

MARK SCHEME

GCSE

BIOLOGY

AQA - TRIPLE SCIENCE

B 1 - TEST 3

CELL BIOLOGY

Intermediate

Mark schemes

- 1.** (a) contract / shorten
ignore relax
*do **not** allow expand* 1
- to churn / move / mix food
accept peristalsis / mechanical digestion
ignore movement unqualified 1
- (b) 400
acceptable range 390-410
allow 1 mark for answer in range of 39 to 41
allow 1 mark for answer in range of 3900 to 4100 2
- (c) to transfer energy for use
allow to release / give / supply / provide energy
*do **not** allow to 'make' / 'produce' / 'create' energy*
allow to make ATP
ignore to store energy 1
- by (aerobic) respiration **or** from glucose
*do **not** allow anaerobic*
*energy released **for** respiration = max 1 mark* 1
- (d) (i) to make protein / enzyme
ignore 'antibody' or other named protein 1
- (ii) too small / very small
allow light microscope does not have sufficient magnification / resolution
allow ribosomes are smaller than mitochondria
ignore not sensitive enough
ignore ribosomes are transparent 1
- [8]**
- 2.** (a) (i) xylem 1
- (ii) water 1

minerals / ions / named example(s)

ignore nutrients

1

(b) (i) movement of (dissolved) sugar

*allow additional substances, eg amino acids / correct named sugar
(allow sucrose / glucose)*

allow nutrients / substances / food molecules if sufficiently qualified

ignore food alone

1

(ii) sugars are made in the leaves

1

so they need to be moved to other parts of the plant for respiration / growth / storage

1

(c) (i) mitochondria

1

(ii) for movement of minerals / ions

Do not accept 'water'

1

against their concentration gradient

1

[9]

3.

(a) large surface / large area

1

thin / short distance (from air to blood) / one cell thick / two cells thick

1

good blood supply / many capillaries / capillary network / many blood vessels

ignore moist surface

1

(b) (i) diffusion

ignore gaseous exchange

1

(ii) brings (more) oxygen / air into the lungs / alveoli

1

keeps O₂ level high in alveoli

or

maintains concentration difference (between alveoli and blood) / keeps O₂ concentration in alveoli > O₂ concentration in blood gains **2** marks

1

[6]

4.

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

An example is given of a named substance

or

a process

or

there is an idea of why diffusion is important eg definition.

Level 2 (3 – 4 marks)

At least one example of a substance is given

and

correctly linked to a process in either animals or plants.

Level 3 (5 – 6 marks)

There is a description of a process occurring in either animals or plants that is correctly linked to a substance

and

a process occurring in the other type of organism that is correctly linked to a substance.

examples of points made in the response

Importance of diffusion:

- to take in substances for use in cell processes
- products from cell processes removed

Examples of processes and substances:

- for gas exchange / respiration: O₂ in / CO₂ out
- for gas exchange / photosynthesis: CO₂ in / O₂ out
- food molecules absorbed: glucose, amino acids, etc
- water absorption in the large intestine
- water lost from leaves / transpiration
- water absorption by roots
- mineral ions absorbed by roots

extra information

Description of processes might include:

- *movement of particles / molecules / ions*
- *through a partially permeable membrane*
- *(movement of substance) down a concentration gradient*
- *osmosis: turgor / support / stomatal movements*

[6]

5.

(a) diffusion

1

active transport

1

this order only

- (b) (i) concentration (of sugar) in the bag was higher (than in the drink)
allow concentration (of sugar) in the drink was lower (than in the bag)

or

higher concentration of water outside the bag **or** in the drink / boiling tube
*allow higher water potential outside the bag **or** lower water potential inside the bag*

1

(so) water moved in (to the tubing)
*allow water moves down **its** concentration gradient
do **not** allow sugar moving*

1

by osmosis

*allow diffusion (of water)
do **not** allow sugar moving by osmosis **or** water moving by active transport*

1

- (ii) **B**

1

- (iii) close(st) to the concentration in the bag **or** to 5%
*allow small(est) diffusion gradient **or** close(st) to an equilibrium*

1

(so rate of) diffusion / osmosis is slow
*allow (so) less water moves in (to the bag)
ignore ref. to sugar*

1

[8]

6.

- (a) (i) nucleus

1

- (ii) diffusion

1

- (b) increases / larger surface area (for diffusion)
ignore large surface area to volume ratio

1

- (c) (i) sugar / glucose
accept amino acids / other named monosaccharides 1
- (ii) against a concentration gradient
or
from low to high concentration 1
- (iii) (active transport requires) energy 1

(from) respiration 1
- (d) minerals / ions
accept named ion ignore nutrients
do not accept water 1

[8]

7.

- (a) electron (microscope) 1
- (b) $\frac{30000}{200}$

an answer of 150 (μm) scores 2 marks 1

150 (μm)
if answer is incorrect allow for 1 mark sight of 0.015 / 0.15 / 1.5 / 15
allow ecf for incorrect measurement of line X for max 1 mark 1
- (c) **either**
large surface area
allow (vacuole contains) cell sap that is more concentrated than soil water (1) 1

for more / faster osmosis
create / maintain concentration / water potential gradient (1)

or

allow thin (cell) walls

for short(er) diffusion distance 1

- (d) (on hot day) more water lost
allow converse for a cold day if clearly indicated 1
- more transpiration
or
 more evaporation 1
- so more water taken up (by roots) to replace (water) loss (from leaves) 1
- (e) (aerobic) respiration occurs in mitochondria
do not accept anaerobic respiration 1
- (mitochondria / respiration) release energy
do not accept energy produced / made / created 1
- (energy used for) active transport 1
- to transport ions, against the concentration gradient
or
 from a low concentration to a high concentration 1
- [12]**
- 8.** (a) active transport 1
- (b) by transpiration stream / pull 1
- in xylem 1
- (c) any **three** in the correct order from:
- mount epidermis on a slide
 - count stomata in one area
 - repeat in four more areas
 - repeat method on other surface of leaf
 - calculate mean
- allow nail varnish film* 3
- (d) 1
allow numbers written out in a line with middle number circled 1
- (e) $(44 + 41 + 40 + 42 + 39) / 5 = 41.2$ 1

41

allow 41 with no working shown for 2 marks

1

allow 41.2 for 1 mark

(f) less water lost

1

so it does not wilt

1

[11]