



# **GCSE Biology**

## **Animal Organ Systems**

### **Mark Scheme**

**Time available: 68 minutes**

**Marks available: 60 marks**

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## Mark schemes

<b>1.</b>	(a) (A) stomach	1
	(B) small intestine	
	<i>allow ileum</i>	
	<i>ignore intestine unqualified</i>	1
	(C) liver	1
(b)	soluble	1
	catalyse	1
	denatured	1
	<i>this order only</i>	
(c)	amino acids	1
(d)	any <b>one</b> from:	
	• for growth	
	<i>allow for enzymes / hormones / antibodies</i>	
	• for repair / replacement (of cells / tissues / organs)	
	<i>allow to strengthen bones</i>	
	<i>ignore for energy</i>	1
(e)	stomach	1

(f) **Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.

3-4

**Level 1:** Facts, events or processes are identified and simply stated but their relevance is not clear.

1-2

**No relevant content**

0

**Indicative content**

- grinding up the food
- add Biuret reagent (allow  $\text{CuSO}_4$  and  $\text{NaOH}$ ) to food (sample)
- protein turns solution (from blue) to purple / lilac
- wear goggles to protect eyes
- clean up spills immediately
- Biuret /  $\text{NaOH}$  is an irritant / corrosive / poisonous

for **level 2** a reference to Biuret, a positive result and reason for a safety precaution is required

(g) fat

1

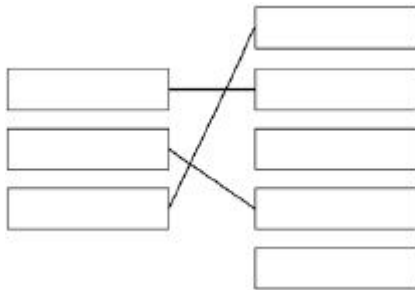
(h) type 2 diabetes

1

[15]

2.

(a)



*additional line from a blood component negates the mark for that component*

1  
1  
1

(b) C

1

(c) (vessel) B

thick walls **or** thick muscle / elastic tissue  
*do not accept ref to 'cell walls'*

1

**or**

lumen is small / narrow

*allow description of 'lumen'*

1

(d) 95

1

(e) (because coronary) arteries / they are narrower

*allow (because the coronary) arteries are blocked /  
clogged (with fat)*

1

(f)  $250 \times 60 (= 15\,000)$

**or**

15 000

*allow  $0.25 \times 60$*

1

15

*allow  $\frac{\text{answer to marking point 1}}{1000}$*

*an incorrect conversion to  $\text{dm}^3$  in calculation does not  
negate marking point 1*

1

*an answer of 15 scores 2 marks*

- (g) any **two** from:
- no need to stay as long in hospital (after procedure) **or** can go home sooner / same day

*allow only need to stay 2–3 hours in hospital (after procedure)*

*allow less scarring*

*allow less chance of infection*

*allow only a small cut needed*

- not as / less invasive **or** no need for a major operation **or** no need for general anaesthetic
- shorter recovery time **or** can get back to normal lifestyle quicker **or** less time needed off work

*allow only 7 days recovery*

- lower risk of a heart attack (during procedure)

*ignore reference to cost*

*ignore idea that it takes less time overall*

2

- (h) lower chance of failure (within one year)

*allow only a 5% chance of failure*

1

only need one operation to treat multiple blockages **or** can treat multiple blockages at one time

*ignore ref to anaesthetic or CABG being a long-term treatment*

1

[14]

3.

- (a) vena cava

1

- (b) 0.5 mm = 0.05 cm

1

$$\text{time} = \frac{10.00 - 0.05}{0.4}$$

*allow alternative correct substitution*

1

24.875

1

25 (s)

*an answer of 25 (s) scores 4 marks*

*allow 24 for 3 marks (no conversion of mm to cm)*

*allow 23.8 / 23.75 for 2 marks (no conversion of mm to cm and incorrect sf)*

1

- (c) (blood) travels through (the) pulmonary vein 1
- (blood) enters left atrium 1
- (blood) enters (the) left ventricle 1
- (blood) leaves the heart via / through (the) aorta 1
- allow blood travels through arterioles*
- allow blood (travels round the body and) reaches the cells / tissues via / in capillaries*
- ignore ref to valves / systole / diastole throughout*

(d) **Level 3 (5-6 marks):**

Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.

**Level 2 (3-4 marks):**

Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

**Level 1 (1-2 marks):**

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

No relevant content (0 marks)

**Indicative content**

**S = structural F = functional**

- (S) both have a large surface area
- (S) villi have many microvilli
- (S) alveolar walls are not flat / are folded
- (F) to maximise diffusion (of gases) / absorption of (food) molecules
- (S) both have many capillaries / good blood supply / capillaries near the surface
- (F) to maintain concentration / diffusion gradient
- (S) both have thin walls / walls that are one cell thick / one cell thick surface
- (F) to provide a short diffusion distance (for molecules to travel)
- (S) villi have many mitochondria
- (F) to provide energy for active transport (of food molecules)
- (S) cells of the villi have microvilli / more projections
- (F) to further increase the surface area / increase the number of proteins in the membrane / to allow more active transport to take place

[15]

4. (a) salivary glands and pancreas

1

- (b) starch / substrate fits into active site (of enzyme) 1
- shape of active site is unique / complementary to substrate  
*allow converse*
- or**  
 substrate is specific to active site / enzyme  
*allow enzyme has a high specificity for substrate* 1
- bonds (within starch / substrate  
**or**  
 between sugar molecules) are broken 1
- (c) converted to new carbohydrates / glycogen / named organic compound (e.g. protein / fat) 1
- (d) to allow (the starch and amylase / solutions) to equilibrate (to the temperature of the water bath)  
**or**  
 to get the starch and amylase / solutions to the same temperature / 20 °C  
**or**  
 to get the starch and amylase / solutions to the (same) temperature of the water bath 1
- (e) **40 °C**  
 all wells contain a symbol  
**and**  
 must contain at least two crossed (✖) wells at the end  
*allow final three wells crossed*  
 (✖) 1
- 60 °C**  
 all wells contain a symbol  
**and**  
 must have fewer crossed (✖) wells at the end than at 40 °C  
*allow all wells ticked (✓)*  
*for either mp do **not** allow a crossed well followed by a ticked well* 1
- (f) more accurate  
*allow (so) closer to (the) true value* 1
- (because) it is a quantitative measure  
*allow (it's) an actual value as opposed to an opinion*  
**or**  
 less / not subjective  
*allow colour is only qualitative* 1

(g) 0.07 (%)

1

(h) starch is broken down less quickly (at 20 °C)

*allow converse*

1

because, at 20 °C, substrates / enzymes / molecules have less (kinetic) energy

1

(i) 1.08 (arbitrary units)

1

at 80 °C, enzyme / amylase has denatured

*allow description of denaturation*

*do **not** allow enzyme is killed*

1

so starch is not broken down (at all)

*allow the concentration of starch is still 0.5%*

1

**[16]**