AQA

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.
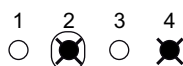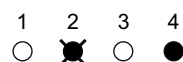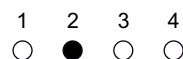
Information
- The maximum mark for this paper is 36.

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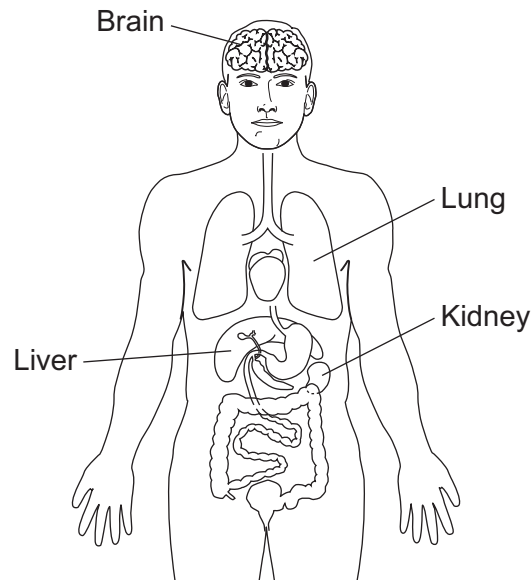
Match organs, **A**, **B**, **C** and **D**, with the statements **1–4** in the table.

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

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

Turn over ▶

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

QUESTION FOUR

The effects of three slimming programmes were evaluated for 6 months.
The graph shows the results of the study.
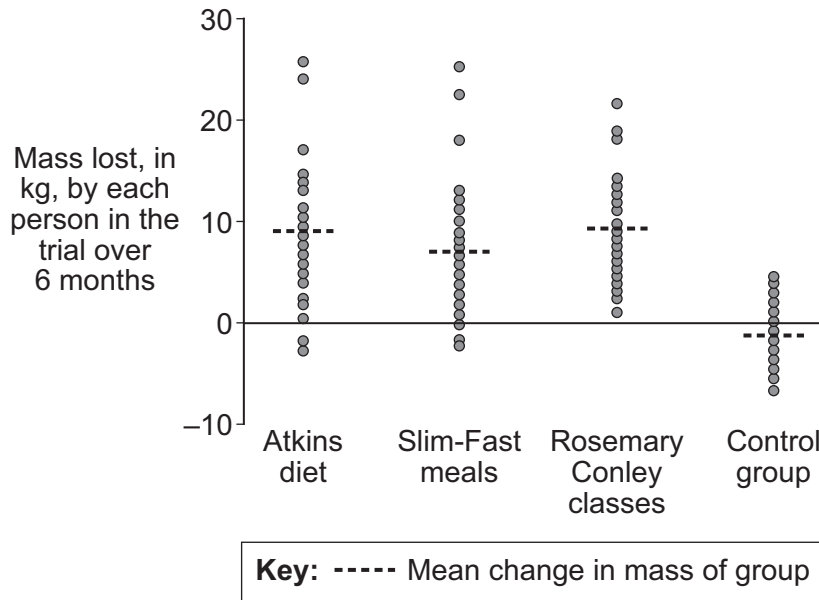
Data © BMJ, 2006, 332 1309−1314, and reproduced/amended
with permission from the BMJ Publishing Group

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

Turn over ▶

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** . . . .

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

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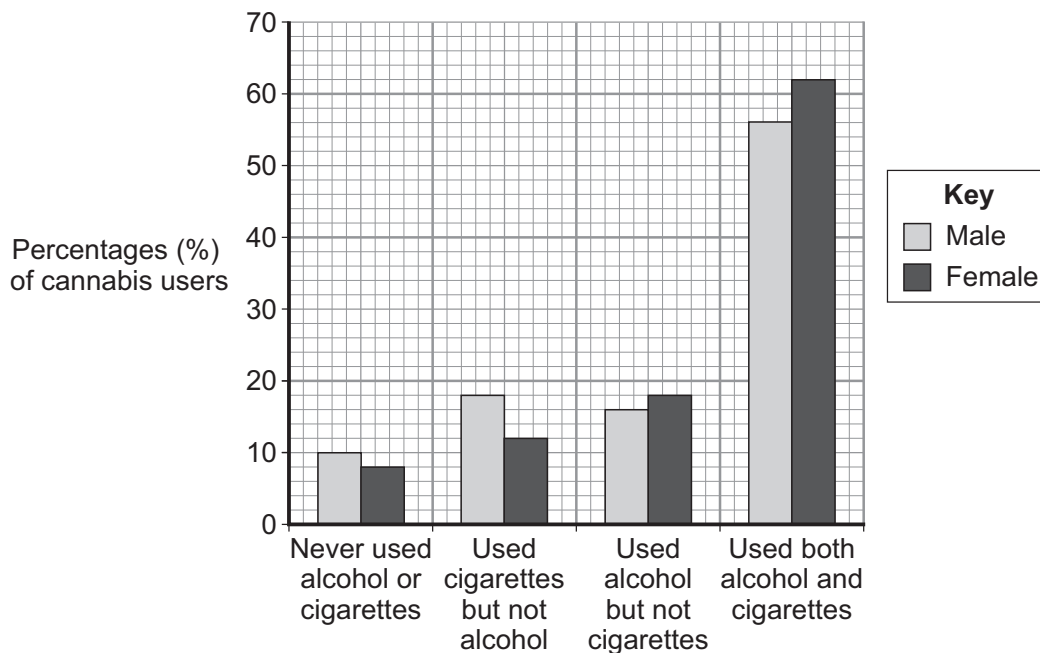
6B What percentage of males had used only cigarettes before they began using cannabis?

1 10 %

2 12 %

3 16 %

4 18 %

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

Turn over ▶

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.

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

Turn over ▶

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.

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**.

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

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

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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** . . . .

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

Turn over ▶

SECTION TWO

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

Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION THREE

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.

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    3   an epidemic.

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

    1   a virus causes influenza.

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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

Turn over ▶

QUESTION FOUR

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

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

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

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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**.

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

Turn over ▶

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

Turn over for the next question

Turn over ▶

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'

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

Turn over ▶

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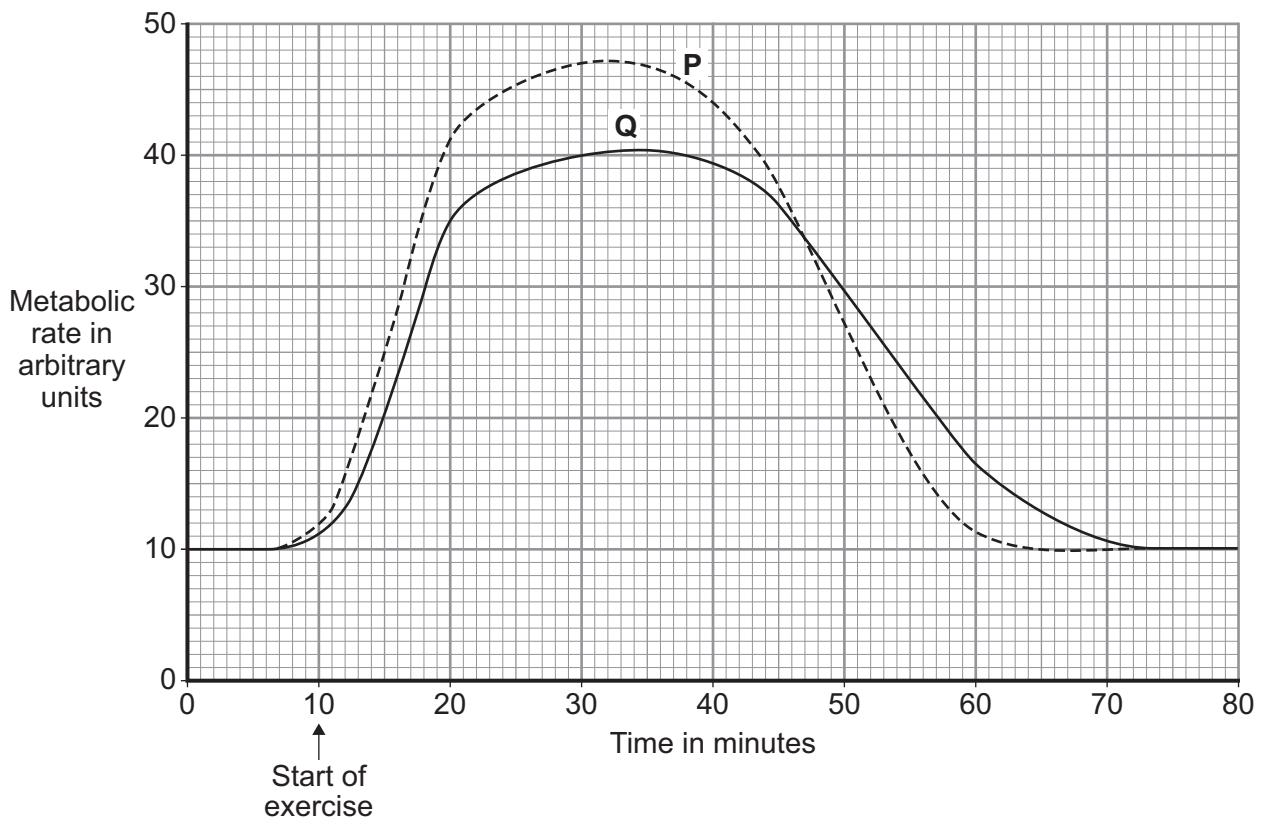
7B How long after the end of the exercise did it take for the metabolic rate of person **P** to return to resting level?

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

Turn over ▶

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.

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

Turn over ▶

QUESTION NINE

Read the information about cholesterol.

Cholesterol is needed for human cells to function normally. The human body synthesises about 1g per day. Another 200 to 300mg comes from the food we eat. An adult with a mass of 68kg has a typical total body content of 35g 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 68kg 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.

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

There are no questions printed on this page