AQA GCSE Biology | 8461

SPECIFICATION POINT 4.1.3.1

Diffusion

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**20**
Available paper years	**2008–2022**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.1.3.1 Diffusion

Answer 01 · Mark scheme

June 2008 | BLY2F | Original Q1 | Legacy

question	answers	extra information	mark
1(a)	**A** nucleus **B** (cell) membrane **C** cytoplasm		1 1 1
1(b)(i)	it is thin		1
1(b)(ii)	diffusion		1
Total			**5**

Answer 02 · Mark scheme

June 2008 | BLY2F | Original Q2 | Legacy

question	answers	extra information	mark
2(a)	photosynthesis		1
2(b)	oxygen		1
2(c)	chlorophyll		1
2(d)	starch		1
Total			**4**

4.1.3.1 Diffusion

Answer 02 · Mark scheme

June 2008 | BLY2F | Original Q2 | Legacy

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: June 2008

4.1.3.1 Diffusion

Answer 03 · Mark scheme

June 2008 | BLY3F | Original Q4 | Legacy

question	answers	extra information	mark
4(a)(i)	red cell		1
4(a) (ii)	diffusion		1
4(a) (iii)	haemoglobin		1
4(a) (iv)	a nucleus		1
4(b)	(on diagram) arrow from any part of blood to air		1
Total			**5**

4.1.3.1 Diffusion

Answer 03 · Mark scheme

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: June 2008

4.1.3.1 Diffusion

Answer 04 · Mark scheme

January 2009 | BLY2F | Original Q4 | Legacy

question	answers	extra information	mark
4(a)	respiration	clear indication eg tick, underlining, others crossed out	1
4(b)	lungs		1
4(c)	liver		1
4(d)	amino acids		1
Total			**4**

4.1.3.1 Diffusion

Answer 04 · Mark scheme January 2009 | BLY2F | Original Q4 | Legacy

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

Answer 05 · Mark scheme January 2009 | BLY3F | Original Q1 | Legacy

The full source mark scheme begins on page 36. Follow original question 1 in that document.

4.1.3.1 Diffusion

Answer 06 · Mark scheme

June 2009 | BLY2F | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)	A		1
2(b)(i)	diffusion		1
2(b)(ii)	respiration		1
2(b)(iii)	mitochondria		1
2(b)(iv)	photosynthesis		1
Total			**5**

4.1.3.1 Diffusion

Answer 06 · Mark scheme

June 2009 | BLY2F | Original Q2 | Legacy

BLY2F

4.1.3.1 Diffusion

Answer 07 · Mark scheme

June 2009 | BLY3F | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)	mineral ions water	each extra box ticked cancels **1** mark	1 1
2(b)(i)	blood plasma		1
2(b)(ii)	dialysis fluid		1
2(b)(iii)	diffusion		1
2(b)(iv)	partially permeable		1
2(b)(v)	small		1
2(c)	drug treatment is needed to suppress the immune system		1
Total			**8**

4.1.3.1 Diffusion

Answer 07 · Mark scheme

June 2009 | BLY3F | Original Q2 | Legacy

BLY3F

4.1.3.1 Diffusion

Answer 08 · Mark scheme

June 2010 | BLY3F | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)(i)	root hair		1
1(a)(ii)	any **two** from: • water • ions / minerals / nutrients / salts / correct named eg nitrates • oxygen	ignore food ignore N,P,K	2
1(b)(i)	stomata		1
1(b)(ii)	diffusion		1
Total			**5**

4.1.3.1 Diffusion

Answer 08 · Mark scheme

June 2010 | BLY3F | Original Q1 | Legacy

BLY 3F

Answer 09 · Mark scheme

January 2011 | BLY3F | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)(i)	capillary		1
2(a)(ii)	diffusion		1
2(b)(i)	Z	ignore any names	1
2(b)(ii)	large / increased surface / area / **or** to absorb more food **or** improved diffusion	allow all food absorbed	1
Total			4

Answer 09 · Mark scheme

January 2011 | BLY3F | Original Q2 | Legacy

BLY3F

4.1.3.1 Diffusion

Answer 10 · Mark scheme

January 2013 | BL2FP | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)(i)	A = nucleus B = (cell) membrane		1 1
1(a)(ii)	any **two** from: • no (cell) wall • no (large / permanent) vacuole • no chloroplasts / chlorophyll	ignore shape	2
1(b)	because high to low oxygen / concentration **or** down gradient	allow 'more / a lot of oxygen molecules outside' ignore along / across gradient	1
1(c)	a tissue		1
Total			**6**

4.1.3.1 Diffusion

Answer 10 · Mark scheme

January 2013 | BL2FP | Original Q1 | Legacy

BL2FP

4.1.3.1 Diffusion

Answer 11 · Mark scheme

June 2013 | BL2FP | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)	xylem **and** phloem	either order allow words ringed in box allow mis-spelling if unambiguous	1
7(b)(i)	movement / spreading out of particles / molecules / ions / atoms	ignore names of substances / 'gases'	1
	from high to low concentration	accept down concentration gradient ignore 'along' / 'across' gradient ignore 'with' gradient	1
7(b)(ii)	oxygen / water (vapour)	allow O_2/O2 ignore O^2/O allow H_2O/H2O ignore H^2O	1
Total			**4**

4.1.3.1 Diffusion

Answer 12 · Mark scheme June 2014 | BL2FP | Original Q8 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.
8			6	AO1 2.1.2a,b, c, 2.2.1d, 2.3.1a,b, c,g, 2.6.1

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 refer to the information on page 5 and apply a 'best-fit' approach to the marking.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content.	An example is given of a named substance **or** a process **or** there is an idea of why diffusion is important eg definition.	At least one example of a substance is given **and** correctly linked to a process in either animals or plants.	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	extra information
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: O_2 in / CO_2 out • for gas exchange / photosynthesis: CO_2 in / O_2 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	**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

Total			6

4.1.3.1 Diffusion

Answer 12 · Mark scheme

June 2014 | BL2FP | Original Q8 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.

4.1.3.1 Diffusion

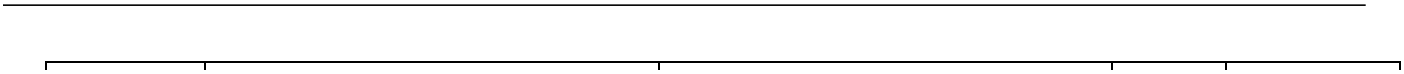
Answer 13 · Mark scheme June 2015 | BL3FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	alveoli / alveolus	allow air sacs allow phonetic spelling	1	AO1 312a
1(a)(ii)	any **one** from: • protection (of lungs / heart) • help you breathe / inflate lungs		1	AO1 312a
1(b)(i)	diffusion		1	AO1 312b
1(b)(ii)	capillaries		1	AO1 311h/i/k
1(b)(iii)	any **two** from: • (have many) alveoli • large surface / area • thin (exchange) surface **or** short diffusion pathway • good blood supply / many capillaries	allow air sacs accept only one / two cell(s) thick allow (kept) ventilated or maintained concentration gradient	2	AO1 321g
Total			**6**	

4.1.3.1 Diffusion

Answer 13 · Mark scheme

June 2015 | BL3FP | Original Q1 | Legacy



4.1.3.1 Diffusion

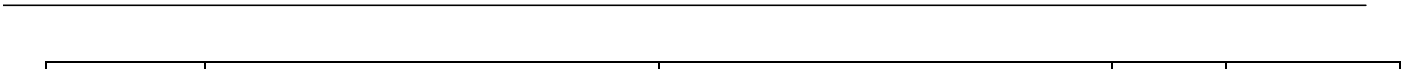
Answer 14 · Mark scheme June 2016 | BL2FP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	large intestine = **E** small intestine = **D** stomach = **B**		1 1 1	AO1 2.2.1d
2(a)(ii)	**Function** — **Organ** Digestion of fat → Small intestine Absorption of water into the blood → Large intestine Production of hydrochloric acid → Stomach extra lines cancel		3	AO1 2.2.1d 2.5.2f/g
2(b)	The concentration in the blood is lower.		1	AO2 2.1.2b
Total			**7**	

4.1.3.1 Diffusion

Answer 14 · Mark scheme

June 2016 | BL2FP | Original Q2 | Legacy



4.1.3.1 Diffusion

Answer 15 · Mark scheme

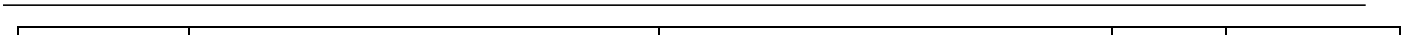
June 2017 | BL2FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)(i)	surface of organ(s)	allow covering / lining organ allow named example of an organ, e.g. surface of stomach allow the skin	1	AO1 2.2.1b/c
6(a)(ii)	**A** (cell) membrane **B** cytoplasm	allow phonetic spelling allow cell surface membrane do **not** allow (cell) wall	1 1	AO1 2.1.1a
6(b)	Protein synthesis		1	AO1 2.1.1a
6(c)	movement of <u>particles</u> / <u>molecules</u> from high to low concentration / down a concentration gradient	allow movement of ions / atoms ignore carbon dioxide / other named substance ignore along / across gradient ignore through membrane	1 1	AO1 2.1 2.1.2a/b
Total			**6**	

4.1.3.1 Diffusion

Answer 15 · Mark scheme

June 2017 | BL2FP | Original Q6 | Legacy



4.1.3.1 Diffusion

Answer 16 · Mark scheme June 2018 | 8461/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	diffusion		1	AO2 4.1.3.1
06.2	A		1	AO2 4.1.3.1
06.3	B		1	AO3 4.1.3.1
06.4	(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	AO2 4.1.3.1
06.5	lipase		1	AO1 4.2.2.1
06.6	 more oxygen (in soil with earthworms) (for) more (aerobic) respiration (of) bacteria / fungi / microorganisms / microbes / decomposers	reference to more is only needed once for the first two marking points allow earthworms bring oxygen to soil do **not** accept anaerobic respiration	 1 1 1	AO2 4.4.2.1 4.7.2.2
06.7	fertilisation	ignore sexual reproduction	1	AO1 4.6.1.1 4.6.1.2

4.1.3.1 Diffusion

Answer 16 · Mark scheme

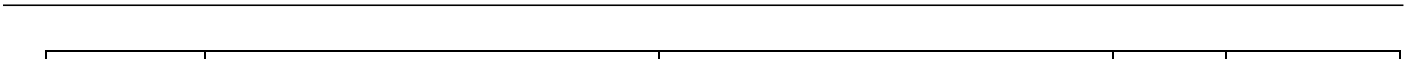
June 2018 | 8461/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.8	asexual (reproduction)	allow cloning	1	AO2 4.6.1.1
Total			**10**	

4.1.3.1 Diffusion

Answer 16 · Mark scheme

June 2018 | 8461/1F | Original Q6



4.1.3.1 Diffusion

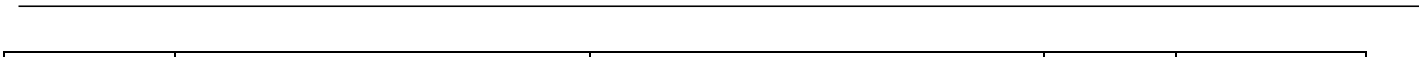
Answer 17 · Mark scheme June 2019 | 8461/1F | Original Q2

02.1	the movement of particles from a high concentration to a low concentration		1	4.1.3.1 AO1
02.2	(gills) have (many) projections (for) large(r) surface / area **or** (gills) are on the outside of the body (1) for good access to water (1)	allow description of projections allow have lots of / five gills	1 1	4.1.3.1 AO2
02.3	differentiation		1	4.1.2.3 AO1
02.4	mitosis	do **not** accept meiosis	1	4.1.2.2 AO1
02.5	hair		1	4.1.2.2 4.1.2.3 AO1
02.6	axolotls are cheap to feed axolotls are easy to breed		1 1	4.1.2.3 AO3
02.7	D		1	4.2.2.2 AO1
02.8	trachea	allow windpipe allow cartilage (ring)	1	4.2.2.2 AO1
02.9	pulmonary artery		1	4.2.2.2 AO1
Total			**11**	

4.1.3.1 Diffusion

Answer 17 · Mark scheme

June 2019 | 8461/1F | Original Q2



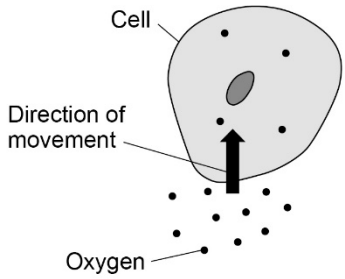
Answer 18 · Mark scheme

November 2020 | 8461/1F | Original Q8

The full source mark scheme begins on page 49. Follow original question 8 in that document.

4.1.3.1 Diffusion

Answer 19 · Mark scheme November 2021 | 8461/1F | Original Q1

01.1			1	AO3 4.1.3.1

01.2	water mineral ions energy	in this order only allow minerals / ions	 1 1 1	AO1 4.1.3.2 4.1.3.3 4.2.3.2

01.3	root hair (cell)	ignore root / hair unqualified	1	AO1 4.1.1.3 4.2.3.2

01.4	large surface / area	allow it has a long projection allow the walls are thin allow it has lots of mitochondria	1	AO1 4.1.1.3 4.2.3.2

01.5	**Feature of sperm cell** / **How the feature helps** Contains a nucleus → To provide the chromosomes for fertilisation Has a long tail → To help the cell to swim to the egg To break the outer layer of the egg To release energy do **not** accept more than one line from a box on the left		 1 1	AO1 4.1.1.3

4.1.3.1 Diffusion

Answer 19 · Mark scheme

01.6	nerve (cell) any **one** from: • long • has branches • has insulation	allow neuron(e) ignore motor / sensory / relay allow myelin / fat	1 1	AO1 4.1.1.3
Total			**10**	

4.1.3.1 Diffusion

Answer 19 · Mark scheme

November 2021 | 8461/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.3.1 Diffusion

Answer 20 · Mark scheme

June 2022 | 8461/1F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1 View with Table 4	$\frac{3\ 600}{1\ 200}$ 3	if no answer in answer space allow answer in **Table 4** allow 3:1 do **not** accept if a unit is given	1 1	AO2 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	as size increases, (surface area to volume) ratio decreases	allow as one increases, the other decreases allow as size decreases, (surface area to volume) ratio increases	1	AO3 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	any **one** from: • carbon dioxide • glucose / sugar • water • ions / minerals / salts	allow a correct chemical formula allow named ions allow other correct substances eg amino acids / fatty acids / glycerol ignore nutrients / food	1	AO1 4.1.3.2 4.1.3.1

4.1.3.1 Diffusion

Answer 20 · Mark scheme

June 2022 | 8461/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	any **two** from: • concentration gradient • surface area • thickness of exchange surface • presence of a blood / circulatory system • temperature	allow description allow surface area : volume ratio ignore size unqualified allow thickness of skin	2	AO1 4.1.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	gills		1	AO1 4.1.3.1

4.1.3.1 Diffusion

Answer 20 · Mark scheme

June 2022 | 8461/1F | Original Q6

Question	Answers	Mark	AO / Spec. Ref.
06.6	**Level 3:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO2
	Level 2: Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO1
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO1
	No relevant content	0	4.1.3.1 4.2.2.2
	Indicative content • large number of alveoli • large surface / area • alveolus and blood vessel / capillary are in close proximity • alveoli / capillaries have thin walls **or** alveoli / capillaries have walls that are one cell thick • to reduce diffusion distance • has a good blood supply **or** has a capillary network • to maintain concentration gradient • to remove oxygen quickly **or** to deliver carbon dioxide quickly • (capillary network) increases surface area (for diffusion) • lungs are ventilated **or** lungs continually move air in and out • (ventilation) brings in oxygen **or** removes carbon dioxide • to maintain concentration gradient Types of adaptation of the lungs are required for **Level 3.**		

Total Question 6		**13**

4.1.3.1 Diffusion

Version 1: 0109

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Biology 4411

BLY3F Unit Biology 3

Mark Scheme

2009 examination – January series

4.1.3.1 Diffusion

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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Dr Michael Cresswell Director General

4.1.3.1 Diffusion

MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example:
where consequential marking needs to be considered in a calculation;
or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

4.1.3.1 Diffusion

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
1(a)(i)	artery		1
1(a)(ii)	capillary		1
1(b)	alveoli		1
	red blood cells		1
	nucleus		1
Total			**5**

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
2(a)(i)	energy		1
2(a)(ii)	microorganisms		1
2(b)(i)	25°C		1
2(b)(ii)	pathogens		1
Total			**4**

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

<table>
<tr><th>question</th><th>answers</th><th>extra information</th><th>mark</th></tr>
<tr><td>3(a)</td><td>178</td><td>ignore working or lack of working

correct working: 180 – 2 but no answer / wrong answer = 1 mark</td><td>2</td></tr>
<tr><td>3(b)</td><td><table><tr><th>Man A</th><th>Man B</th></tr><tr><td>higher</td><td>lower</td></tr><tr><td>lower</td><td>higher</td></tr><tr><td>lower</td><td>higher</td></tr></table></td><td>all 4 cells correct = 2 marks
2 or 3 cells correct = 1 mark
0 or 1 cells correct = 0 mark</td><td>2</td></tr>
<tr><td>Total</td><td></td><td></td><td>4</td></tr>
</table>

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
4(a)	yeast		1
4(b)(i)	**two** sensible suggestions, each linked to correct explanation:	max **4** marks	
	does not release CO		1
	gas is toxic / harms living organisms		1
		allow ethanol <u>only</u> releases CO_2 and H_2O for **1** mark	
	does not release NO_x / SO_2	do **not** allow more pollution / more gases released	1
	gas(es) cause acid rain / eq / harms organisms		1
	or		
	does not cause acid rain (1)		
	(acid rain) damages building / harms organisms (1)		
	made from crops / not a fossil fuel (1)		
	crops can re-grow / source is renewable / fossil fuels are non-renewable (1)		
4(b)(ii)	any **one** from • releases less energy (per litre) • need to burn more to cover same distance / travel shorter distance • land not being used for food crops / less food available • raises food prices		1
Total			**6**

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
5(a)	40–60 hours		1
5(b)(i)	decrease 1st slowly then faster / appropriate detail from the graph eg from 7.8 to 0 / faster after 4-10 h		1 1
5(b)(ii)	oxygen after glucose oxygen less than glucose	extra box ticked cancels **1** mark	1 1
5(b)(iii)	aerobic respiration		1
Total			**6**

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
6(a)(i)	kill / destroys (micro)organisms / bacteria / fungi / living things	do **not** allow get rid of microorganisms	1
6(a)(ii)	entered from environment / already in flask **or** insufficient heating to kill all microorganisms		1
6(b)	any **two** from: • heated more thoroughly / for longer / higher temperature • destroyed / killed all microorganisms • sealed better eg flask melted / sealed immediately after heating / no pouring through air • microorganisms unable to enter (from air) / can only enter when neck broken / open		2
6(c)	biogenesis		1
Total			**5**

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
7(a)(i)	19 800	for correct answer ignore working or lack of working 165 × 120 but no answer / wrong answer = **1** mark (ignore extras)	2
7(a)(ii)	any **two** from: • for respiration • energy released • prevents anaerobic respiration • prevents build-up of lactic acid	 ignore oxygen debt allow energy produced	2
7(b)	any **two** from: • increased breathing rate • increased depth of breathing **or** deep breathing • dilation of arteries / vasodilation • blood diverted from elsewhere	 } more breathing is max **1** mark ignore increase in heart rate allow heavier breathing do **not** allow harder breathing allow blood vessels dilate do **not** allow veins / capillaries dilate ignore name of organ	2
Total			**6**

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
8(a)	transpiration / evaporation / diffusion	ignore osmosis	1
8(b)(i)	D		1
8(b)(ii)	any **two** from: • more / faster diffusion **or** evaporation **or** transpiration • molecules move faster • maintains concentration gradient **or** keeps water concentration low in the air **or** brings in more dry air **or** removes damp air / water		2
Total			**4**

4.1.3.1 Diffusion

COMPONENT NUMBER: BLY3F

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
9(a)	prevents denaturation / change / damage of proteins / enzymes **or** prevents bacteria being killed / destroyed	allow protein is 'destroyed' do **not** allow 'bacteria denatured' **or** 'protein killed'	1
9(b)(i)	any **two** from: • anaerobic respiration • lactic (production) • acid (produced)	do **not** allow 'bacteria are acidic' allow max **1** mark if incorrect named acid	2
9(b)(ii)	any **one** from: • thickens / clots / solidifies (milk) • kills other microorganisms **or** prevents other microbes growing • preserves yoghurt **or** prevents yoghurt going off **or** makes yoghurt last longer **or** keeps it fresh • reference to (improved) flavour	allow reference to germs	1
9(c)	reduce / prevent growth / reproduction of microorganisms **or** to prevent decay **or** to preserve it **or** to keep it fresh **or** to prevent it becoming <u>too</u> sour	allow reference to germs ignore curdling	1
Total			**5**

4.1.3.1 Diffusion

AQA

GCSE
BIOLOGY
8461/1F

Paper 1 Foundation Tier

Mark scheme

June 2020

Version: 1.0 Final Mark Scheme

jun2084611F/MS

4.1.3.1 Diffusion

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

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Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement
- the Assessment Objectives, level of demand and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

[1 mark]

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system.

[2 marks]

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols/formulae

If a student writes a chemical symbol/formula instead of a required chemical name, full credit can be given if the symbol/formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Marks should be awarded for each stage of the calculation completed correctly, as students are instructed to show their working. Full marks can, however, be given for a correct numerical answer, without any working shown.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation ecf in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Allow

In the mark scheme additional information, 'allow' is used to indicate creditworthy alternative answers.

3.9 Ignore

Ignore is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

3.10 Do <u>not</u> accept

Do **not** accept means that this is a wrong answer which, even if the correct answer is given as well, will still mean that the mark is not awarded.

4. Level of response marking instructions

Extended response questions are marked on level of response mark schemes.

- Level of response mark schemes are broken down into levels, each of which has a descriptor.
- The descriptor for the level shows the average performance for the level.
- There are two marks in each level.

Before you apply the mark scheme to a student's answer, read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1: Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer.

When assigning a level you should look at the overall quality of the answer. Do **not** look to penalise small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level.

Use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 content.

Step 2: Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this.

The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

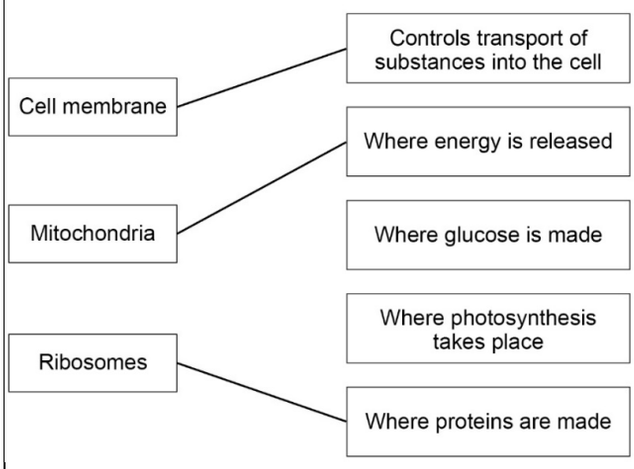
You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do **not** have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

You should ignore any irrelevant points made. However, full marks can be awarded only if there are no incorrect statements that contradict a correct response.

An answer which contains nothing of relevance to the question must be awarded no marks.

4.1.3.1 Diffusion

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	bacterium		1	AO2 4.1.1.1
01.2	to strengthen the cell		1	AO1 4.1.1.1 4.1.1.2
01.3	chloroplast		1	AO2 4.1.1.2 4.2.3.1
01.4	**Structure** **Function**  additional line from a box on the left negates the mark for that box		3	AO1 4.1.1.2 4.1.3.1
01.5	adjust the focus knob		1	AO3 4.1.1.2 RPA1
01.6	(A =) 15 (mm) (B =) 60 (mm)	allow a tolerance of ± 1mm	1 1	AO2 4.1.1.2 RPA 1
01.7	$\frac{60}{15} = 4(.0)$	allow ecf from question **01.6**	1	AO2 4.1.1.2 RPA 1

4.1.3.1 Diffusion

01.8	$\frac{40}{0.1}$ 400	 do **not** accept if a unit is given	1 1	AO2 4.1.1.5 RPA 1
Total			**12**	

4.1.3.1 Diffusion

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	mitosis		1	AO1 4.1.2.2
02.2	all lines correct = **2** marks 1 or 2 lines correct = **1** mark **Stage of cell cycle** / **What happens during that stage** Stage 1 → The cell grows and the chromosomes replicate Stage 2 → One set of chromosomes is pulled to each end of the cell Stage 3 → The cytoplasm and cell membrane divide to form two new cells additional line from a box on the left negates the credit for that box		2	AO1 4.1.2.2
02.3	$\frac{7}{10} \times 100$ 70(%)	allow $\frac{252}{300} \times 100$ allow answer calculated from angle in range 250° to 254° if no other mark awarded, allow 0.7 for **1** mark	1 1	AO2 4.1.2.2
02.4	3		1	AO2 4.1.2.2
02.5	DNA	allow deoxyribonucleic acid	1	AO1 4.1.2.1 4.1.2.2
02.6	a gene		1	AO1 4.1.2.1

4.1.3.1 Diffusion

02.7	(bone marrow) cells differentiate into many / other types of (named) cell (so) will cure diseases where new cells are needed **or** will cure diseases where cells are damaged	allow (bone marrow) cells can become many / other types of (named) cell allow (so) will cure anaemia / leukaemia **or** blood cancer **or** blood disorders allow (so) will cure paralysis / diabetes	1 1	AO1 AO2 4.1.2.3
Total			**10**	

4.1.3.1 Diffusion

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	any **one** from: • bacteria • fungi • protists	allow singular allow names of pathogens e.g. Salmonella ignore virus / germ	1	AO1 4.3.1.1 4.3.1.3 4.3.1.5
03.2	hydrochloric acid is produced by the stomach the skin is a barrier covering the whole body		1 1	AO1 4.2.2.1 4.3.1.6
03.3	white blood cells engulf the microorganisms.		1	AO1 4.2.2.3 4.3.1.6
03.4	weakened fast	in this order only	1 1	AO1 4.3.1.7
03.5	by coughs / sneezes	allow 'by droplets in the air' do **not** accept other means of transmission e.g. touch	1	AO1 4.3.1.1 4.3.1.2
03.6	(from day) 10 (to day) 18	allow (from day) 18 (to day) 10	1	AO2 4.3.1.2
03.7	14 (days)	allow in the range 13 to 15 (days)	1	AO3 4.3.1.2
03.8	any **one** from: • they had been vaccinated • they already had antibodies • they were immune • they had had it before • they did not get any / enough virus from infected child • they did not play (much) with the infected child	 ignore they were resistant ignore they wore a mask unqualified	1	AO3 4.3.1.2 4.3.1.7

4.1.3.1 Diffusion

03.9	antibiotics do not kill viruses	allow antibiotics do not work on viruses allow antibiotics only kill bacteria	1	AO3 4.3.1.8
Total			**11**	

4.1.3.1 Diffusion

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	increased (at first) until 4 minutes **or** 50 breaths per minute (then) stayed constant (from 4 minutes **or** at 50 breaths per minute)		1 1 1	AO2 4.4.2.2
04.2	175 (beats per minute)		1	AO2 4.4.2.2
04.3	140 (beats per minute)		1	AO2 4.4.2.2
04.4	because his rate is lower than the maximum safe rate	allow ecf for incorrect values in question **04.2** and question **04.3**	1	AO3 4.2.2.2 4.4.2.2

04.5	**Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO3
	Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO2
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO2
	No relevant content	0	

	Indicative content
	
	• heart rate increased
	  ○ to increase blood flowing to muscles / lungs
	  ○ to provide more oxygen (to muscles)
	  ○ to provide more glucose (to muscles)
	  ○ to remove carbon dioxide more quickly (from the muscles / blood)
	  ○ to remove lactic acid more quickly (from the muscles)
	
	• breathing rate increased
	  ○ supplies more oxygen / air to lungs
	  ○ so more oxygen to blood
	  ○ more carbon dioxide removed
	
	• more oxygen to muscles
	  ○ needed for (increased) respiration
	  ○ to release / provide energy
	  ○ for muscle contraction
	
	• anaerobic respiration occurs
	  ○ due to lack of oxygen
	  ○ which causes a build-up of lactic acid
	  ○ oxygen debt
	  ○ muscle fatigue / pain
	
	To reach **Level 3**, there must be reference to heart rate, breathing rate and respiration
			4.2.2.2
			4.2.2.3
			4.4.2.1
			4.4.2.3
			4.4.2.2

Total			**12**

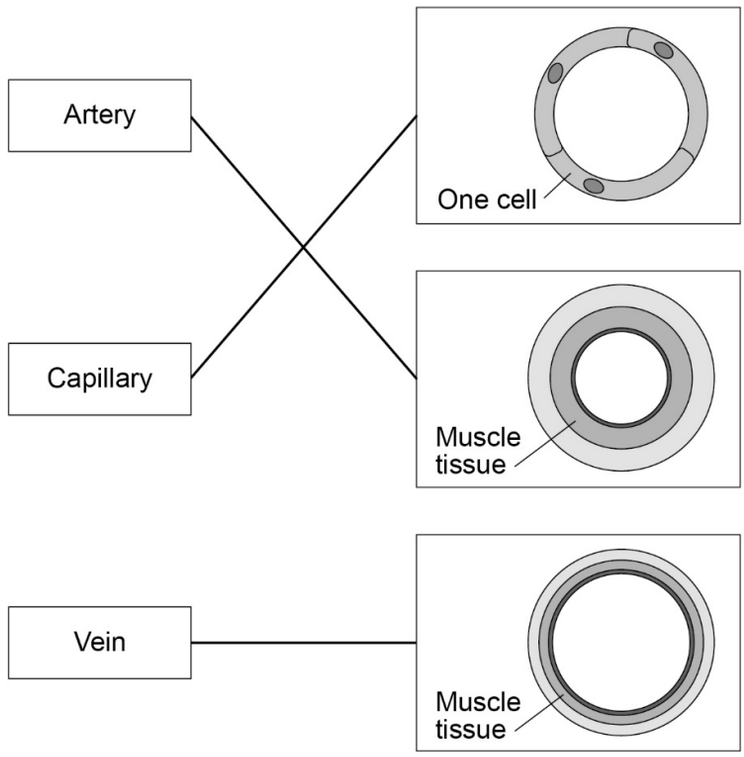
4.1.3.1 Diffusion

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	will stop animals / herbivores eating it	allow it will not be eaten	1	AO3 4.3.3.2
05.2	chemical		1	AO1 4.3.3.2
05.3	thorns / spikes / spines / prickles (to stop animals / herbivores eating it)		1	AO3 4.3.3.2
05.4	for respiration to store as starch		1 1	AO1 4.4.1.3 4.4.2.1
05.5	add Benedict's (solution / reagent to the liquid) boil / heat (if glucose is present the blue) colour changes to yellow / green / orange / brown / (brick)red	 allow any temperature of 65 °C or above 	1 1 1	AO1 4.2.2.1 RPA 4
05.6	(nitrate ions are needed) to make proteins / amino acids which are needed for growth / enzymes / new cells	allow to make chlorophyll / DNA / ATP / nucleic acid allow correct process for named molecule in mp1	1 1	AO1 AO2 4.1.3.3 4.4.1.3 4.4.2.3
05.7	in / on the (soil) water	allow through air (spaces) in the soil	1	AO3 4.3.1.1 4.3.1.4
05.8	dosage toxicity		1 1	AO1 4.3.1.9

4.1.3.1 Diffusion

05.9	placebos		1	AO1 4.3.1.9
Total			**14**	

4.1.3.1 Diffusion

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	all lines correct = **2** marks 1 **or** 2 lines correct = **1** mark **Type of blood vessel** / **Structure of blood vessel**  additional line from a box on the left negates the credit for that box		2	AO2 4.2.2.2

4.1.3.1 Diffusion

06.2	any **one** from: • thick(er) (muscle) walls / tissue (1) to push blood (all) around the body (1) **or** • thick(er) elastic walls / tissue (1) to maintain / withstand high (blood) pressure **or** to retain / regain shape (1) **or** • narrow lumen (1) to maintain high (blood) pressure (1)	allow to withstand high (blood) pressure do **not** accept to pump blood (all) around the body	2	AO1 4.2.2.2
06.3	(A) – white (blood) cell(s) (B) – platelet(s)	allow any named white (blood) cell(s)	1 1	AO2 4.2.2.3
06.4	(no nucleus) more space for haemoglobin / oxygen (has haemoglobin) to bind / carry oxygen	allow to carry more oxygen ignore carries carbon dioxide	1 1	AO3 4.1.1.2 4.1.1.3 4.2.2.3
06.5	plasma		1	AO1 4.2.2.3
06.6	platelets		1	AO3 4.2.2.3

4.1.3.1 Diffusion

06.7	any **one** from: • (continued) bleeding • (more) bruising	allow described allow blood does not clot (at cuts) allow ecf from answer to question **06.6**	1	AO3 4.2.2.3
Total			**11**	

4.1.3.1 Diffusion

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1		allow correct chemical symbols ignore any attempt at balancing equation ignore light / chlorophyll		AO1 4.4.1.1
	before arrow carbon dioxide **and** water	either order	1	
	after arrow glucose	ignore sugar / carbohydrate do **not** accept starch	1	
07.2		ignore description of subsequent parts of the photosynthesis reaction		AO1 4.1.1.2 4.4.1.1
	<u>light</u>	allow sun<u>light</u> ignore sun	1	
	(light) is captured / trapped / absorbed by chlorophyll / chloroplasts	allow (light) is used by chlorophyll / chloroplasts	1	
07.3	$\frac{(18.5 + 19.3 + 19.5)}{3}$ **or** $\frac{57.3}{3}$		1	AO2 4.4.1.2 RPA 6
	19.1 (cm^3/hour)	allow an answer correctly calculated using only two correct values	1	
07.4	a ring around 14.2	allow clear indication of correct result	1	AO3 4.4.1.2 RPA 6

4.1.3.1 Diffusion

07.5	any **one** from: • scale / value was misread • there was air / oxygen in the syringe / measuring cylinder / apparatus • the lamp / light was moved • temperature changed • had different mass / length of pondweed • pondweed had not acclimatised	ignore human error ignore references to counting bubbles or time allow measurement error allow light intensity changed ignore different bulb / lamp unqualified	1	AO3 4.4.1.2 RPA 6
07.6	did not use it in calculation (of mean)		1	AO3 4.4.1.2 RPA 6
07.7	any **one** from: • light (intensity) • carbon dioxide (concentration) • pondweed size / amount • pondweed species	do **not** accept temperature ignore time allow distance / power / colour of lamp / light allow same (piece of) pondweed	1	AO3 4.4.1.2 RPA 6
07.8	enzyme(s) lose the shape of the active site	allow enzyme(s) (start to) denature allow enzyme(s) destroyed / damaged do **not** accept enzyme(s) killed	1	AO2 4.2.2.1

4.1.3.1 Diffusion

07.9	y-axis labelled '(rate of) photosynthesis in cm^3/hour'		1	AO2 4.4.1.2 RPA 6
	suitable scale on y-axis	must take up half or more of grid provided	1	
	all points plotted to within ± ½ small square	allow 3 or 4 correct plots for **1** mark ignore any attempt to plot a point at 20 °C	2	
	correct curved line of best fit	ignore line joined point to point with straight lines ignore extrapolation	1	
Total			**16**	

4.1.3.1 Diffusion

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	movement / spreading out of molecules / particles	allow movement / spreading out of (named) substances / chemicals / gases / liquids ignore reference to membranes / cells	1	AO1 4.1.3.1
	from (an area of) high(er) concentration to (an area of) low(er) concentration	allow down / with the concentration gradient ignore along / across the concentration gradient do **not** accept movement from / to a concentration gradient	1	
08.2	increased carbon dioxide concentration in the air		1	AO2 4.1.3.1 4.2.3.2
	increased number of stomata that are open		1	

4.1.3.1 Diffusion

08.3	**Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO1 4.1.3.1 4.2.2.2 4.2.2.3
	Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	
	No relevant content	0	

	Indicative content
	• (many) alveoli
	  • provide a large(r) surface area (**:** volume)
	
	• capillaries are thin
	  or alveoli / capillary walls are thin **or** one cell thick
	  or capillaries are close to the alveoli
	  • which provides short diffusion path (for oxygen / carbon dioxide)
	
	• breathing (mechanism) moves air in and out
	or lungs are ventilated
	  • to bring in (fresh) oxygen
	  • to remove carbon dioxide
	  • to maintain a concentration / diffusion gradient`
	
	• large capillary network (around alveoli)
	or good blood supply
	  • to remove oxygen(ated blood) quickly
	  • to bring carbon dioxide to the lungs quickly
	  • to maintain a concentration / diffusion gradient		

4.1.3.1 Diffusion

08.4	Osmosis	allow diffusion	1	AO1 4.1.3.1 4.2.3.2 4.1.3.2
08.5	active transport (because) energy is needed (to move nitrate ions) from a low(er) concentration (in the soil) to a high(er) concentration (in the root / cell)	 allow (to move nitrate ions) against / up the concentration gradient allow (because) there is a lower concentration (of nitrate ions) in the soil **or** (because) there is a higher concentration (of nitrate ions) in the root / cell ignore reference to amount / number of nitrate ions ignore along / across the concentration gradient do **not** accept if reference to molecules / atoms moving	1 1 1	AO3 AO2 AO2 4.1.1.3 4.2.3.2 4.1.3.3
Total			**14**	

4.1.3.1 Diffusion

Answer 18 · Examiner comments

November 2020 | 8461/1F | Original Q8

Question 8 (standard demand)

The use of the term concentration gradient was confused by many students throughout this question. Movement 'along/across' a concentration gradient gives no clear indication of direction and requires further qualification; movement to/from a high/low concentration 'gradient' is incorrect. Some students described cells moving, instead of ions or particles. Some students had simply not learnt the definition.

Students should take care when reading the command word for each question. **08.3** asked for explanation(s), and without this, Level 2 and Level 3 could not be accessed. Very few students showed any detailed knowledge of the adaptations of the lungs; few could name the alveoli and the term 'bronchioli' as a hybrid of bronchioles and alveoli was commonly seen. Some students also stated that the alveoli contained villi. It is important to note that the alveoli having 'moist linings' is not a creditworthy answer to a question about adaptations for gas exchange. The gas exchange surfaces are moist **due** to diffusion, and therefore, a moist surface is a feature of the lungs but not a feature that maximises the diffusion of gases.

Osmosis and active transport were often confused in **08.5** and whilst nearly half of students were able to name active transport as the method of transport in **08.6**, less than 20% were able to go on to explain the process in the context of the question.

4.1.3.1 Diffusion

Answer 18 · Examiner comments

Concluding Remarks

Generally, performance on this paper was broadly comparable to previous years. Students generally scored well on simple recall of knowledge questions (AO1) and the topics of cell structure and immunity were well answered. Students were less confident in their knowledge and understanding of stem cells and differentiation and many could not apply their knowledge to new situations effectively (AO2).

Many students lacked the ability to articulate their thoughts logically and clearly on paper and a lack of comparative answers was common. As in previous years, details of the Benedict's test for sugar had been poorly learnt and students continue to struggle to understand how protein is used in living organisms. Students' understanding of command words was weak. Many 'explain' questions throughout the paper were answered in descriptive terms and students are advised to check the command word for each question before putting pen to paper.

4.1.3.1 Diffusion

Answer 18 · Examiner comments

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

4.1.3.1 Diffusion

Answer 20 · Examiner comments

June 2022 | 8461/1F | Original Q6

Question 6 (Low and standard demand)

06.1 77% of students gained full marks in this question.

06.2 Nearly 60% of students scored zero marks on this question. Many confused the idea of surface area to volume ratio with surface area or volume, therefore making their explanations contradictory.

06.3 Over 70% of students were able to name one substance that enters cells by diffusion with the most popular answers being carbon dioxide and water. Nitrogen was occasionally seen but was not credited.

06.4 Less than 10% of students gained both marks in this question and lots of responses about size were seen, which was not enough to gain the mark. Some students wrote about the concentration of oxygen in the water but failed to go on to mention the concentration gradient. The most common correct responses were temperature and surface area.

06.5 Nearly 70% of students were able to name the gills as the was exchange organs in fish. Common incorrect answers included lungs, heart, fins and scales.

Answer 20 · Examiner comments

June 2022 | 8461/1F | Original Q6

06.7 Over 40% of students scored zero marks in this question and the most common score after zero was one mark. In this levelled response question, students were asked to explain how the breathing system is adapted to maximise the rate of gas exchange. Logical linking was required to reach both levels 2 and 3 of the mark scheme, and this is where most students fell down. A minority of students were able to describe some feature of the lungs, but many failed to even state that the lungs have a large surface area. Very few students were able to make the link between gas exchange and diffusion. Many students wrote lengthy responses about the journey of oxygen or the mechanism of breathing, neither of which were asked about in the question.