GCSE
BIOLOGY
AQA - COMBINED SCIENCE
MARK SCHEME

B2

ORGANISATION

TEST 1

Mark schemes

1   (a)   biuret

                 1

       (b)   purple

                 1

       (c)   1:1.6

                 1

       (d)   provides amino acids to make new muscle

                 1

       (e)   it has a large surface area

                 1

             it has a thin surface

                 1

       (f)   **C**

                 1

             lowest sugar (content)

                 1

                     [8]

2   (a)   (**A**) right atrium

                 1

            (**B**) right ventricle

                 1

       (b)   To take blood from the lungs to the heart

                 1

       (c)   keeps the (coronary) artery open / wide

                 1

            so the blood can carry glucose and oxygen

                 1

            to the heart (muscle)

                 1

            for respiration

                 1

                  *if marking points 2, 3 and 4 not awarded allow **1** mark for 'keep a (constant) flow of blood to the heart (muscle)'*

       (d)   bar **D** correctly plotted

                 1

            bar **E** correctly plotted

                 1

(e)   twice / two times (more likely)

1

(f)   **Level 3 (5–6 marks):**
A detailed and coherent evaluation is provided that considers a range of relevant points about how well the data correlates with the statement, quoting relevant comparisons and comes to a conclusion consistent with the reasoning.

Level 2 (3–4 marks):
An attempt to relate relevant points within the data and come to a conclusion. The logic may be inconsistent at times but builds towards a coherent argument.

Level 1 (1–2 marks):
Discrete, relevant points made, attempting to apply understanding of the factors involved in development of CHD to the data in the table. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.

0 marks:
No relevant content

Indicative content

data that supports statement:
- country A has the highest death rate at 285 deaths per 1000 and the lowest consumption at only 180 kg per person
- death rate in country E is less than half that in country A (125 compared with 285) and consumption is higher (244 compared with 180)
- other countries with lower death rates than A have higher consumption (eg country B 250 deaths per 1000 but consumption of 320 kg per person)

arguments against statement:
- but most of the data on the graph does not show clear correlation between death rates and consumption of data
- eg death rate in country B is second highest at 250 deaths per 1000 but consumption is highest at 320 kg per person, nearly double that in A where death rate is only 35 per 1000 more
- differences show no clear pattern – eg in countries where death rate is much lower the consumption is not a similar proportion higher (cf country D death rate just under half that in A but consumption not double that in A)
- there may be other factors affecting death rate that are not reported, such as smoking, obesity, exercise, stress

6

[16]

3   (a)   (i)   large intestine = **E**
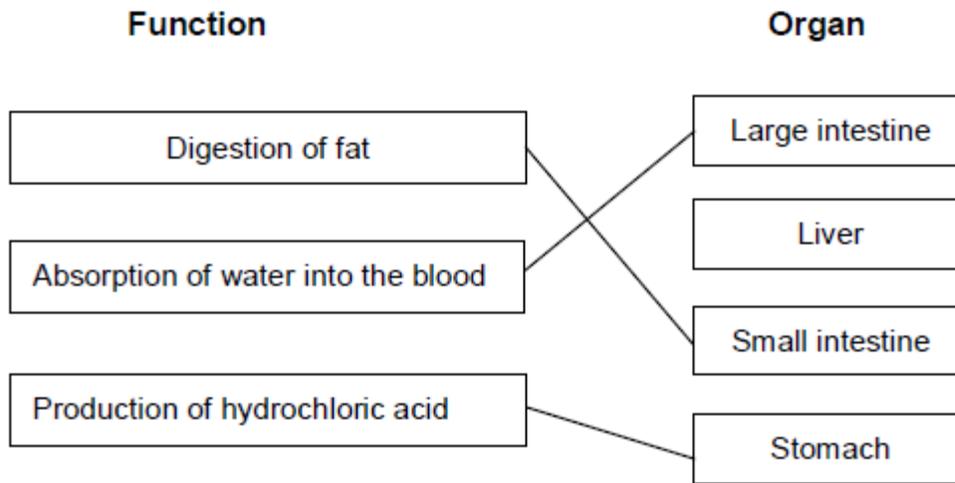
1

        small intestine = **D**

1

        stomach = **B**

1

(ii)

Function		Organ
Digestion of fat		Large intestine
Absorption of water into the blood		Liver
		Small intestine
Production of hydrochloric acid		Stomach

Digestion of fat → Small intestine

Absorption of water into the blood → Large intestine

Production of hydrochloric acid → Stomach

extra lines cancel

3

(b)   The concentration in the blood is lower.

1

[7]

4   (a)   breathing rate when walking is twice that at rest

allow breathing rate when walking is 12 (breaths / minute) more than at rest

1

breathing rate when jogging is 5 times that at rest

allow breathing rate when jogging is 48 (breaths / minute) more than at rest

1

breathing rate when jogging is 2.5 times that when walking

allow breathing rate when jogging is 36 (breaths / minute) more than when walking

1

*allow for **1** mark if no other marks gained: breathing rate at rest is 12 (breaths per minute), breathing rate when walking is 24 (breaths per minute) and breathing rate when jogging is 60 (breaths per minute)*
or
breathing rate increases with increasing activity

***max 2** marks if written in terms of heart rate*

(b)　(breathing rate increases)

to supply more oxygen / O_2
or
to supply oxygen / O_2 faster
　　　　allow to remove more carbon dioxide / CO_2
　　　　or
　　　　to remove carbon dioxide / CO_2 faster
　　　　*do **not** accept incorrectly written formulae*

1

for (aerobic) respiration
or
to reduce anaerobic respiration
or
to reduce lactic acid build up

1

(so) that more energy is transferred / released
or
(because) more energy is required
　　　　*do **not** accept used / produced / created or energy
　　　　made*

1

　　　　*reference to more / faster required at least once for full
　　　　marks*

(c)　right ventricle / side of the heart pumps (blood) to the lungs

1

　　left ventricle / side of the heart pumps (blood) to the body

1

　　　　*if no other marks scored allow **1** mark for one side
　　　　pumps blood to the lungs and the other side pumps
　　　　blood to the body*

(d)　any **one** from:
　　•　(the left ventricle) has to pump blood further (than the right ventricle)
　　　　*allow (the left ventricle) has to pump blood all around
　　　　the body*

　　•　(the left ventricle) has to pump blood with a greater force (than the right
　　　　ventricle)
　　　　allow (left ventricle) has to pump blood harder

　　•　(the left ventricle) has to pump blood at a higher pressure (than the right
　　　　ventricle)

1

　　　　there must be a comparative statement

(e) any **one** from:
- strengthens heart (muscle)

- reduces chance of another heart attack

    ignore prevents / no heart attacks

- reduces / controls weight
- improves circulation

    allow decreases chance of fatty deposits
    or fat building up (in arteries / blood vessels)

    allow reduces resting heart rate

1

[10]

5 (a) (i) stomach

1

(ii) small intestine

1

(b)

	salivary glands	stomach	pancreas	small intestine
amylase	✓	✗	✓	✓
lipase	✗	✗	✓	✓
protease	✗	✓	✓	✓

1 mark per correct row
or
if no correct row max 1 mark for any one correct column

2

(c) enzyme / protease / pepsin most effective in acid conditions / low pH

accept optimum / correct pH
do not accept ref to incorrectly named enzymes
ignore killing bacteria
ignore acid breaks down food

1

(d)

Enzyme   **Breakdown products**
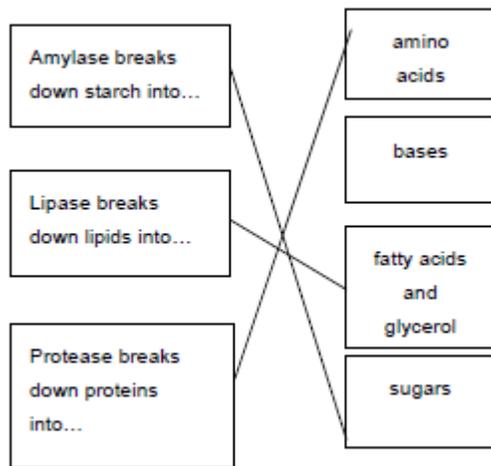
3

[8]

6 (a) is not caused by a pathogen / infective organism

allow not caused by a microorganism / microbe
ignore not caused by infection
ignore named pathogen unless bacteria, virus and
fungus all mentioned

1

(so) is not passed / spread (from person to person)

allow cannot be spread / caught
allow is not infectious / contagious

1

(b) reduced / restricted / stopped blood flow

it does not matter where blood flow is restricted to −
heart / body

1

(so) less oxygen reaches heart (muscle / cells)

must reference heart / it
allow no oxygen reaches the heart (muscle / cells)

1

(so heart muscle / cells) cannot respire (enough)

or

(so heart muscle / cells) do not release (enough) energy

*do **not** accept do not make / produce / create energy*
ignore references to breathing / suffocation
ignore blood clots / blockages

1

allow 'it' for heart

(c) **Level 3:** Relevant points (factors / effects) are identified, given in detail and logically linked to form a clear account.

5−6

Level 2: Relevant points (factors / effects) are identified and there are attempts at logical linking. The resulting account is not fully clear.

3−4

Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

1−2

No relevant content

0

Indicative content

medical risk factors:
*   high blood pressure
*   high cholesterol
*   diabetes
*   genetic factors
*   medications

lifestyle risk factors:
*   smoking
*   obesity
*   lack of exercise
*   high fat / energy diet
*   eating insufficient fruit / vegetables
*   alcohol
*   high salt intake
*   exposure to air pollution
*   certain drugs / correct named drug

examples of links:
*   smoking − high bp / cholesterol / fatty deposition
*   obesity − lack of exercise / high bp / cholesterol / fatty deposition / diabetes
*   exercise − obesity / bp /diabetes
*   diet − obesity / cholesterol / diabetes
*   alcohol − bp / cholesterol
*   high salt intake − high blood pressure
*   genetic factors − bp / cholesterol / diabetes / obesity
*   medication − can affect blood / blood vessels / metabolism

the main discriminator is the quality of linking
both lifestyle and medical factors are required for **level 3**

[11]

7 (a) any **two** from:

- to work out the correct dose to be given
- to check that the drug is working correctly
- to check for toxic effects.

2

(b) patients are randomly allocated to receive statin or a placebo

1

so neither patient nor doctor knows who has received which

1

*answer in terms of only the drug company knows who is taking the statin or the placebo gains **2** marks*

(c) To prevent false claims

1

(d) drug **A** reduced the blood cholesterol level more than drug **B**

1

drug **A** reduced the thickness of the artery **or** drug **B** increased the thickness of the artery

*allow drug **A** made the artery thinner **or** drug **B** made the artery thicker*

1

ignore side effects

(e) differences in number of patients reporting side effects are very similar

1

we don't know what the patients died of

1

[9]

8 (a) xylem

1

(b) **A** is phloem, **B** is xylem

1

any **three** from:

- phloem transports sugars
- there are more sugars in fluid A
- xylem transports mineral ions / potassium ions / nitrate ions
- there are more mineral ions in fluid B.

3

(c) correct conversion of 1.18 µg to mg / cm^3

1

$$\frac{118}{0.00118} = 100\ 000$$

*allow **1** mark for 100 (ie no conversion to mg)*

*allow 100 000 with no working shown for **2** marks*

1

(d)   potassium ions are transported into the root

1

against a concentration gradient

1

by active transport

1

[10]

9   (a)   plasma transports proteins / dissolved substances / food (molecules) / urea / hormones
or
blood cells are suspended in the plasma

1

platelets are involved in blood clotting

1

(b)   the right side of the heart pumps blood to the lungs
and
the left side of the heart pumps blood around (the rest of) the body

1

(c) **Level 3 (5–6 marks):**
A detailed and coherent evaluation is provided which considers a range of relevant points and comes to a conclusion consistent with the reasoning.

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Level 1 (1–2 marks):
Discrete relevant points made. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.

0 marks:
No relevant content

Indicative content

pros of statins:
- decreases blood cholesterol
- slows down build-up of fatty material in arteries
- (so) blood can flow to heart muscle cells

cons of statins:
- drug has to be taken regularly **or** may forget to take drug
- drug will need to be taken long-term
- side-effects of taking the drug
- effects of drug will take time to happen

pros of stents:
- blocked artery is held open
- (so) blood can flow to heart muscle cells
- will remain in place / work for a long time
- rapid recovery time

cons of stents:
- risk of infection from procedure
- risk of surgery eg heart attack
- risk of thrombosis **or** blood clot

a justified conclusion

6

[9]

10 (a) (lack of) exercise

allow description of type or amount of exercise

1

allow other risk factors not mentioned in table, eg high cholesterol levels, blood pressure, levels of obesity, diabetes

(b)   the second highest death rate has the highest fruit and vegetable consumption

the lowest death rates don't have high fruit and vegetable consumption

lowest death rates have a low percentage of the population that smokes.

3

(c)   (it builds up) inside the <u>coronary</u> arteries

1

(causing) them to narrow

1

(this) reduces blood flow

1

so less oxygen gets to the heart <u>muscle</u>

1

(d)   (statins) reduce cholesterol in the blood

1

so there is less build up of fatty material (in coronary arteries)
        allow slows the rate of fat deposit

1

[10]