

MARK SCHEME

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

B 2 - TEST 4

Organisation

Intermediate

Mark schemes

1.

- (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]

- | | | |
|-----------|---|---|
| 2. | (a) stomach and pancreas | 1 |
| | (b) all points plotted correctly
<i>allow 1 mark for 3 points correctly plotted</i> | 2 |
| | smooth curve drawn through all the points | 1 |
| | (c) as concentration of protein increases the percentage of light passing through decreases | 1 |
| | (because) mixture more cloudy
<i>allow idea of more particles in suspension</i> | 1 |
| | (d) use protein concentrations between 2 and 10 g/dm ³ | 1 |

(e) any one from:

- to allow them to reach 37 °C
to allow them to reach body temperature
- so they would be at the optimum temperature
allow so they would be at the same temperature
- so reaction temperature controlled
allow temperature affects enzyme activity

1

(f) correctly read concentration at 57% from their graph

1

(g) their value given in part (f) – 0.5

allow use of different values over straight line portion of graph

1

answer for their value given in

$$\frac{03.6 - 0.5}{12}$$

1

(h) (protease from organ **B**) is inactive **or** rate of digestion is zero **and** protease from organ **A** is active

*allow only protease from organ **B** is inactive*

1

any **one** from:

- enzyme denatured by pH
- at the wrong pH
- enzyme not specific for this protein
allow active site damaged / changed by pH

1

[13]

3.

(a) platelets

1

white blood cells

1

plasma

this order only

1

(b) 5500 000

1

(55 000 000 × 1000 000 =) 5500 000 000 000

1

5.5×10^{12}

1

(c) $(5.5 \times 10^{12} \times 5.2 =) 2.86 \times 10^{13}$

allow ecf from part (b)

allow 28 600 000 000 000

1

(d) it is recessive

allow it is not dominant

1

(e)

Level 3: Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5-6
Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logically 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 <ul style="list-style-type: none">• red blood cells carry oxygen• rbc contain haemoglobin• haemoglobin carries / binds to oxygen• sickle cells are smaller or have smaller volume• sickle cells contain less haemoglobin• less oxygen carried• smaller SA:volume ratio• oxygen enters rbc by diffusion• slower / decreased diffusion• less oxygen delivered per minute or slower rate of delivery• blood vessels blocked (due to cell shape)	

6

- (f) any **one** from:
- breathlessness
 - tiredness
 - less able to do exercise
 - pain (in muscles)
 - muscle fatigue
 - anaemia

1

[15]

4.

- (a) guard (cells)

allow phonetic spelling

1

- (b) (i) as carbon dioxide (concentration) increases, the (mean) number of stomata decreases

allow there is a negative correlation

1

(there is a) rapid drop initially

allow use of any number between 1.5 and 3.0 to indicate "initially"

1

- (ii) (there is) more carbon dioxide so plant doesn't need as many stomata (to obtain the amount needed)

or

(there is) less carbon dioxide so the plant needs more stomata (to obtain enough)

1

- (c) (i) may lose too much water

allow plant may wilt

ignore references to oxygen / carbon dioxide

plants lose a lot of water is insufficient

ignore flaccid

1

- (ii) any **one** from:

- hot
- dry
- windy

ignore environments unqualified eg desert

1

[6]

5.

- (a) tissue → organ → organ system

one right for 1 mark

three right for 2 marks

2

(b) **Epithelial tissue** → covers the outside and the inside of the stomach

more than one line from a tissue = no mark

1

Glandular tissue → produces digestive juices

1

Muscular tissue → allows food to be churned around the stomach

1

(c) (i) light

ignore dark

1

(ii) moving (to the dark)

1

(iii) any **two** from:

- use more woodlice
- repeat the experiment
- run for a longer time

2

[9]

6.

(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

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]

7. (a) (i) glycerol 1

(ii) pancreas / small intestine
accept duodenum / ileum
ignore intestine unqualified

(b) any **two** from:

- type of milk
- volume / amount of milk
- vol. bile equals vol. water
- volume of lipase
- concentration of lipase
- temperature

ignore time interval

ignore solution unqualified

*do **not** allow pH*

ignore starting pH

ignore volume / amount of bile / water

ignore concentration of bile

accept amount of lipase if neither volume nor concentration given

2

(c) (i) fatty acid (production)

1

(ii) faster reaction / digestion (with bile)

or

pH decreases faster (with bile)

or

takes less time (with bile)

or

steeper fall / line (with bile)

allow use of data

ignore easier

1

(iii) all fat / milk digested

or

same amount of fatty acids present

or

(lower pH) denatures the enzyme / lipase

allow all reactants used up

ignore reference to neutralisation

allow enzyme won't work at low pH

*do **not** allow enzyme killed*

1

[7]

8.

any **two** from:

- arthritis

ignore descriptions

- diabetes

- high blood pressure

- heart / blood vessel disease

ignore cholesterol

[2]