

Mark schemes

1.

(a) diffusion

1

(b) A

1

(c) B

1

(d) (earthworm) can absorb more oxygen (in a given time)

or

increases / more gas exchange

allow get / obtain / take in more oxygen

ignore easier absorption of oxygen

ignore references to food

1

(e) lipase

1

(f) more oxygen (in soil with earthworms)

allow earthworms bring oxygen to soil

1

(for) more (aerobic) respiration

*do **not** accept anaerobic respiration*

1

(of) bacteria / fungi / microorganisms / microbes / decomposers

1

reference to more is only needed once for the first two marking points

(g) fertilisation

ignore sexual reproduction

1

(h) asexual (reproduction)

allow cloning

1

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2.

(a) (yes, because) the mass change (of egg 4) is much lower than the others

allow because it / egg 4 has gained (over) 50% less mass than the others

allow it / egg 4 has gained 1.5 g and the others have all gained more than 3 g (unit required)

1

(b) $\frac{75.7 - 72.4}{72.4} \times 100$

or equivalent

1

4.6 (%)

allow 4.558 / 4.56 (%)

allow any correct rounding of 4.558011049723757

1

an answer of 4.6 / 4.56 / 4.558 scores **2** marks

(c) (mass increased because) water entered by osmosis

1

from a dilute solution in the beaker to a more concentrated solution in the egg (cell)

allow from an area of high water concentration in the
beaker to an area of low water concentration in the egg
(cell)

allow ref to water potential

allow ref to 'strong' and 'weak' solutions

ignore along / across concentration gradient

do **not** accept 'amount' in place of concentration

through a partially permeable membrane

allow semi-permeable / selectively permeable
membrane

1

(d) use five (or more) different concentrations of salt / sugar solution (in beakers)

allow any number of concentrations provided it is more
than four

1

(by) plotting percentage change (in mass / volume) on / using a graph

1

determine the concentration where the curve / line crosses the zero percentage
change (in mass / volume)

1

(e) (ions are moved) from an area of low concentration to high concentration

allow against the concentration gradient

allow in terms of solution

do **not** accept molecules

1

(by) active transport

1

(which) requires using energy

do **not** accept idea of energy being created

1

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3.	(a) $(0.15 / 1.35) \times 100$ 11.1 (%) <i>allow 11.1 (%) with no working shown for 2 marks</i>	1	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 <i>allow ecf from 05.1</i> <i>allow 1 mark for 4 points correctly plotted</i>		2
	line of best fit		1
	(d) 0.5 <i>allow 0.45–0.55</i>		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]
4.	(a) <u>diffusion</u> <u>active transport</u>	1	
	<i>this order only</i>		1

- (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]

5.

(a) more concentrated
must be a comparison

1

than the cell / cytoplasm

*accept more salty / solutes / ions
accept cell is less concentrated than solution for **2** marks*

1

(b) (i) turgid

1

(ii) plasmolysed
accept flaccid

1

(c) any **four** from:

- water left the cell (in A)
- by osmosis
- from dilute to more concentrated solution
accept high to low water potential or from high to low water concentration
- via partially permeable membrane
- so cell membrane shrank away from cell wall

4

(d) water enters the cells (by osmosis)

allow 1 mark for:

1

they burst / lyse / lysis occurs

water leaves and cell shrinks (if they think it is hypertonic solution)

1

animal cells have no cell wall **or** plant cells have a cell wall

1

cell wall prevents lysis / bursting / allows turgidity

allow correct description

1

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