Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

General Certificate of Secondary Education
November 2008

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

BIOLOGY
Unit Biology B1a (Human Biology)

Thursday 20 November 2008 Morning Session

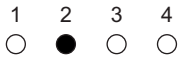
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

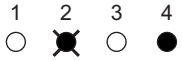
Time allowed: 30 minutes

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

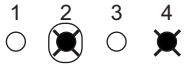
Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown:



- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown:



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



Information
- The maximum mark for this paper is 36.

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

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

SECTION ONE

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

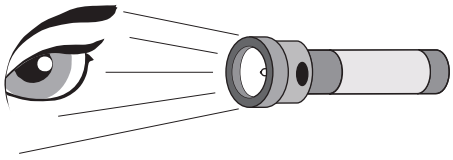
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

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

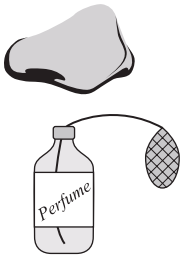
Mark your choices on the answer sheet.

QUESTION ONE

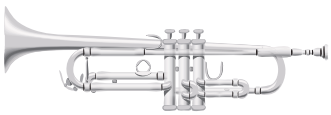
The diagrams show four parts of the body and four stimuli.



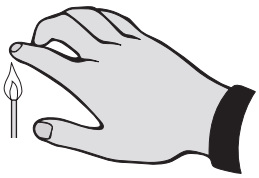
1



2



3



4

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

A stimulates temperature receptors

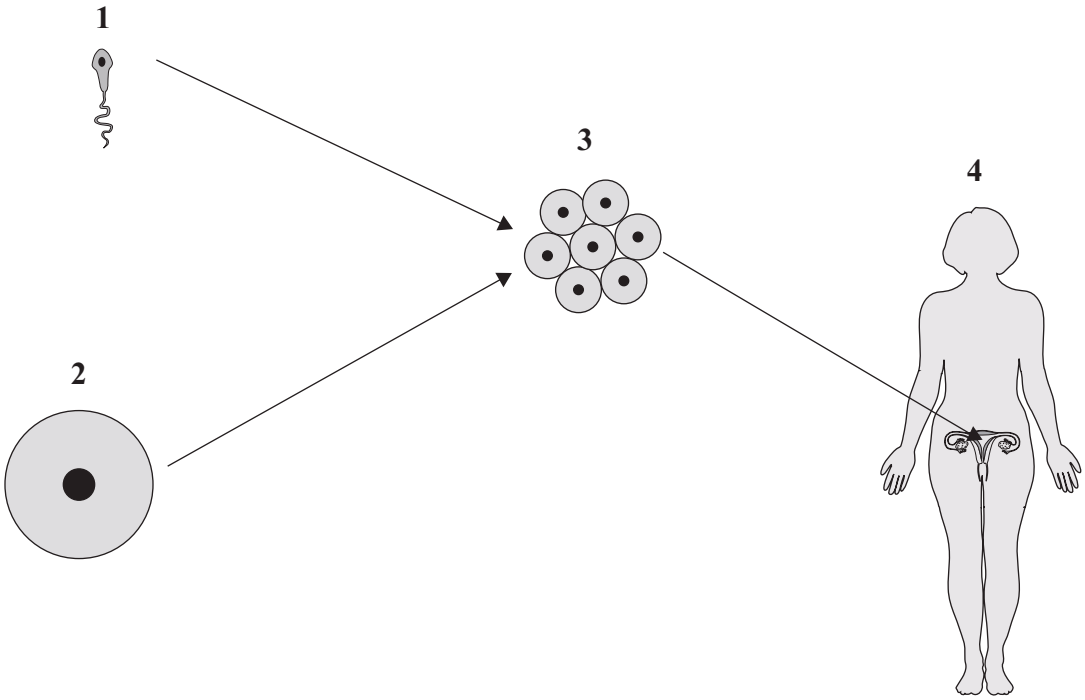
B stimulates sound receptors

C stimulates chemical receptors

D stimulates light receptors

QUESTION TWO

The diagram shows some of the stages in IVF (in vitro fertilisation).



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

A removed from ovary

B womb (uterus)

C provided by father

D embryo

Turn over for the next question

QUESTION THREE

Different human organs have different functions.

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

A produces cholesterol

B produces sweat

C produces urine

D produces hormones

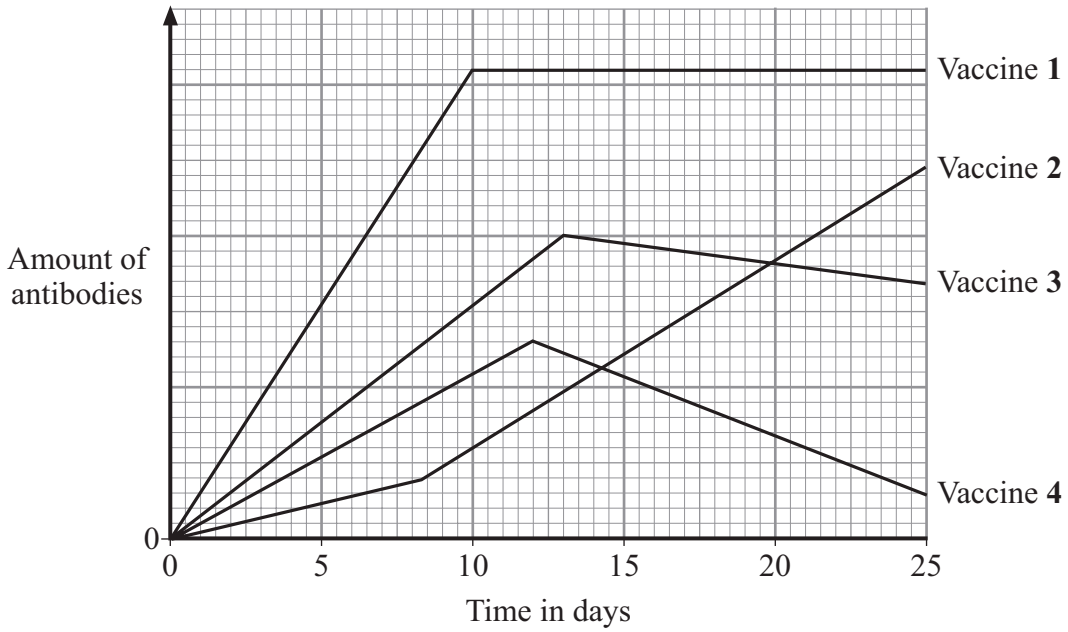
1	pituitary gland
2	liver
3	skin
4	kidney

QUESTION FOUR

The graph shows the amount of antibodies produced over 25 days in response to injecting four different vaccines, **1**, **2**, **3** and **4**.

Match statements, **A**, **B**, **C** and **D**, with the vaccines **1–4**.

A	The amount of antibodies falls to almost zero by 25 days.
B	The amount of antibodies levels off after 10 days.
C	The amount of antibodies reaches a peak at 13 days and then falls slowly.
D	The amount of antibodies rises throughout the 25 days.



Turn over for the next question

QUESTION FIVE

This question is about harmful chemicals.

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

A heroin

B carbon monoxide

C nicotine

D alcohol

1	a highly addictive and illegal drug
2	the addictive substance in tobacco
3	a chemical which may damage the liver
4	a chemical which reduces the amount of oxygen in the blood

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

This question is about food and energy.

6A Which of the following conditions is **not** linked to obesity?

1 diabetes

2 measles

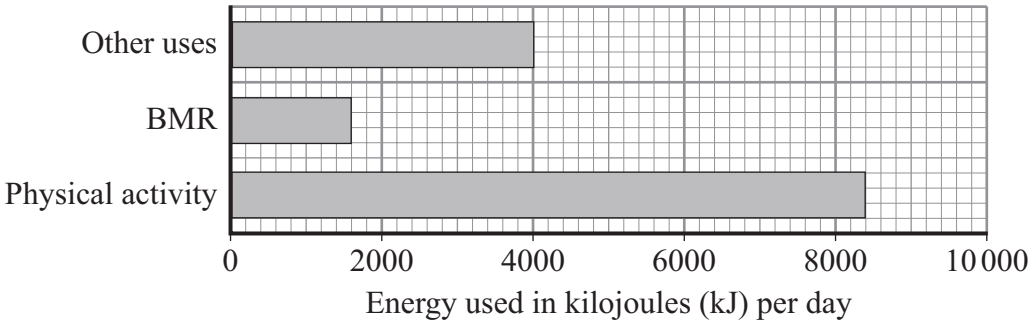
3 high blood pressure

4 arthritis

6B Which person is likely to need the least amount of food?

Person	Amount of exercise	Temperature of country where person lives
1	high	warm
2	high	cold
3	low	warm
4	low	cold

The bar chart shows the amount of energy used by a teenager.
BMR is the amount of energy needed to keep the teenager alive.



6C What is the total amount of energy used by the teenager in one day?

1 1600 kJ

2 4000 kJ

3 8400 kJ

4 14 000 kJ

6D What is likely to happen if the same teenager takes in 17 000 kJ each day?

The teenager would . . .

1 gain mass.

2 gain height.

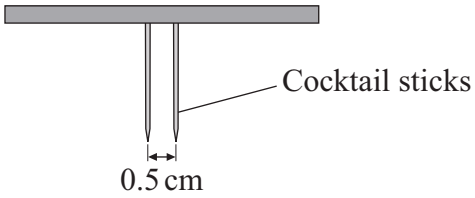
3 become fitter.

4 be hungry all the time.

Turn over for the next question

QUESTION SEVEN

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



A student set the points of the two cocktail sticks 0.5 cm apart. He then pressed them 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

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 others.

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 later in the day and got similar results.

What does this suggest?

1 The students all have sensitive skin.

2 The data collected by the students is reliable.

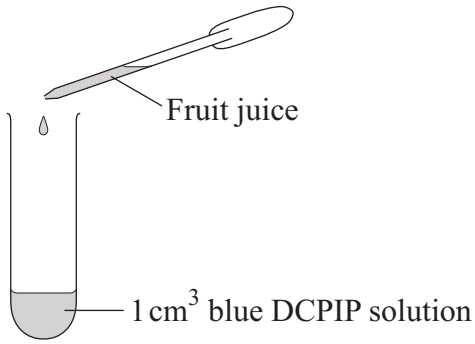
3 The students made errors when collecting their data.

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

Turn over for the next question

QUESTION EIGHT

The blue dye DCPIP can be used to find the amount of vitamin C in fruit juices.
Vitamin C in the fruit juice makes the blue colour disappear.
Fruit juice is added drop by drop, as shown in the diagram, until the DCPIP solution is decolourised (loses its blue colour).



8A In this experiment, the number of drops of fruit juice needed to decolourise DCPIP solution is the . . .

1 categoric variable.

2 control variable.

3 dependent variable.

4 independent variable.

A class of students carried out this experiment on four different fruit juices.
The average number of drops for each fruit juice are shown in the table.

Type of juice	Average number of drops which decolourised 1 cm^3 of DCPIP solution
apple	more than 30
grapefruit	8
orange	10
lemon	5

8B Which fruit juice contained most vitamin C?

1 apple

2 grapefruit

3 lemon

4 orange

8C Why would it have been useful to see all the class results before they were averaged?

1 to make a better conclusion

2 to identify any anomalous results

3 to make the results more accurate

4 to make it a fair test

8D The food label on a carton of grapefruit juice states that 100 cm^3 contains 40 mg of vitamin C.
The recommended daily amount of vitamin C for an adult is 60 mg.

How many cm^3 of grapefruit juice would need to be drunk in order to provide the recommended 60 mg of vitamin C?

1 150

2 160

3 167

4 200

QUESTION NINE

In the 1840s, many women died from infections after giving birth in hospitals.
The table shows data for two maternity wards in the same hospital over a two-year period.

	Ward P	**Ward Q**
Number of women who gave birth	296	308
Number of these women who died from infections	109	42

9A The number of women who survived in ward **Q** was . . .

1 42

2 187

3 266

4 350

9B A doctor called Semmelweiss noticed that medical students were delivering babies in ward **P** just after they had been dissecting corpses as part of their studies.
Only midwives delivered babies in ward **Q**.

Which is the best hypothesis to explain the higher death rate in ward **P**?

1 Students were carrying infections from corpses to women.

2 Midwives are better at delivering babies than students.

3 The higher number of deaths occurred by chance.

4 The women who gave birth in ward **P** were poorer than those in ward **Q**.

9C Semmelweiss instructed all medical students in the hospital to wash their hands thoroughly before treating patients.

Which row in the table shows the effect that this might have had on the death rate in the two wards?

	Death rate in ward P			Death rate in ward Q		
	Increase	**No change**	**Decrease**	**Increase**	**No change**	**Decrease**
1	✓				✓	
2		✓				✓
3			✓		✓	
4			✓	✓		

9D In the 1980s, antibiotics were often used to kill pathogens to prevent infections from spreading. However, antibiotics are now less effective than in the 1980s.

This is because . . .

1 medical staff do not wash their hands as often.

2 antibiotics have become useless against viruses.

3 mutations in bacteria have made them resistant to antibiotics.

4 people have become immune to antibiotics.

END OF TEST

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

HIGHER TIER

SECTION ONE

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

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

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

Mark your choices on the answer sheet.

QUESTION ONE

This question is about harmful chemicals.

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

A heroin

B carbon monoxide

C nicotine

D alcohol

1	a highly addictive and illegal drug
2	the addictive substance in tobacco
3	a chemical which may damage the liver
4	a chemical which reduces the amount of oxygen in the blood

QUESTION TWO

This question is about substances in the diet.

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

A mono-unsaturated fats

B LDLs

C salt

D sugar

1	is directly linked to high blood pressure
2	is found in large amounts in the blood of diabetics
3	may help to reduce cholesterol levels in the blood
4	may lead to high levels of cholesterol in the blood

Turn over for the next question

SECTION TWO

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

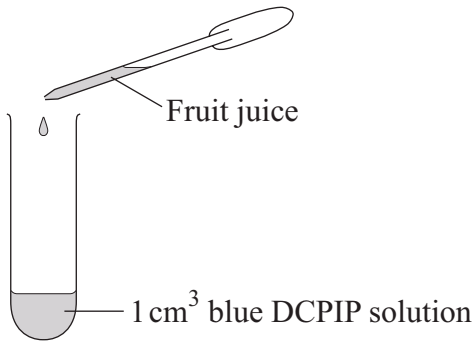
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION THREE

The blue dye DCPIP can be used to find the amount of vitamin C in fruit juices.
Vitamin C in the fruit juice makes the blue colour disappear.
Fruit juice is added drop by drop, as shown in the diagram, until the DCPIP solution is decolourised (loses its blue colour).



3A In this experiment, the number of drops of fruit juice needed to decolourise DCPIP solution is the . . .

1 categoric variable.

2 control variable.

3 dependent variable.

4 independent variable.

A class of students carried out this experiment on four different fruit juices.
The average number of drops for each fruit juice are shown in the table.

Type of juice	Average number of drops which decolourised 1 cm^3 of DCPIP solution
apple	more than 30
grapefruit	8
orange	10
lemon	5

3B Which fruit juice contained most vitamin C?

1 apple

2 grapefruit

3 lemon

4 orange

3C Why would it have been useful to see all the class results before they were averaged?

1 to make a better conclusion

2 to identify any anomalous results

3 to make the results more accurate

4 to make it a fair test

3D The food label on a carton of grapefruit juice states that 100 cm^3 contains 40 mg of vitamin C.
The recommended daily amount of vitamin C for an adult is 60 mg.

How many cm^3 of grapefruit juice need to be drunk in order to provide the recommended 60 mg of vitamin C?

1 150

2 160

3 167

4 200

QUESTION FOUR

In the 1840s, many women died from infections after giving birth in hospitals.
The table shows data for two maternity wards in the same hospital over a two-year period.

	Ward P	**Ward Q**
Number of women who gave birth	296	308
Number of these women who died from infections	109	42

4A The number of women who survived in ward **Q** was . . .

1 42

2 187

3 266

4 350

4B A doctor called Semmelweiss noticed that medical students were delivering babies in ward **P** just after they had been dissecting corpses as part of their studies.
Only midwives delivered babies in ward **Q**.

Which is the best hypothesis to explain the higher death rate in ward **P**?

1 Students were carrying infections from corpses to women.

2 Midwives are better at delivering babies than students.

3 The higher number of deaths occurred by chance.

4 The women who gave birth in ward **P** were poorer than those in ward **Q**.

4C Semmelweiss instructed all medical students in the hospital to wash their hands thoroughly before treating patients.

Which row in the table shows the effect that this might have had on the death rate in the two wards?

	Death rate in ward P			Death rate in ward Q		
	Increase	**No change**	**Decrease**	**Increase**	**No change**	**Decrease**
1	✓				✓	
2		✓				✓
3			✓		✓	
4			✓	✓		

4D In the 1980s, antibiotics were often used to kill pathogens to prevent infections from spreading. However, antibiotics are now less effective than in the 1980s.

This is because . . .

1 medical staff do not wash their hands as often.

2 antibiotics have become useless against viruses.

3 mutations in bacteria have made them resistant to antibiotics.

4 people have become immune to antibiotics.

Turn over for the next question

QUESTION FIVE

Read the information about whooping cough.

- Whooping cough is a harmful disease which can damage the lungs.
- Whooping cough is often caught in childhood.
- Whooping cough can be treated with antibiotics.

5A Whooping cough is . . .

1 caused by bacteria.

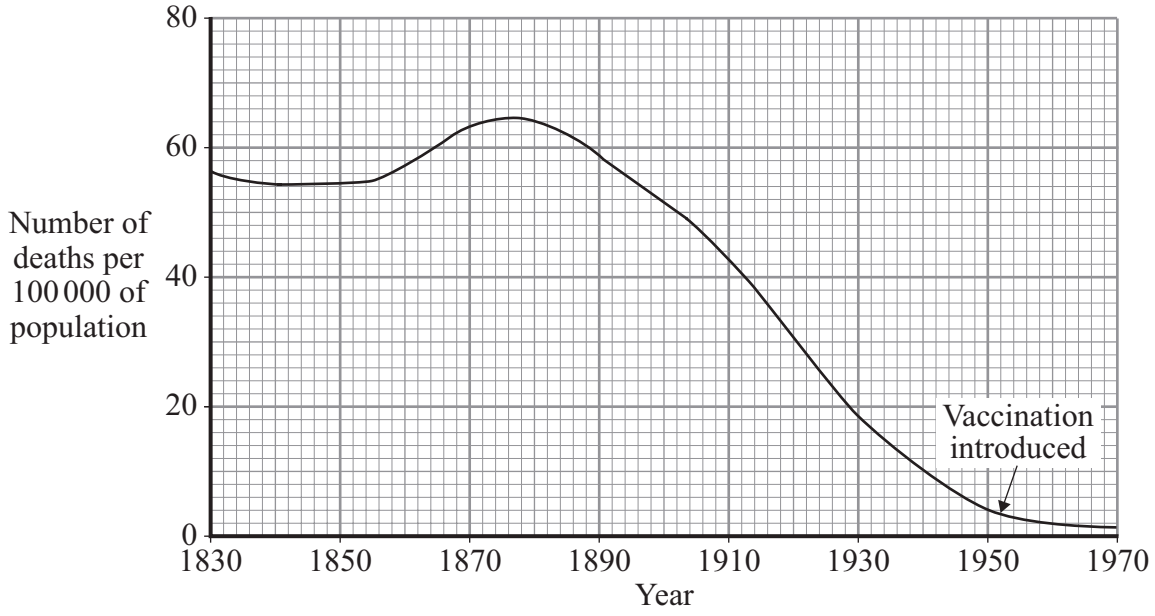
2 caused by smoking.

3 caused by a virus.

4 a deficiency disease.

Graph 1 shows the number of deaths due to whooping cough in England and Wales between 1830 and 1970.

Graph 1



5B In 1950, the population of England and Wales was 45 million.

How many people died from whooping cough in England and Wales in 1950?

1 180

2 1800

3 18 000

4 180 000

5C A whooping cough vaccine was introduced in 1952.

From the information in the graph, what was the most likely reason for the changes in the number of deaths after 1950?

1 improved standards of hygiene

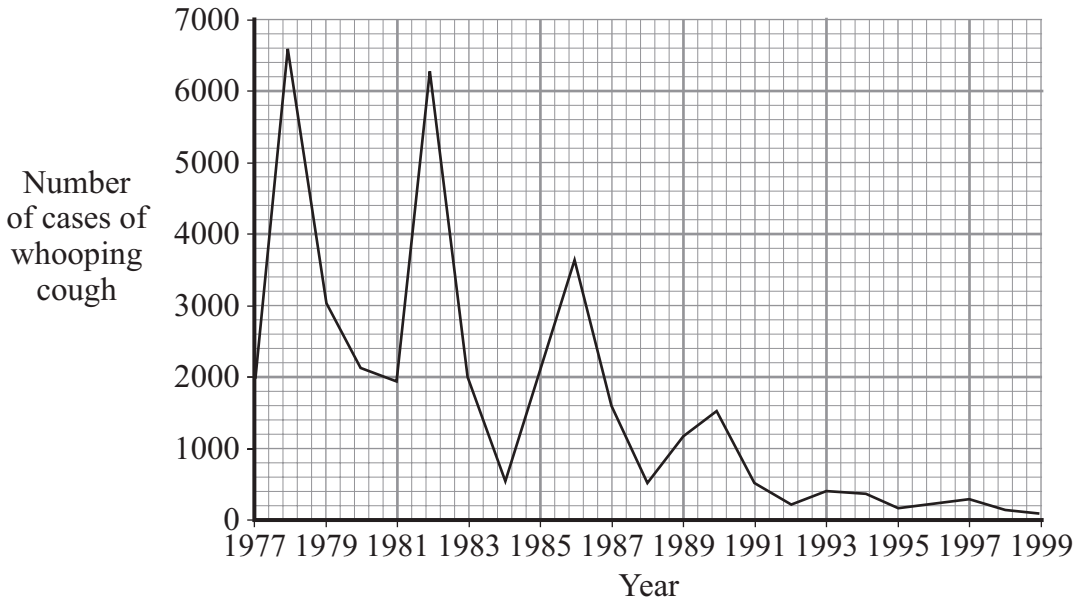
2 antibiotic resistance

3 better education

4 vaccination

5D **Graph 2** shows information about the number of cases of whooping cough in England and Wales after 1977.

Graph 2



What conclusion can be drawn from the data?

1 Deaths from whooping cough were much higher in 1982 than in 1882.

2 Cases of whooping cough occurred in four-year cycles between 1977 and 1993.

3 Whooping cough had been wiped out in England and Wales by 1999.

4 Cases of whooping cough and time are directly related.

QUESTION SIX

Drugs have to be tested before they can be approved for use.

6A New drugs are often tested in which sequence?

1 first on animals → then on humans → then laboratory analysis

2 first on humans → then on animals → then laboratory analysis

3 first laboratory analysis → then on humans → then on animals

4 first laboratory analysis → then on animals → then on humans

6B During drug trials, some volunteers are given a placebo.

This is to . . .

1 increase the number of volunteers involved to make the findings more acceptable.

2 avoid the risk of too many volunteers suffering side effects.

3 act as a control so that the effects of the drug can be assessed more accurately.

4 reduce the costs of the trials.

6C Drug trials are carried out on human volunteers to . . .

1 wipe out a disease.

2 discover any side effects.

3 find out if the drug can be produced cheaply.

4 find out if the drug reacts with any other drugs.

6D Which of the following is **not** a valid reason for testing a new drug on humans?

1 Scientists cannot always predict with certainty what will happen when a drug is used to treat humans.

2 Scientists cannot say with certainty that the results of any tests on laboratory animals will be the same as the results on humans.

3 Scientists cannot get a drug passed for public consumption without finding out how safe it is.

4 Scientists need to find out how much a drug will cost to market.

Turn over for the next question

QUESTION SEVEN

This question is about reflex actions.

7A Which of the following best describes reflex actions?

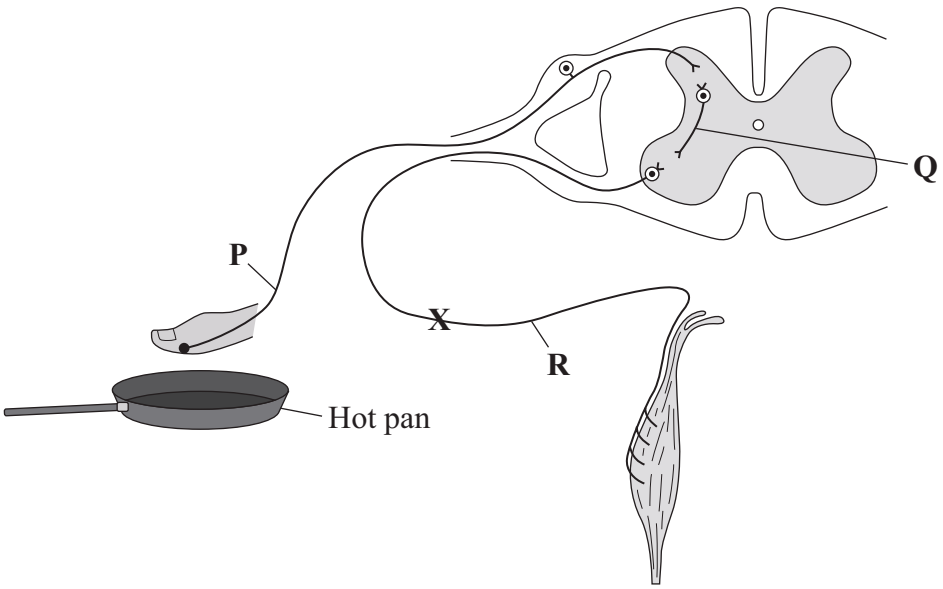
1 They are coordinated by both the brain and the spinal cord.

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.



7B 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

7C 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

7D 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.

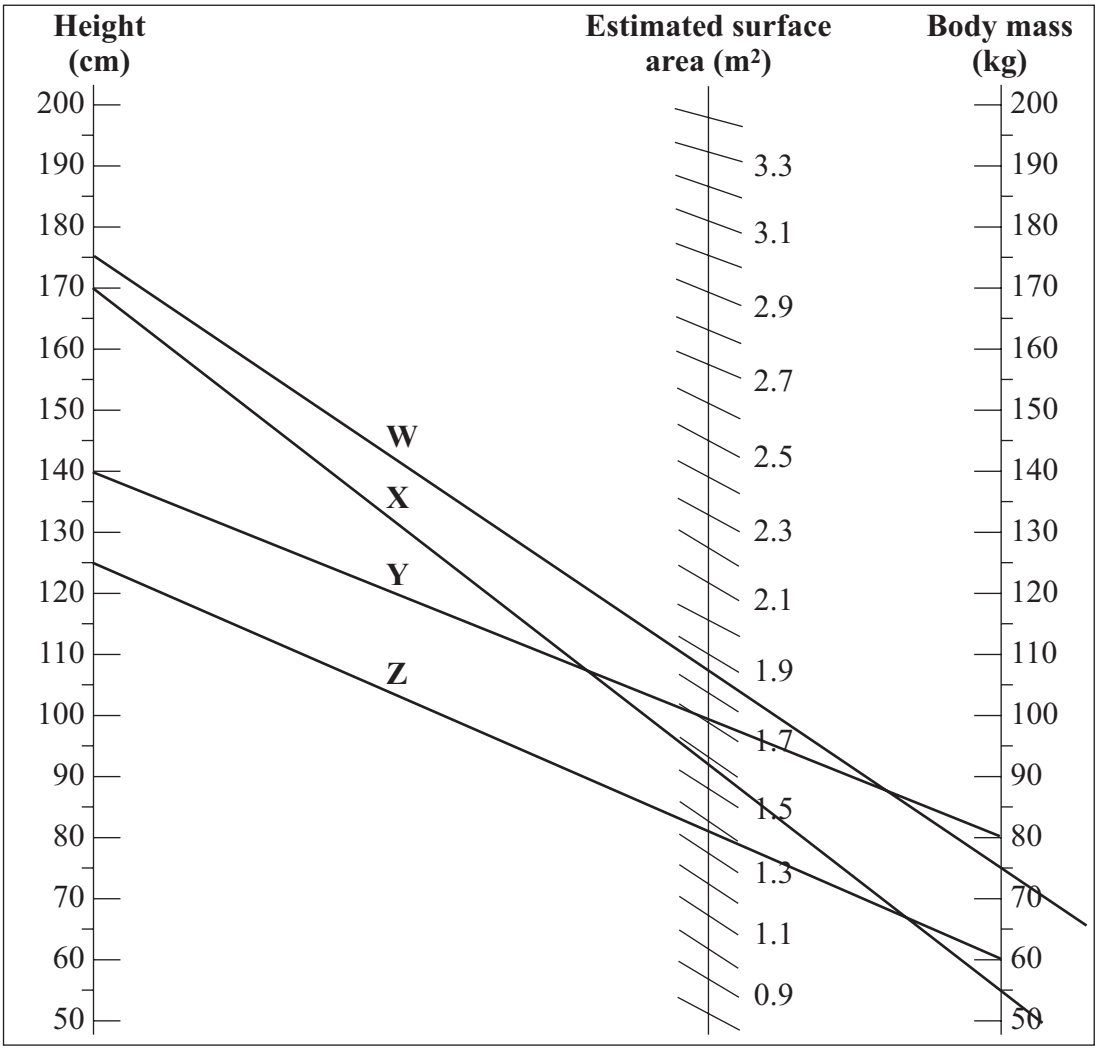
Turn over for the next question

QUESTION EIGHT

The surface area of an adult male can be estimated by using this nomogram.

A straight line is drawn from the man's height to his body mass. His surface area is then read off where the line crosses the surface area scale.

Data for four men, **W**, **X**, **Y** and **Z**, is plotted on the nomogram.



8A The man with an estimated surface area of 1.71 m^2 is . . .

1 **W**.

2 **X**.

3 **Y**.

4 **Z**.

8B Why would this nomogram **not** give accurate results for a woman?

1 Women are generally shorter than men.

2 Women generally weigh less than men.

3 Women exercise more than men.

4 Women are generally a different shape from men.

8C The actual surface area of a man depends mainly on . . .

1 his body mass.

2 his height.

3 his body mass and his height.

4 factors other than his body mass and height.

8D Man **Z** goes on a slimming programme.

Which of the following is likely to be affected by the programme?

1 his mass only

2 his height and his mass

3 his mass and his surface area

4 his height and his surface area

Turn over for the next question

QUESTION NINE

This question is about hormones.

9A Which row in the table shows the sites of production of FSH, LH and oestrogen?

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

9B Which row in the table shows the effect of oestrogen on the production of FSH and LH?

	FSH production	**LH production**
1	stimulated	inhibited
2	inhibited	inhibited
3	stimulated	stimulated
4	inhibited	stimulated

9C IVF (in vitro fertilisation) treatment can be used to help childless couples have children.

This treatment usually involves giving the woman . . .

1 FSH only.

2 FSH and LH.

3 oestrogen and FSH.

4 oestrogen and LH.

9D Hormones are used during IVF treatment.

Which of the following is an ethical issue associated with IVF treatment?

1 Children born following IVF treatment will not have a father.

2 There may be more embryos produced than can be used.

3 The mother may produce many eggs during the treatment.

4 The mother will not be able to have more than one child.

END OF TEST

There are no questions printed on this page