the best concentration of sodium ions to use in a sports drink.

- The scientists dehydrated some athletes by getting them to exercise in hot conditions.
- Each athlete then drank a test drink containing one of the following concentrations of sodium ions:

Test drink **W** (water)	0 mmol per litre
Test drink **X**	25 mmol per litre
Test drink **Y**	50 mmol per litre
Test drink **Z**	100 mmol per litre

- After one hour, the scientists measured the water balance and the sodium balance of the blood of each athlete.

The results are shown in the graph.



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The dashed lines on the graph show the normal water balance and the normal sodium ion balance of the body. The horizontal line at each plot shows the range of the water balance for that drink.

5B What was the range of the water balance for the 25 mmol per litre sodium ion drink?

1 50 cm^3

2 100 cm^3

3 175 cm^3

4 250 cm^3

5C The data shows that one litre of the best drink for restoring the balance of water and sodium ions contains . . .

1 0 mmol sodium ions.

2 25 mmol sodium ions.

3 50 mmol sodium ions.

4 100 mmol sodium ions.

5D If the water balance and the sodium ion balance of the body are not correct, . . .

1 enzymes will not work as effectively.

2 body cells will not work as efficiently.

3 body temperature will start to increase.

4 the kidneys will stop working.

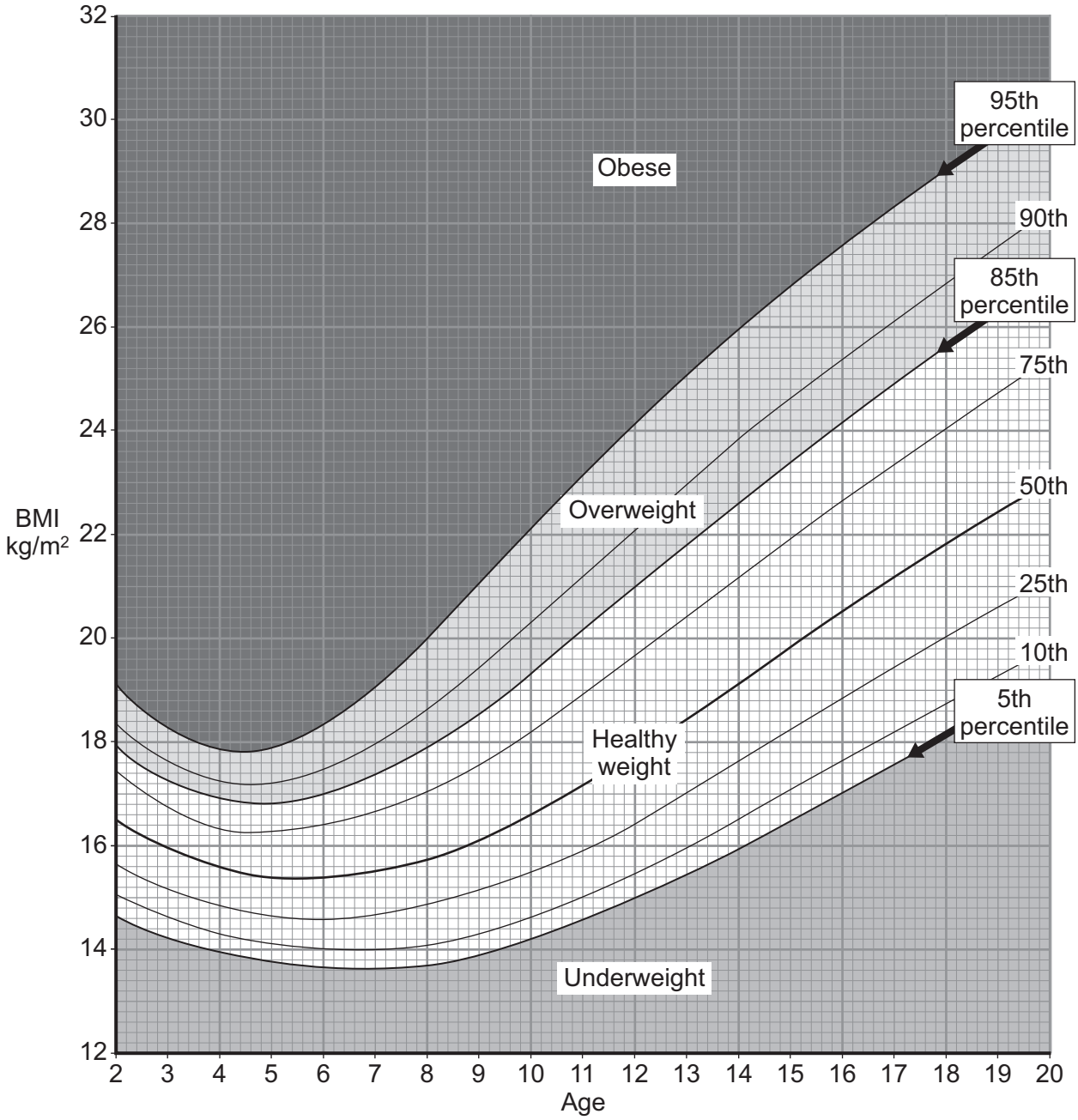
Turn over for the next question

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QUESTION SIX

Body mass index (BMI) is a reliable indicator of body fatness for most people.
BMI is a number calculated from a person's mass and height.
The BMI number is plotted on a BMI-for-age growth chart. This chart compares a young person's BMI number with the BMI numbers of other young people of the same sex and age.

The lines obtained by this method are called percentiles. The graph shows the BMI percentiles for males aged from 2 to 20.



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6A A 10-year-old male with a BMI of 21 is . . .

1 obese.

2 overweight.

3 a healthy weight.

4 underweight.

6B An 18-year-old male on the 75th percentile is . . .

1 obese.

2 overweight.

3 a healthy weight.

4 underweight.

6C The formula for calculating BMI is mass $\div$ height^2.

From the shape of the curves on the graph, we can see that between the ages of 2 and 4 . . .

1 height^2 and mass increase at the same rate.

2 height^2 increases faster than mass.

3 mass increases faster than height^2.

4 a boy does not grow much.

6D The metabolic rate of a young male with a BMI of 34 is most probably . . .

1 lower than average.

2 greater than average.

3 about average.

4 about the same BMI as an adult.

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QUESTION SEVEN

Some infections can be treated using antibiotics.

7A Antibiotics can . . .

1 relieve the symptoms of infectious diseases by acting as painkillers.

2 kill viruses inside body cells.

3 cause white blood cells to produce antibodies.

4 kill some strains of bacteria.

Often, a doctor will prescribe antibiotics for an ear infection the first time a child goes to the doctor with earache.

Scientists investigated 240 young children with earache to see if the antibiotic was really needed. Some of the children were given the antibiotic. Other children were given a placebo.

The results are shown in the table.

	Children given an antibiotic	**Children given a placebo**
Average time for which the child had a fever	2 days	3 days
Average time for which the child had severe pain	3 days	3 days
Average amount of painkilling medicine given in the first 10 days	2.3 doses	4.1 doses
Difference in the redness of the infected eardrum after 4 days	No difference between the two groups	
Difference in the redness of the infected eardrum after 11 days	No difference between the two groups	

7B Compared with the children given the placebo, the children given the antibiotic had . . .

1 fever and severe pain for a shorter time.

2 severe pain and painkilling medicine for a longer time.

3 less redness of the eardrum after 11 days.

4 no difference in the redness of the eardrum after 4 days and the period of severe pain.

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7C The best conclusion that can be drawn from these results is that children with ear infections . . .

1 should always be prescribed antibiotics.

2 recover from all symptoms more quickly if given antibiotics.

3 should be given a placebo on the first visit to a doctor.

4 do **not** really need to be prescribed an antibiotic on the first visit to a doctor.

7D Doctors are concerned that antibiotic resistance is increasing in some bacteria.

The increase is because . . .

1 antibiotics cause bacteria to mutate into resistant forms of bacteria.

2 bacteria mutate spontaneously, then antibiotics do not kill the resistant forms of the bacteria.

3 the strongest bacteria mutate into resistant forms of bacteria.

4 after being in contact with antibiotics, bacteria decide to mutate.

Turn over for the next question

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QUESTION EIGHT

After operations, patients can have large scars.

Scientists have developed a new drug. The drug can help to reduce scarring if it is injected during the operation.

The scientists carried out double-blind trials. The purpose of the trials was to find out how much of the drug should be injected to reduce scarring.

- Each patient in the trial had a large vein removed from their left leg and a large vein removed from their right leg.
- Two surgeons operated at the same time. One surgeon operated on the left leg and the other surgeon on the right leg.
- During the operation, a hospital researcher injected a dose of the drug into one of the patient's legs and a placebo into the other leg.

8A A double-blind trial was used so that . . .

1 the surgeons could operate on both legs at the same time.

2 neither surgeon nor patient could influence the outcome of the trial.

3 the hospital researchers would know into which leg to inject the drug.

4 equal amounts of the drug or the placebo were used.

8B One year after the operation, the hospital researchers measured and photographed the scars on both legs.

Which factor might have made the trial unreliable?

1 Both legs belonged to the same patient and so would have the same natural healing power.

2 The researcher did not know whether he was injecting the drug or the placebo.

3 Both legs were operated on at the same time.

4 Two different surgeons did the operations.

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8C In the year after the operation, each patient had to fill in some questionnaires. The patients also went back to the hospital to be examined. After all the testing was finished, the patient volunteers were paid £300 each.

Giving the volunteers £300 meant that . . .

1 the volunteers' opinions on the scars were unbiased.

2 the volunteers were more likely to complete all the requirements of the trials.

3 the risk of having the drug injected would be less.

4 the volunteers would say that the scar on the leg that had the drug injected would be smaller.

8D Only a small quantity of this new drug is available at present.

In the circumstances, which of the following might people think is an unethical use of the drug?

1 using the drug on children in operations to correct inherited deformities

2 using the drug on patients that need a life-saving operation

3 using the drug on women in operations to increase the size of their breasts

4 using the drug on patients having operations after a car crash

Turn over for the next question

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QUESTION NINE

There are several ways of helping infertile women to become pregnant.

These include:

- IVF (in vitro fertilisation)
- FET – implanting frozen embryos from previous IVF treatments into the womb
- COH/IUI – treating the woman with 'fertility drugs' to release several eggs, then introducing sperm into the womb.

9A What is the main difference between COH/IUI and IVF?

1 Fertilisation takes place inside the woman in COH/IUI.

2 'Fertility drugs' are not used in IVF.

3 Sperm are not used in IVF.

4 Embryos are not formed in COH/IUI.

9B Which hormones are normally used as 'fertility drugs'?

1 FSH only

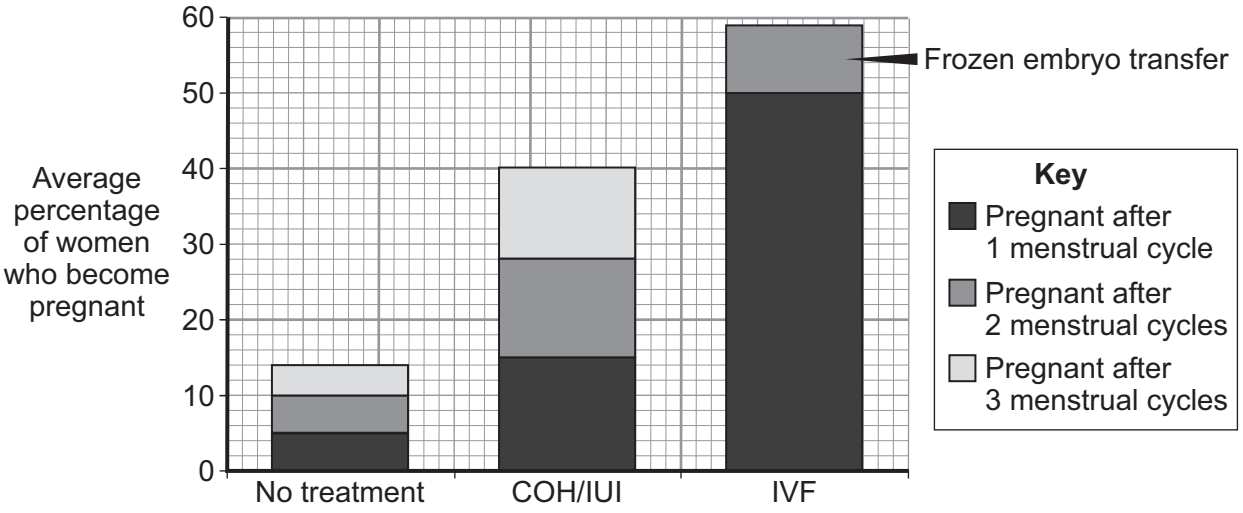
2 FSH and oestrogen

3 FSH and LH

4 LH and oestrogen

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The graph shows the average percentage of women who become pregnant after one, two and three menstrual cycles.



9C IVF treatment increases the chance of getting pregnant after one menstrual cycle.

By how much does IVF treatment increase the chance?

1 4 times

2 5 times

3 10 times

4 60 times

9D What is the most likely reason for the higher success rate of IVF over COH/IUI?

1 More 'fertility drugs' are used in IVF.

2 Doctors can select the best embryos to use.

3 More eggs are produced in IVF.

4 Doctors can examine the sperm before they are used.

END OF TEST

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There are no questions printed on this page

There are no questions printed on this page

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Version 1.0: 01/04/2011

GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2011 Examination – March Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

March 2011

Foundation Tier

Question	Key		
One	**A**	cocaine	**3**
	B	nicotine	**2**
	C	statin	**4**
	D	thalidomide	**1**
Two	**A**	an effector	**4**
	B	a receptor	**2**
	C	a response	**3**
	D	a stimulus	**1**
Three	**A**	2 units	**1**
	B	5 units	**2**
	C	6 units	**4**
	D	14 units	**3**
Four	**A**	doctors	**1**
	B	pregnant women	**3**
	C	politicians	**4**
	D	volunteers	**2**
Five	**A**	liver	**4**
	B	pituitary gland	**1**
	C	kidney	**3**
	D	skin	**2**

	A	B	C	D
Six	**4**	**4**	**4**	**4**
Seven	**2**	**1**	**3**	**3**
Eight	**1**	**3**	**3**	**4**
Nine	**4**	**2**	**1**	**4**

GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

March 2011

Higher Tier

Question	Key		
One	**A**	liver	**4**
	B	pituitary gland	**1**
	C	kidney	**3**
	D	skin	**2**
Two	**A**	result **A**	**4**
	B	result **B**	**2**
	C	result **C**	**1**
	D	result **D**	**3**

	A	**B**	**C**	**D**
Three	**1**	**3**	**3**	**4**
Four	**4**	**2**	**1**	**4**
Five	**4**	**3**	**3**	**2**
Six	**2**	**3**	**2**	**1**
Seven	**4**	**4**	**4**	**2**
Eight	**2**	**4**	**2**	**3**
Nine	**1**	**3**	**3**	**2**

GCSE SCIENCE

AQA

Unit : BLY1AP **BIOLOGY UNIT 1A**

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 3G11

02-MAR-11

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	liver	○	○	○	○
1B	pituitary gland	○	○	○	○
1C	kidney	○	○	○	○
1D	skin	○	○	○	○

QUESTION TWO		1	2	3	4
2A	Result A	○	○	○	○
2B	Result B	○	○	○	○
2C	Result C	○	○	○	○
2D	Result D	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE

		1	2	3	4
1A	cocaine	○	○	○	○
1B	nicotine	○	○	○	○
1C	statin	○	○	○	○
1D	thalidomide	○	○	○	○

QUESTION TWO

		1	2	3	4
2A	an effector	○	○	○	○
2B	a receptor	○	○	○	○
2C	a response	○	○	○	○
2D	a stimulus	○	○	○	○

QUESTION THREE

		1	2	3	4
3A	2 units	○	○	○	○
3B	5 units	○	○	○	○
3C	6 units	○	○	○	○
3D	14 units	○	○	○	○

QUESTION FOUR

		1	2	3	4
4A	doctors	○	○	○	○
4B	pregnant women	○	○	○	○
4C	politicians	○	○	○	○
4D	volunteers	○	○	○	○

QUESTION FIVE

		1	2	3	4
5A	liver	○	○	○	○
5B	pituitary gland	○	○	○	○
5C	kidney	○	○	○	○
5D	skin	○	○	○	○

QUESTION SIX

	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN

	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT

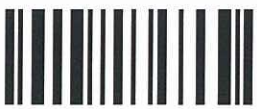
	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE

	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
November 2010

Science A

Unit Biology B1a (Human Biology)

Biology

Unit Biology B1a (Human Biology)

BLY1AP

F&H

Thursday 11 November 2010 Afternoon Session

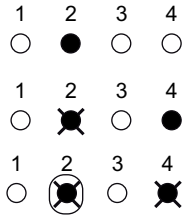
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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.

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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

An unhealthy lifestyle may cause illness.

The table gives information about some conditions that affect the body.

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

A arthritis

B diabetes

C high blood pressure

D irregular periods

	Information
1	may be caused by the effect of too much weight on joints
2	may be caused by a diet that is high in sugars
3	may be caused by not enough food in the diet
4	may be caused by too much salt in the diet

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QUESTION TWO

We use substances to prevent diseases and to cure diseases.

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

A painkiller

B penicillin

C thalidomide

D vaccine

	Information
1	used to cure an infection caused by bacteria
2	used to prevent disease
3	used to help in the treatment of leprosy
4	used to treat symptoms, eg headache

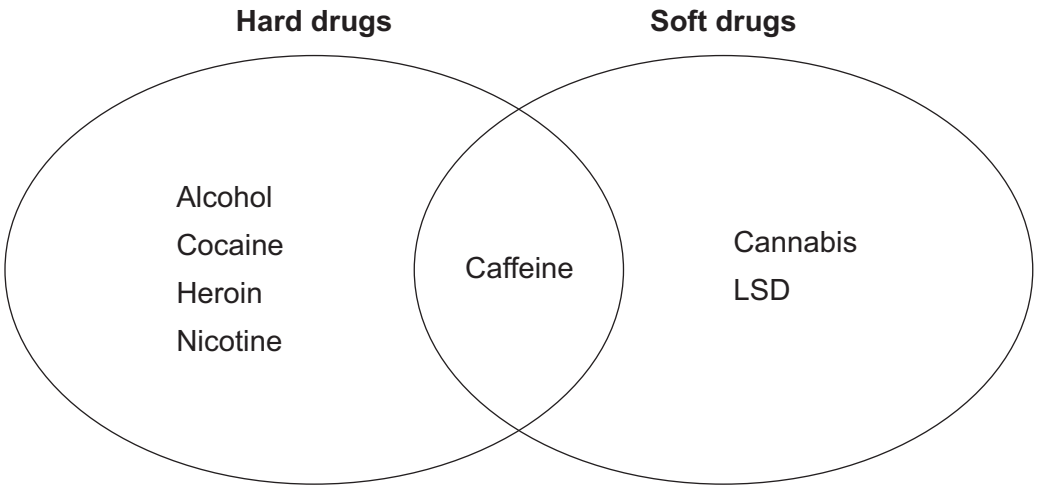
Turn over for the next question

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QUESTION THREE

Recreational drugs may harm the body.

The diagram shows how some drugs can be classified.



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

A alcohol

B cocaine

C caffeine

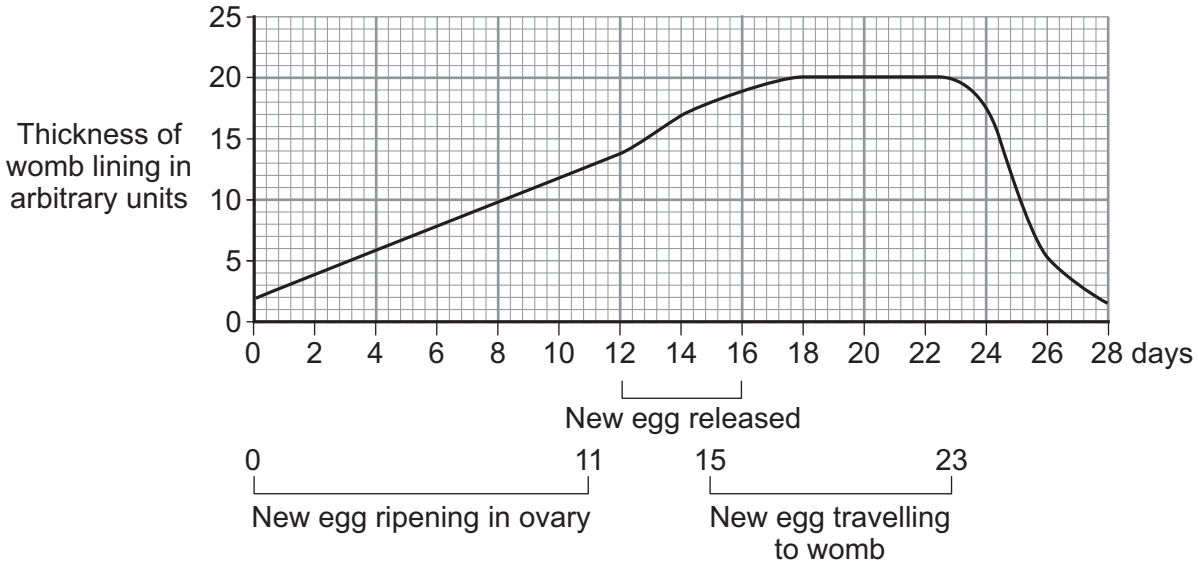
D cannabis

	Description
1	a drug that is difficult to classify as hard or soft
2	a legal, hard drug
3	an illegal, soft drug
4	an illegal, hard drug

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QUESTION FOUR

The graph shows changes in the thickness of the womb lining during a woman's menstrual cycle.



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

A 5

B 11

C 15

D 28

1	a day when a new egg could be released
2	the number of days the womb lining takes to break down
3	the number of days the new egg takes to ripen
4	a day when the womb lining is thinnest

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QUESTION FIVE

Our diet affects our health.

Read the passage below.

> Before the nineteenth century, many sailors suffered from a disease called scurvy.
> James Lind, a naval doctor, thought that scurvy may be due to a lack of fresh fruit in the diet.
> Once the sailors were back on land and eating fresh fruit, the scurvy disappeared.
>
> In an investigation on sailors suffering from scurvy:
>
> - he gave one group a diet including fresh fruit
> - he gave the other group the same diet, but with no fresh fruit.
>
> The group given fresh fruit got better, but the other group did not get better.

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

A a hypothesis

B a control

C an observation

D a conclusion

1	Some sailors with scurvy were not given fresh fruit to eat.
2	Eating fresh fruit cures scurvy.
3	Sailors with scurvy on the ship got better when they were back on land.
4	Not enough fresh fruit in the diet might cause scurvy.

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Turn over for the next question

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Section Two

Questions **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

Several factors can affect the metabolic rate in humans.

6A What is *metabolic rate*?

1 how fast someone can run

2 how much food you eat each day

3 how fast the blood flows around the body

4 how fast chemical reactions happen in the cells of the body

The table shows the body mass and metabolic rate of five different animals.

Animal	Mass in kg	Metabolic rate at rest in arbitrary units
Rabbit	2	7
Sheep	50	100
Dolphin	80	160
Pig	100	50
Cow	400	480

6B One student said: 'The heavier the animal, the higher its metabolic rate at rest.'

Which animal does **not** fit this pattern?

1 rabbit

2 dolphin

3 pig

4 cow

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6C Another student suggested: 'The number for metabolic rate is always exactly double the number for mass.'

Which animals fit this suggestion?

1 sheep and pig

2 rabbit and cow

3 pig and dolphin

4 sheep and dolphin

6D A third student said: 'The more active an animal is, the higher its metabolic rate, compared to its body mass.'

If this were true, which animal would be the most active?

1 rabbit

2 dolphin

3 pig

4 cow

Turn over for the next question

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QUESTION SEVEN

The concentration of alcohol in the blood affects the chance of having an accident.

7A Alcohol . . .

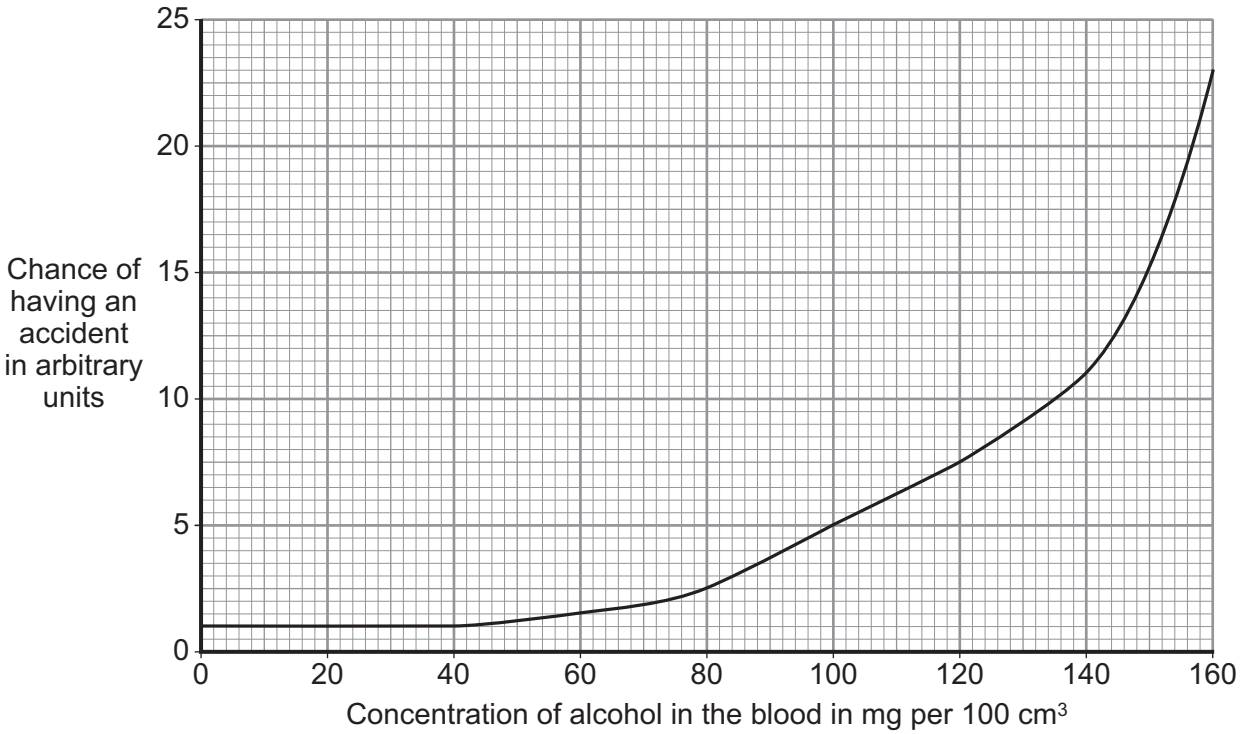
1 reduces the ability of the blood to carry oxygen.

2 damages the heart.

3 causes lung disease.

4 slows down reactions.

The graph shows the relationship between blood alcohol concentration and the chance of having an accident.



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Use information from the graph to answer the following questions.

7B The drink-driving limit in the UK is 80 mg of alcohol per 100 cm^3 of blood.

With this amount of alcohol in the blood, the chance of having an accident is increased.

How much is the chance increased?

1 unchanged

2 2.5 times

3 4 times

4 5.5 times

7C What is the highest concentration of blood alcohol that would have **no effect** on the chance of having an accident?

1 0 mg per 100 cm^3

2 20 mg per 100 cm^3

3 40 mg per 100 cm^3

4 60 mg per 100 cm^3

7D Which of the following best describes the relationship between blood alcohol concentration and the chance of having an accident?

1 There is no relationship between blood alcohol concentration and the chance of having an accident.

2 The higher the blood alcohol concentration, the lower the chance of having an accident.

3 The higher the blood alcohol concentration, the higher the chance of having an accident.

4 The lower the blood alcohol concentration, the higher the chance of having an accident.

Turn over for the next question

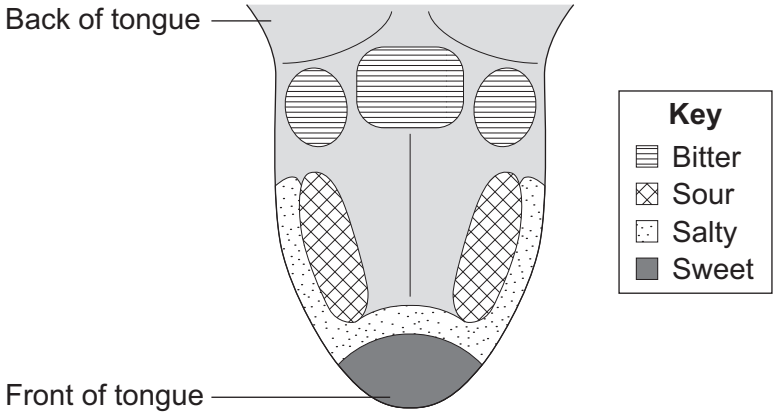
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QUESTION EIGHT

A student found **diagram 1** in a science book.

Diagram 1 shows how different areas of the tongue are sensitive to different tastes.

Diagram 1

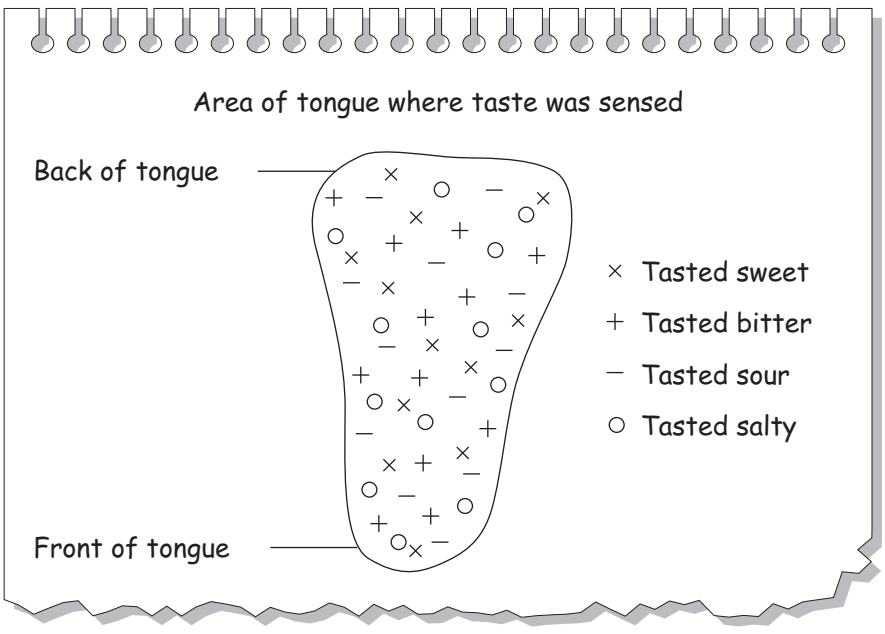


The student decided to find out if the book was correct.

She tested three people.

- She put a small drop of a sweet-tasting liquid on different parts of each person's tongue.
- She recorded each part of the tongue where the sweet-tasting liquid could be tasted.
- This was repeated for the other tastes.
- Her results are shown in **diagram 2**.

Diagram 2



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8A The cells in the tongue that sense the different tastes are called . . .

1 stimuli.

2 effectors.

3 receptors.

4 synapses.

8B These results would have been more reliable if . . .

1 a teacher had carried out the investigation.

2 more than three students had been tested.

3 more concentrated solutions had been used.

4 more areas of the tongue had been tested.

8C The best description of the student's results is that . . .

1 bitter tastes are sensed at the back of the tongue.

2 there are areas of the tongue where particular tastes are grouped.

3 sour tastes are always sensed at the sides of the tongue.

4 there are no definite areas of the tongue for sensing particular tastes.

8D The information about the tongue in the science book . . .

1 is not supported by the student's data.

2 must be correct.

3 proves that the student's data is not valid.

4 proves that the student's method is wrong.

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QUESTION NINE

A virus causes influenza (flu).

Older people are much more likely to die from flu than younger people. The government offers flu vaccination to people aged over 65.

9A Flu vaccine contains . . .

1 antibodies.

2 antitoxins.

3 weakened virus.

4 white blood cells.

9B After the vaccination, people are immune to flu because their bodies . . .

1 destroy the flu virus in the vaccine.

2 produce antibodies against the flu virus.

3 produce antibiotics against the flu virus.

4 produce white blood cells to ingest the flu virus.

9C Every year, scientists develop a vaccine for several strains of the flu virus. They choose the strains that they think are most likely to be around in winter. Some older people get vaccinated but later die from flu.

The most likely reason for these deaths among older people is that . . .

1 they had not taken antibiotics.

2 they had suffered with flu last winter.

3 they were allergic to the vaccine.

4 there are many different strains of flu virus.

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9D People in a doctor's surgery made the comments below.

Which of these comments would be a valid reason for someone **not** to have the flu vaccination?

1 'I don't like injections.'

2 'I have a bad reaction to vaccines.'

3 'I never get flu anyway.'

4 'I've heard that my children might get flu from me if I have the vaccination.'

END OF TEST

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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

Our diet affects our health.

Read the passage below.

> Before the nineteenth century, many sailors suffered from a disease called scurvy.
> James Lind, a naval doctor, thought that scurvy may be due to a lack of fresh fruit in the diet.
> Once the sailors were back on land and eating fresh fruit, the scurvy disappeared.
>
> In an investigation on sailors suffering from scurvy:
> - he gave one group a diet including fresh fruit
> - he gave the other group the same diet, but with no fresh fruit.
>
> The group given fresh fruit got better, but the other group did not get better.

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

A a hypothesis

B a control

C an observation

D a conclusion

1	Some sailors with scurvy were not given fresh fruit to eat.
2	Eating fresh fruit cures scurvy.
3	Sailors with scurvy on the ship got better when they were back on land.
4	Not enough fresh fruit in the diet might cause scurvy.

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QUESTION TWO

Smoking damages your health.

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

A carbon monoxide

B carcinogen

C nicotine

D oxygen

1	the addictive substance in tobacco smoke
2	a cancer-causing chemical in tobacco smoke
3	reduces the birth mass in babies
4	a fetus needs this substance

Turn over for the next question

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Section Two

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

Each of these questions has four parts.

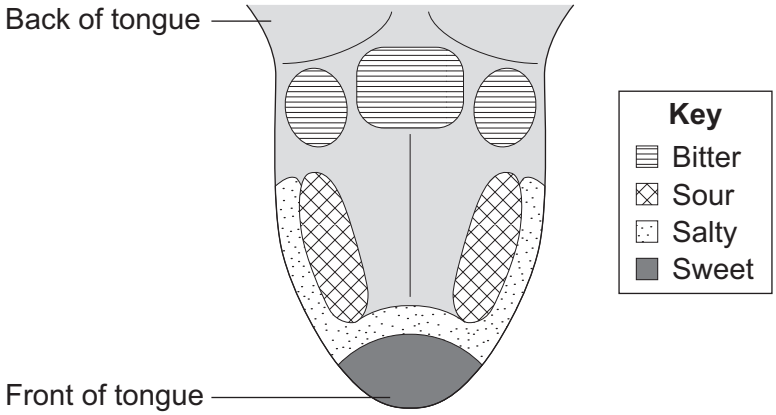
In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION THREE

A student found **diagram 1** in a science book.
Diagram 1 shows how different areas of the tongue are sensitive to different tastes.

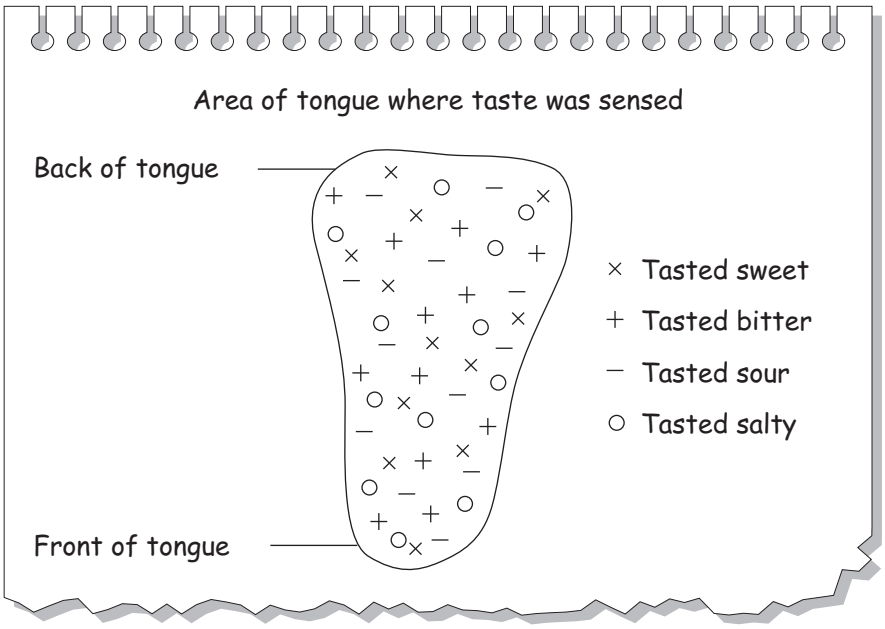
Diagram 1



The student decided to find out if the book was correct.
She tested three people.

- She put a small drop of a sweet-tasting liquid on different parts of each person's tongue.
- She recorded each part of the tongue where the sweet-tasting liquid could be tasted.
- This was repeated for the other tastes.
- Her results are shown in **diagram 2**.

Diagram 2



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3A The cells in the tongue that sense the different tastes are called . . .

1 stimuli.

2 effectors.

3 receptors.

4 synapses.

3B These results would have been more reliable if . . .

1 a teacher had carried out the investigation.

2 more than three students had been tested.

3 more concentrated solutions had been used.

4 more areas of the tongue had been tested.

3C The best description of the student's results is that . . .

1 bitter tastes are sensed at the back of the tongue.

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3 sour tastes are always sensed at the sides of the tongue.

4 there are no definite areas of the tongue for sensing particular tastes.

3D The information about the tongue in the science book . . .

1 is not supported by the student's data.

2 must be correct.

3 proves that the student's data is not valid.

4 proves that the student's method is wrong.

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QUESTION FOUR

A virus causes influenza (flu).

Older people are much more likely to die from flu than younger people. The government offers flu vaccination to people aged over 65.

4A Flu vaccine contains . . .

1 antibodies.

2 antitoxins.

3 weakened virus.

4 white blood cells.

4B After the vaccination, people are immune to flu because their bodies . . .

1 destroy the flu virus in the vaccine.

2 produce antibodies against the flu virus.

3 produce antibiotics against the flu virus.

4 produce white blood cells to ingest the flu virus.

4C Every year, scientists develop a vaccine for several strains of the flu virus. They choose the strains that they think are most likely to be around in winter. Some older people get vaccinated but later die from flu.

The most likely reason for these deaths among older people is that . . .

1 they had not taken antibiotics.

2 they had suffered with flu last winter.

3 they were allergic to the vaccine.

4 there are many different strains of flu virus.

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4D People in a doctor's surgery made the comments below.

Which of these comments would be a valid reason for someone not to have the flu vaccination?

1 'I don't like injections.'

2 'I have a bad reaction to vaccines.'

3 'I never get flu anyway.'

4 'I've heard that my children might get flu from me if I have the vaccination.'

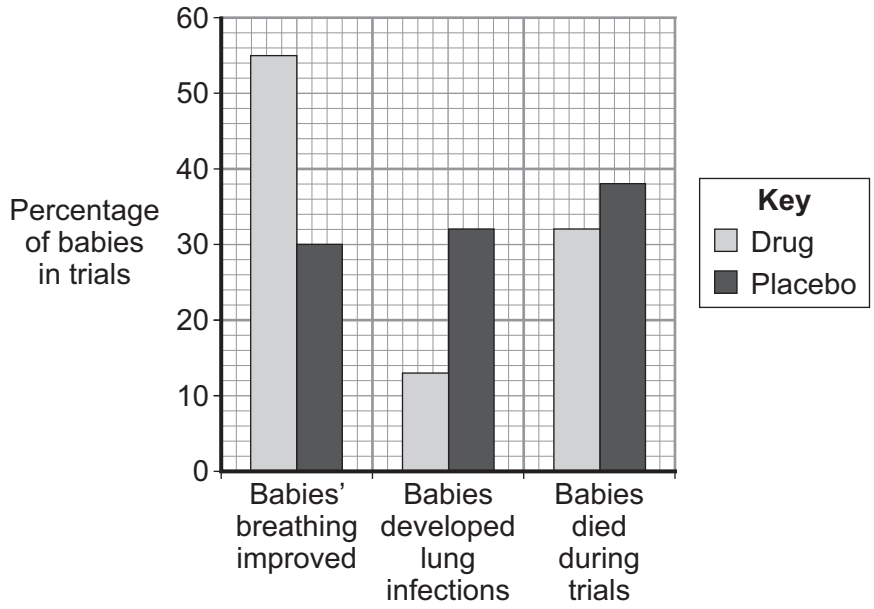
Turn over for the next question

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QUESTION FIVE

Some babies have life-threatening breathing problems. A company developed a new drug to help the babies. The company tested the drug against a placebo on 180 babies.

The results of the trial are shown on the graph.



5A What percentage of the babies given the drug did not show any improvement in breathing?

1 16 %

2 30 %

3 45 %

4 55 %

5B Many people are against doctors using placebos in drug trials on children.

This is because . . .

1 no-one knows which child gets the placebo.

2 some children die who might have benefited from the drug.

3 it makes the trials more expensive.

4 it slows down testing of the drug.

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5C Some babies in the trial died, but this did not stop the trial.

The reason for this was that . . .

1 the company did not think it was important.

2 other babies in the trial developed lung infections.

3 the percentage of babies who died was greater for the babies taking the placebo than for the babies taking the drug.

4 many of the babies given the placebo were showing improvement in breathing.

5D Why is it important that an independent company also carries out the tests on a new drug?

1 The results will be more accurate.

2 It is illegal for just one company to test a drug.

3 The drug can be put on sale more quickly.

4 The results will not be biased.

Turn over for the next question

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QUESTION SIX

Most recreational drugs damage the body.

6A Heroin is addictive because . . .

1 heroin produces withdrawal symptoms.

2 heroin can change the chemical processes in the body.

3 heroin affects the way the body responds to stimuli.

4 people taking heroin have a gene that makes them addicted.

6B Most people who are addicted to heroin smoked cannabis before they started using heroin. However, the majority of people who smoke cannabis do not progress to using heroin.

Which is the most valid conclusion from this information?

1 There is no link between smoking cannabis and becoming addicted to heroin.

2 Regular cannabis smokers are not at any risk of progressing to heroin.

3 All heroin addicts have smoked cannabis at some time.

4 There may be a link between smoking cannabis and becoming addicted to heroin.

6C An athlete's performance can be affected for several hours after smoking a cigarette.

This is because . . .

1 the blood is not carrying enough oxygen.

2 there are carcinogens in tobacco smoke.

3 reaction times are slower.

4 smoking affects self-control.

6D Legal recreational drugs generally cause more ill-health than illegal recreational drugs because . . .

1 legal drugs are more harmful.

2 illegal drugs are used by fewer people.

3 illegal drugs are addictive.

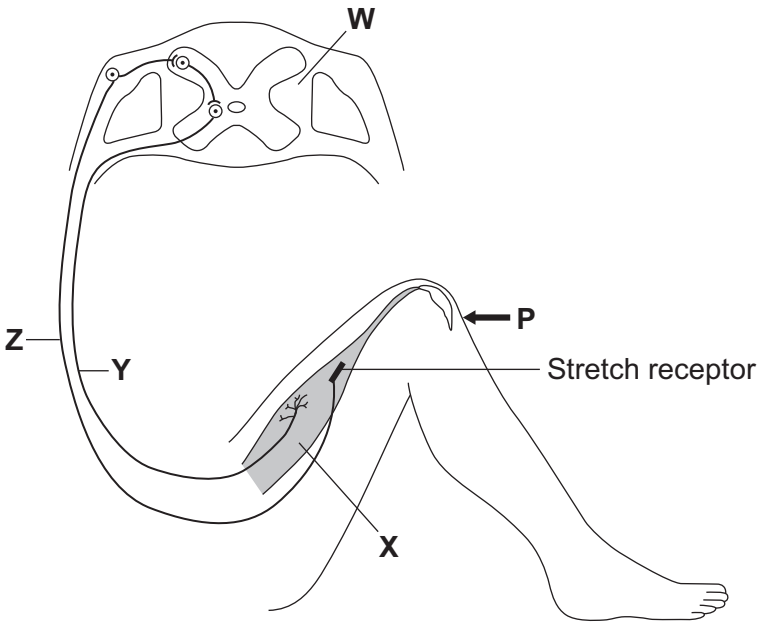
4 only a doctor can prescribe legal drugs.

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Turn over for the next question

QUESTION SEVEN

The diagram shows the nervous pathway used to coordinate the knee-jerk reflex.
When the person is hit at point **P**, the lower leg is suddenly raised.



7A In this reflex action, the motor neurone is labelled . . .

1 **W**

2 **X**

3 **Y**

4 **Z**

7B In this reflex action, the effector is labelled . . .

1 **W**

2 **X**

3 **Y**

4 **Z**

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Read the newspaper article about an accident.

> A young man suffered terrible injuries when his motor cycle skidded off the road last night.
>
> The bones around part of his spinal cord were badly crushed and the spinal cord was damaged. The young man is not able to move his legs because of the damage to the spinal cord. He will have to use a wheelchair for the rest of his life.

7C This young man would not be able to raise his foot when he wanted to put on a shoe because . . .

1 impulses from receptors in his eyes would not be able to travel to his brain.

2 impulses from his brain would not be able to travel to his leg muscle.

3 chemicals would be released at synapses in the central nervous system.

4 reflex actions would not be able to happen in his legs.

7D The young man can sense some stimuli to his feet.

Which structures in his spinal cord were not damaged in the accident?

1 receptors

2 sensory neurones

3 motor neurones

4 effectors

Turn over for the next question

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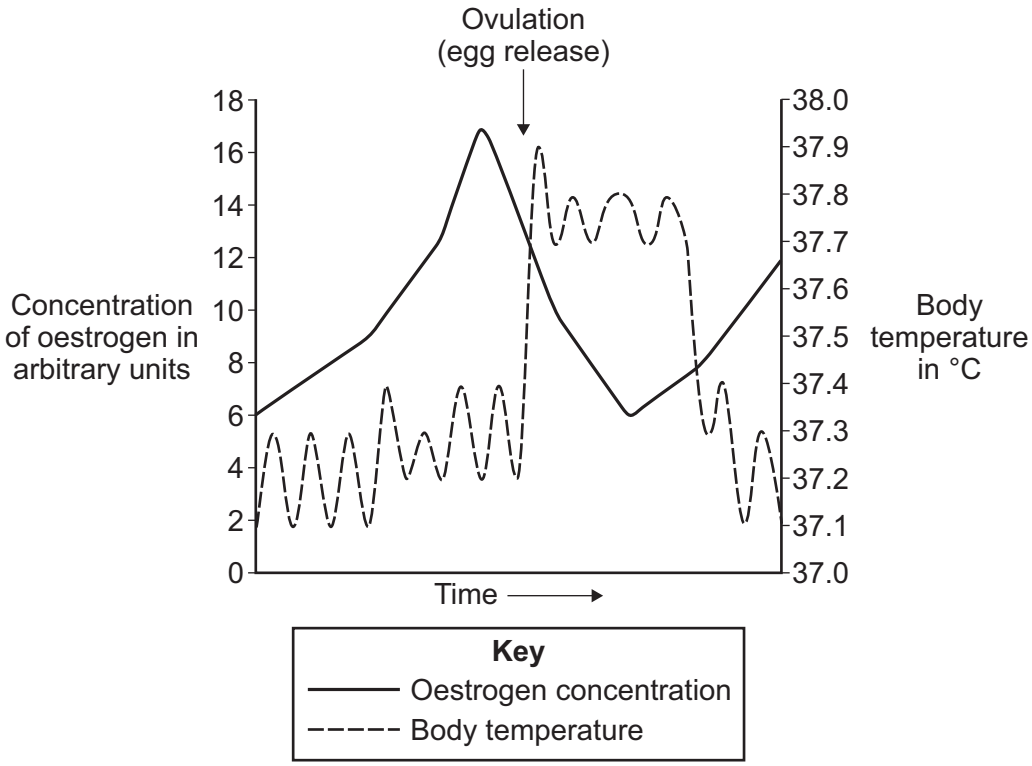
QUESTION EIGHT

Hormones control the menstrual cycle.

8A Which row in the table shows where oestrogen and FSH are produced?

	Oestrogen	FSH
1	ovaries	ovaries
2	pituitary gland	pituitary gland
3	ovaries	pituitary gland
4	pituitary gland	ovaries

The graph shows the changes in the concentration of oestrogen in a woman's blood during part of the menstrual cycle. The graph also shows the changes in her body temperature.



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8B By how much does the woman's temperature rise (in °C) when the egg is released?

1 0.55

2 0.60

3 0.65

4 0.70

8C What is the relationship between the woman's body temperature and the concentration of oestrogen in her blood?

1 A rise in oestrogen concentration causes a rise in temperature.

2 Low oestrogen concentration is linked to high temperatures.

3 There is a link between a fall in oestrogen concentration and a rise in temperature.

4 A high temperature causes a rise in oestrogen concentration.

8D The rise in oestrogen before ovulation will . . .

1 inhibit FSH production and stimulate LH production.

2 stimulate FSH production and inhibit LH production.

3 inhibit FSH production and inhibit LH production.

4 stimulate FSH production and stimulate LH production.

Turn over for the next question

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QUESTION NINE

The amount of energy we need depends on age, gender and activity.

9A The table shows the mean energy needed per day by different people.

Person	Mean energy needed per day in kJ	
	Male	Female
6-year old	7500	7500
16-year old	13000	10000
30-year old office worker	11000	9500
30-year old labourer	16000	13500
Pregnant woman		10500

From the data in the table, which of the following has the biggest effect on the amount of energy needed by the body?

1 your gender

2 pregnancy

3 how active you are

4 how fit you are

9B Of the following, who needs least food?

People who . . .

1 exercise little and live in cold climates.

2 exercise a lot and live in warm climates.

3 exercise little and live in warm climates.

4 exercise a lot and live in cold climates.

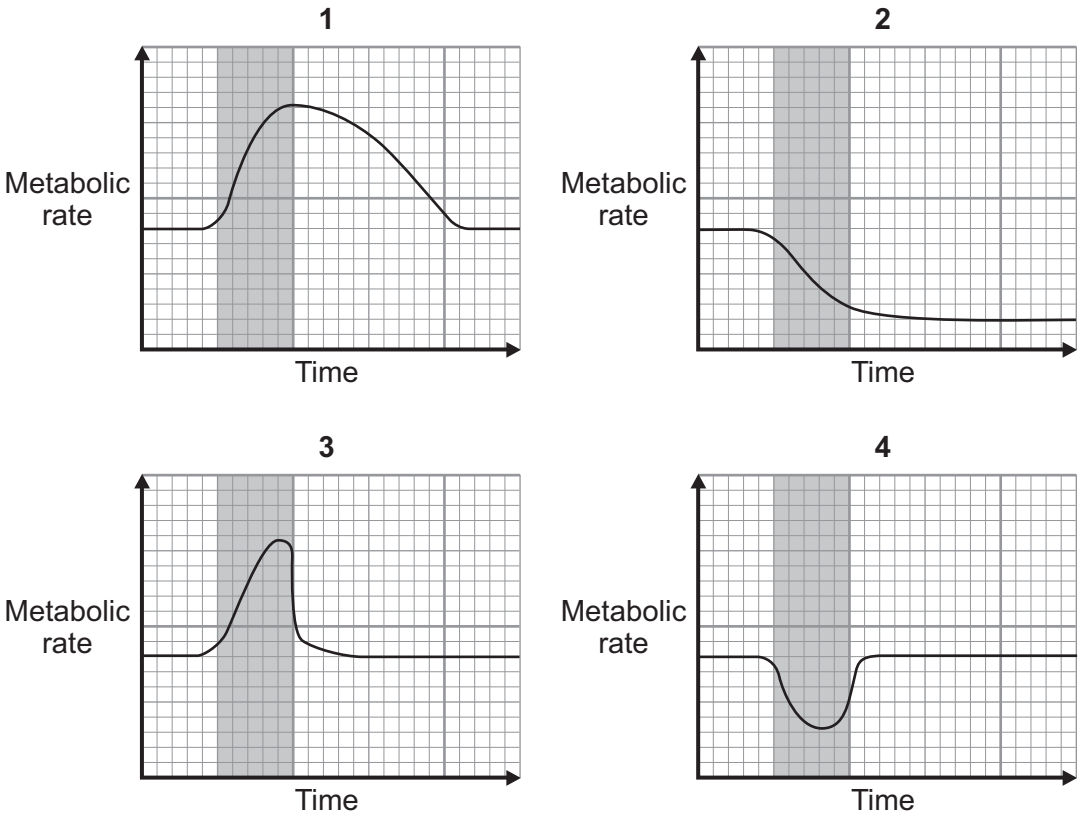
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9C Some people take more energy into their body than they use.

Which row in the table shows diseases linked with this?

	Arthritis	Cancer	Diabetes	Rubella	Deficiency diseases
1	✓	✓		✓	
2			✓		✓
3	✓		✓		
4		✓		✓	✓

9D Which graph shows a person's metabolic rate, before, during and after a 20-minute period of exercise?



END OF TEST

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There are no questions printed on this page

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ASSESSMENT and QUALIFICATIONS ALLIANCE

GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2010 Examination – November Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1A (Human Biology)

November 2010

Foundation Tier

Question	Key		
One	**A**	arthritis	**1**
	B	diabetes	**2**
	C	high blood pressure	**4**
	D	irregular periods	**3**
Two	**A**	painkiller	**4**
	B	penicillin	**1**
	C	thalidomide	**3**
	D	vaccine	**2**
Three	**A**	alcohol	**2**
	B	cocaine	**4**
	C	caffeine	**1**
	D	cannabis	**3**
Four	**A**	5	**2**
	B	11	**3**
	C	15	**1**
	D	28	**4**
Five	**A**	a hypothesis	**4**
	B	a control	**1**
	C	an observation	**3**
	D	a conclusion	**2**

	A	B	C	D
Six	**4**	**3**	**4**	**1**
Seven	**4**	**2**	**3**	**3**
Eight	**3**	**2**	**4**	**1**
Nine	**3**	**2**	**4**	**2**

GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1A (Human Biology)

November 2010

Higher Tier

Question	Key		
One	**A**	a hypothesis	**4**
	B	a control	**1**
	C	an observation	**3**
	D	a conclusion	**2**
Two	**A**	carbon monoxide	**3**
	B	carcinogen	**2**
	C	nicotine	**1**
	D	oxygen	**4**

	A	B	C	D
Three	**3**	**2**	**4**	**1**
Four	**3**	**2**	**4**	**2**
Five	**3**	**2**	**3**	**4**
Six	**2**	**4**	**1**	**2**
Seven	**3**	**2**	**2**	**2**
Eight	**3**	**4**	**3**	**1**
Nine	**3**	**3**	**3**	**1**

AQA

Unit : BLY1AP BIOLOGY UNIT 1A

Centre :

Candidate Number : **UCI :** Series : BG10

Candidate Name :

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE

		1	2	3	4
1A	a hypothesis	○	○	○	○
1B	a control	○	○	○	○
1C	an observation	○	○	○	○
1D	a conclusion	○	○	○	○

QUESTION TWO

		1	2	3	4
2A	carbon monoxide	○	○	○	○
2B	carcinogen	○	○	○	○
2C	nicotine	○	○	○	○
2D	oxygen	○	○	○	○

QUESTION THREE

	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR

	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE

	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX

	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN

	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT

	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE

	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A arthritis	○	○	○	○
1B diabetes	○	○	○	○
1C high blood pressure	○	○	○	○
1D irregular periods	○	○	○	○

QUESTION TWO	1	2	3	4
2A painkiller	○	○	○	○
2B penicillin	○	○	○	○
2C thalidomide	○	○	○	○
2D vaccine	○	○	○	○

QUESTION THREE	1	2	3	4
3A alcohol	○	○	○	○
3B cocaine	○	○	○	○
3C caffeine	○	○	○	○
3D cannabis	○	○	○	○

QUESTION FOUR	1	2	3	4
4A 5	○	○	○	○
4B 11	○	○	○	○
4C 15	○	○	○	○
4D 28	○	○	○	○

QUESTION FIVE	1	2	3	4
5A a hypothesis	○	○	○	○
5B a control	○	○	○	○
5C an observation	○	○	○	○
5D a conclusion	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
June 2010

Science A

Unit Biology B1a (Human Biology)

Biology

Unit Biology B1a (Human Biology)

BLY1AP

F&H

Monday 28 June 2010 Morning Session

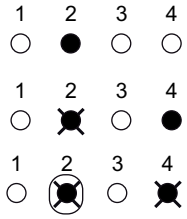
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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.

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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**.

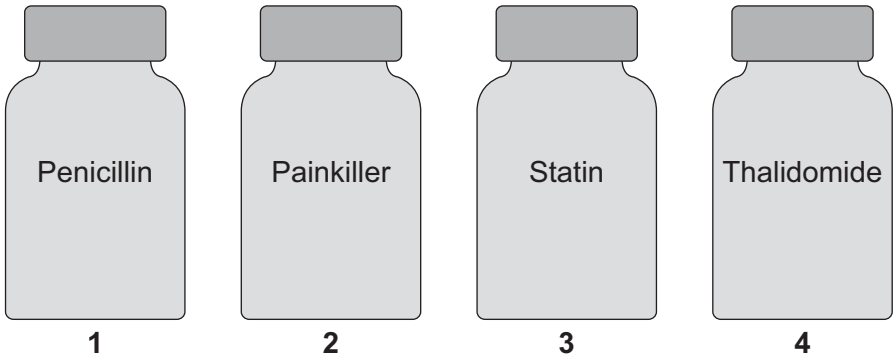
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

Drugs are used to treat sick people.



Match treatments, **A**, **B**, **C** and **D**, with the drugs **1–4** in the diagram.

A used to treat a headache

B used to treat infections

C used to treat leprosy

D used to treat high cholesterol

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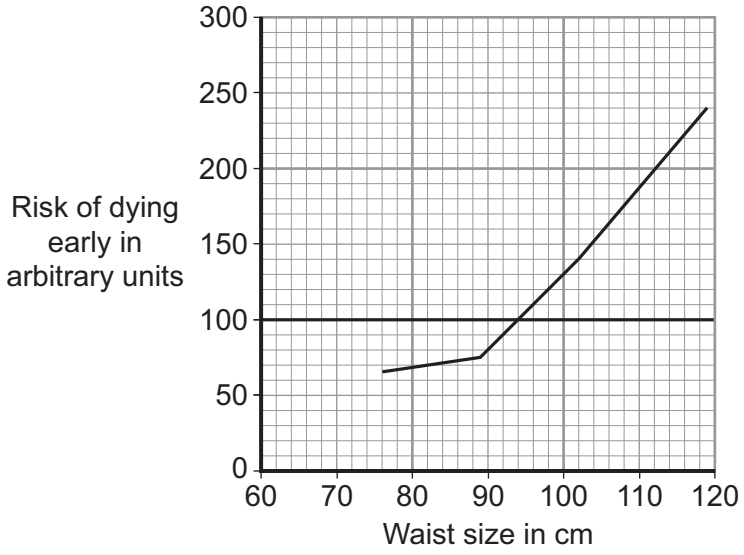
QUESTION TWO

Obesity can increase the risk of dying early.

The graph shows the relationship between waist size in men and the risk of dying early.

A risk of 100 or less means that a person is not expected to die early.

A risk higher than 100 means that a person has a higher risk of dying early.



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

A 80

B 94

C 130

D 140

1	the waist size in cm of a man with a risk of 100
2	the risk of dying early for a man with a waist size of 102 cm
3	a waist size in cm of a man with a reduced risk of dying early
4	the difference in risk between a man with a waist size of 80 cm and a man with a waist size of 112 cm

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QUESTION THREE

The human body responds to changes in the environment.

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

A muscles

B stimuli

C receptors

D neurones

Changes in the environment that the body detects are called . . . **1** . . . .

Changes in the environment are detected by special cells called . . . **2** . . . .

Electrical impulses are then sent along . . . **3** . . . .

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

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QUESTION FOUR

Semmelweiss was a doctor. He did research that saved the lives of thousands of mothers and their babies.

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

A observation

B hypothesis

C experiment

D result

1	He told the doctors to wash their hands before treating mothers to see if it had any effect.
2	He noticed that in one ward many mothers were dying.
3	The death rate amongst mothers fell.
4	He had an idea that doctors might be carrying disease to the mothers.

Turn over for the next question

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QUESTION FIVE

The menstrual cycle is controlled by hormones.

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

A embryo

B ovary

C pituitary gland

D womb

	Information
1	produces eggs
2	produced when a fertilised egg divides
3	produces the hormone FSH
4	its lining is thickened by the action of a hormone

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Turn over for the next question

Section Two

Questions **SIX** to **NINE**.

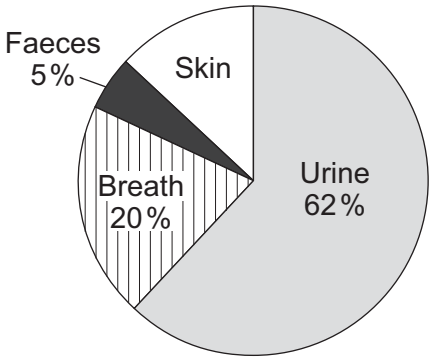
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION SIX

The pie chart shows the percentages of water lost from different parts of the body on a cold day.



6A What is the percentage of water lost from the skin?

1 10%

2 13%

3 15%

4 17%

6B The total volume of water lost from the body was 2000 cm^3.

How many cm^3 of water would be lost from the body in the breath?

1 20 cm^3

2 100 cm^3

3 400 cm^3

4 500 cm^3

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6C More water is lost from the skin on a hot day than on a cold day.

Why is this useful to the body?

1 It gets rid of excess water.

2 It moisturises the skin.

3 It helps to control blood sugar levels.

4 It helps to control body temperature.

6D The volume and composition of the urine would be different on a hot day compared with a cold day.

Which row in the table shows these differences?

	Concentration of ions in urine on a hot day	**Volume of urine produced on a hot day**
1	increased	increased
2	increased	decreased
3	decreased	increased
4	decreased	decreased

Turn over for the next question

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QUESTION SEVEN

A class of students investigated the reaction time of a student.

- The students used a computer program to measure reaction time.
- A student was told to press the space bar when the screen colour changed to yellow.
- The computer program measured the time it took for the student to press the space bar after the screen colour changed to yellow.
- The starting screen colour was changed in each test.
- The end screen colour was always yellow.

7A The receptors that detect the colour change on the screen are found in the . . .

1 finger.

2 eye.

3 brain.

4 ear.

7B The independent variable in this experiment was the . . .

1 starting colour.

2 end colour.

3 time taken to press the space bar.

4 gender of the student.

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7C The table shows the results for the student.

Starting colour	End colour	Time taken to press the space bar in seconds
Red	Yellow	0.07
Blue	Yellow	0.04
Green	Yellow	0.06
Black	Yellow	0.05

To which colour change did the student react the fastest?

1 red to yellow

2 blue to yellow

3 green to yellow

4 black to yellow

7D How could this investigation be made more reliable?

1 decrease the number of starting colours

2 increase the number of end colours

3 increase the number of times the student did the test

4 decrease the size of the computer screen

Turn over for the next question

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QUESTION EIGHT

Our bodies defend themselves against attack by pathogens.

8A Our white cells produce antibodies which destroy . . .

1 all types of bacteria and all types of viruses.

2 all types of bacteria but no viruses.

3 all types of viruses but no bacteria.

4 some types of bacteria and some types of viruses.

8B Our white cells also produce antitoxins which . . .

1 counteract poisons produced by pathogens.

2 destroy both bacteria and viruses.

3 destroy bacteria but not viruses.

4 ingest pathogens.

8C Antibiotics destroy . . .

1 all types of bacteria and all types of viruses.

2 some types of bacteria and some types of viruses.

3 some types of bacteria but no viruses.

4 some types of viruses but no bacteria.

8D Vaccines . . .

1 can be made from dead pathogens.

2 can give protection against bacteria but not viruses.

3 can give protection against viruses but not bacteria.

4 destroy pathogens.

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Turn over for the next question

QUESTION NINE

If you take in less energy than you use, you will lose weight.
A popular diet book claims that a low carbohydrate diet results in quicker weight loss and a more healthy body than a low fat diet.

Scientists carried out an investigation to see if this claim is true.

- They used 120 overweight volunteers divided into two equal groups.
- Both groups were allowed 2000 kilocalories per day.
- **Group 1** was given a diet containing less than 20 g of carbohydrate per day.
- **Group 2** was given a low-fat diet containing less than 30 % of energy from fat and less than 300 mg of cholesterol per day.
- Both groups were given the same exercise programmes which they did at home.
- Both groups attended a weekly information meeting.

9A In what way did the scientists plan a controlled investigation?

1 All volunteers were allowed the same amount of fat per day.

2 All volunteers had the same starting weight.

3 All volunteers were given a low-cholesterol diet.

4 All volunteers were allowed the same amount of energy per day.

The results after 24 weeks are shown in the table.

	Group 1 Low carbohydrate diet	**Group 2 Low fat diet**
Proportion of volunteers who completed the trial	76 %	57 %
Mean change in body mass	–12.9 %	– 6.7 %
Mean change in body fat mass	– 9.4 kg	– 4.8 kg
Mean change in blood HDL concentration	+ 55 mg per litre	– 16 mg per litre
Mean change in blood LDL concentration	+ 16 mg per litre	– 74 mg per litre

9B The investigation would have been more reliable if all the volunteers . . .

1 had been allowed more energy per day.

2 had done the exercise programme under supervision.

3 had lost the same amount of mass.

4 had been given the same amount of cholesterol per day.

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9C The difference in the mean change in blood HDL concentration between **Group 1** and **Group 2** was . . .

1 16 mg per litre.

2 39 mg per litre.

3 55 mg per litre.

4 71 mg per litre.

9D The data supports the popular diet book's claim because . . .

1 people on the low carbohydrate diet had an increased blood LDL concentration.

2 people on the low fat diet had a bigger decrease in blood HDL concentration.

3 people on the low fat diet lost less body mass, on average.

4 more people on the low carbohydrate diet completed the trial.

END OF TEST

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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

The menstrual cycle is controlled by hormones.

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

A embryo

B ovary

C pituitary gland

D womb

	Information
1	produces eggs
2	produced when a fertilised egg divides
3	produces the hormone FSH
4	its lining is thickened by the action of a hormone

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QUESTION TWO

Drugs affect our body chemistry.

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

A illegal and addictive

B legal and addictive

C medicinal

D illegal and non-addictive

1	Cannabis
2	Nicotine
3	Heroin
4	Statin

Turn over for the next question

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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

Our bodies defend themselves against attack by pathogens.

3A Our white cells produce antibodies which destroy . . .

1 all types of bacteria and all types of viruses.

2 all types of bacteria but no viruses.

3 all types of viruses but no bacteria.

4 some types of bacteria and some types of viruses.

3B Our white cells also produce antitoxins which . . .

1 counteract poisons produced by pathogens.

2 destroy both bacteria and viruses.

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4 ingest pathogens.

3C Antibiotics destroy . . .

1 all types of bacteria and all types of viruses.

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3 some types of bacteria but no viruses.

4 some types of viruses but no bacteria.

3D Vaccines . . .

1 can be made from dead pathogens.

2 can give protection against bacteria but not viruses.

3 can give protection against viruses but not bacteria.

4 destroy pathogens.

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Turn over for the next question

QUESTION FOUR

If you take in less energy than you use, you will lose weight.
A popular diet book claims that a low carbohydrate diet results in quicker weight loss and a more healthy body than a low fat diet.

Scientists carried out an investigation to see if this claim is true.

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4A In what way did the scientists plan a controlled investigation?

1 All volunteers were allowed the same amount of fat per day.

2 All volunteers had the same starting weight.

3 All volunteers were given a low-cholesterol diet.

4 All volunteers were allowed the same amount of energy per day.

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Mean change in blood LDL concentration	+ 16 mg per litre	– 74 mg per litre

4B The investigation would have been more reliable if all the volunteers . . .

1 had been allowed more energy per day.

2 had done the exercise programme under supervision.

3 had lost the same amount of mass.

4 had been given the same amount of cholesterol per day.

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4C The difference in the mean change in blood HDL concentration between **Group 1** and **Group 2** was . . .

1 16 mg per litre.

2 39 mg per litre.

3 55 mg per litre.

4 71 mg per litre.

4D The data supports the popular diet book's claim because . . .

1 people on the low carbohydrate diet had an increased blood LDL concentration.

2 people on the low fat diet had a bigger decrease in blood HDL concentration.

3 people on the low fat diet lost less body mass, on average.

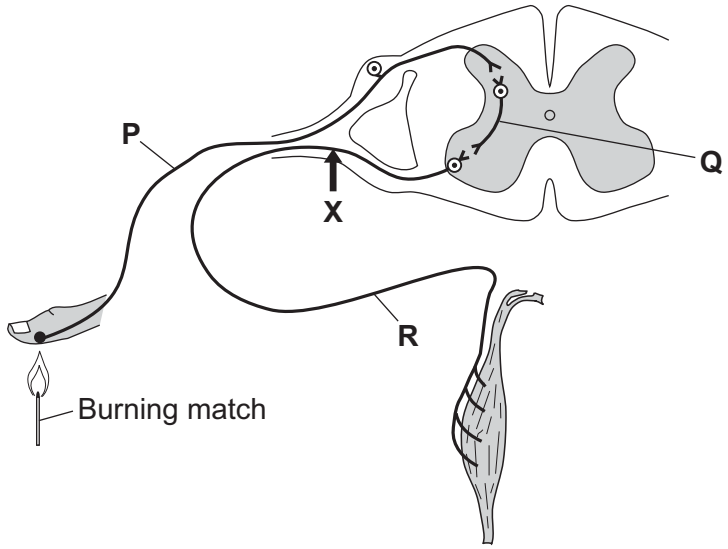
4 more people on the low carbohydrate diet completed the trial.

Turn over for the next question

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QUESTION FIVE

The diagram shows the structures involved in a reflex action.



5A What types of neurone are **P** and **Q**?

	P	**Q**
1	relay	sensory
2	motor	sensory
3	sensory	relay
4	sensory	motor

5B Which row in the table below shows how information passes between neurone **P** and neurone **Q**, and between neurone **Q** and neurone **R**?

	Between neurone **P** and neurone **Q**	Between neurone **Q** and neurone **R**
1	chemical	impulse
2	impulse	impulse
3	chemical	chemical
4	impulse	chemical

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5C In one person, the distance travelled by an impulse was found to be 1.5 m. The time taken for the impulse to travel this distance was 0.015 s. However, the time taken for a response to occur was 0.021 s.

What is the main reason for this difference?

1 It takes extra time for the brain to respond.

2 It takes extra time for information to cross synapses.

3 Information travels more slowly in the spinal cord.

4 Reflex actions can be slowed down by low body temperature.

5D In an accident, neurone **R** is cut at the point labelled **X** on the diagram.

How would this affect the person shown in the diagram?

1 The stimulus could be detected but the effector would not work.

2 The effector would work but the person could not detect the stimulus.

3 The effector would not work and the stimulus could not be detected.

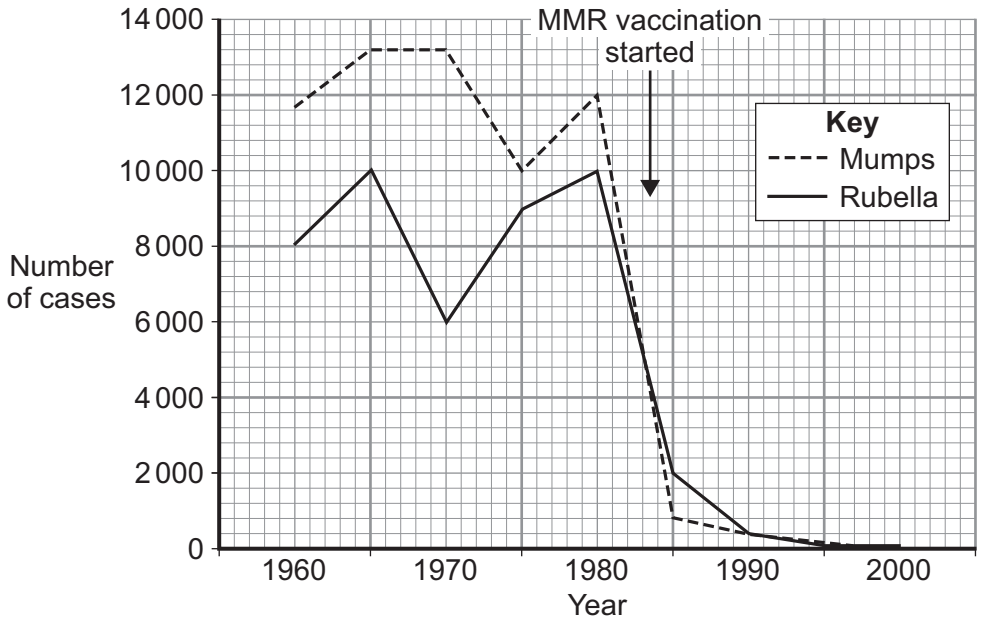
4 The stimulus could be detected and the effector would work.

Turn over for the next question

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QUESTION SIX

The graph shows the effect of MMR vaccination on the number of cases of mumps and rubella in Finland.



6A By how many did the number of cases of rubella decrease between 1980 and 1990?

1 400

2 800

3 9 600

4 12 000

6B Rubella is caused by a virus. There were no cases of rubella in Finland after 1997.

What was the most probable reason for this?

1 There had been a large decrease in the number of cases of mumps by 1997.

2 An antibiotic cure for rubella was introduced in 1997.

3 The rubella pathogen mutated in 1997.

4 Most of the children in Finland had been vaccinated by 1997.

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Finland has a population of 4.4 million.

The table shows the occurrence of some side-effects linked to MMR vaccination in Finland by 1997.

Side-effect	Total number of side-effects linked to MMR vaccination by 1997	Number of side-effects per 100 000 people given MMR vaccine by 1997
Anaphylaxis	14	0.42
Asthma	5	0.15
Autism	0	0
Epilepsy	1	0.03
Febrile seizure	28	0.84
Urticaria	25	0.75

6C Using the data for anaphylaxis, how many people in Finland had been given the MMR vaccine by 1997?

1 588 000

2 1 385 000

3 3.3 million

4 4.4 million

6D Look at the data in the graph and the table.

What advice should a doctor in Finland give to a mother who is worried about her child being given the MMR vaccine?

1 There is no danger from being given the vaccine.

2 There is a slight risk of autism.

3 The risk of any side-effect is very low.

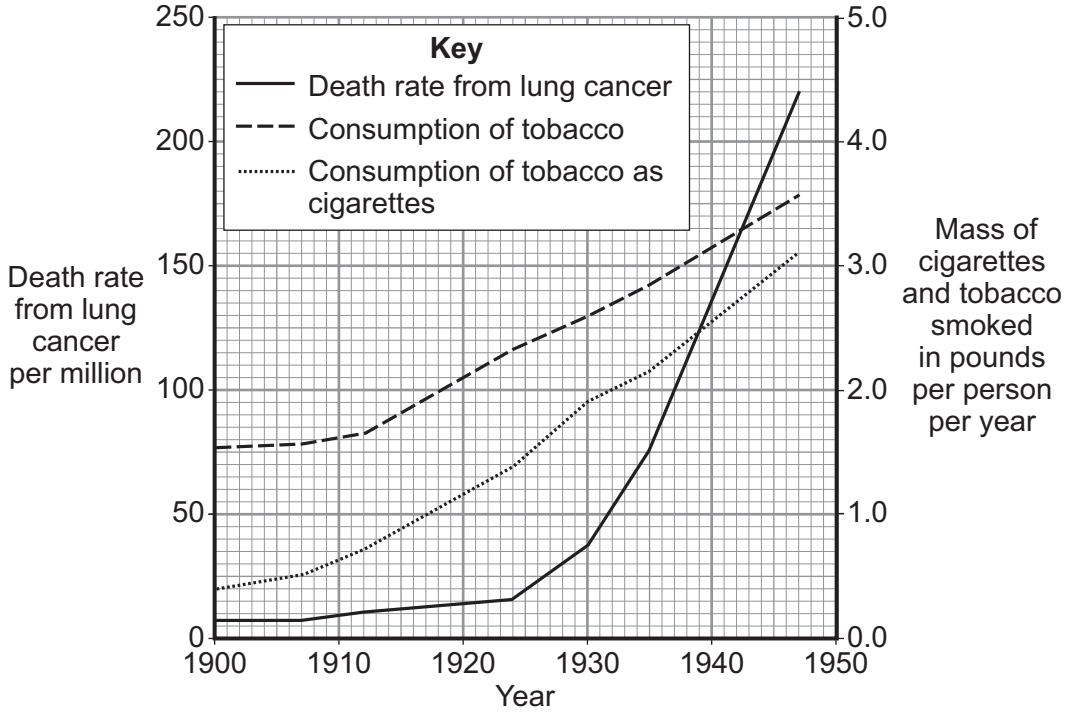
4 There is no need to have your child vaccinated with the MMR vaccine.

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QUESTION SEVEN

In the 1950s, Richard Doll used surveys to investigate the causes of lung cancer.

The graph shows one set of data that he produced.



7A By how much did the consumption of tobacco as cigarettes increase between 1900 and 1947?

1 2.7 pounds per person per year

2 3.0 pounds per person per year

3 3.5 pounds per person per year

4 5.4 pounds per person per year

7B The death rate from lung cancer between 1900 and 1947 . . .

1 increased at a constant rate.

2 increased slowly at first, then more rapidly.

3 increased rapidly at first, then more slowly.

4 increased rapidly, then levelled off.

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Doll interviewed hospital patients about their smoking habits.

The table shows some of the results.

Numbers of cigarettes smoked each day	**0**	**1–4**	**5–14**	**15–24**	**25 or more**
Number of lung cancer patients	2	12	36	27	21
Number of patients with diseases other than lung cancer	9	9	30	19	11

7C This data shows that . . .

1 there is a possible link between smoking and lung cancer.

2 there is no link between smoking and lung cancer.

3 smoking causes lung cancer.

4 smoking causes a wide range of diseases.

7D It took many years for Doll's work to be widely accepted by other doctors.

The main reason for this was that . . .

1 his work mainly involved collecting statistics.

2 large amounts of money were spent on tobacco advertising.

3 interviews about smoking habits produce very unreliable data.

4 many doctors were smokers.

Turn over for the next question

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QUESTION EIGHT

Some crocodiles live in lakes in Africa. These lakes may contain rotting meat and vegetation.

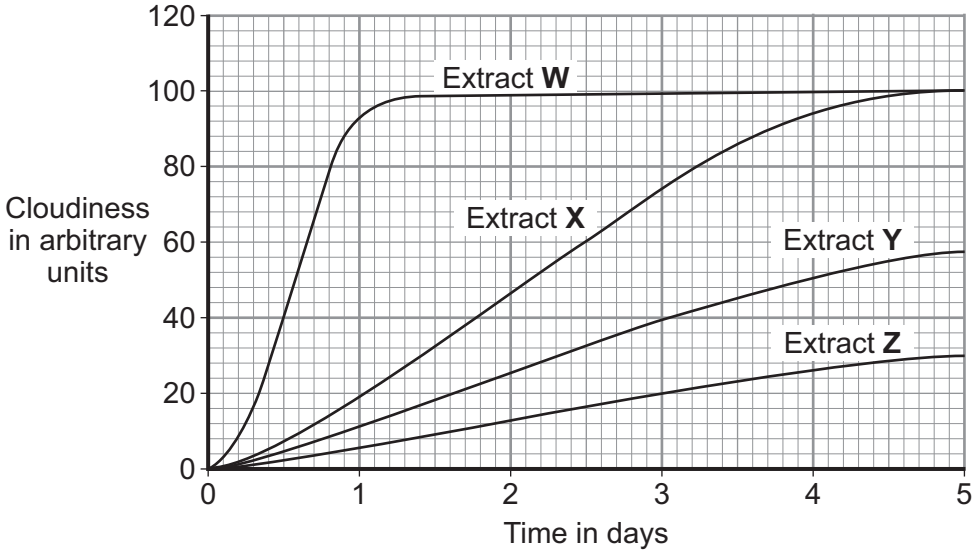
- Crocodiles often get cuts but these rarely become infected.
- However, local people notice that when they bathe in the same lakes, **their** cuts often become infected.

8A Which row in the table correctly identifies the two statements?

	Cuts on crocodiles rarely become infected	**Cuts on local people often become infected**
1	Theory	Hypothesis
2	Hypothesis	Theory
3	Observation	Observation
4	Hypothesis	Observation

- A researcher took a sample of crocodile blood and made four extracts, **W**, **X**, **Y** and **Z**, from it.
- He added these extracts to MRSA bacteria in tubes of nutrient solution.
- The tubes were kept in a warm place for five days.
- As bacteria grew, the nutrient solution became cloudy.

The graph shows how the cloudiness of the nutrient solutions changed over the five days.



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8B The researcher decided to purify one of the extracts to isolate the bacteria-killing chemical.

Which extract would he most likely choose to purify?

1 Extract **W**

2 Extract **X**

3 Extract **Y**

4 Extract **Z**

8C After several pure chemicals had been isolated from one extract, the chemicals were trialled.

The table shows four stages in the trialling of a new chemical.

Stage	Trialled on
P	human volunteers who do not have disease
Q	cell cultures
R	animals
S	humans who do have disease

Which is the correct sequence for these stages?

1 **R** → **S** → **Q** → **P**

2 **Q** → **P** → **S** → **R**

3 **Q** → **R** → **P** → **S**

4 **S** → **P** → **R** → **Q**

8D Volunteers in trials of new chemicals . . .

1 should always be paid for taking part.

2 should always be told about the risks of side-effects.

3 should be able to choose whether to take the new chemical or a placebo.

4 should be told whether they have been given the placebo or the new chemical.

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QUESTION NINE

IVF (in vitro fertilisation) treatment helps women to become pregnant.

9A The hormone which stimulates the monthly release of the egg is secreted by the . . .

1 ovary.

2 brain.

3 pituitary gland.

4 womb.

9B Which hormone treatment is usually used in IVF?

1 oestrogen only

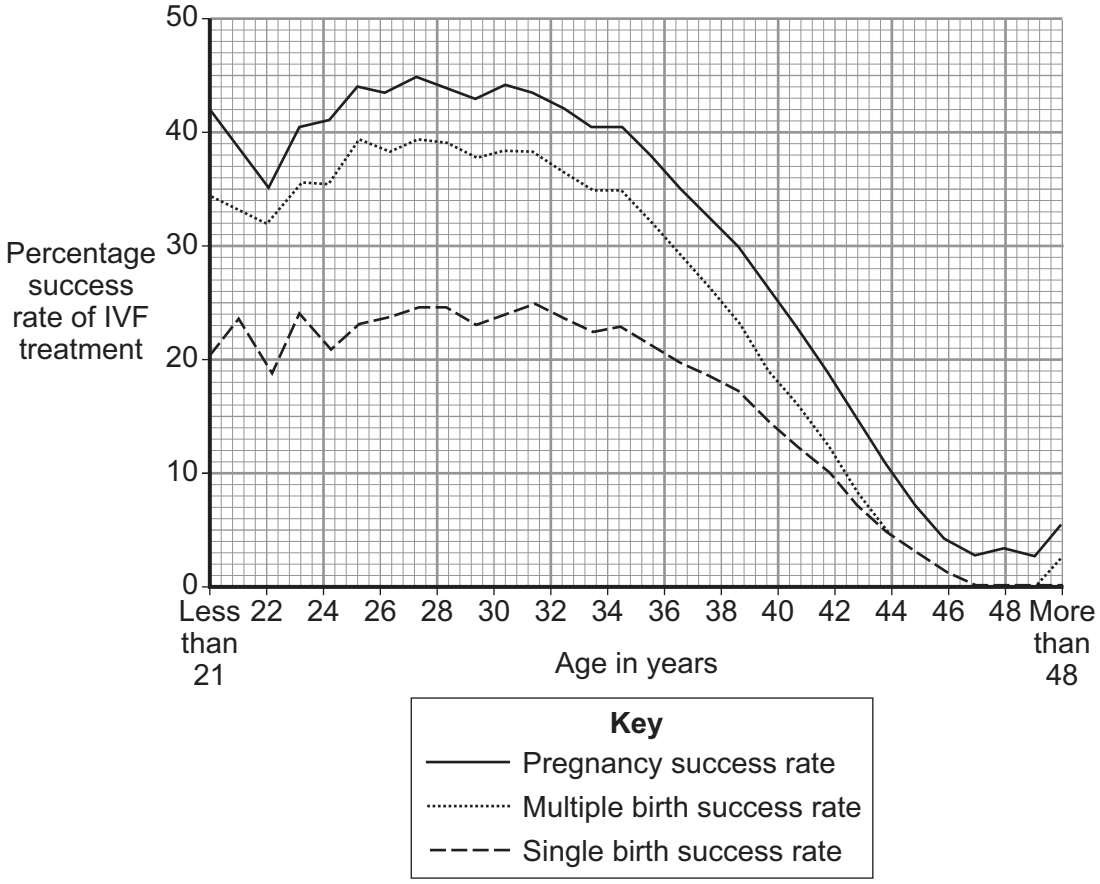
2 FSH followed by LH

3 FSH only

4 LH followed by FSH

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The graph shows the percentage success rates of IVF treatments for women of different ages.



9C Which conclusion can be drawn from this data?

1 Only single babies were born to women over 45.

2 IVF should not be given to women over 45.

3 The pregnancy success rate falls significantly after the age of 34.

4 The pregnancy success rate is independent of the age of the woman.

9D Which pattern is shown by the data?

1 The single birth success rate is always less than the multiple birth success rate.

2 The multiple birth success rate is never less than 20%.

3 Women of all ages produce multiple births.

4 After the age of 34 the proportion of multiple births compared with single births decreases with the age of the mother.

END OF TEST

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Version 1:0: 26/07/10

ASSESSMENT and QUALIFICATIONS ALLIANCE

GCSE

Science A (4461)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2010 Examination – June Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

June 2010

Foundation Tier

Question	Key		
One	**A**	used to treat a headache	2
	B	used to treat infections	1
	C	used to treat leprosy	4
	D	used to treat high cholesterol	3
Two	**A**	80	3
	B	94	1
	C	130	4
	D	140	2
Three	**A**	muscles	4
	B	stimuli	1
	C	receptors	2
	D	neurones	3
Four	**A**	observation	2
	B	hypothesis	4
	C	experiment	1
	D	result	3
Five	**A**	embryo	2
	B	ovary	1
	C	pituitary gland	3
	D	womb	4

	A	**B**	**C**	**D**
Six	**2**	**3**	**4**	**2**
Seven	**2**	**1**	**2**	**3**
Eight	**4**	**1**	**3**	**1**
Nine	**4**	**2**	**4**	**3**

GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

June 2010

Higher Tier

Question	Key		
One	**A**	embryo	2
	B	ovary	1
	C	pituitary gland	3
	D	womb	4
Two	**A**	illegal and addictive	3
	B	legal and addictive	2
	C	medicinal	4
	D	illegal and non-addictive	1

	A	**B**	**C**	**D**
Three	**4**	**1**	**3**	**1**
Four	**4**	**2**	**4**	**3**
Five	**3**	**3**	**2**	**1**
Six	**3**	**4**	**3**	**3**
Seven	**1**	**2**	**1**	**1**
Eight	**3**	**4**	**3**	**2**
Nine	**3**	**2**	**3**	**4**

AQA

Unit : BLY1AP **BIOLOGY UNIT 1A**

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 6M10

28-JUN-10

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE

		1	2	3	4
1A	embryo	○	○	○	○
1B	ovary	○	○	○	○
1C	pituitary gland	○	○	○	○
1D	womb	○	○	○	○

QUESTION TWO

		1	2	3	4
2A	illegal and addictive	○	○	○	○
2B	legal and addictive	○	○	○	○
2C	medicinal	○	○	○	○
2D	illegal and non-addictive	○	○	○	○

QUESTION THREE

	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR

	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE

	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX

	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN

	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT

	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE

	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A used to treat a headache	○	○	○	○
1B used to treat infections	○	○	○	○
1C used to treat leprosy	○	○	○	○
1D used to treat high cholesterol	○	○	○	○

QUESTION TWO	1	2	3	4
2A 80	○	○	○	○
2B 94	○	○	○	○
2C 130	○	○	○	○
2D 140	○	○	○	○

QUESTION THREE	1	2	3	4
3A muscles	○	○	○	○
3B stimuli	○	○	○	○
3C receptors	○	○	○	○
3D neurones	○	○	○	○

QUESTION FOUR	1	2	3	4
4A observation	○	○	○	○
4B hypothesis	○	○	○	○
4C experiment	○	○	○	○
4D result	○	○	○	○

QUESTION FIVE	1	2	3	4
5A embryo	○	○	○	○
5B ovary	○	○	○	○
5C pituitary gland	○	○	○	○
5D womb	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
March 2010

Science A
Unit Biology B1a (Human Biology)

Biology
Unit Biology B1a (Human Biology)

BLY1AP

F&H

Wednesday 3 March 2010 Morning Session

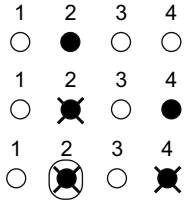
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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.

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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**.

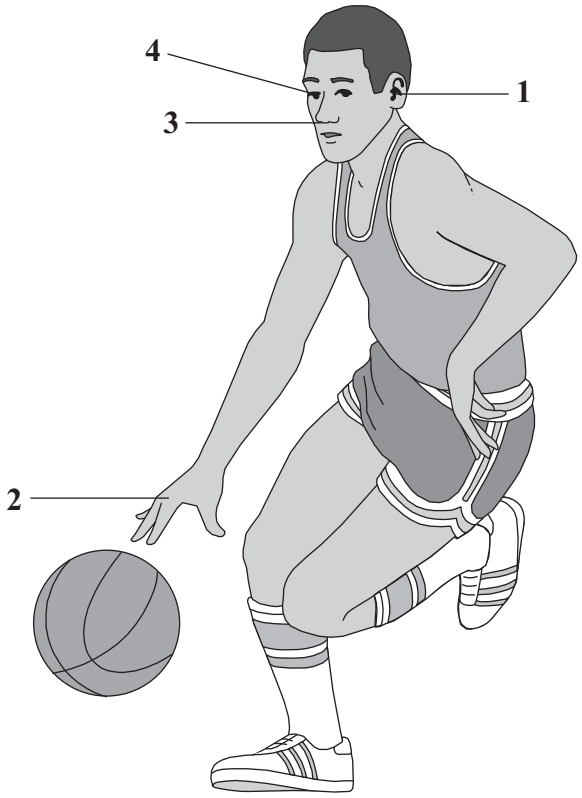
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1– 4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

The drawing shows a basketball player.



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

A allows the player to hear the spectators

B allows the player to see the basket

C allows the player to detect smells in the arena

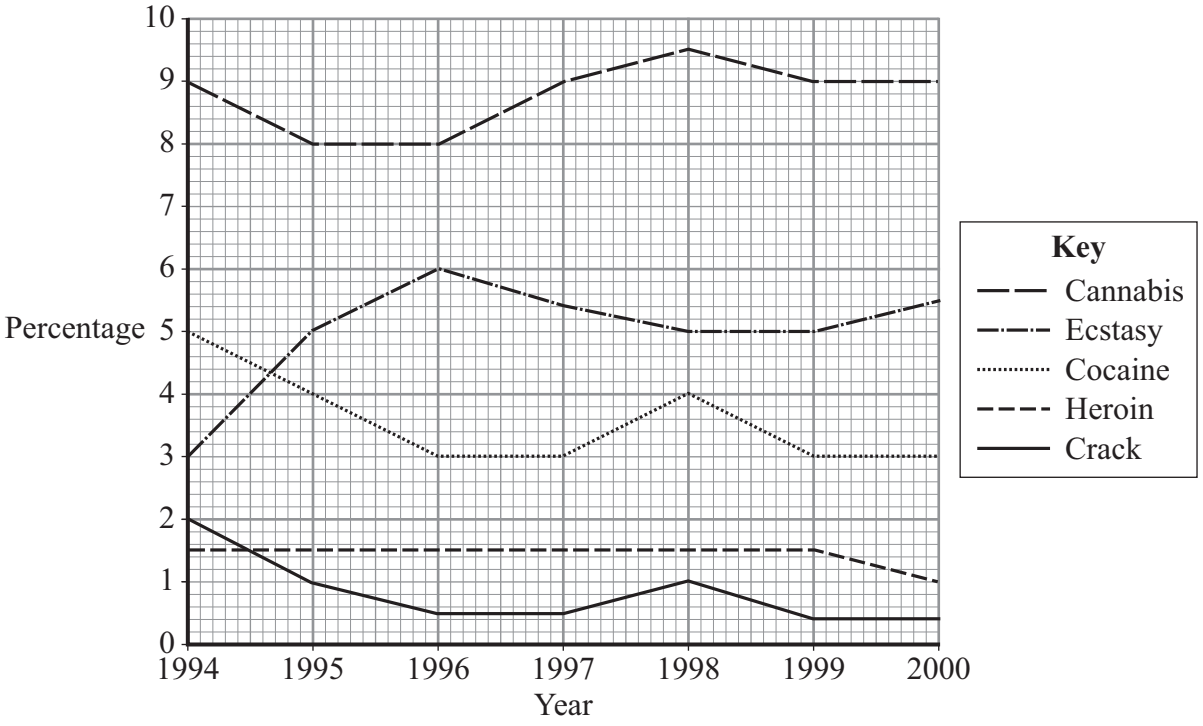
D allows the player to feel the ball

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QUESTION TWO

Patterns of illegal drug taking have changed over recent years.

The graph shows the percentage of a population that used different illegal drugs between 1994 and 2000.



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

A cannabis

B cocaine

C ecstasy

D heroin

1	This is the most commonly used drug shown in the graph.
2	1.5% of the population used this drug in 1998.
3	The use of this drug increased between 1994 and 1996.
4	The pattern of use of this drug was most similar to that of crack between 1994 and 2000.

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QUESTION THREE

A balanced diet is important for a healthy body.

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

A blood

B heart

C joints

D liver

Cholesterol is a substance made in the . . . **1** . . . .

Cholesterol is carried around the body by the . . . **2** . . . .

High levels of cholesterol increase the risk of disease of the . . . **3** . . . .

Obesity leads to arthritis which affects the . . . **4** . . . .

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QUESTION FOUR

Some women find it difficult to become pregnant. Several methods are used to increase the chances of pregnancy for these women.

The table shows the percentage of women, of different ages, who became pregnant after treatment.

	Percentage of women who became pregnant after treatment		
Age in years	**Using drugs to stimulate egg production**	**IVF treatment using their own eggs**	**IVF treatment using donated eggs (eggs taken from other women)**
33	68	74	78
36	54	58	60
39	38	44	46
42	36	38	40

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

A 30

B 39

C 60

D 72

1	The percentage of 36 year old women who became pregnant after IVF treatment using donated eggs.
2	The age of women who had a 44% chance of becoming pregnant after IVF treatment using their own eggs.
3	Out of 200 women aged 42, the number who became pregnant after using drugs to stimulate egg production.
4	The decrease, between the ages of 33 and 39, in the percentage of women who became pregnant using IVF and their own eggs.

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QUESTION FIVE

Most long-distance runners drink sports drinks during a race.

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

A energy

B enzymes

C mass

D sweat

Ions and water are lost during a race in . . . **1** . . . .

Sugar is added to sports drinks to replace the sugar used to release . . . **2** . . . .

In hot conditions, the athlete's body temperature may rise. This affects the working of . . . **3** . . . .

An athlete who drinks too much water during a race will probably gain . . . **4** . . . .

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Turn over for the next question

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SECTION TWO

Questions **SIX** to **NINE**.

Each of these questions has four parts.

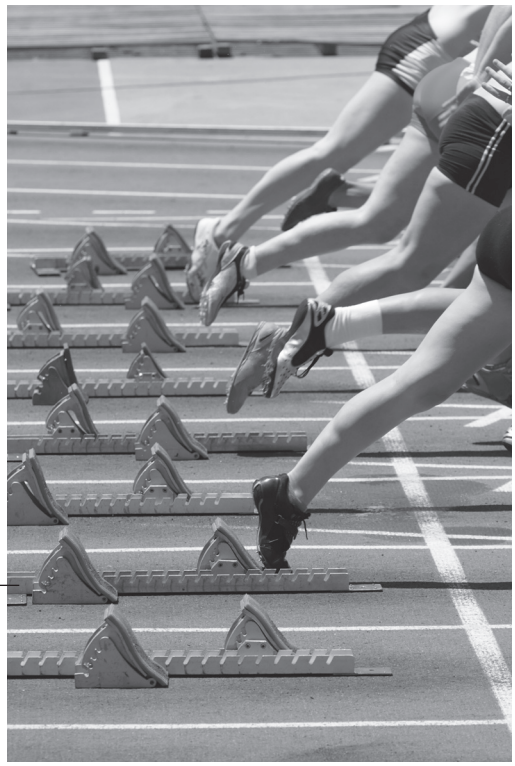
In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION SIX

A sports teacher wanted to find out which student had the quickest reaction time at the start of a 100 m race.

A starting pistol was fired from behind the start line and each student's reaction time was measured.



6A The stimulus to start running is . . .

1 heat.

2 light.

3 smell.

4 sound.

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6B The reaction time is the time from when the pistol was fired to when the student . . .

1 left the starting block.

2 reached the end of the race.

3 had taken one complete stride.

4 heard the sound made by the pistol.

6C The gun was fired behind the students so that they would . . .

1 not anticipate the gun firing.

2 hear the gun firing better.

3 not be frightened by the gun being fired.

4 have a clear track to run on.

6D The student who left the blocks first would be the one with . . .

1 the longest reaction time.

2 the shortest reaction time.

3 the greatest range of reaction times.

4 the smallest range of reaction times.

Turn over for the next question

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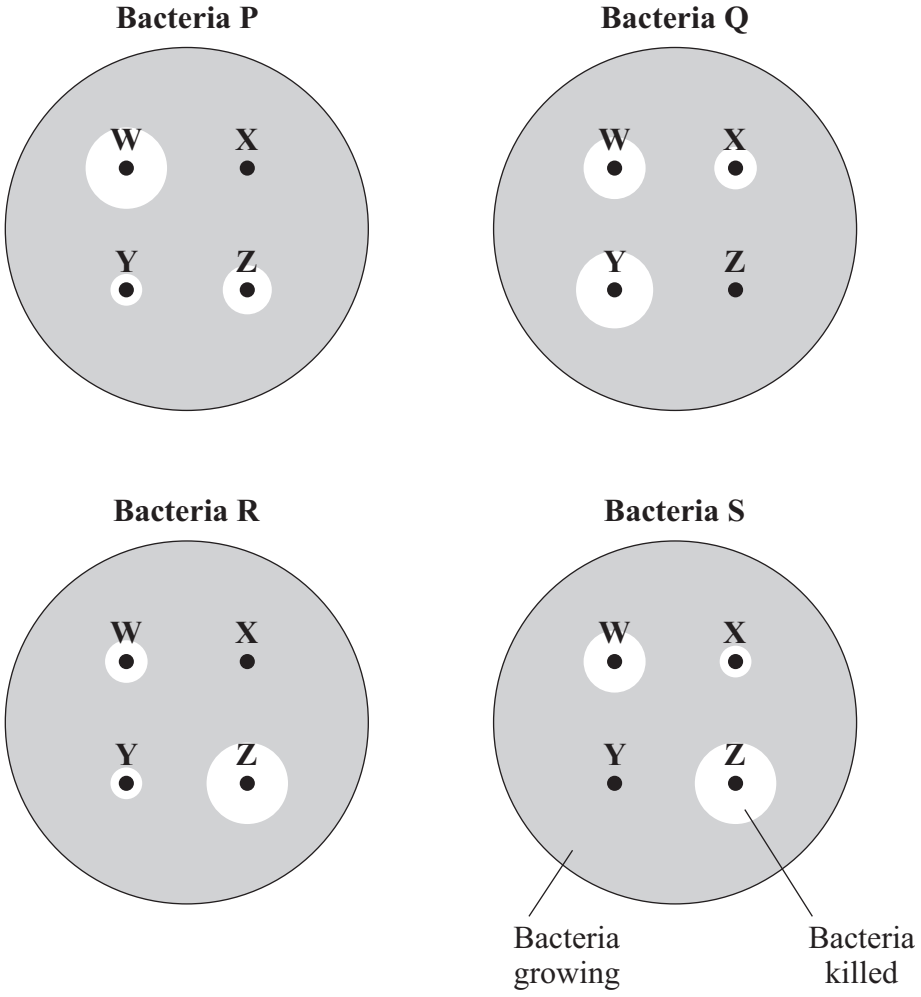
QUESTION SEVEN

A group of students investigated how effective four different antibiotics were at killing four different bacteria.

In this investigation:

- the four bacteria, **P**, **Q**, **R** and **S**, were spread on separate dishes containing nutrient agar
- paper discs were dipped into the four different antibiotics, **W**, **X**, **Y** and **Z**
- one of each disc was placed onto the agar in each of the four dishes.

The diagram shows the appearance of the dishes after three days. If the antibiotic kills the bacteria there is a clear space around the disc. The larger the clear space, the more effective the antibiotic is.



7A Which of the following is **not** an important control variable in this investigation?

1 the diameter of the dishes

2 the temperature at which the dishes were kept

3 the concentration of the antibiotics

4 the volume of antibiotic on each disc

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7B How could the students improve the reliability of their investigation?

1 calculating the mean clear area for all the antibiotics in one dish

2 repeating the investigation using different antibiotics and different bacteria

3 repeating the investigation and calculating the mean clear area for each antibiotic

4 ignoring all the results where bacteria were **not** killed

7C Using the information in the diagrams, which antibiotic could be used to kill any of the bacteria?

1 antibiotic **W**

2 antibiotic **X**

3 antibiotic **Y**

4 antibiotic **Z**

7D Using the information in the diagrams, which antibiotic worked equally well in killing bacteria **R** and **S**?

1 antibiotic **W**

2 antibiotic **X**

3 antibiotic **Y**

4 antibiotic **Z**

Turn over for the next question

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QUESTION EIGHT

Measles is a dangerous viral disease which kills about one person in every 1000 people infected. It gives long-term complications for many others. Worldwide, almost 350 000 people, mainly of school age, are killed by measles every year.

After a UK health scare, some parents refused to have their children vaccinated.

In England and Wales:

- in 2006 there were 756 cases of measles
- in 2007 there were 971 cases of measles
- in 2008 there were more than 1300 cases of measles.

8A Approximately how many people are **infected** by measles across the world each year?

1 971

2 350 000

3 350 000 000

4 It is impossible to tell from the data.

8B The rise in the number of people suffering from measles in the UK in recent years . . .

1 can be described as a pandemic.

2 is due to measles viruses mutating.

3 is due to antibiotic resistance.

4 can be described as an epidemic.

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8C White blood cells can protect us from pathogens.

Which row in the table shows the way(s) in which this protection can occur?

	Ingesting pathogens	Producing antitoxins	Producing antibodies
1	✓	✓	✗
2	✓	✗	✓
3	✗	✓	✓
4	✓	✓	✓

8D School-age children are more likely to catch measles than adults.

This is because . . .

1 large numbers of children are often close together.

2 children have a poorly developed immune system.

3 the virus multiplies in the soil in playing fields.

4 new vaccines are less effective than older ones in protecting against measles.

Turn over for the next question

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QUESTION NINE

Read the passage about the discovery of thalidomide.

> A small German drugs company first made thalidomide in 1953. The company scientists could not find any beneficial effects of thalidomide, including antibiotic activity, in mice and rats. However, the new chemical seemed to be harmless. Very high doses did not kill rodents, rabbits, cats or dogs. In addition, the animals showed no other side effects.
>
> In further testing, the animals did not appear to become sleepy or calmer when given thalidomide. However, the company thought that selling thalidomide as a sleeping drug would make them lots of money.
>
> Soon the drug was being sold in 46 countries without any additional independent testing. Thalidomide became the drug of choice for pregnant women with morning sickness.

9A Nowadays, all drugs are thoroughly tested before being marketed.

Which stage of drug testing was not done by the company scientists?

1 tests on animals

2 toxicity tests

3 tests on humans

4 antibiotic activity

9B The company marketed thalidomide quickly because . . .

1 they thought that they could make a big profit.

2 they wanted to cure morning sickness in women.

3 it was a good sleeping drug.

4 it was a good antibiotic.

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9C When clinical trials of a new drug are carried out, half the volunteers are given a placebo.

A placebo contains . . .

1 only inactive substances.

2 a small quantity of the drug.

3 an antibiotic.

4 a painkiller.

9D Thalidomide was banned when its side effects became known.

It has recently been approved for the treatment of . . .

1 morning sickness.

2 leprosy.

3 limb abnormalities.

4 mental illness.

END OF TEST

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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

Most long-distance runners drink sports drinks during a race.

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

A energy

B enzymes

C mass

D sweat

Ions and water are lost during a race in . . . **1** . . . .

Sugar is added to sports drinks to replace the sugar used to release . . . **2** . . . .

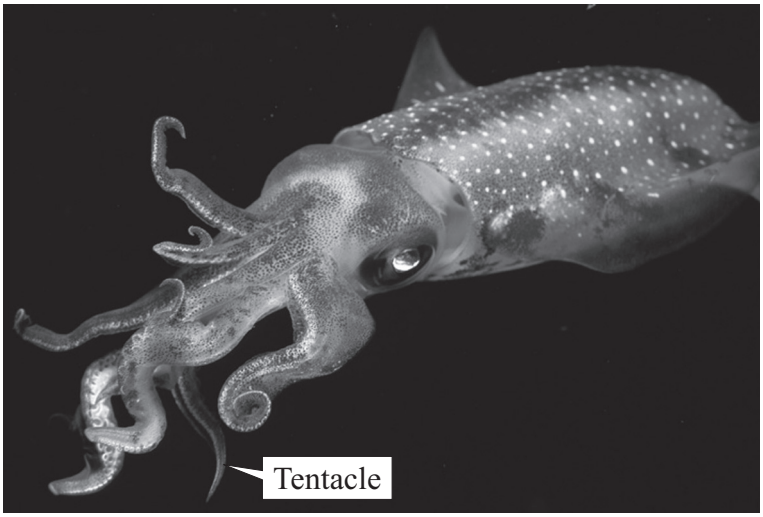
In hot conditions, the athlete's body temperature may rise. This affects the working of . . . **3** . . . .

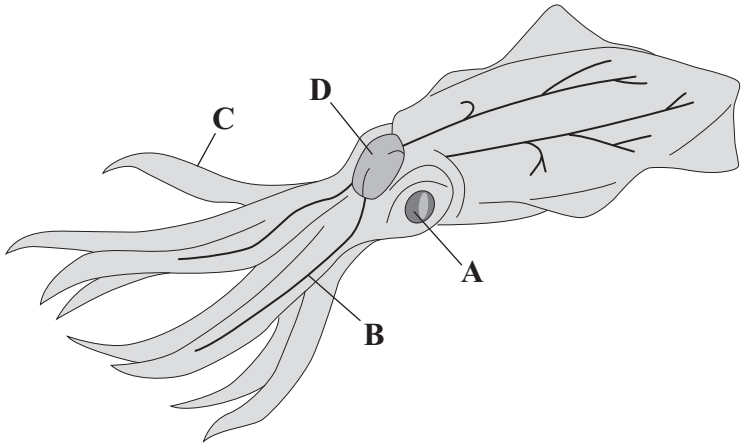
An athlete who drinks too much water during a race will probably gain . . . **4** . . . .

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QUESTION TWO

The photograph shows a squid. The diagram shows some of its organs. When a squid sees a fish, it tries to catch it with its tentacles.





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

1	brain
2	effector
3	nerve
4	receptor

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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

Measles is a dangerous viral disease which kills about one person in every 1000 people infected. It gives long-term complications for many others. Worldwide, almost 350 000 people, mainly of school age, are killed by measles every year.

After a UK health scare, some parents refused to have their children vaccinated.

In England and Wales:

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- in 2007 there were 971 cases of measles
- in 2008 there were more than 1300 cases of measles.

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3 350 000 000

4 It is impossible to tell from the data.

3B The rise in the number of people suffering from measles in the UK in recent years . . .

1 can be described as a pandemic.

2 is due to measles viruses mutating.

3 is due to antibiotic resistance.

4 can be described as an epidemic.

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3C White blood cells can protect us from pathogens.

Which row in the table shows the way(s) in which this protection can occur?

	Ingesting pathogens	Producing antitoxins	Producing antibodies
1	✓	✓	✗
2	✓	✗	✓
3	✗	✓	✓
4	✓	✓	✓

3D School-age children are more likely to catch measles than adults.

This is because . . .

1 large numbers of children are often close together.

2 children have a poorly developed immune system.

3 the virus multiplies in the soil in playing fields.

4 new vaccines are less effective than older ones in protecting against measles.

Turn over for the next question

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QUESTION FOUR

Read the passage about the discovery of thalidomide.

> A small German drugs company first made thalidomide in 1953. The company scientists could not find any beneficial effects of thalidomide, including antibiotic activity, in mice and rats. However, the new chemical seemed to be harmless. Very high doses did not kill rodents, rabbits, cats or dogs. In addition, the animals showed no other side effects.
>
> In further testing, the animals did not appear to become sleepy or calmer when given thalidomide. However, the company thought that selling thalidomide as a sleeping drug would make them lots of money.
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4A Nowadays, all drugs are thoroughly tested before being marketed.

Which stage of drug testing was not done by the company scientists?

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2 toxicity tests

3 tests on humans

4 antibiotic activity

4B The company marketed thalidomide quickly because . . .

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2 they wanted to cure morning sickness in women.

3 it was a good sleeping drug.

4 it was a good antibiotic.

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4C When clinical trials of a new drug are carried out, half the volunteers are given a placebo.

A placebo contains . . .

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2 a small quantity of the drug.

3 an antibiotic.

4 a painkiller.

4D Thalidomide was banned when its side effects became known.

It has recently been approved for the treatment of . . .

1 morning sickness.

2 leprosy.

3 limb abnormalities.

4 mental illness.

Turn over for the next question

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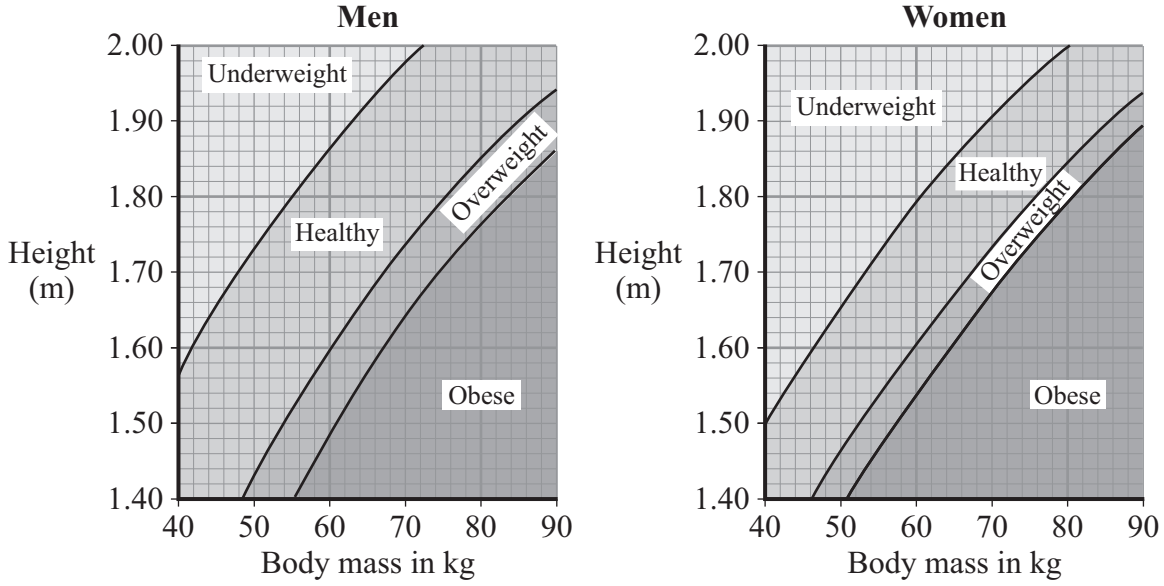
QUESTION FIVE

A combination of a balanced diet and exercise are needed to keep the body healthy.

5A Which row in the table correctly shows a cause and an effect of obesity?

	Cause of obesity		Effect of obesity	
	High salt	**High fat**	**Arthritis**	**Lung cancer**
1	✓		✓	
2		✓		✓
3	✓			✓
4		✓	✓	

The charts are used to find if a person has a healthy mass for his/her height.



5B A woman is 1.6 m tall and has a mass of 66 kg.

From the chart, she is . . .

1 underweight.

2 healthy.

3 overweight.

4 obese.

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5C A man is 1.70 m tall. He is overweight.

His body mass is between . . .

1 48 and 68 kg.

2 66 and 72 kg.

3 67 and 74 kg.

4 76 and 84 kg.

5D The metabolic rate of a healthy person eating a balanced diet will **not** be affected by . . .

1 the proportion of muscle to fat in the body.

2 taking vitamin tablets.

3 inherited factors.

4 the amount of exercise taken.

Turn over for the next question

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QUESTION SIX

Antibiotic-resistant bacteria are causing severe problems in many hospitals.

6A What is the main cause of the increase in the numbers of antibiotic-resistant bacteria in hospitals?

1 Antibiotics cause mutations.

2 Antibodies are released into the environment.

3 Toxins from bacteria are no longer effective.

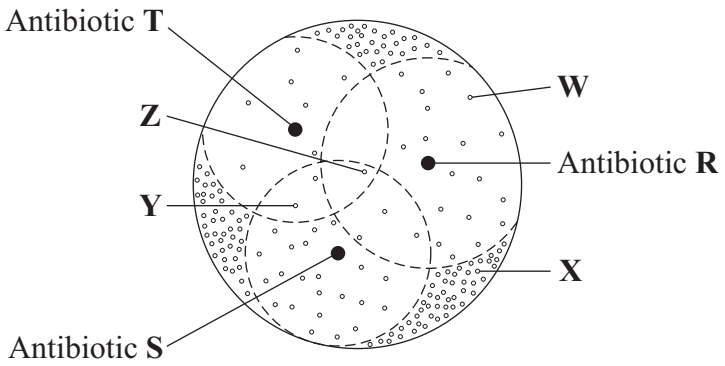
4 Antibiotics are overused.

A group of students investigated the effects of different antibiotics on one type of bacterium.

- A solution of one type of bacterium was spread across sterile nutrient jelly in a dish.
- Discs of absorbent paper containing three different antibiotics, **R**, **S** and **T**, were placed on the dish and were left for two days.

The diagram shows the appearance of the dish after two days. Four colonies of bacteria are labelled **W**, **X**, **Y** and **Z**.

The dotted circles indicate the distance to which each antibiotic diffused.



6B Which row in the table shows the effectiveness of the antibiotics?

	Most effective → Least effective		
1	**R**	**S**	**T**
2	**T**	**S**	**R**
3	**T**	**R**	**S**
4	**R**	**T**	**S**

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6C Which of the four colonies of bacteria is resistant to all three antibiotics?

1 **W**

2 **X**

3 **Y**

4 **Z**

6D An individual antibiotic-resistant bacterium is originally produced by . . .

1 vaccination.

2 natural selection.

3 antibiotics.

4 mutation.

Turn over for the next question

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QUESTION SEVEN

The success of in vitro fertilisation (IVF) treatment depends on several factors.

7A During IVF, a woman is usually treated with . . .

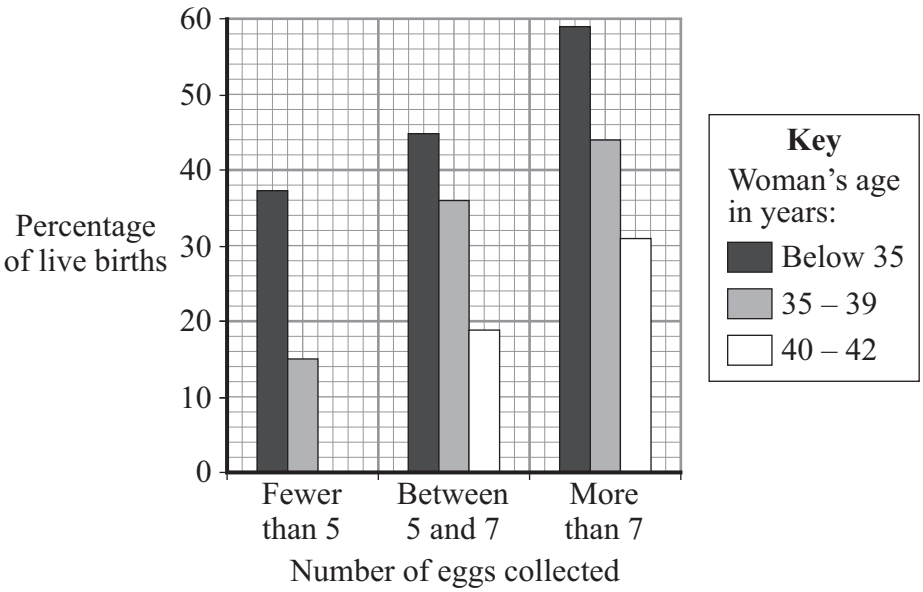
1 FSH only.

2 FSH and LH.

3 oestrogen.

4 LH and oestrogen.

The bar chart shows how a woman's age and the number of eggs collected from her affect the percentage of live births.



7B The highest IVF success rate occurs with women aged . . .

1 below 35.

2 35–39.

3 40–42.

4 over 42.

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7C Which conclusion can be drawn from the data in the bar chart?

1 The number of eggs collected is directly proportional to the age of the woman.

2 Collecting more than seven eggs for fertilisation is certain to lead to a successful pregnancy.

3 Women aged over 42 cannot become pregnant by IVF treatment.

4 At least five eggs must be collected from a woman between 40 and 42 years old for her to have a chance of a live birth.

7D An IVF procedure may result in the production of 'spare' fertilised eggs.

Which one of the following can be decided using only scientific considerations?

1 whether spare eggs should be sold to another clinic

2 whether to destroy the spare eggs

3 how best to store the spare eggs if required

4 whether to give the spare eggs to another woman needing IVF treatment

Turn over for the next question

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QUESTION EIGHT

There are different opinions about the link between smoking cannabis and the use of hard drugs.

8A Cannabis is the most commonly used illegal drug.

It was a class C drug, but it has been reclassified up to the more dangerous class B.

What is the main reason for this?

1 Users could be imprisoned for a longer period of time.

2 Its effects on the liver are worse than initially thought.

3 The government will make more money from fines.

4 There is evidence that it is linked to mental illness.

Scientists investigated the link between smoking cannabis and heroin addiction.

- THC is the active chemical in cannabis.
- Six 'teenage' rats were given a small dose of THC every 3 days between the ages of 28 and 49 days. The rat ages are the equivalent of humans aged 12 to 28 years.
- The amount of THC given was roughly equivalent to a human smoking one cannabis 'joint' every three days.
- A control group of six 'teenage' rats did not receive THC.
- After 56 days, the now adult rats were allowed to self-administer heroin frequently. After a short while, they stabilised their daily intake at a certain level. The rats that had been on THC as 'teenagers' stabilised their heroin intake at a much higher level than the others. The THC 'teenagers' appeared to be less sensitive to the effects of heroin.

8B Which row in the table shows two features of the design which made the investigation more valid?

	Design features	
1	use of teenage rats	use of an appropriate sample size
2	THC dose typical of human cannabis use	use of a control group
3	rats allowed to choose how much heroin to take	rats are suitable animals to use as substitutes for humans
4	heroin administration was similar to that in humans	heroin was provided only for adult rats

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8C In what way could the design of the investigation be improved?

1 carry out the investigation using humans instead of rats

2 give the rats a larger dose of THC every day

3 use groups with a larger number of rats

4 use ‘adult’ rats instead of ‘teenage’ rats

8D Which conclusion can be drawn from this investigation?

1 All humans who use cannabis as teenagers are likely to become addicted to heroin as adults.

2 Only the rats given THC became addicted to heroin.

3 Rats that were not given THC did not like the effects of heroin.

4 There is evidence, but no proof, for a link between THC and heroin use in humans.

Turn over for the next question

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QUESTION NINE

Some diseases are caused by viruses. Each type of virus only infects and causes the disease in one species of organism. One of the reasons for this is that a protein on the virus surface only matches with the cells of one particular species of organism.

9A Why does the flu virus make us feel ill?

1 The virus itself produces a toxin.

2 The virus damages the cells in which it reproduces.

3 The large number of viruses increases our temperature.

4 Viruses reproduce rapidly as soon as they are breathed in.

9B Bird flu is caused by a virus.

What might happen to the existing form of bird flu virus that would allow it to infect humans and cause flu in Britain?

1 an increase in the number of birds with the bird flu virus

2 a new strain of bird flu entering Britain

3 a change in the antibody which the bird flu virus carries

4 a change in the protein on the virus surface

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Humans produce antibodies against viruses.

A scientist investigated the effect of a virus infection on the antibody concentration in a person's blood.

The person was infected by day 3.

Time in days	**1**	**4**	**7**	**10**	**13**	**16**	**19**	**22**	**25**
Antibody concentration in mg per 100 cm^3 of blood	5.1	6.0	10.4	35.9	55.9	50.2	48.8	32.7	10.0

9C Which conclusion can be drawn from the data?

1 This virus did not reproduce until the 10th day.

2 Antibody production by the body continues to rise until the patient recovers.

3 The patient had recovered by the 25th day.

4 Antibody production by the body rises to a peak after an infection and then declines.

9D Another scientist repeated the investigation but could not measure the antibody concentration directly. Instead, he made measurements using a blood cell counter. He counted the white blood cells using a microscope with an automatic cell counter. A colleague said that he would not trust this data as much as measuring the antibody concentration with a machine.

Which of the reasons below best accounts for his colleague's attitude?

1 There is no relationship between the number of white cells and the concentration of antibodies.

2 Counting white cells is a less sensitive method than measuring antibody concentration with a machine.

3 The antibody measuring machine is more expensive to buy and run.

4 Reading the cell counter is less accurate than reading the scale on the antibody machine.

END OF TEST

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There are no questions printed on this page

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Question 2H Jupiter Images

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Version 1:0: 09/04/10

ASSESSMENT and QUALIFICATIONS ALLIANCE

GCSE

Science A (4461)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2010 Examination – March Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

March 2010

Foundation Tier

Question	Key		
One	**A**	allows the player to hear the spectators	**1**
	B	allows the player to see the basket	**4**
	C	allows the player to detect smells in the arena	**3**
	D	allows the player to feel the ball	**2**
Two	**A**	cannabis	**1**
	B	cocaine	**4**
	C	ecstasy	**3**
	D	heroin	**2**
Three	**A**	blood	**2**
	B	heart	**3**
	C	joints	**4**
	D	liver	**1**
Four	**A**	30	**4**
	B	39	**2**
	C	60	**1**
	D	72	**3**
Five	**A**	energy	**2**
	B	enzymes	**3**
	C	mass	**4**
	D	sweat	**1**

	A	B	C	D
Six	**4**	**1**	**1**	**2**
Seven	**1**	**3**	**1**	**4**
Eight	**3**	**4**	**4**	**1**
Nine	**3**	**1**	**1**	**2**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

March 2010

Higher Tier

Question	Key		
One	**A**	energy	**2**
	B	enzymes	**3**
	C	mass	**4**
	D	sweat	**1**
Two	This question has been removed because of a problem with the answer sheet.		

	A	B	C	D
Three	**3**	**4**	**4**	**1**
Four	**3**	**1**	**1**	**2**
Five	**4**	**4**	**3**	**2**
Six	**4**	**3**	**4**	**4**
Seven	**2**	**1**	**4**	**3**
Eight	**4**	**2**	**3**	**4**
Nine	**2**	**4**	**4**	**2**

OTQ3

GCSE SCIENCE

AQA

Unit : BLY1AP BIOLOGY UNIT 1A

Centre :
Candidate Number : **UCI :**
Candidate Name :

Series : 3G10
03-MAR-10

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	energy	○	○	○	○
1B	enzymes	○	○	○	○
1C	mass	○	○	○	○
1D	sweat	○	○	○	○

QUESTION TWO		1	2	3	4
2A		○	○	○	○
2B		○	○	○	○
2C		○	○	○	○
2D		○	○	○	○

QUESTION THREE				
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR				
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE				
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX				
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN				
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT				
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE				
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A allows the player to hear the spectators	○	○	○	○
1B allows the player to see the basket	○	○	○	○
1C allows the player to detect smells in the arena	○	○	○	○
1D allows the player to feel the ball	○	○	○	○

QUESTION TWO	1	2	3	4
2A cannabis	○	○	○	○
2B cocaine	○	○	○	○
2C ecstasy	○	○	○	○
2D heroin	○	○	○	○

QUESTION THREE	1	2	3	4
3A blood	○	○	○	○
3B heart	○	○	○	○
3C joints	○	○	○	○
3D liver	○	○	○	○

QUESTION FOUR	1	2	3	4
4A 30	○	○	○	○
4B 39	○	○	○	○
4C 60	○	○	○	○
4D 72	○	○	○	○

QUESTION FIVE	1	2	3	4
5A energy	○	○	○	○
5B enzymes	○	○	○	○
5C mass	○	○	○	○
5D sweat	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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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

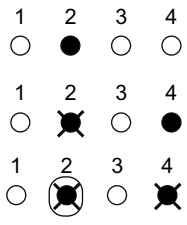
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

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.



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.

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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** . . . .

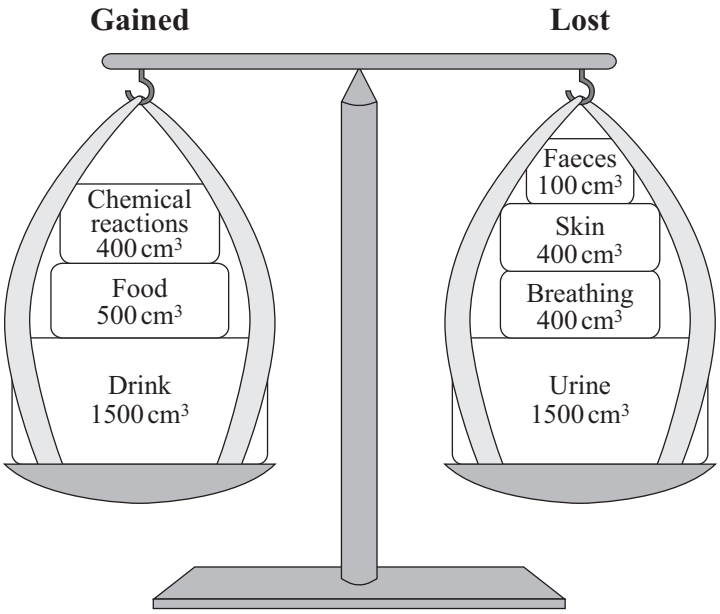
The response is the . . . **3** . . . .

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

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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

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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

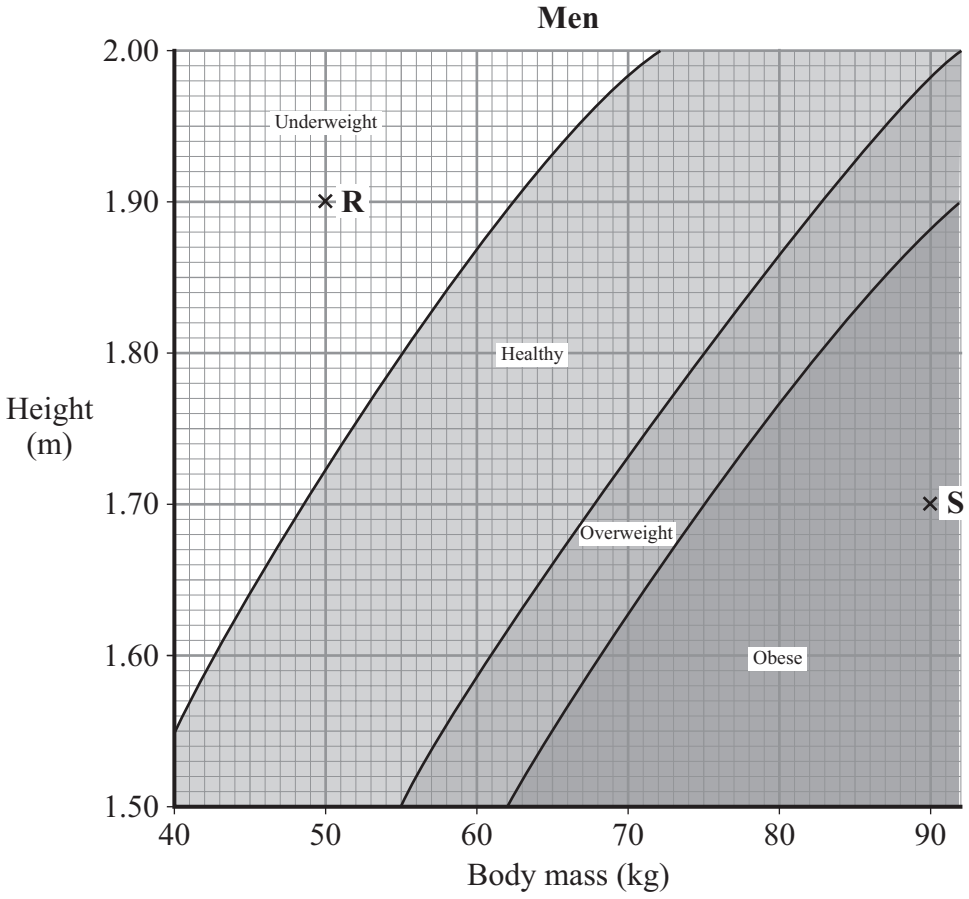
D toxin

	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

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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 1.6 m tall man with a mass of 70 kg needs to lose to become healthy
4	the tallest in metres (m) that a 50 kg man can be to be classed as healthy

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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

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Turn over for the next question

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SECTION TWO

Questions **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.

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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

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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

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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

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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

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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

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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.

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

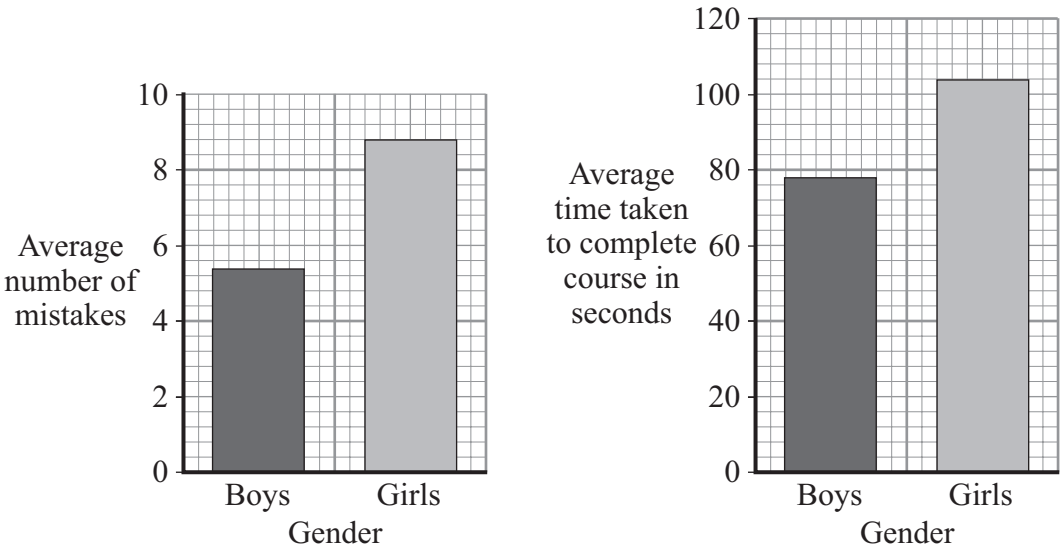
1 age of the pupils

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

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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

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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

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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 . . .

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

3B 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

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3C 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.

3D 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

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QUESTION FOUR

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.

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 . . .

1 hearsay.

2 a model.

3 a theory.

4 a survey.

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

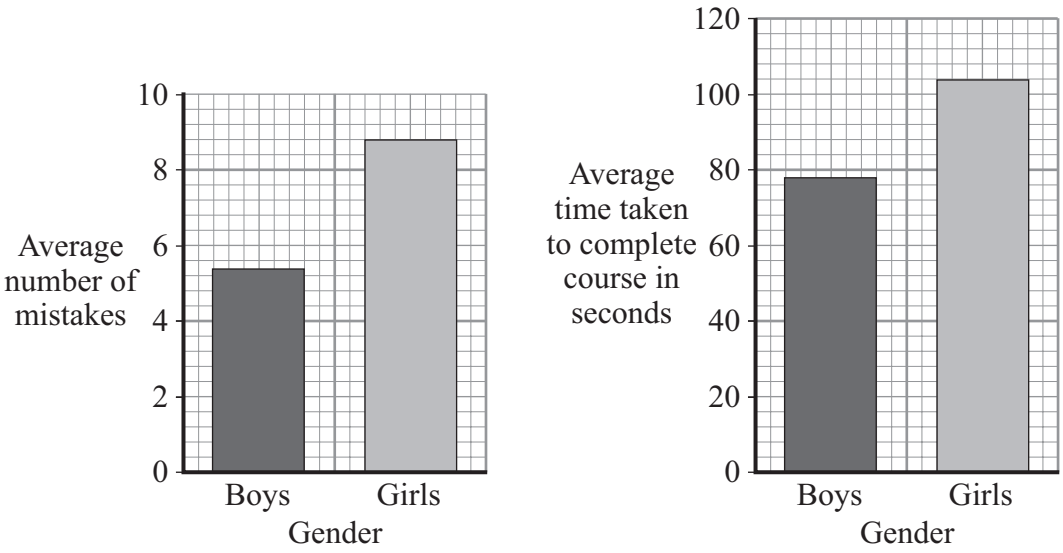
1 age of the pupils

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

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QUESTION FIVE

The body responds to stimuli.

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

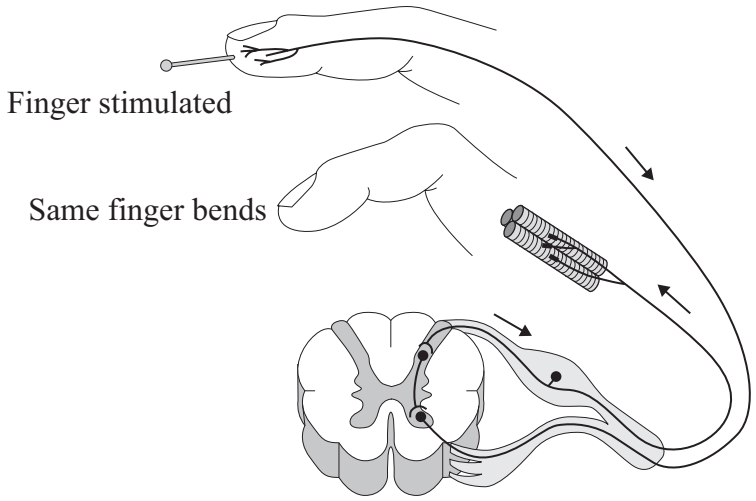
1 touch and pain only.

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

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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.

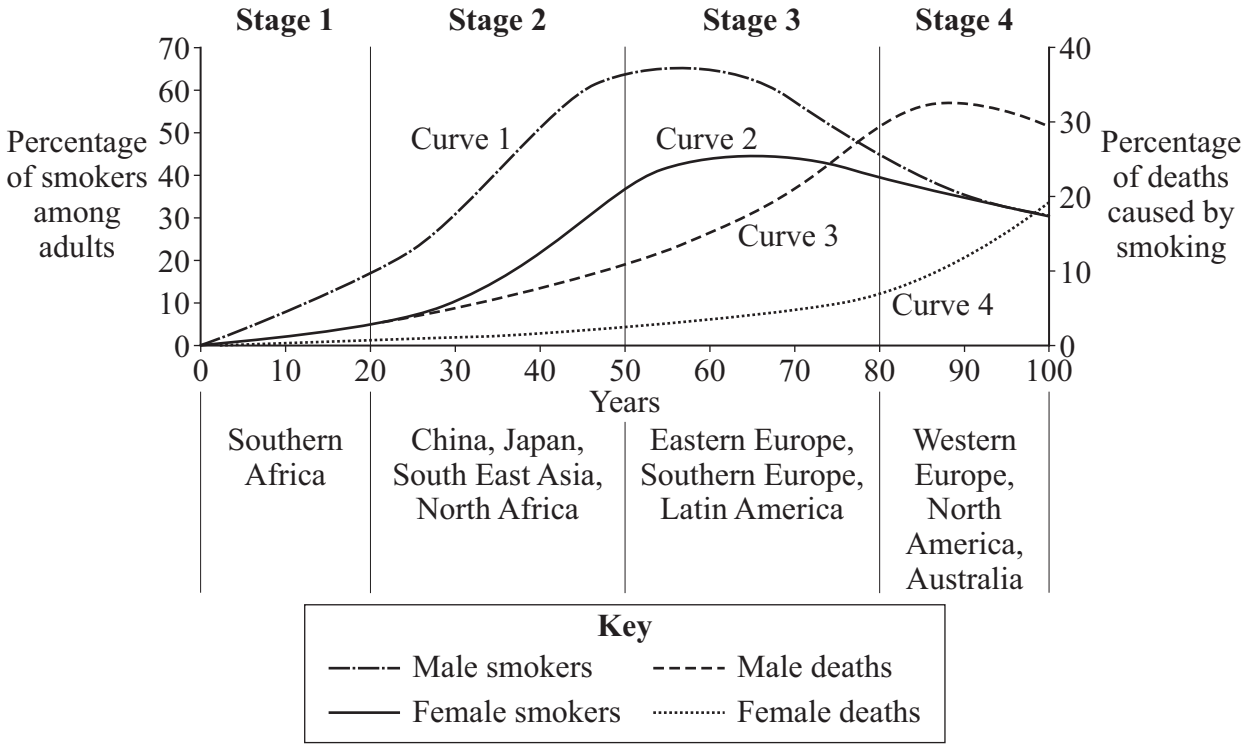
Turn over for the next question

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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

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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

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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.

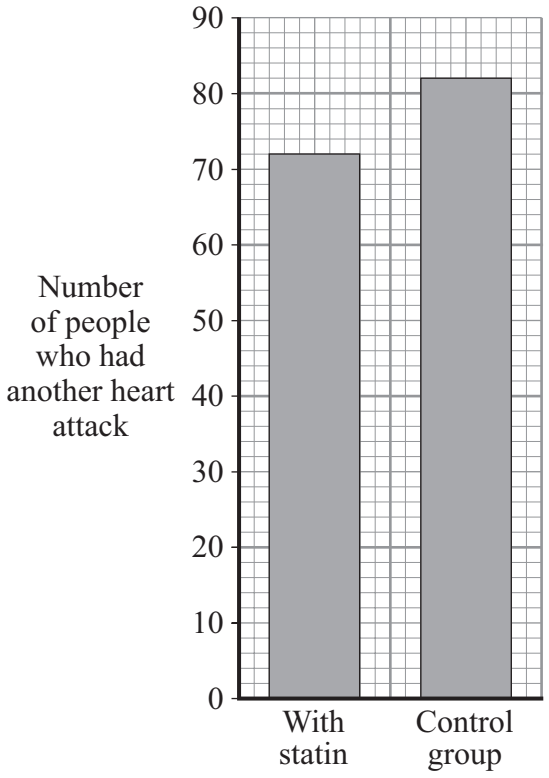
3 the amount of cholesterol in the blood.

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.



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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

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QUESTION EIGHT

Some pathogens cause epidemics and pandemics.

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

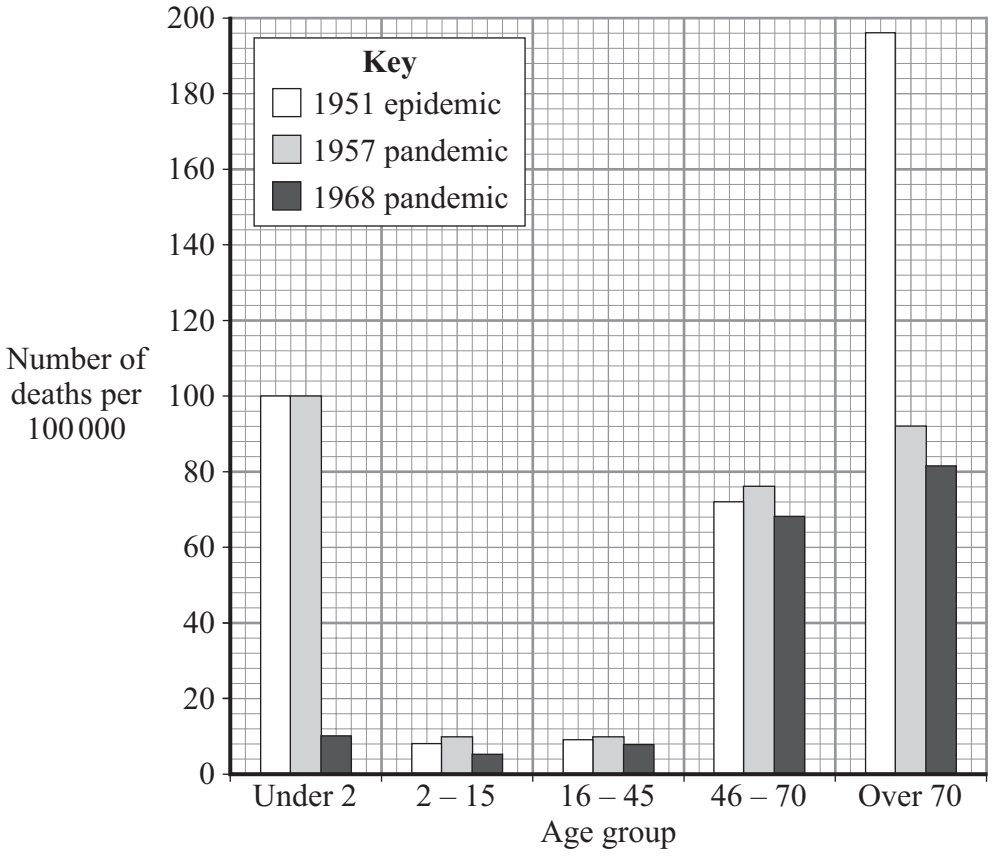
1 An epidemic results in more deaths.

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.



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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.

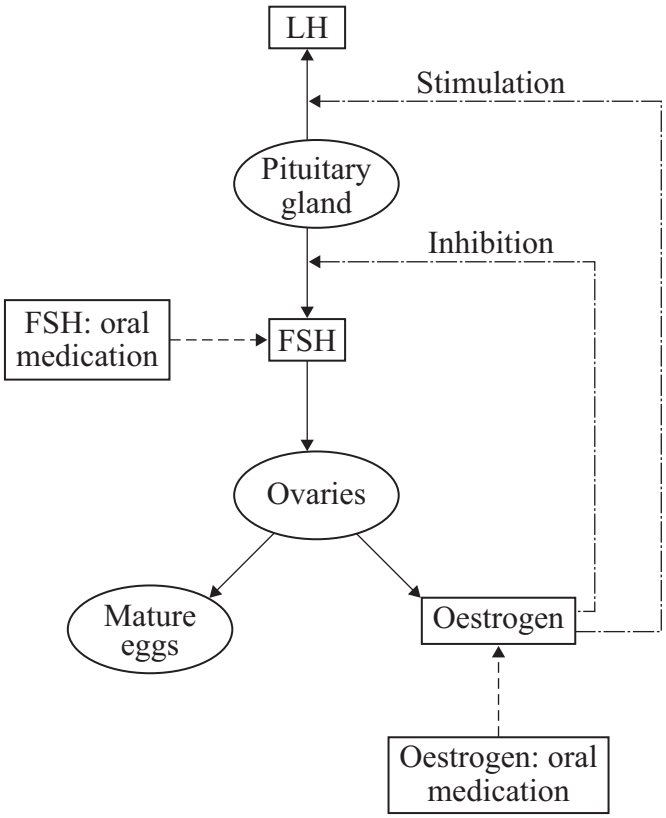
4 produce antibodies which counteract the toxins.

Turn over for the next question

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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.

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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

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There are no questions printed on this page

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Version 1:0: 27/11/09

ASSESSMENT and QUALIFICATIONS ALLIANCE

GCSE

Science A (4461)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2009 Examination – November Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

November 2009

Foundation Tier

Question	Key		
One	**A**	dust	**1**
	B	muscles	**4**
	C	nose	**2**
	D	sneeze	**3**
Two	**A**	100	**1**
	B	400	**4**
	C	900	**3**
	D	2400	**2**
Three	**A**	antibody	**2**
	B	medicine	**1**
	C	pathogen	**3**
	D	toxin	**4**
Four	**A**	1.72	**4**
	B	1.90	**1**
	C	9.00	**3**
	D	90.00	**2**
Five	**A**	alcohol	**2**
	B	carbon monoxide	**1**
	C	carcinogen	**3**
	D	thalidomide	**4**

	A	B	C	D
Six	**4**	**2**	**2**	**4**
Seven	**2**	**2**	**1**	**4**
Eight	**3**	**1**	**2**	**2**
Nine	**1**	**2**	**3**	**1**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

November 2009

Higher Tier

Question	Key		
One	**A**	alcohol	**2**
	B	carbon monoxide	**1**
	C	carcinogen	**3**
	D	thalidomide	**4**
Two	**A**	antibodies	**2**
	B	antitoxins	**3**
	C	pathogens	**1**
	D	vaccines	**4**

	A	**B**	**C**	**D**
Three	**3**	**1**	**2**	**2**
Four	**1**	**2**	**3**	**1**
Five	**4**	**4**	**2**	**1**
Six	**1**	**2**	**3**	**3**
Seven	**3**	**4**	**3**	**2**
Eight	**3**	**3**	**2**	**3**
Nine	**4**	**1**	**2**	**2**

AQA

Unit : BLY1AP BIOLOGY UNIT 1A

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : BG09

19-NOV-09

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	alcohol	○	○	○	○
1B	carbon monoxide	○	○	○	○
1C	carcinogen	○	○	○	○
1D	thalidomide	○	○	○	○

QUESTION TWO		1	2	3	4
2A	antibodies	○	○	○	○
2B	antitoxins	○	○	○	○
2C	pathogens	○	○	○	○
2D	vaccines	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A dust	○	○	○	○
1B muscles	○	○	○	○
1C nose	○	○	○	○
1D sneeze	○	○	○	○

QUESTION TWO	1	2	3	4
2A 100	○	○	○	○
2B 400	○	○	○	○
2C 900	○	○	○	○
2D 2400	○	○	○	○

QUESTION THREE	1	2	3	4
3A antibody	○	○	○	○
3B medicine	○	○	○	○
3C pathogen	○	○	○	○
3D toxin	○	○	○	○

QUESTION FOUR	1	2	3	4
4A 1.72	○	○	○	○
4B 1.90	○	○	○	○
4C 9.00	○	○	○	○
4D 90.00	○	○	○	○

QUESTION FIVE	1	2	3	4
5A alcohol	○	○	○	○
5B carbon monoxide	○	○	○	○
5C carcinogen	○	○	○	○
5D thalidomide	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature								

General Certificate of Secondary Education
June 2009

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

BIOLOGY
Unit Biology B1a (Human Biology)

Monday 22 June 2009 Morning Session

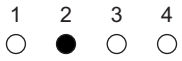
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

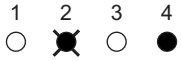
Time allowed: 30 minutes

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.

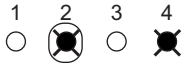
Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown:



- 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:



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**.

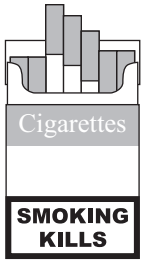
Use **each** answer only **once**.

Mark your choices on the answer sheet.

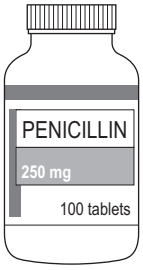
QUESTION ONE

The diagrams show four different drugs.

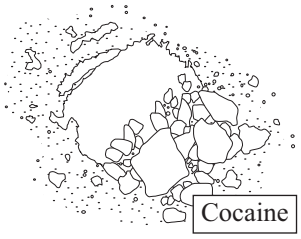
1



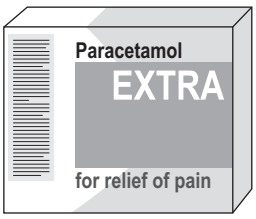
2



3



4



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

A kills bacteria

B linked to lung disease

C an addictive, illegal drug

D relieves some disease symptoms

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QUESTION TWO

The picture shows a girl cooking some pasta sauce.



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

A has receptors that are sensitive to the smell of the pasta sauce

B has receptors that would detect heat if the girl touched the pan

C has receptors that are sensitive to the taste of the pasta sauce

D has receptors that enable the girl to read the recipe for the pasta sauce

1	eye
2	nose
3	skin
4	tongue

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QUESTION THREE

Water leaves your body from several organs.

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

A glands

B kidneys

C lungs

D skin

When you breathe out, water vapour leaves your . . . **1** . . . .

When you sweat, water leaves the surface of your . . . **2** . . . .

Water is lost in urine produced by the . . . **3** . . . .

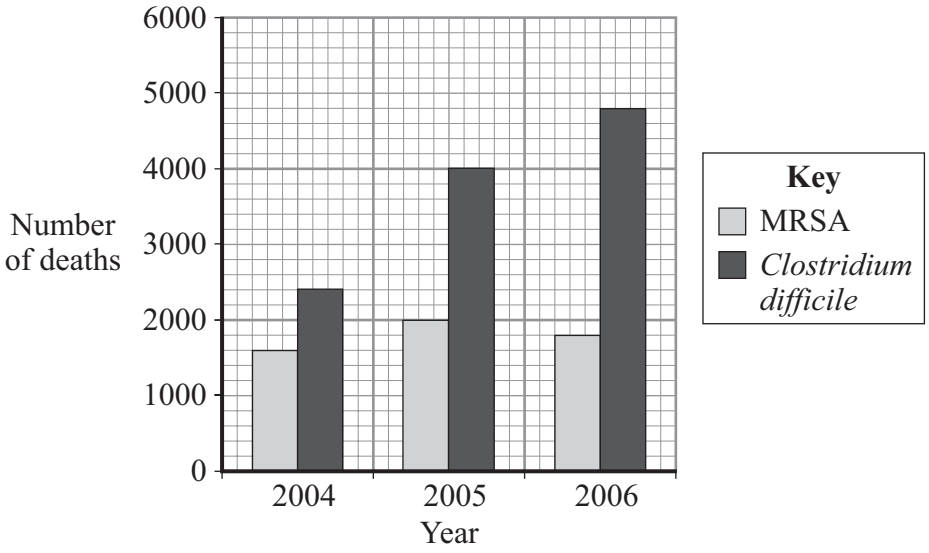
The total amount of water lost from the body is controlled by hormones.

Hormones are produced by . . . **4** . . . .

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QUESTION FOUR

The graph shows the number of deaths caused by two bacteria, MRSA and *Clostridium difficile*, in 2004, 2005 and 2006.



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

A 200

B 2000

C 4000

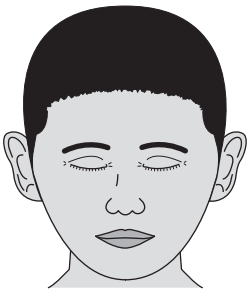
D 5200

1	the number of deaths caused by *Clostridium difficile* in 2005
2	the largest number of deaths caused by MRSA in any year
3	the decrease in the number of deaths from MRSA between 2005 and 2006
4	the possible number of deaths caused by *Clostridium difficile* in 2007 if the trend continues

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QUESTION FIVE

A small insect flew into this boy's eye, making him blink.



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

A motor neurone

B muscle

C sensory neurone

D synapse

An impulse from a receptor passes to the central nervous system along a . . . **1** . . . .

In the central nervous system, a chemical is released at a . . . **2** . . . .

The impulse then passes from the central nervous system to the eyelid along a . . . **3** . . . .

The blink is caused by the contraction of a . . . **4** . . . in the eyelid.

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Turn over for the next question

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SECTION TWO

Questions **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

Alcohol is a legal, recreational drug.

6A Most of the people who drink alcohol do so because . . .

1 it is highly addictive.

2 it slows down their reactions.

3 there are no risks involved in drinking it.

4 they like the effect it has on them.

6B Drinking too much alcohol for several years is most likely to cause damage to the . . .

1 blood vessels.

2 heart.

3 liver.

4 lungs.

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Blood alcohol content (BAC) is measured by the percentage of alcohol in the blood.

The chart shows how blood alcohol content is related to the effects on the body and to the number of units of alcohol consumed in 1 hour.

Number of units of alcohol consumed in one hour	Effects on the body	Percentage of alcohol in the blood
10	Coma and possible death	Over 0.4
	Unconscious	0.4
9	Cannot walk unassisted. Confused. Vomits	
8	Feels sick and restless	0.3
7	Has serious lack of muscle control	
6	Feels anxious and restless	0.2
5	Has major loss of muscle control Blurred vision	
4		
3	Some loss of balance, reaction speed and muscle control	
2		
1	Feels good, some loss of caution	
	Loss of shyness	0.1
0		0

6C From the data in the table, a person who drank 1 unit of alcohol in one hour would . . .

1 feel good.

2 have blurred vision.

3 feel anxious.

4 need hospital treatment.

6D From the data in the table, what is the highest percentage of alcohol that a person driving a car should have in the blood?

1 0.1

2 0.2

3 0.4

4 0.5

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QUESTION SEVEN

Equal portions of four 'healthy option soups' were tested.

The table shows the energy content and some of the nutrients in these portions.

	Tomato soup	Pepper and lime soup	Pea and courgette soup	Sweetcorn soup
Energy in kJ	474	366	730	848
Total fat in g	3.61	1.57	2.14	3.01
Saturated fat in g	0.49	0.12	0.54	0.43
Cholesterol in mg	0	0	0	45.56

7A Which soup contains the most saturated fat?

1 tomato soup

2 pepper and lime soup

3 pea and courgette soup

4 sweetcorn soup

7B Which soup is the best for someone trying to lose weight?

1 tomato soup

2 pepper and lime soup

3 pea and courgette soup

4 sweetcorn soup

7C What sort of variable is the type of soup?

1 categoric

2 continuous

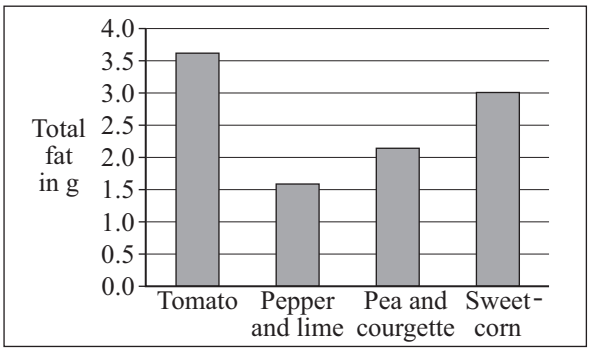
3 control

4 discrete

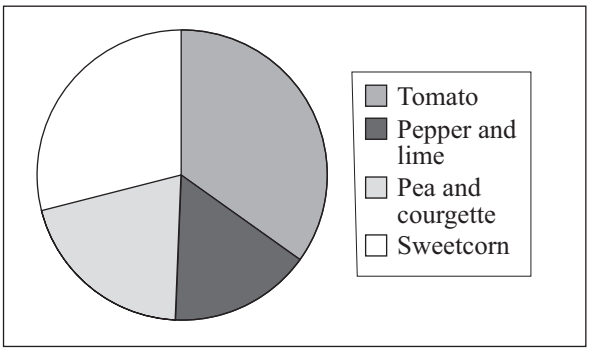
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7D Which one of these is the best way of displaying the data about the total amount of fat in the different soups?

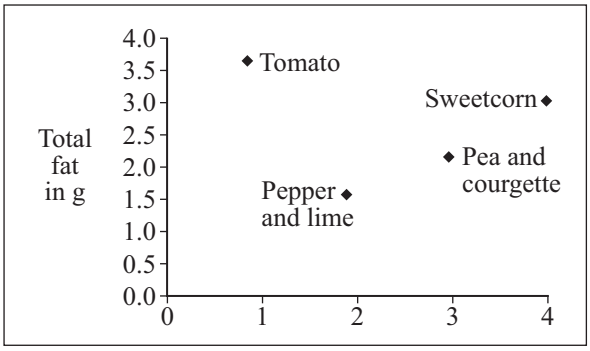
1



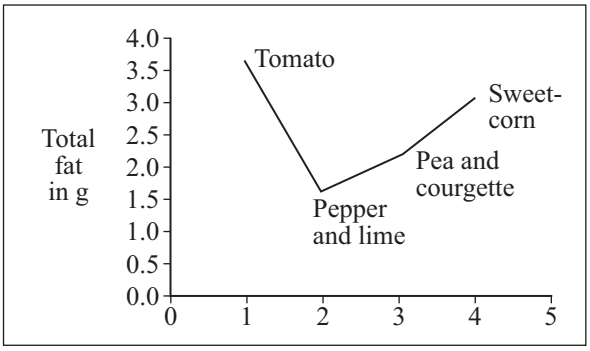
2



3



4



Turn over for the next question

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QUESTION EIGHT

Recovery heart rate is the heart rate measured one minute after exercise. The lower the heart rate after this minute, the fitter a person is.

A class of students investigated the relationship between recovery heart rate and body mass:

- they measured the mass of each student
- each student stepped onto and off a low stool for 3 minutes at a rate of 22 complete step-ups per minute
- on completing the exercise, the students counted their heart rate, starting one minute after the exercise.

8A What was the dependent variable in this investigation?

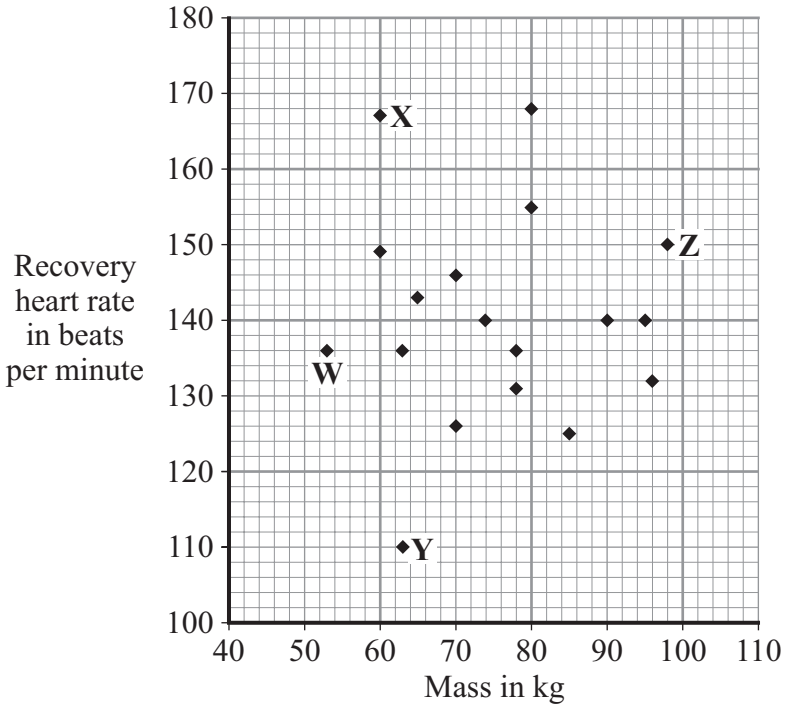
1 the mass of each student

2 the number of step-ups per minute

3 the length of the exercise period

4 the recovery heart rate of each student

The scattergram shows the results of the investigation.



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8B Which was the fittest student?

1 **W**

2 **X**

3 **Y**

4 **Z**

8C The scattergram shows that . . .

1 the greater the body mass, the higher the recovery heart rate.

2 the lower the body mass, the higher the recovery heart rate.

3 there is no association between body mass and recovery heart rate.

4 exercise reduces recovery heart rate.

8D Which one of the following factors would have the greatest effect on the results of the investigation?

1 the proportion of muscle to fat in each student's body

2 the amount of sweat produced by each student during exercise

3 the change in the breathing rate of each student during exercise

4 the time of day of exercise

Turn over for the next question

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QUESTION NINE

Vaccination helps to protect us from disease.

Vaccination may cause a reaction, such as a rash, in the person who is vaccinated.

The table shows the reported number of reactions to vaccination in the UK in one year.

Vaccine	Type of vaccination	Total number of reactions reported	Number of severe reactions
Measles	Single	414	61
Mumps	Single	54	19
Rubella	Single	685	100
MMR	Triple	20974	2586

9A Which vaccine caused the highest proportion of severe reactions, when compared with the number of reactions reported?

1 measles

2 mumps

3 rubella

4 MMR

9B To calculate the percentage of people who had reactions to the vaccines, you would also need to know . . .

1 the number of vaccinations of each type given.

2 the age of each person vaccinated.

3 whether those people given one of the single vaccinations had previously been given one of the other single vaccinations.

4 the total population of the UK.

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The table shows the percentage of children vaccinated against some diseases in the UK.

Year	Percentage of children vaccinated			
	Polio	Whooping cough	Flu	Measles, mumps, rubella (MMR)
1996 – 1997	96	94	95	92
1997 – 1998	96	94	95	91
1998 – 1999	95	94	95	88
1999 – 2000	95	94	94	88
2000 – 2001	94	94	94	87
2001 – 2002	94	93	93	84
2002 – 2003	93	93	93	82
2003 – 2004	94	93	93	80
2004 – 2005	93	93	93	81
2005 – 2006	94	94	94	84

9C For which disease was the percentage of children vaccinated most stable between 1996 and 2006?

1 polio

2 whooping cough

3 flu

4 measles, mumps and rubella

9D It is important that the percentage of people in the population who have been vaccinated is high.

This is because . . .

1 it reduces the chance of epidemics.

2 fewer people may suffer side effects from the vaccine.

3 there is less chance that resistant strains of pathogen will develop.

4 antibodies will be produced quickly if the live pathogen is caught.

END OF TEST

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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**.

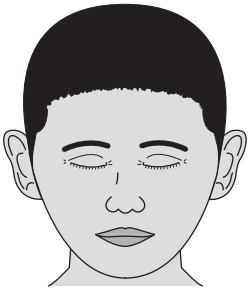
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

A small insect flew into this boy's eye, making him blink.



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

A motor neurone

B muscle

C sensory neurone

D synapse

An impulse from a receptor passes to the central nervous system along a . . . **1** . . . .

In the central nervous system, a chemical is released at a . . . **2** . . . .

The impulse then passes from the central nervous system to the eyelid along a . . . **3** . . . .

The blink is caused by the contraction of a . . . **4** . . . in the eyelid.

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QUESTION TWO

Bacteria and viruses cause disease in the human body.

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

A antibodies

B antitoxins

C pathogens

D toxins

Organisms that cause disease are called . . . **1** . . . .

To neutralise poisons, white cells produce . . . **2** . . . .

Bacteria make us feel unwell by producing . . . **3** . . . .

To kill bacteria, white cells produce . . . **4** . . . .

Turn over for the next question

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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

Recovery heart rate is the heart rate measured one minute after exercise. The lower the heart rate after this minute, the fitter a person is.

A class of students investigated the relationship between recovery heart rate and body mass:

- they measured the mass of each student
- each student stepped onto and off a low stool for 3 minutes at a rate of 22 complete step-ups per minute
- on completing the exercise, the students counted their heart rate, starting one minute after the exercise.

3A What was the dependent variable in this investigation?

1 the mass of each student

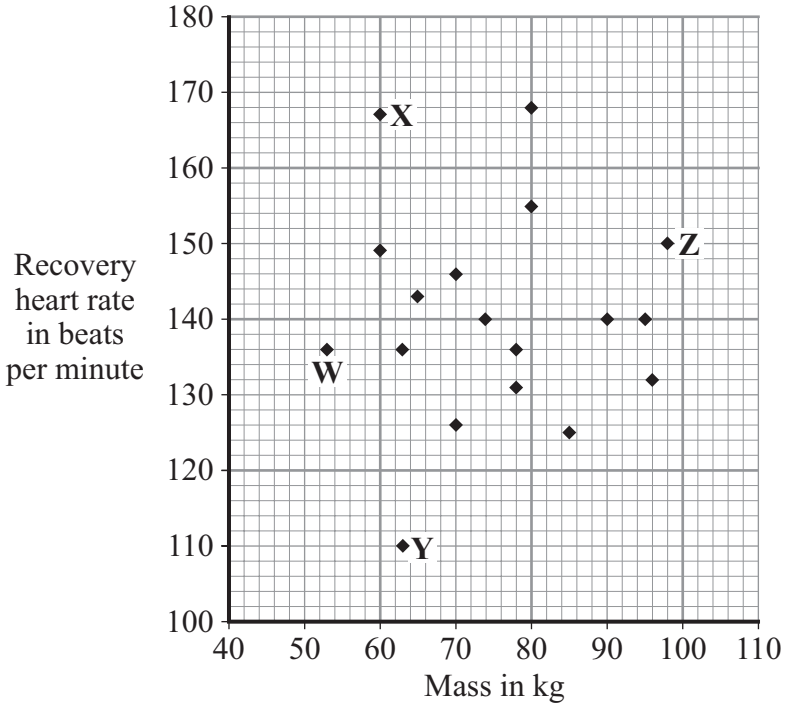
2 the number of step-ups per minute

3 the length of the exercise period

4 the recovery heart rate of each student

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The scattergram shows the results of the investigation.



3B Which was the fittest student?

1 **W**

2 **X**

3 **Y**

4 **Z**

3C The scattergram shows that . . .

1 the greater the body mass, the higher the recovery heart rate.

2 the lower the body mass, the higher the recovery heart rate.

3 there is no association between body mass and recovery heart rate.

4 exercise reduces recovery heart rate.

3D Which one of the following factors would have the greatest effect on the results of the investigation?

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2 the amount of sweat produced by each student during exercise

3 the change in the breathing rate of each student during exercise

4 the time of day of exercise

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QUESTION FOUR

Vaccination helps to protect us from disease.

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Rubella	Single	685	100
MMR	Triple	20974	2586

4A Which vaccine caused the highest proportion of severe reactions, when compared with the number of reactions reported?

1 measles

2 mumps

3 rubella

4 MMR

4B To calculate the percentage of people who had reactions to the vaccines, you would also need to know . . .

1 the number of vaccinations of each type given.

2 the age of each person vaccinated.

3 whether those people given one of the single vaccinations had previously been given one of the other single vaccinations.

4 the total population of the UK.

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The table shows the percentage of children vaccinated against some diseases in the UK.

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2002 – 2003	93	93	93	82
2003 – 2004	94	93	93	80
2004 – 2005	93	93	93	81
2005 – 2006	94	94	94	84

4C For which disease was the percentage of children vaccinated most stable between 1996 and 2006?

1 polio

2 whooping cough

3 flu

4 measles, mumps and rubella

4D It is important that the percentage of people in the population who have been vaccinated is high.

This is because . . .

1 it reduces the chance of epidemics.

2 fewer people may suffer side effects from the vaccine.

3 there is less chance that resistant strains of pathogen will develop.

4 antibodies will be produced quickly if the live pathogen is caught.

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QUESTION FIVE

Cholesterol affects our health.

5A Cholesterol is produced in the . . .

1 heart.

2 intestines.

3 kidneys.

4 liver.

5B 'Good cholesterol' is the common name for . . .

1 high-density cholesterol.

2 high-density lipoprotein.

3 low-density cholesterol.

4 low-density lipoprotein.

5C It is recommended that to remain healthy the total blood cholesterol concentration of an adult should be less than 100 mg per 100 cm^3 blood. However, a limit of 70 mg per 100 cm^3 is recommended for some people.

The 70 mg per 100 cm^3 limit would be particularly important for a person with a family history of . . .

1 arthritis.

2 cancer.

3 diabetes.

4 heart disease.

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5D A patient needs to decrease his total blood cholesterol and to improve the balance between 'good cholesterol' and 'bad cholesterol'.

Which row in the table shows the best combination of diet changes to achieve this?

Combination	Saturated fats	Monounsaturated fats	Polyunsaturated fats
1	decrease	decrease	decrease
2	decrease	increase	increase
3	increase	increase	decrease
4	decrease	decrease	increase

Turn over for the next question

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QUESTION SIX

Antibiotics are used to treat many types of infection.

6A Antibiotics kill . . .

1 bacteria only.

2 viruses only.

3 both bacteria and viruses.

4 all types of pathogens.

In recent years there has been a rapid increase in the number of infections in hospitals caused by antibiotic-resistant bacteria such as MRSA.

6B Bacteria such as MRSA have become resistant to antibiotics mainly because of . . .

1 overcrowding in hospitals.

2 lack of hand-hygiene amongst medical staff.

3 use of infected surgical instruments.

4 overuse of antibiotics.

6C Pathogens can be removed from hands by just washing them with soap and water.

The main advantage of this method, in terms of long-term infection control, is that . . .

1 it does not increase the proportion of antibiotic-resistant bacteria.

2 it is cheap.

3 it selectively kills the most dangerous types of bacteria.

4 soap has been used for many years with no resulting side effects.

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6D An antibiotic-resistant strain of a bacterium develops as a result of natural selection.

Natural selection means that . . .

1 doctors select which antibiotic to use against the bacterium.

2 only a selection of bacteria can infect the human body.

3 bacteria select the most suitable person to infect.

4 only successful bacteria survive to reproduce.

Turn over for the next question

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QUESTION SEVEN

There are many support methods that people can use to help them to stop smoking. Some of them are shown in the table.

The figures given for the success rate of each support method show the extra people who stopped smoking using a support method compared with those who succeeded without support of any kind.

Support method	How it works	Success rate
NRT medication	Gum, nasal spray, patch. Reduces the need to smoke. Prescription not necessary.	Approximately 1 in 5 extra people stopped smoking.
Zyban medication	Prescription-only tablets. Can cause side effects, worst is having fits (chance of 1 in 1000).	Approximately 1 in 10 extra people stopped smoking.
Champix medication	Tablets. Reduces the need to smoke. Available on prescription.	Approximately 1 in 7 extra people stopped smoking after one course. More stopped after two courses.
Face-to-face counselling	Works best with a fully trained adviser.	Approximately 1 in 20 extra people stopped smoking.
Smokers' support group meetings	Smokers help each other with problems, and try not to let the group down.	Approximately 1 in 20 extra people stopped smoking.

7A Which of the following support methods is the least likely to cause any undesirable physical side effects?

1 NRT medication

2 Zyban medication

3 Champix medication

4 Support group meetings

7B Which of the following support methods appears to be the most effective on its own?

1 NRT medication

2 Zyban medication

3 Champix medication

4 Face-to-face counselling

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7C Smokers' support group meetings . . .

1 are about as effective at helping people to stop smoking as face-to-face counselling with a trained adviser.

2 are only as effective at helping people to stop smoking as some of the drugs in the table.

3 need to be tried out with non-smoking volunteers before they are made generally available to the public.

4 reduce the physical urge to smoke.

7D Which one of the following is **not** a correct statement about people who have smoked for many years?

1 They are likely to die younger than if they had been a non-smoker.

2 They experience urges to smoke after they have stopped.

3 They have an increased risk of contracting various diseases.

4 They will eventually get lung cancer.

Turn over for the next question

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QUESTION EIGHT

Women under the age of about 40 may take oral contraceptives containing oestrogen. However, there are possible side effects after long-term use of oestrogen.

8A The role of oestrogen in the menstrual cycle is to . . .

1 stimulate FSH production and inhibit LH production.

2 inhibit both FSH production and LH production.

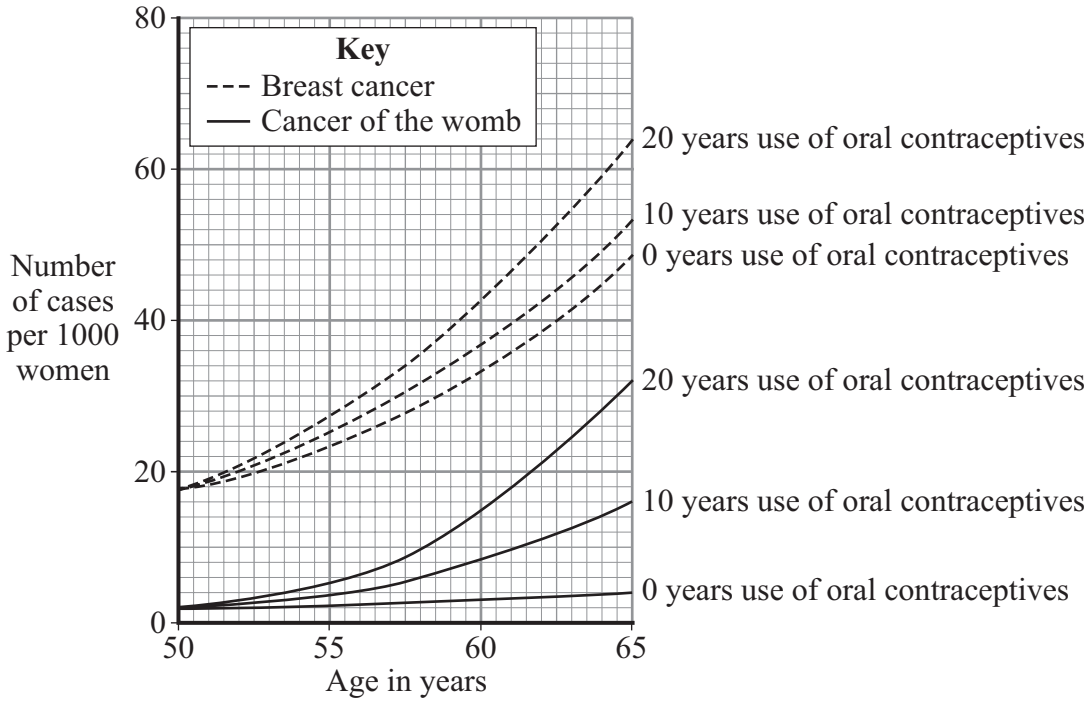
3 inhibit FSH production and stimulate LH production.

4 stimulate both FSH production and LH production.

8B Which row in the table correctly identifies the organs that produce the hormones controlling the menstrual cycle?

	FSH	LH	Oestrogen
1	pituitary gland	ovaries	pituitary gland
2	ovaries	pituitary gland	ovaries
3	pituitary gland	ovaries	ovaries
4	pituitary gland	pituitary gland	ovaries

The graph shows some of the effects of taking oestrogen as an oral contraceptive for different lengths of time between the ages of 16 and 40.



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8C The graph shows that the use of oestrogen as an oral contraceptive for 20 years may . . .

1 cause an eightfold increase in the percentage of women who develop womb cancer by the age of 65.

2 cause a sixteenfold increase in the percentage of women who develop womb cancer by the age of 65.

3 have no effect on the risk of breast cancer until 54 years of age.

4 reduce the number of unwanted pregnancies.

8D Which one of the following statements **cannot** be deduced from the information in the graph?

1 Oestrogen in oral contraceptives causes cancer.

2 The longer a woman takes oral contraceptives, the greater the risk of certain cancers developing.

3 The older a woman is, the greater the risk of breast cancer developing.

4 Women who have never taken oral contraceptives are very unlikely to develop cancer of the womb.

Turn over for the next question

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QUESTION NINE

Read the information about drugs.

Tobacco
About 100 000 people die each year in Britain from tobacco-related illnesses. Among other dangerous substances, tobacco smoke also contains the addictive drug nicotine. Buying tobacco is legal in the UK from the age of 18.

Alcohol
About 28 000 people die each year in England and Wales from alcohol-related illnesses. Alcohol is an addictive substance which is often associated with antisocial behaviour and violent crime. Buying alcohol is legal in the UK from the age of 18.

Cannabis
This is a substance which is smoked, often mixed with tobacco. There are no records of cannabis being directly responsible for any deaths or being responsible for violent crimes. Most experts regard cannabis as much less addictive than tobacco or alcohol, but some users have difficulty giving it up. It does carry some health risks due to inhaling smoke, and may cause long-term mental illness. It is illegal to sell or buy cannabis in the UK.

Hard drugs are addictive and are often linked with violent crime. They may also cause death. Soft drugs are not generally associated with high levels of addiction, violence, crime or death.

9A The information above suggests that . . .

1 smoking cannabis always affects the health of other people around the smoker.

2 smoking cannabis may be physically less harmful than smoking tobacco.

3 it is perfectly safe to use cannabis.

4 giving up smoking cannabis would result in more severe withdrawal symptoms than giving up smoking tobacco.

9B From the information in the passage, which of the following is a true statement?

1 Alcohol and cannabis are hard drugs.

2 Alcohol and tobacco are soft drugs.

3 Cannabis and tobacco are hard drugs.

4 Cannabis is a soft drug.

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9C Heroin and cocaine are extremely addictive hard drugs. Most users admit to having smoked cannabis before using these drugs. Research indicates that the majority of cannabis smokers do not progress to these hard drugs.

Which is the most valid conclusion from this information?

1 All users of heroin or cocaine started by using cannabis.

2 Regular users of cannabis are not at risk of progressing to heroin or cocaine use.

3 There is no link between smoking cannabis and addiction to heroin or cocaine.

4 There may be a link between smoking cannabis and addiction to heroin or cocaine.

9D From the information in the passage, what would be the best advice to give to a 17 year-old girl who might be tempted to try cannabis?

1 'Don't smoke cannabis if you are under the influence of alcohol.'

2 'Don't try it, smoke ordinary cigarettes instead.'

3 'If you try it, don't drive while still experiencing its effects.'

4 'Don't try it, it has health risks associated with it.'

END OF TEST

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Version 1:0: 27/07/09

ASSESSMENT and QUALIFICATIONS ALLIANCE

GCSE

Science A (4461)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2009 Examination – June Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

June 2009

Foundation Tier

Question	Key	
One	**A** kills bacteria	**2**
	B linked to lung disease	**1**
	C an addictive, illegal drug	**3**
	D relieves some disease symptoms	**4**
Two	**A** has receptors that are sensitive to the smell of the pasta sauce	**2**
	B has receptors that would detect heat if the girl touched the pan	**3**
	C has receptors that are sensitive to the taste of the pasta sauce	**4**
	D has receptors that enable the girl to read the recipe for the pasta sauce	**1**
Three	**A** glands	**4**
	B kidneys	**3**
	C lungs	**1**
	D skin	**2**
Four	**A** 200	**3**
	B 2000	**2**
	C 4000	**1**
	D 5200	**4**
Five	**A** motor neurone	**3**
	B muscle	**4**
	C sensory neurone	**1**
	D synapse	**2**

	A	B	C	D
Six	**4**	**3**	**1**	**1**
Seven	**3**	**2**	**1**	**1**
Eight	**4**	**3**	**3**	**1**
Nine	**2**	**1**	**2**	**1**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

June 2009

Higher Tier

Question	Key	
One	**A** motor neurone	**3**
	B muscle	**4**
	C sensory neurone	**1**
	D synapse	**2**
Two	**A** antibodies	**4**
	B antitoxins	**2**
	C pathogens	**1**
	D toxins	**3**

	A	B	C	D
Three	**4**	**3**	**3**	**1**
Four	**2**	**1**	**2**	**1**
Five	**4**	**2**	**4**	**2**
Six	**1**	**4**	**1**	**4**
Seven	**4**	**1**	**1**	**4**
Eight	**3**	**4**	**1**	**1**
Nine	**2**	**4**	**4**	**4**

GCSE SCIENCE

AQA

Unit : BLY1AP BIOLOGY UNIT 1A

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 6M09

22-JUN-09

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE

		1	2	3	4
1A	motor neurone	○	○	○	○
1B	muscle	○	○	○	○
1C	sensory neurone	○	○	○	○
1D	synapse	○	○	○	○

QUESTION TWO

		1	2	3	4
2A	antibodies	○	○	○	○
2B	antitoxins	○	○	○	○
2C	pathogens	○	○	○	○
2D	toxins	○	○	○	○

QUESTION THREE

	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR

	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE

	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX

	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN

	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT

	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE

	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE

		1	2	3	4
1A	kills bacteria				
1B	linked to lung disease				
1C	an addictive, illegal drug				
1D	relieves some disease symptoms				

QUESTION TWO

		1	2	3	4
2A	has receptors that are sensitive to the smell...				
2B	has receptors that would detect heat...				
2C	has receptors that are sensitive to the taste...				
2D	has receptors that enable the girl to read...				

QUESTION THREE

		1	2	3	4
3A	glands				
3B	kidneys				
3C	lungs				
3D	skin				

QUESTION FOUR

		1	2	3	4
4A	200				
4B	2000				
4C	4000				
4D	5200				

QUESTION FIVE

		1	2	3	4
5A	motor neurone				
5B	muscle				
5C	sensory neurone				
5D	synapse				

QUESTION SIX

	1	2	3	4
6A				
6B				
6C				
6D				

QUESTION SEVEN

	1	2	3	4
7A				
7B				
7C				
7D				

QUESTION EIGHT

	1	2	3	4
8A				
8B				
8C				
8D				

QUESTION NINE

	1	2	3	4
9A				
9B				
9C				
9D				

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2206

Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature								

General Certificate of Secondary Education
March 2009

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

BIOLOGY
Unit Biology B1a (Human Biology)

Wednesday 4 March 2009 Morning Session

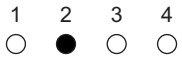
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

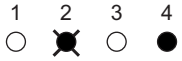
Time allowed: 30 minutes

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.

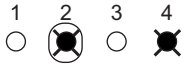
Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown:



- 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:



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**.

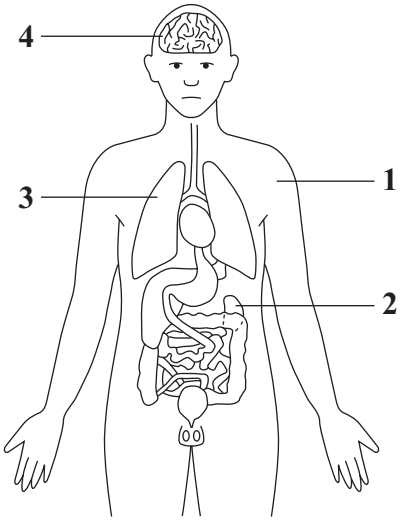
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows some of the organs which help to keep conditions inside the human body constant.



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

A the skin, which produces sweat

B a lung, which breathes out carbon dioxide

C the brain, which coordinates the other organs

D the kidney, which produces urine

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QUESTION TWO

What we eat affects our health.

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

A a diet low in fat

B a diet high in sugar

C a diet high in salt

D a diet high in saturated fat

1	should be avoided by a person with diabetes
2	could lead to high blood pressure
3	is suitable for someone trying to lose weight
4	might raise the level of cholesterol in the blood

Turn over for the next question

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QUESTION THREE

There are both legal drugs and illegal drugs.

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

A alcohol

B cocaine

C tobacco

D thalidomide

1	is linked to lung cancer
2	slows people's reactions
3	is used to treat leprosy
4	is an illegal drug that is very addictive

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QUESTION FOUR

The table shows the effectiveness of in vitro fertilisation (IVF) treatment in a fertility clinic in 2004 and 2005.

	2004				2005			
Age of women	Under 35	35–37	38–40	Over 40	Under 35	35–37	38–40	Over 40
Number of IVF treatments	130	100	29	20	142	62	33	11
Average number of embryos transferred	2.6	2.8	3.3	3.6	2.5	2.8	3.0	3.2
Percentage of successful pregnancies	43	30	21	13	43	48	30	27

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

A 30

B 48

C 99

D 142

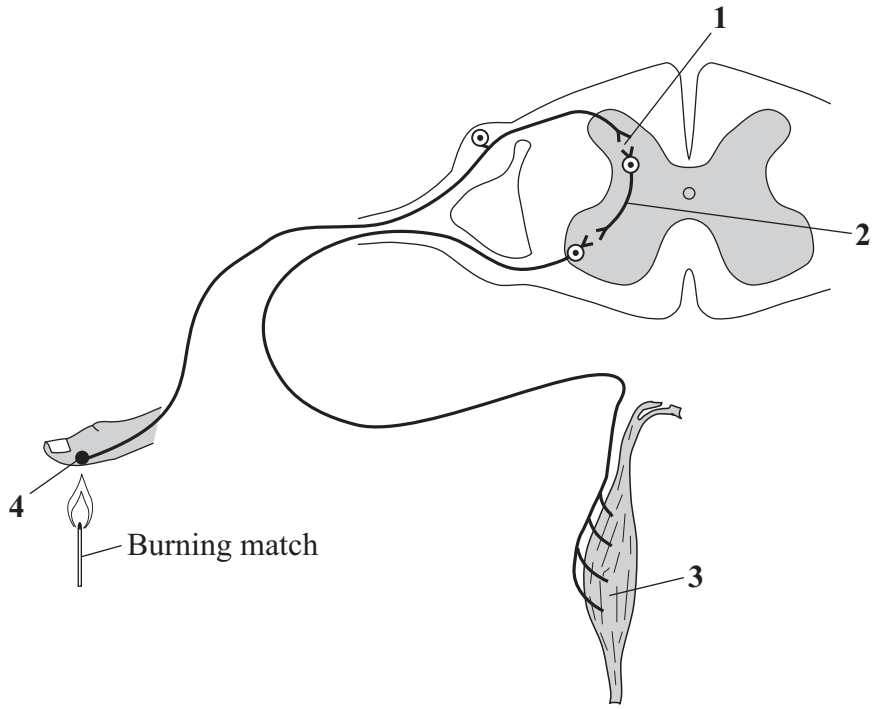
1	the number of IVF treatments for women under 35 in 2005
2	the highest percentage of successful pregnancies
3	the number of embryos transferred to women aged 38–40 in 2005
4	the number of successful pregnancies for women aged 35–37 in 2004

Turn over for the next question

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QUESTION FIVE

A student accidentally puts his hand close to a burning match. His hand automatically moves away from the flame. The drawing shows the parts involved in this reflex action.



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

A effector

B receptor

C relay neurone

D synapse

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Turn over for the next question

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SECTION TWO

Questions **SIX** to **NINE**.

Each of these questions has four parts.

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

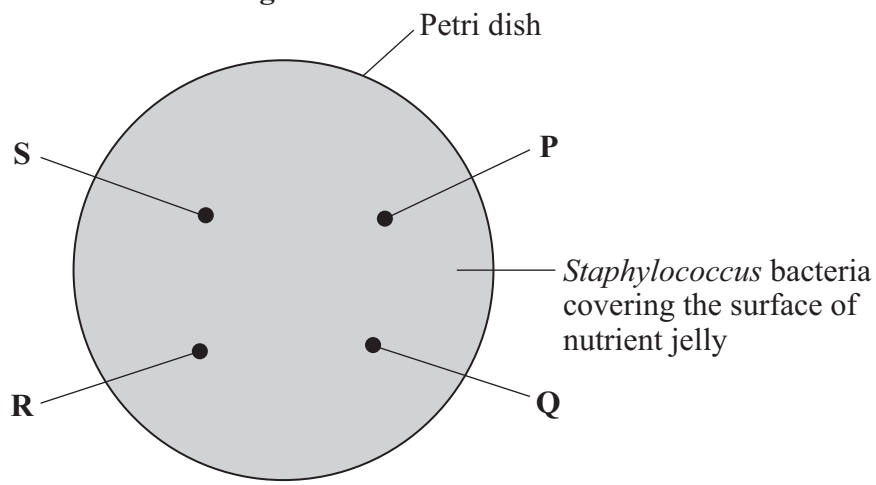
Mark your choices on the answer sheet.

QUESTION SIX

Students investigated the effectiveness of four different antibacterial mouthwashes, **P**, **Q**, **R** and **S**. Identical filter paper discs were soaked in mouthwashes **P**, **Q**, **R** and **S** respectively.

The discs were then placed on *Staphylococcus* bacteria growing in a Petri dish, as shown in **Diagram 1**.

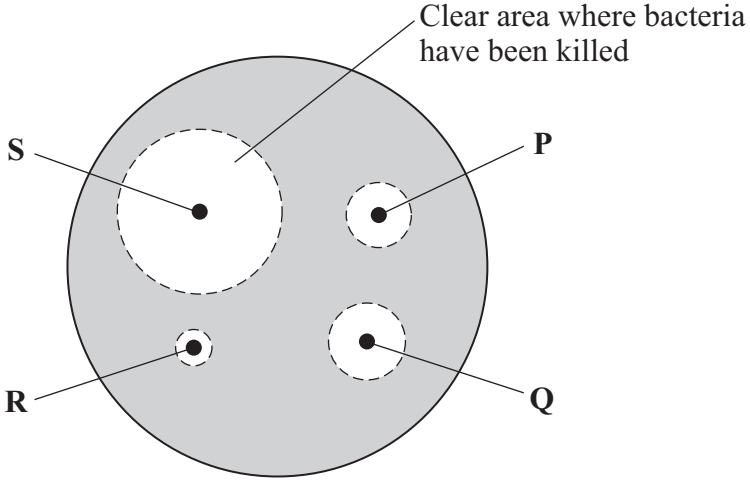
Diagram 1



The dish was covered and left for 48 hours.

Diagram 2 shows the appearance of the Petri dish after 48 hours.

Diagram 2



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6A Which was the independent variable in this investigation?

1 the temperature of the room

2 the type of mouthwash

3 the time the dish was left for

4 the size of the clear area

6B Which was a control variable in this investigation?

1 the diameter of each bacterium

2 the diameter of the Petri dish

3 the diameter of the clear area

4 the diameter of each filter paper disc

6C Which mouthwash killed most *Staphylococcus* bacteria?

1 **P**

2 **Q**

3 **R**

4 **S**

6D The investigation would have been more reliable if the students had . . .

1 left the dish for 72 hours.

2 left the dish uncovered.

3 used larger discs of filter paper.

4 compared their results with other groups.

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QUESTION SEVEN

Vaccination protects us against some diseases.

7A It is important that a high proportion of children are vaccinated against measles . . .

1 to reduce the chance of a measles epidemic.

2 so that fewer people will suffer side effects from vaccination.

3 so that there is less chance of a resistant strain of measles developing.

4 so that fewer people will produce measles antibodies.

The table is taken from an information leaflet for parents of young children. It shows a recommended vaccination programme for children.

When the vaccination is given	What the vaccine protects children against	How the vaccine is given
At 2 months old **and** at 3 months old **and** at 4 months old	polio	by mouth
	diphtheria tetanus whooping cough	by one injection
Between 12 and 15 months old **and** at 4 to 5 years old	measles mumps rubella	by one injection
	polio	by mouth
	diphtheria tetanus	by one injection
At 10–14 years old	tuberculosis	by one injection

Use **only** the information in the table to answer questions **7B** and **7C**.

7B Which vaccine is given by mouth?

1 polio

2 tetanus

3 tuberculosis

4 whooping cough

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7C Against how many diseases altogether has a 14 year-old child been vaccinated?

1 4

2 7

3 8

4 14

7D It is necessary to give the same vaccination against polio more than once because . . .

1 white blood cells only live for a few weeks.

2 the polio virus mutates frequently.

3 one vaccination does **not** result in a sufficient number of antibodies.

4 the older you are, the more likely you are to get polio.

Turn over for the next question

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QUESTION EIGHT

Some infections are caused by bacteria.

8A Bacteria can change into strains that are resistant to a particular antibiotic.

What causes this change in a bacterium?

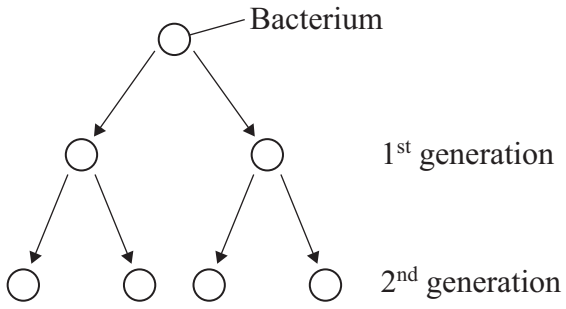
1 immunity

2 mutation

3 natural selection

4 reproduction

The diagram shows how the number of bacteria in the body changes after infection.



8B In ideal conditions, the population of bacteria doubles every 20 minutes.

In ideal conditions, how many bacteria will there be in the body 2 hours after infection with a single bacterium?

1 4

2 8

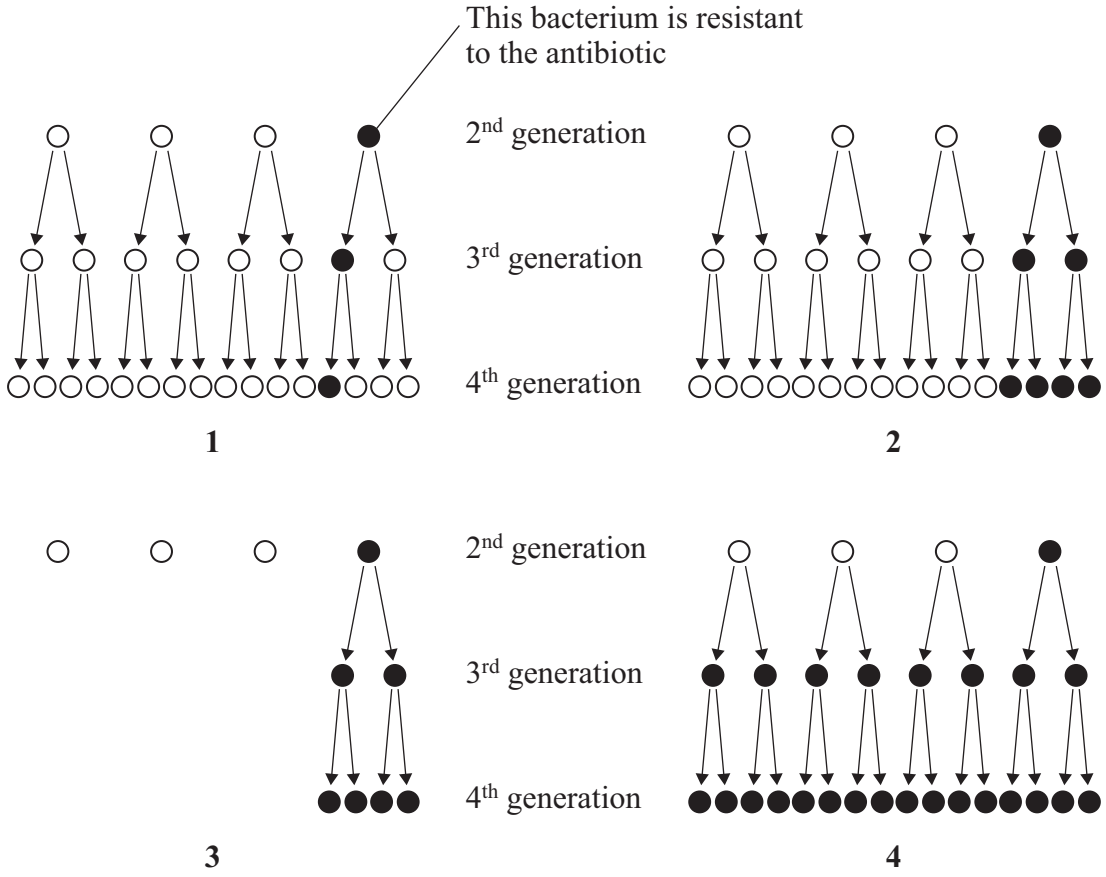
3 64

4 128

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8C One of the second generation of bacteria changes so that it is resistant to an antibiotic.

Which diagram shows the way in which the population of bacteria changes when this generation is treated with the antibiotic?



8D The change in the proportions of non-resistant and resistant bacteria by the fourth generation is due to . . .

1 genetic engineering.

2 mutation.

3 natural selection.

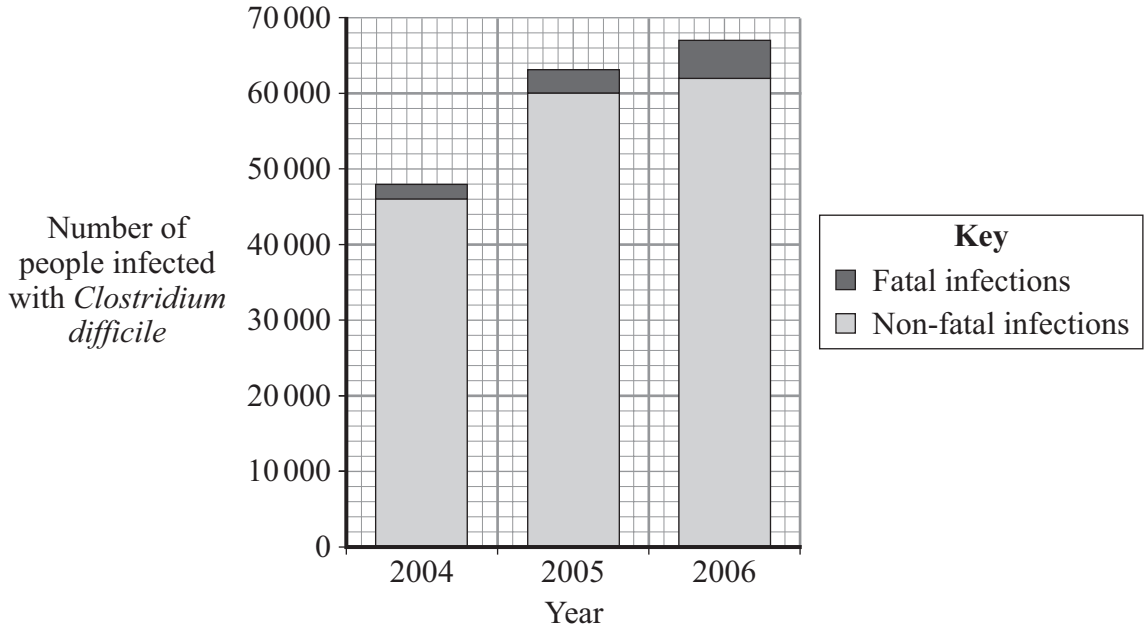
4 reproduction.

Turn over ▶

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QUESTION NINE

The bar chart shows the number of recorded cases of illness and of deaths caused by *Clostridium difficile* in the UK.



9A What proportion of people infected with *Clostridium difficile* in 2004 died from the infection?

1 1 in 24

2 1 in 46

3 1 in 48

4 1 in 65

9B The data indicates that . . .

1 treatment of infections caused by *Clostridium difficile* is becoming more effective.

2 the rise in *Clostridium difficile* cases is causing a pandemic.

3 an infection of *Clostridium difficile* was less likely to kill a patient in 2004 than in 2006.

4 there were fewer antibiotic resistant strains of *Clostridium difficile* in 2006 than in 2004.

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One leading surgeon has said: "It is believed that one sixth of all cases of infections caused by *Clostridium difficile* are not diagnosed."

9C The surgeon's statement is . . .

1 likely to be accurate as a prominent scientist made the statement.

2 likely to be inaccurate as it was reported in a newspaper.

3 a valid conclusion based on observations.

4 hearsay, because no-one knows the real number of cases.

9D If the surgeon's statement were correct, this would suggest that . . .

1 *Clostridium difficile* has developed resistance to some drugs.

2 fewer people die of *Clostridium difficile* infections than is reported.

3 it is often difficult to determine the cause of an infection.

4 *Clostridium difficile* infections are out of control.

END OF TEST

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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**.

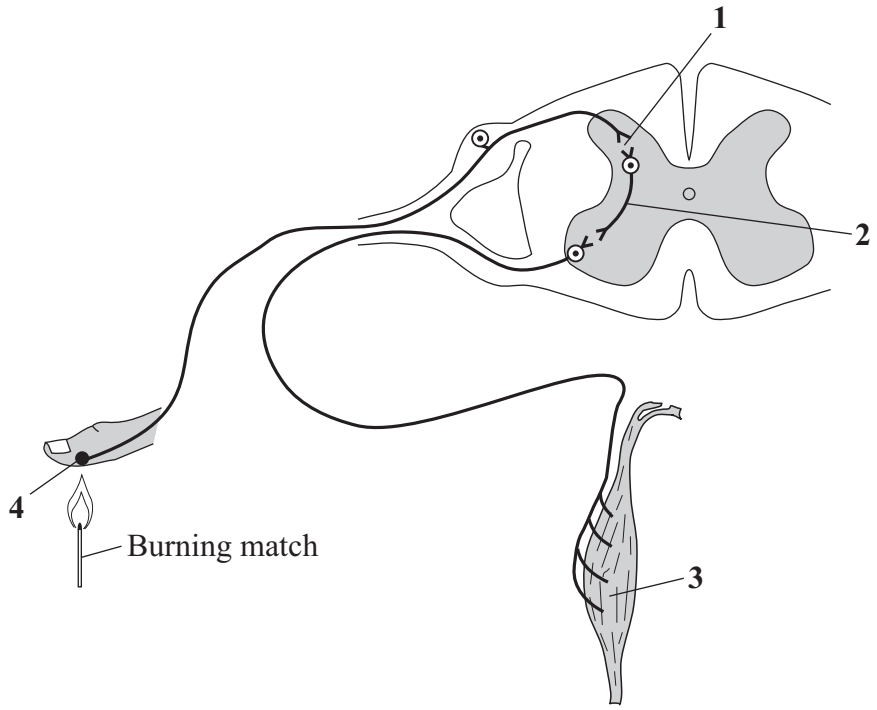
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

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

Mark your choices on the answer sheet.

QUESTION ONE

A student accidentally puts his hand close to a burning match. His hand automatically moves away from the flame. The drawing shows the parts involved in this reflex action.



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

A effector

B receptor

C relay neurone

D synapse

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QUESTION TWO

A combination of balanced diet and regular exercise is needed to keep our bodies healthy.

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

A constant

B greater

C insufficient

D irregular

Lack of food can result in a woman's periods becoming . . . **1** . . . .

Obesity may result from . . . **2** . . . exercise.

When an adult's energy intake balances their energy consumption, their body mass will be . . . **3** . . . .

When people do more exercise, their metabolic rate becomes . . . **4** . . . .

Turn over for the next question

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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

Some infections are caused by bacteria.

3A Bacteria can change into strains that are resistant to a particular antibiotic.

What causes this change in a bacterium?

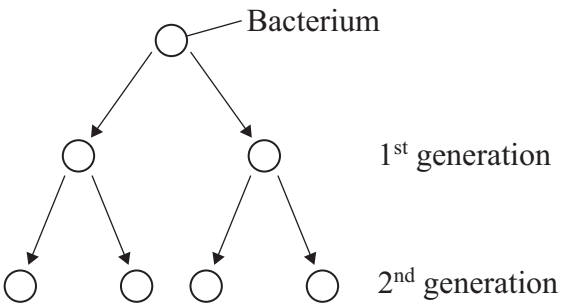
1 immunity

2 mutation

3 natural selection

4 reproduction

The diagram shows how the number of bacteria in the body changes after infection.



3B In ideal conditions, the population of bacteria doubles every 20 minutes.

In ideal conditions, how many bacteria will there be in the body 2 hours after infection with a single bacterium?

1 4

2 8

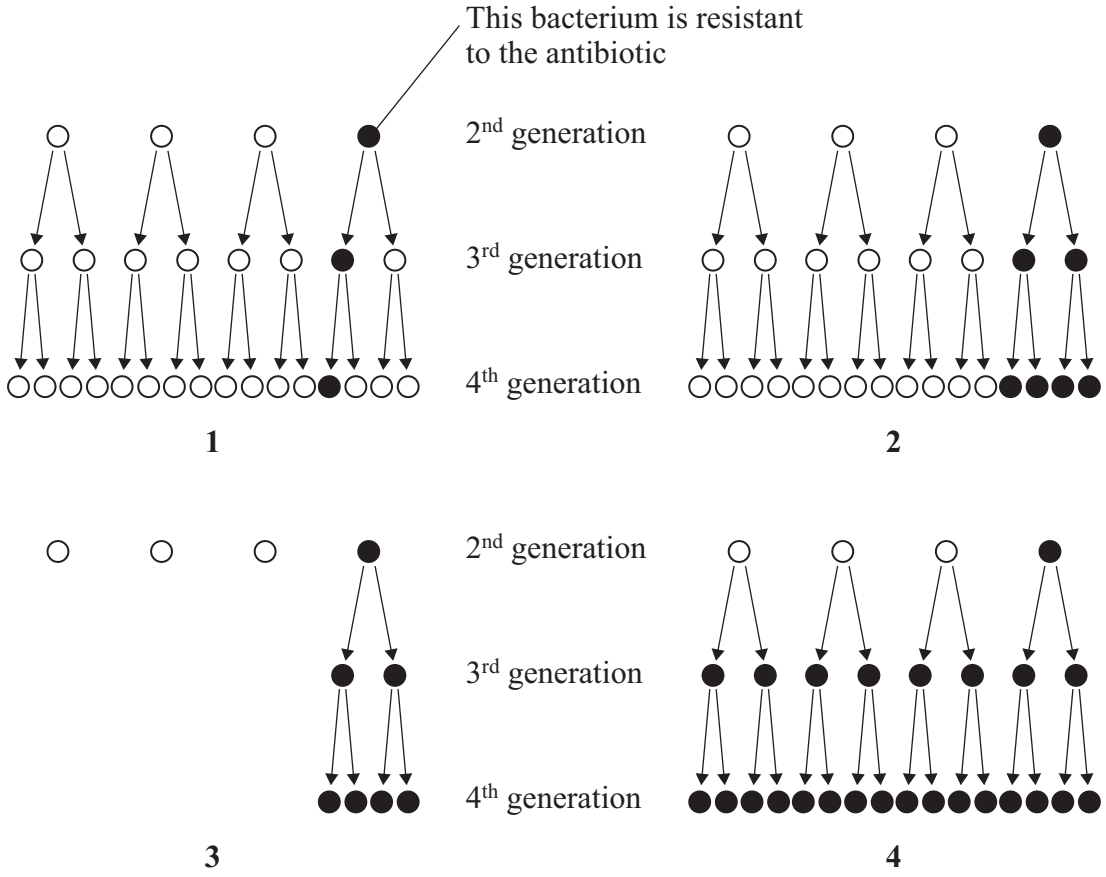
3 64

4 128

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3C One of the second generation of bacteria changes so that it is resistant to an antibiotic.

Which diagram shows the way in which the population of bacteria changes when this generation is treated with the antibiotic?



3D The change in the proportions of non-resistant and resistant bacteria by the fourth generation is due to . . .

1 genetic engineering.

2 mutation.

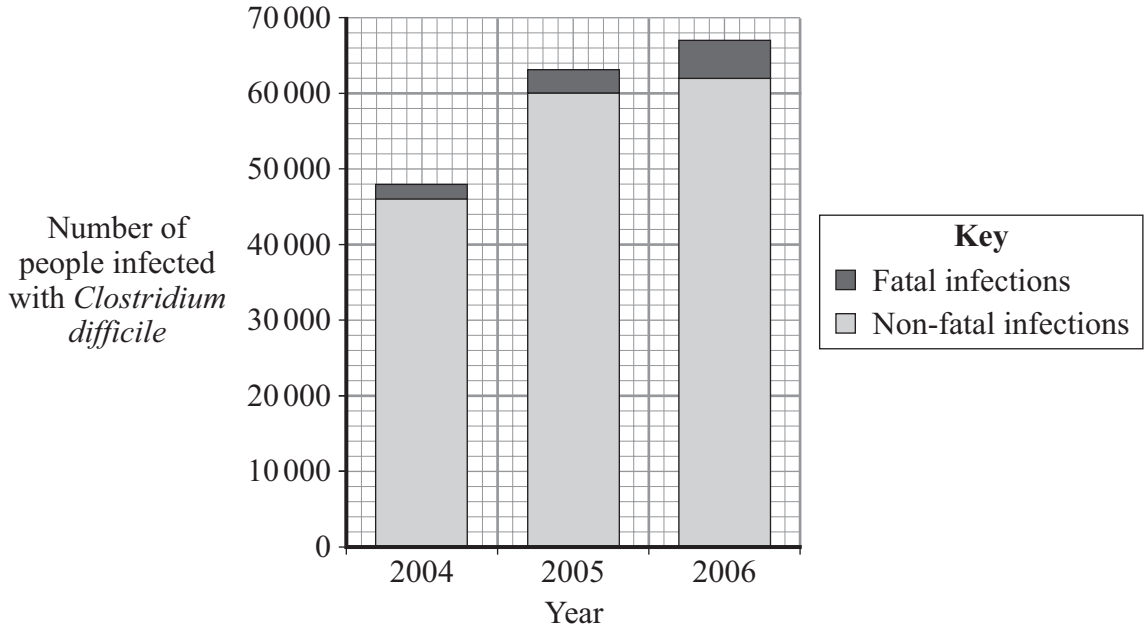
3 natural selection.

4 reproduction.

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QUESTION FOUR

The bar chart shows the number of recorded cases of illness and of deaths caused by *Clostridium difficile* in the UK.



4A What proportion of people infected with *Clostridium difficile* in 2004 died from the infection?

1 1 in 24

2 1 in 46

3 1 in 48

4 1 in 65

4B The data indicates that . . .

1 treatment of infections caused by *Clostridium difficile* is becoming more effective.

2 the rise in *Clostridium difficile* cases is causing a pandemic.

3 an infection of *Clostridium difficile* was less likely to kill a patient in 2004 than in 2006.

4 there were fewer antibiotic resistant strains of *Clostridium difficile* in 2006 than in 2004.

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One leading surgeon has said: "It is believed that one sixth of all cases of infections caused by *Clostridium difficile* are not diagnosed."

4C The surgeon's statement is . . .

1 likely to be accurate as a prominent scientist made the statement.

2 likely to be inaccurate as it was reported in a newspaper.

3 a valid conclusion based on observations.

4 hearsay, because no-one knows the real number of cases.

4D If the surgeon's statement were correct, this would suggest that . . .

1 *Clostridium difficile* has developed resistance to some drugs.

2 fewer people die of *Clostridium difficile* infections than is reported.

3 it is often difficult to determine the cause of an infection.

4 *Clostridium difficile* infections are out of control.

Turn over for the next question

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QUESTION FIVE

Nicotine replacement therapy (NRT) is used to help people to stop smoking.

5A NRT is used to help people to stop smoking because nicotine . . .

1 reduces the amount of oxygen carried by the blood.

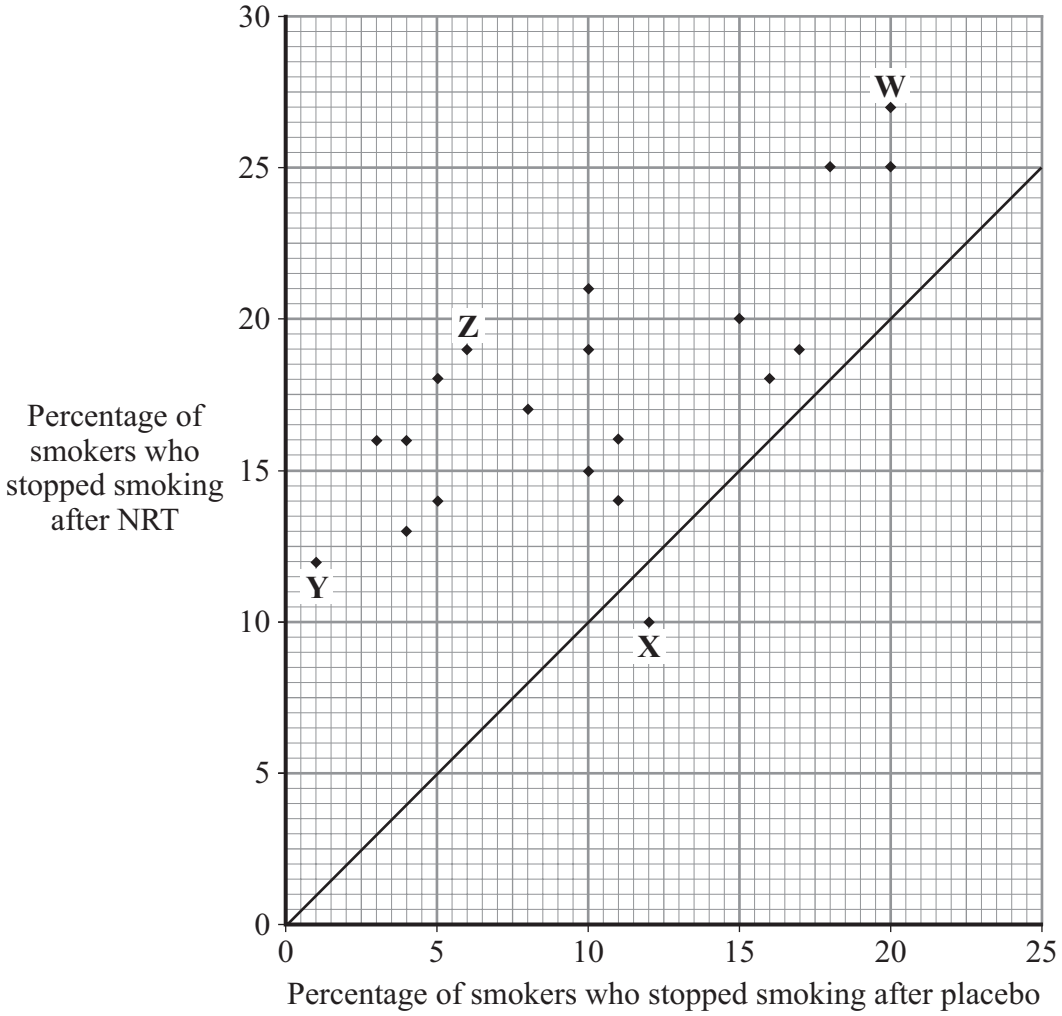
2 causes lung cancer.

3 alters chemical processes in the body.

4 increases appetite.

The scattergram shows the results of 20 investigations into the use of different types of NRT tablets. In each investigation, some smokers were given NRT and some were given a placebo.

Each plot represents **one** investigation. Each plot represents the percentage of smokers who stopped smoking after NRT and the percentage of people who stopped smoking after being given a placebo in that investigation.



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5B In these investigations, the placebo would be . . .

1 a tablet that tasted of nicotine.

2 a white tablet.

3 a tablet with sugar.

4 a tablet with no nicotine.

5C In which investigation did more people stop smoking after using the placebo than after using NRT?

1 **W**

2 **X**

3 **Y**

4 **Z**

5D What conclusion can be drawn from the results of the investigations?

1 NRT was more effective than a placebo in most of the investigations.

2 Patients given a placebo do not stop smoking.

3 All the people given NRT stopped smoking.

4 Most of the people in the investigations gave up smoking.

Turn over for the next question

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QUESTION SIX

Body mass index (BMI) is an indication of a person's obesity.

A person's BMI is calculated using the formula below.

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

The table shows the relationship between BMI and obesity.

BMI	Obesity category
less than 18.5	underweight
18.5 – 24.9	normal
25.0 – 29.9	overweight
30.0 and over	obese

6A A 1.83 m tall adult with a body mass of 61 kg is . . .

1 underweight.

2 normal.

3 overweight.

4 obese.

6B Scientists want to survey 2000 adults for BMI.

Which factor would be most difficult to control in the survey?

1 age

2 ethnic origin

3 diet type

4 gender

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6C Compared with an adult female whose BMI is 19, an adult female with a BMI of 28 is more likely to have . . .

1 a high blood sugar level.

2 irregular periods.

3 a low blood LDL level.

4 reduced resistance to infection.

6D Muscle tissue is more dense than fat. Athletes who train regularly build up their muscles. As a result, they have a higher muscle to fat ratio than non-athletes.

An adult athlete with a BMI of 26.2 . . .

1 is likely to be healthy and fit even though he is outside the 'normal' guideline in the obesity category.

2 should begin a diet programme to encourage weight loss.

3 should still be classed as 'normal' in the obesity category.

4 would have a lower metabolic rate than non-athletes.

Turn over for the next question

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QUESTION SEVEN

In the first 10 months of 2006, 15 000 cases of chickenpox were reported in Scotland.

Over the same period in 2007, 19 500 cases of the disease were reported.

7A What was the percentage rise in the number of cases of chickenpox reported in Scotland from 2006 to 2007?

1 3.0

2 4.5

3 23.1

4 30.0

7B Doctors suggested that the actual number of cases during the whole of 2007 would be over 24 000.

This suggestion is . . .

1 hearsay.

2 a conclusion.

3 a hypothesis.

4 a prediction.

Read the extract from the article.

> Most children with chickenpox suffer only a few uncomfortable days. Yet we are being told that it is a serious disease against which we need to vaccinate. These recommendations are based on research which included all children admitted to hospitals in the UK and Ireland over a 13-month period. The researchers found that, out of a total population of over 10 million children, 112 children had serious complications with chickenpox. Six deaths were reported, but four of these children also had other chronic health problems.

7C The author of the article is against vaccination against chickenpox because . . .

1 it may further increase the number of cases of autism caused by vaccination.

2 chickenpox causes death in only a very small number of cases.

3 children with chickenpox do not get complications.

4 children already have too many painful vaccinations.

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7D The author also claims that: 'Vaccination will push the disease into older age groups. These groups will catch the illness as their vaccine-induced immunity wears off. We have seen this happen with mumps.'

'Vaccine-induced immunity' will wear off because . . .

1 the number of white blood cells increases with age.

2 older people are less sensitive to antibiotics.

3 the number of antibodies in the blood gradually decreases with age.

4 older people do not produce antitoxins.

Turn over for the next question

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QUESTION EIGHT

Influenza (flu) is caused by a virus.

8A Viruses can reproduce . . .

1 anywhere in the human body.

2 only in human lungs.

3 inside human cells.

4 on the surface of the human skin.

Bird flu virus does not normally infect humans. In 1997, one strain of bird flu, HN51, spread from infected chickens to 18 people in Hong Kong and killed 6 of them.

Since 2003 there have been over 300 cases of HN51 in humans. The World Health Organisation is worried that mutations of the HN51 virus will enable it to spread rapidly from human to human. Scientists believe that 13 different mutations of the HN51 virus will be required for it to transfer rapidly between humans. Up to now, two of these mutations have occurred.

8B Bird flu cannot be treated with antibiotics.

This is because . . .

1 white blood cells do not recognise the bird flu virus.

2 antibiotics only work in humans.

3 bird flu is caused by a virus.

4 antibiotics do not affect the toxins produced by the bird flu virus.

8C Which row of the table is correct?

	Statement	Reason
1	Human-to-human transfer of HN51 could cause millions of deaths.	It could be transferred rapidly between people living in cities.
2	Human-to-human transfer of HN51 will never occur.	The virus could never undergo enough mutations to make this possible.
3	It is not possible to vaccinate people against all strains of bird flu.	Vaccines damage body cells.
4	The World Health Organisation should ignore the possibility of a HN51 pandemic.	There have been very few cases of HN51 in humans.

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8D The success of vaccinating humans against HN51 may be limited because . . .

1 some people may catch HN51 from the vaccine.

2 HN51 mutates frequently.

3 vaccines are only effective against bacterial infections.

4 vaccines only work on certain people.

Turn over for the next question

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QUESTION NINE

In vitro fertilisation (IVF) is used to help women who have difficulty conceiving.

9A Which hormone treatment is given to a woman during IVF?

1 FSH is given to stimulate eggs to mature.

2 LH is given to stimulate eggs to mature.

3 Oestrogen is given to stimulate the thickening of the lining of the womb.

4 FSH is given to stimulate the release of eggs.

9B Which statement correctly describes one stage in IVF treatment?

1 Sperm cells are inserted into the mother's womb when eggs are released from the ovary.

2 Fertilised eggs develop into embryos outside the mother's body.

3 Eggs are collected from the mother after every menstrual period.

4 Fertilisation takes place inside the woman's body.

The table shows the effectiveness of IVF treatment in a fertility clinic in 2004 and 2005.

	2004				**2005**			
Age of woman	Under 35	35–37	38–40	Over 40	Under 35	35–37	38–40	Over 40
Number of IVF treatments	130	100	29	20	142	62	33	11
Average number of embryos transferred	2.6	2.8	3.3	3.6	2.5	2.8	3.0	3.2
Percentage of successful pregnancies	43	30	21	13	43	48	30	27

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9C What conclusion can be drawn from the data?

1 The more embryos transferred, the greater the chance of a successful pregnancy.

2 There were more multiple births in 2005 than in 2004.

3 Older women are less likely to have a successful pregnancy by IVF.

4 More women were given IVF treatment in 2005 than in 2004.

9D Many people oppose the use of IVF.

What information from the table could be used by people campaigning against IVF on ethical grounds?

1 A high proportion of women in the country are being treated with IVF.

2 High doses of hormones cause side effects in many women.

3 Many embryos die in IVF treatment.

4 IVF treatment is too expensive for most women.

END OF TEST

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ASSESSMENT and QUALIFICATIONS ALLIANCE

GCSE

Science A (4461)

Specification A

BLY1AP, BL1ASF & BL1ASH

Mark Scheme

2009 Examination – March Series

STEMUP.CO.UK

This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

March 2009

Foundation Tier

Question	Key		
One	**A**	the skin, which produces sweat	**1**
	B	a lung, which breathes out carbon dioxide	**3**
	C	the brain, which coordinates the other organs	**4**
	D	the kidney, which produces urine	**2**
Two	**A**	a diet low in fat	**3**
	B	a diet high in sugar	**1**
	C	a diet high in salt	**2**
	D	a diet high in saturated fat	**4**
Three	**A**	alcohol	**2**
	B	cocaine	**4**
	C	tobacco	**1**
	D	thalidomide	**3**
Four	**A**	30	**4**
	B	48	**2**
	C	99	**3**
	D	142	**1**
Five	**A**	effector	**3**
	B	receptor	**4**
	C	relay neurone	**2**
	D	synapse	**1**

	A	**B**	**C**	**D**
Six	**2**	**4**	**4**	**4**
Seven	**1**	**1**	**3**	**3**
Eight	**2**	**3**	**3**	**3**
Nine	**1**	**3**	**4**	**3**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1AP (Human Biology)

March 2009

Higher Tier

Question	Key		
One	**A**	effector	**3**
	B	receptor	**4**
	C	relay neurone	**2**
	D	synapse	**1**
Two	**A**	constant	**3**
	B	greater	**4**
	C	insufficient	**2**
	D	irregular	**1**

	A	B	C	D
Three	**2**	**3**	**3**	**3**
Four	**1**	**3**	**4**	**3**
Five	**3**	**4**	**2**	**1**
Six	**1**	**3**	**1**	**1**
Seven	**4**	**4**	**2**	**3**
Eight	**3**	**3**	**1**	**2**
Nine	**1**	**2**	**3**	**3**