

MARK SCHEME

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

B1 - Test 4
CELL BIOLOGY
Intermediate

Mark schemes

1.

(a) (i) release energy

allow provide / supply / give energy

do not accept produce / create / generate / make energy

do not allow release energy for respiration

1

(ii) contain half the (number of) chromosomes **or** contains one set of chromosomes **or** contains 23 chromosomes

allow genetic information / DNA / genes / alleles instead of chromosomes

accept haploid

1

(b) any two from:

- (stem cells) are unspecialised / undifferentiated
allow description eg 'no particular job'
- are able to become differentiated
or can form other types of cell / tissue / organ
- stem cells can / able to divide / multiply

2

[4]

2.

(a) any **two** from:

- large surface / area **or** many villi **or** have microvilli
accept big surface / area
- thin surface **or** thin wall **or** surface 1-cell thick **or** capillaries near surface **or** permeable **or** partially permeable
accept they are thin
do not allow thin cell wall
- many blood vessels **or** many capillaries **or** capillary network **or** good blood supply
ignore 'constant blood flow' owtte
ignore extras eg moist or reference to gases
- have enzymes
ignore release enzymes
 - *accept reference to lacteal as 5th point*
 - *allow reference to having mitochondria*

2

- (b) (i) small(er) (surface area) / flat(ter) / short(er)
or not as folded
or fewer capillaries
allow small(er) lacteal
ignore references to wide / thick / spread out etc

1

- (ii) less absorption (of digested food) / less digestion / diffusion
accept slower for less
accept description of less digestion
accept less food can get in
*do **not** allow zero absorption*
*do **not** allow 'collection' of nutrients*

1

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3.

- (a) **A** = nucleus
accept phonetic spelling only

1

B = (cell) membrane
accept plasma membrane

1

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

photosynthesis

makes sugar / starch / carbohydrate / organic material

accept 'makes food'

*do **not** accept makes chlorophyll*

ignore stores starch / food / light / chlorophyll

traps or absorbs light

1

(c) any **two** from:

Plant cell

Animal cell

- (has) vacuole **or** has cell sap
 - (has) wall/cellulose
 - (stores) starch **or** doesn't store glycogen
- no vacuole **or** small/temporary vacuole **or** no cell sap
 - no wall/cellulose **or** only membrane
 - doesn't store/have starch **or** stores glycogen

ignore reference to shape
must be clear indication in all four boxes
ignore reference to chlorophyll

2

[5]

4.

(a) (i) makes / produces / synthesises protein / enzyme

1

(ii) plant cell has nucleus / vacuole / chloroplasts / chlorophyll
or plant cell is much larger

'It' = plant cell

allow correct reference to DNA or chromosomes

allow plant cell has fewer ribosomes

allow cellulose (cell wall)

1

(b) (i) 200

correct answer with or without working gains 2 marks

*if answer incorrect, allow 1 mark for $\frac{2 \times 50,000}{500}$ **or** $\frac{100,000}{500}$*
or 100

2

(ii) bacterial cell is too small / bacterial cell about same size as a mitochondrion / 'no room'

ignore references to respiration

1

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5.

(a) (i) A

(ii) B

for 1 mark each

2

(b) diffusion

(reject osmosis)
for one mark

1

- (c) C
 because uptake against a concentration / diffusion gradient
 (*reject osmosis*)
 (if C not given, then idea of movement essential)
for 1 mark each

2

[5]

6.

- (a) (cell) wall
 (cell) membrane
 cytoplasm
 vacuole

for 1 mark each

4

- (b) (i) A
 (ii) B

for 1 mark each

2

- (c) diffusion (*reject osmosis*)
for 1 mark

1

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7.

- (a) award **3** marks per tube for each key idea

for tube 1:

expands **or** gets firmer **or** bigger **or** inflates

it gains water

because the concentration of water is less than its surroundings

make sure answer is about water movement and not sucrose solution

3

for tube 2

gets floppy **or** flaccid **or** contracts

it loses water

because the concentration of water is greater than its surroundings

3

(b) any **2** from:

uptake of water by root (hair) **or**
movement from cell to cell within
plant

*do **not** credit references to diffusion unless it is clear that the
candidate is referring to the diffusion of water*

guard cell function

maintain turgor

water absorption in the large intestine

reabsorption of water from the
nephron **or** collecting duct or in
kidney **or** osmoregulation in kidney

allow osmosis in other animals if some use is shown

2

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8.

(a) (i) chloroplast

1

(ii) cell wall

1

(b) (i) osmosis

accept diffusion

1

(ii) cell wall (prevents bursting)

1

(c) (i) carbon dioxide

allow correct formula

1

glucose

allow sugar / starch

1

(ii) any **two** from:

- light sensitive spot detects light
- tells flagellum to move towards light
- more light = more photosynthesis

2

(d) (cell has) larger SA:volume ratio

1

short (diffusion) distance

allow correct description

1

(diffusion) via cell membrane is sufficient / good enough

or

flow of water maintains concentration gradient

1

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9.

(a) A cytoplasm

1

where (chemical) reactions take place

do not accept where cell functions take place

1

or

carries/holds the organelles/named organelles / named chemicals (including nutrients)

do not accept keeps the shape of the cell

or

contains water

or

presses out on the membrane

allow: keeps cell turgid

allows transport through the cell

B membrane

do not accept by themselves:

protects cell

gives shape

1

controls what enters/leaves the cell

1

or

contains the cell/holds the cell together

do not accept keeps harmful substances out

or

allows movement into and out of the cell C nucleus

1

contains the genetic material/DNA/genes/chromosomes

do not accept:

brain of the cell

stores information/instructions

tells cell what to do

or

controls (the activity) of the cell

1

- (b) (i) one mark for each correctly labelled part

cell wall

do not accept anything inboard of the inner edge vacuole

accept anything inboard of transplast

chloroplast: site of photosynthesis/ for photosynthesis

accept word equation or balanced equation

1

cell wall: supports the cell/keeps the shape/keeps it rigid

do not accept protects the cells

2

- (ii) vacuole: acts as reservoir for water / chemicals/(cell)/sap

3

or

keeps cell turgid/pushes content to edge

or

maintains concentration gradient

or

allows cell elongation (not growth)

1

[12]

10.

- (a) (i) variation in masses / more representative / more typical / more reliable / average / mean / reference to anomalies

or

one worm to light to measure change

do not allow more accurate / more precise

ignore fair test / valid / repeatable / reproducible

1

- (ii) remove solution / liquid (on outside of worm)

allow 'water'

1

- (iii) variable amounts removed from each worm
ignore reference to length of timing 1
- (iv) equal sizes of worm / more worms (in each group) / wash off all the sand / repeats / use more accurate balance / use smaller concentration intervals
allow reference to improve blotting technique eg blot before / blot more thoroughly 1
- (b) (i) different (starting) masses / sizes / weights (at different concentrations) 1
- allows comparisons / shows pattern / shows trend 1
- (ii) (+)20
correct answer = 2 marks, with or without working
or
$$\frac{7.5 \times 100}{37.5} \quad / \quad \frac{7.5}{37.5} \quad / \quad \frac{(45.0 - 1) \times 100}{37.5}$$

for 1 mark 2
- (c) (i) graph: 2
- points correct
allow ± 1 mm
-1 mark per error
allow ecf from part b(ii) 2
- label on x-axis including units – ie Concentration of salt in arbitrary units 1
- line of best fit = smooth curve / ruled straight line
anomaly (4.0, -52) either plotted and ignored re. line
or not plotted
do not allow point to point
allow best fit for ecf from 2bii 1
- (ii) on graph: 1
- ring drawn around point at (4.0, -52)
allow (5.0, -50) if cand. line indicates this

- (iii) sensible suggestion – eg used wrong solution / used 5.0% instead of 4.0% / different length of time in solutions / ref to error in blotting / balance not zeroed / error in weighing

allow some lugworms died

allow error in calculation

1

- (d) (i) 2.9 to 3.0 / correct for candidate's graph ± 0.1

1

value of no change in mass / worms in equilibrium with soln / described

allow small(est) mass change

1

- (ii) water loss

1

by osmosis / diffusion

1

from dilute region in the worm to more concentrated solution outside

allow correct description in terms of high to low water concentration / high to low water potential

salt solution is hypertonic

concentration unqualified = salt concentration

1

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