

# MARK SCHEME

# GCSE

## BIOLOGY

## AQA - TRIPLE SCIENCE

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B 1 - TEST 6

CELL BIOLOGY

Advanced

## Mark schemes

1.

(a) hold cells together **or** prevent flow of cells **or** trap cells

1

(b) 12500

*if correct answer, ignore working / lack of working*

$$\frac{100}{0.008} \text{ for 1 mark}$$

*ignore any units*

2

(c) (i) size RBC approximately same size capillary **or**  
no room for more than one cell **or**  
only one can fit **or**  
RBC is too big

*allow use of numbers*

*do **not** accept capillaries are narrow*

1

(ii) more oxygen released (to tissues) **or**  
more oxygen taken up (from lungs)

1

and any **two** from:

- slows flow **or** more time available
- shorter distance (for exchange) **or** close to cells / capillary wall
- more surface area exposed

2

**[7]**

**2.** any **four** from:

- cells used to treat diseases do not go on to produce a baby
- produces identical cells for research
- cells would not be rejected
- allow cells can form different types of cells
- (immature) egg contains only genetic information / DNA / genes / chromosomes from mother **or** there is only one parent
- asexual / no mixing of genetic material / no sperm involved / no fertilisation **or** chemical causes development
- baby is a clone
- reference to ethical / moral / religious issues  
*allow ethically wrong*  
**NB cloning is illegal gains 2 marks**  
*ignore unnatural*
- risk of damage to the baby  
*in correct context*

[4]

**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* 1

(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.

D – *many microvilli* (1)

Ex – provide large surface area (1)

*five points made*  
*max 3 descriptions*  
*max 3 explanations*

D – *many capillaries / good blood supply* (1)

Ex – maintain concentration / diffusion gradient **or** quickly removes food (1)

D – thin wall / one cell thick surface / capillaries near surface (1)

*allow villi are thin*  
*ignore villi are one cell thick*

Ex – short distance for food to travel (1)

D – *many mitochondria* (1)

Ex – provide energy / ATP for active uptake / transport (1)

[5]

5.

(a) any **two** from:

- sterilise / kill microorganisms  
*ignore 'cleaning' / 'disinfect'*  
*ignore 'germs'*
- method of sterilisation eg apparatus / media sterilised in oven / autoclave  
*allow pressure cooker / boiling water*
- pass flask mouth / pipette tip / loop / test tube mouth through flame
- work near a flame
- minimise opening of flask / test tube **or** hold non-vertical  
*allow idea of sealing / covering **or** prevent entry of air*

2

(b) any **two** from:

- temperature  
*ignore references to time / type of bacterium*
- concentration / amount of nutrients / ions
- type of nutrient
- volume / amount of solution
- amount of bacteria added
- agitation **or** amount of oxygen

2

- (c) (i) 7.5  
*accept in range 7.4 – 7.6* 1
- (ii) use more pH values around / close to pH 7.5 / between 7 and 8 1

[6]

6.

- (a) (i) glucose **and** galactose 1
- (ii) any **three** from:

Evidence:

- absorption reduced by cyanide  
*allow converse*
- absorb faster (than other sugars)

Explanation:

- active transport needs energy
- less / no energy available / released if cyanide is there  
**or** less / no energy if no / less respiration  
*allow energy produced*  
*ignore cyanide prevents respiration*

3

- (b) all / the sugars / they can be absorbed when gut poisoned / with cyanide **or** when no respiration 1

(diffusion) does not need an energy supply 1

[6]

7.

- (a) No  
*no mark*  
*if yes max 1 for correct statement*

diffusion is down the concentration gradient  
*accept by diffusion ions would leave the root* 1

to enter must go up / against the concentration gradient  
**or** concentration higher in the root  
**or** concentration lower in the soil 1

(b) (i) 0.9 **or** 3.25  
*for correct answer with or without working*  
*if answer incorrect 1.3 **or** their rate – 0.4 gains 1 mark*  
**or** 130 – 40 **or** 90 gains 1 mark

(ii) (uptake) by active transport

requires energy

more energy from aerobic respiration

**or**

more energy when oxygen is present

[7]

8.

(a) (i) mitochondrion / mitochondria  
*must be phonetically correct*

(ii) carbon dioxide / CO<sub>2</sub>

water / H<sub>2</sub>O

*in either order*  
*accept CO<sub>2</sub> but **not** CO<sup>2</sup>*  
*accept H<sub>2</sub>O **or** HOH but not H<sup>2</sup>O*

(iii) diffusion

high to low concentration  
*allow down a concentration gradient*

through (cell) membrane **or** through cytoplasm  
*do **not** accept cell wall*

(b) ribosomes make proteins / enzymes

using amino acids

part A / mitochondria provide the energy for the process

*allow ATP*

*do not accept produce or make energy*

1

[9]

9.

(a)  $(0.15 / 1.35) \times 100$

1

11.1 (%)

*allow 11.1 (%) with no working shown for 2 marks*

1

(b) to allow results to be compared  
**or**  
they had different masses at the start

1

(c) axis correct scale and labelled

1

5 points correctly plotted

*allow ecf from 05.1*

*allow 1 mark for 4 points correctly plotted*

2

line of best fit

1

(d) 0.5

*allow 0.45–0.55*

1

(e) (0.0 to 0.4) water moves into cells

1

(0.6 to 0.8) water leaves cells

1

by osmosis

1

(f) any **two** from:

- concentration of solutions
- drying of chips
- accuracy of balance
- evaporation from tubes

2

[13]