AQA GCSE Biology | 8461

SPECIFICATION POINT 4.1.1.5

Microscopy

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**13**
Available paper years	**2010–2025**

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.

4.1.1.5 Microscopy

Answer 01 · Mark scheme

January 2010 | BLY3F | Original Q3 | Legacy

Question 3

question	answers	extra information	mark
3(a)	more reliable **or** in case one does not work / is anomalous	do **not** accept accurate ignore fair test	1
3(b)	any **three** from: **Flask A**: • bacteria could not get in • due to U-tube / bent tube / trapped in bend **Flask B**: • bacteria could get in • due to straight tube / not trapped	allow microorganisms	3
Total			**4**

4.1.1.5 Microscopy

Answer 01 · Mark scheme

January 2010 | BLY3F | Original Q3 | Legacy

BLY3F

4.1.1.5 Microscopy

Answer 02 · Mark scheme

January 2010 | BLY3F | Original Q9 | Legacy

Question 9

question	answers	extra information	mark
9(a)	C		1
9(b)(i)	guard (cell)		1
9(b)(ii)	water movement / transpiration through stomata / pores / holes / (region) X **or** petroleum jelly blocks / covers stomata / pores / holes / X stomata / pores / holes / X found on lower surface		1 1
Total			**4**

4.1.1.5 Microscopy

Answer 03 · Mark scheme

June 2011 | BLY2F | Original Q9 | Legacy

Question 9

question	answers	extra information	mark
9(a) E	because water enters (the cell / it / named cell)	do **not** accept salt / sugar / solution entering	1
	by osmosis / diffusion	if osmosis / diffusion not given accept concentration inside cell greater than outside cell assume concentration refers to solute concentration unless answer indicates otherwise allow water goes up the concentration gradient allow water goes down its concentration gradient do **not** accept if diffusion of salt / sugar	1
	through a partially permeable membrane	allow semi / selectively permeable membrane **or** description	1
9(b) E	(plant cells) have (cell) wall	accept animal cells have no (cell) wall ignore reference to cell membrane do **not** accept reference to other organelles **or** any implication that animal cells have a cell wall eg plant cells have a thicker cell wall	1
Total			**4**

The AQA UMS Conversion Calculator is available on the Results statistics page of the AQA Website

4.1.1.5 Microscopy

Answer 04 · Mark scheme

June 2019 | 8461/1F | Original Q5

05.1	gonorrhoea		1	4.3.1.3 AO1
05.2	the bacteria are resistant to the antibiotics		1	4.3.1.3 AO2
05.3	abstain from sex(ual intercourse) **or** wash hands after touching penis / urinating / using the toilet	allow abstinence ignore wash hands unqualified	1	4.3.1.1 4.3.1.3 AO2
05.4	**Level 2:** Scientifically relevant features are identified; the way(s) in which they are similar / different is made clear and (where appropriate) the magnitude of the similarity / difference is noted.		4–6	4.1.1.6 AO3 x3 AO2 x3
	Level 1: Relevant features are identified and differences noted.		1–3	
	No relevant content		0	
	Indicative Content: **qualitative statements** • **3** works best on **A** • **1** works best on **B** • **2** works best on **C** • **1** is least effective on **A** • **3** is least effective on **B** • **3** is least effective **or** has no effect on **C** **quantitative statements** • **1** kills more of **B** and **C** compared to **A** • **2** kills more of **C** than **A** / **B** • **3** kills more of **A** than **B** and **C** • **2** kills the same amount of **A** and **B** • **2** and **3** killed similar amounts of **B** • **C** are resistant to **3** • only **2** worked well on all of the bacteria • for **A**, **3** works best, **2** is next and **1** is least effective • for **B**, **1** works best, **2** is next and **3** is least effective • for **C**, **2** works best, **1** is next and **3** is least effective for **level 2** reference to qualitative and quantitative statements is required			

4.1.1.5 Microscopy

Answer 04 · Mark scheme

June 2019 | 8461/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	sample **E**		1	4.1.1.6 AO2
05.6	$\frac{15 + 12 + 13 + 16}{4}$ **or** $\frac{56}{4}$ 14	an answer of 14 scores **2** marks	1 1	4.1.1.6 AO2
05.7	(area = 0.1 × 0.1 =) 0.01 (volume = 0.01 × 0.01 =) 0.0001 (number = $\frac{14}{0.0001}$ =) 140 000	an answer of 140 000 scores **3** marks an incorrect answer for one step does not prevent allocation of marks for subsequent steps allow 1×10^{-2} allow 1×10^{-4} allow ecf from question **05.6** allow 1.4×10^{5} do **not** accept 14×10^{4}	1 1 1	4.1.1.6 AO2
05.8	Q		1	4.1.1.6 AO2
05.9	(bacteria) could make humans ill **or** (bacteria) could kill humans **or** (bacteria) could release toxins	allow reverse argument allow (bacteria) cause infection / disease allow (bacteria) cause appropriately named disease ignore harmful	1	4.3.1.1 AO2
Total			**17**	

4.1.1.5 Microscopy

Answer 04 · Mark scheme

June 2019 | 8461/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.1.5 Microscopy

Answer 05 · Mark scheme June 2019 | 8461/1F | Original Q7

07.1	controls the (activities of the) cell	allow contains genetic information / genes / DNA / chromosomes do **not** accept brain do **not** accept controls substances entering / leaving the cell	1	4.1.1.2 AO1
07.2	red blood cell / RBC **or** bacteria / prokaryote **or** xylem (cell)	allow erythrocyte ignore blood cell unqualified ignore platelets allow named examples of bacteria do **not** accept virus	1	4.2.2.3 4.1.1.1 AO1
07.3	cell shape is similar to cell in **Figure 12 and** nucleus present any **two** features correctly identified and labelled: • nucleus • (cell) membrane • cytoplasm • mitochondria / mitochondrion • ribosome(s)	ignore shading do **not** accept a cell wall drawn allow cell wall if drawn and correctly labelled do **not** accept other plant sub-cellular structures	1 1	4.1.1.2 AO2 8.2.1 AO1
07.4	any **one** from: • (cellulose cell) wall • chloroplast • (permanent) vacuole	ignore chlorophyll allow starch grain	1	4.1.1.2 AO1

4.1.1.5 Microscopy

Answer 05 · Mark scheme

June 2019 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5		an answer of (×) 400 scores **3** marks an answer of (×) 40 scores **2** marks		4.1.1.5 AO2
	24 (mm) **or** 2.4 (cm)	allow in range 23 to 25 (mm) **or** in range 2.3 to 2.5 (cm)	1	
	$\frac{24}{0.06}$ **or** $\frac{2.4}{0.06}$	allow correct calculation from their measurement of **X** to **Y** in the range 2.3 cm to 3.5 cm **or** 23 mm to 35 mm	1	
	(×) 400	allow correct magnification derived from their measurement in **mm** ignore rounding errors	1	
07.6	high(er) magnification high(er) resolution **or** high(er) resolving power	ignore bigger / zoom allow see more detail if neither mark awarded allow **1** mark for see smaller objects **or** see smaller sub-cellular structures allow 3D image	1 1	4.1.1.5 AO1
Total			**10**	

4.1.1.5 Microscopy

Answer 05 · Mark scheme

June 2019 | 8461/1F | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.1.5 Microscopy

Answer 06 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	46		1	AO1 4.6.1.2 4.6.1.8
03.2	half the mass of the DNA in cell **A**		1	AO2 4.6.1.2
03.3	meiosis		1	AO1 4.6.1.2
03.4	mutation		1	AO1 4.6
03.5	any **two** from: • different egg / sperm each time • genes from two parents • each gamete / egg / sperm has different alleles / genes / DNA / genetic information	ignore different chromosomes ignore the children have different genes / alleles	2	AO2 4.6 4.6.1.1
03.6	8		1	AO2 4.1.2.2 4.6.1.2
03.7	40	allow in range 39 to 41	1	AO2 4.6.1.2
03.8	$\frac{40}{500}$ × 1000 80	an answer of 80 scores **3** marks allow ecf from Question **03.7** for **3** marks an answer of 0.08 scores **2** marks allow $\frac{\text{answer to Question 03.7}}{500}$ an answer from mp1 but not × 1000 scores **2** marks	1 1 1	AO2 4.6.1.2

4.1.1.5 Microscopy

Answer 06 · Mark scheme

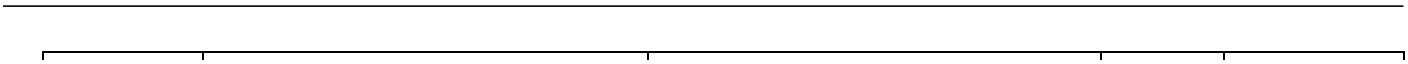
June 2019 | 8461/2F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.9	embryo is (very) small		1	AO2 4.5 4.5.3.4
	(so) embryo not seen / felt **or** lost in normal menstrual flow	ignore not noticed	1	AO3
Total			**13**	

4.1.1.5 Microscopy

Answer 06 · Mark scheme

June 2019 | 8461/2F | Original Q3



Answer 07 · Mark scheme

November 2020 | 8461/1F | Original Q1

The full source mark scheme begins on page 27. Follow original question 1 in that document.

Answer 08 · Mark scheme

November 2020 | 8461/1F | Original Q6

The full source mark scheme begins on page 27. Follow original question 6 in that document.

4.1.1.5 Microscopy

Answer 09 · Mark scheme November 2021 | 8461/1F | Original Q7

07.1	any **two** from: • (microscope) slide • cover slip • dye / stain • (mounted) needle • pipette / dropper • scalpel • forceps / tweezers	 allow named dye / stain ignore water ignore knife allow swab (to collect cells)	2	AO1 4.1.1.5 RPA1
07.2	eyepiece / lens	do **not** accept objective lens	1	AO1 4.1.1.5 RPA1
07.3	to focus (the image / cells)	allow to make the cells / image clear(er) allow to improve resolution (of the image) ignore to move the stage up / down do **not** accept reference to magnification	1	AO1 4.1.1.5 RPA1
07.4	any **one** from: • no cells in the field of view • slide not in the correct position • mirror not in correct position • (objective) lens not clicked into place **or** (objective) lens dirty • (student is) looking at a (large) air bubble • (the microscope is) not focussed	 allow light / microscope not switched on / plugged in allow student did not stain the cells allow idea of magnification not being high enough	1	AO3 4.1.1.5 RPA1

07.5	**Level 2:** Scientifically relevant features are identified; the way(s) in which they are similar/different is made clear and (where appropriate) the magnitude of the similarity/difference is noted.	4–6	AO2
	Level 1: Relevant features are identified and differences noted.	1–3	AO1
	No relevant content	0	
	Indicative Content **Differences:** • red blood cell has no nucleus **or** plant cell has a nucleus • red blood cell has no cell wall **or** plant cell has a cell wall • red blood cell is a biconcave disc **or** there are many different shapes of plant cell • red blood cell contains haemoglobin **or** plant cells do not contain haemoglobin • red blood cells do not contain chlorophyll **or** plant cells (may) contain chlorophyll • red blood cell has no chloroplasts **or** plant cell has chloroplasts • red blood cell has no (permanent) vacuole **or** plant cell has (permanent) vacuole • red blood cells are (much) smaller than plant cells **Similarities:** both have: • cytoplasm • cell membrane • pigments (although they are different) ignore references to mitochondria and ribosomes for **Level 2**, consideration of both red blood cells and plant cells is required.		4.1.1.2 4.2.2.3

07.6	water enters (the cells) by osmosis / diffusion	allow water enters **and** the cell starts to swell ignore explanations of osmosis	1	AO2
	plant cell has a cell wall (which prevents it from bursting)	allow red blood cell has no cell wall (so it swells and bursts)	1	AO1 4.1.3.2 4.1.1.2
Total			**13**	

4.1.1.5 Microscopy

Answer 09 · Mark scheme

November 2021 | 8461/1F | Original Q7

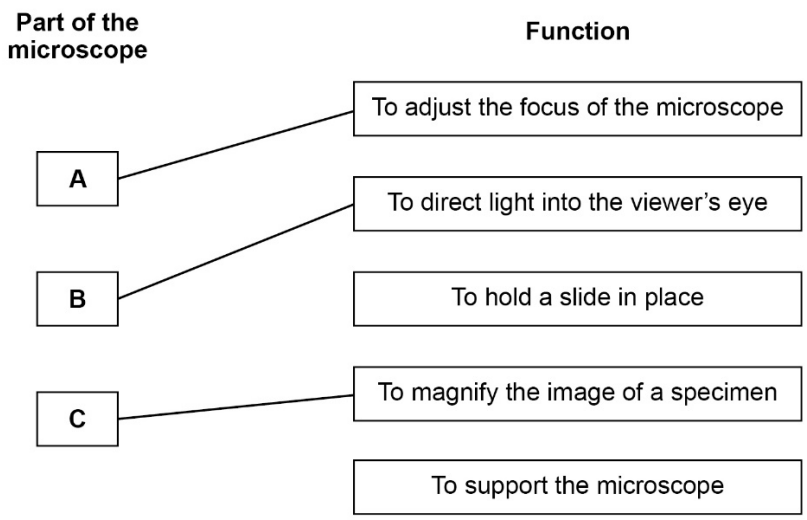
Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.1.1.5 Microscopy

Answer 10 · Mark scheme

June 2022 | 8461/1F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	 do **not** accept more than one line from a box on the left		1 1 1	AO2 4.1.1.2 RPA1

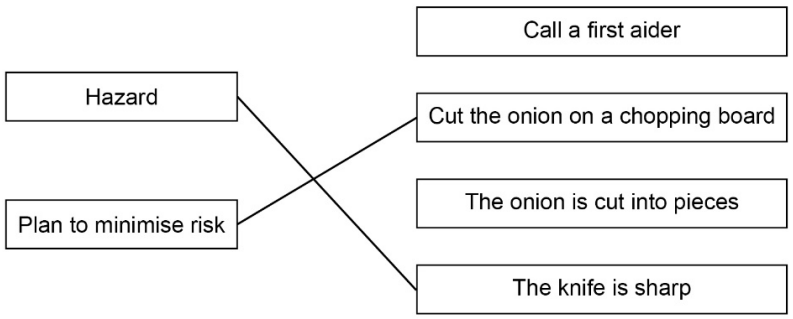
Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	to stain the cells		1	AO2 4.1.1.2 RPA1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	to allow light to pass through the cells		1	AO2 4.1.1.2 RPA1

4.1.1.5 Microscopy

Answer 10 · Mark scheme

June 2022 | 8461/1F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	 do **not** accept more than one line from a box on the left		1 1	AO3 4.1.1.2 RPA1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	*student's measurement* 49 (mm)	allow in range 48 – 50 (mm)	1	AO2 4.1.1.5 RPA1
	conversion of student's measurement 49 000 (µm)	allow correct conversion using student's measurement	1	
	substitution $\frac{49\,000}{400}$	allow a correct substitution using incorrectly measured / converted length	1	
	122.5 (µm)	allow a correct answer from student's division using a magnification of ×400	1	

4.1.1.5 Microscopy

Answer 10 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	the cells would look larger the cells would show more internal structures		1 1	AO1 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	complete the cell walls include the magnification		1 1	AO3 4.1.1.5 RPA1

Total Question 4		15

4.1.1.5 Microscopy

Answer 11 · Mark scheme

June 2024 | 8461/1F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.1	ionising radiation viruses		1 1	AO1 4.2.2.5 4.2.2.6

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.2	mitosis		1	AO1 4.2.2.7 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.3	grow replicate	must be in this order	1 1	AO1 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.4	40%		1	AO2 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.5	chromosomes are pulled to each end of the cell		1	AO2 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.6	(cell) membrane		1	AO2 4.1.1.2

4.1.1.5 Microscopy

Answer 11 · Mark scheme

June 2024 | 8461/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.7	$\frac{50}{800}$ 0.0625 (mm) 62.5 (µm)	allow conversion to µm at any stage in the calculation allow correct conversion from student's incorrect calculation	1 1 1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.8	cells people	must be in this order	1 1	AO1 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.9	placebo	allow placebo effect ignore examples and descriptions of placebos	1	AO1 4.3.1.9

Total Question 5	14

4.1.1.5 Microscopy

Answer 12 · Mark scheme

June 2025 | 8461/1F | Original Q1

Question 1

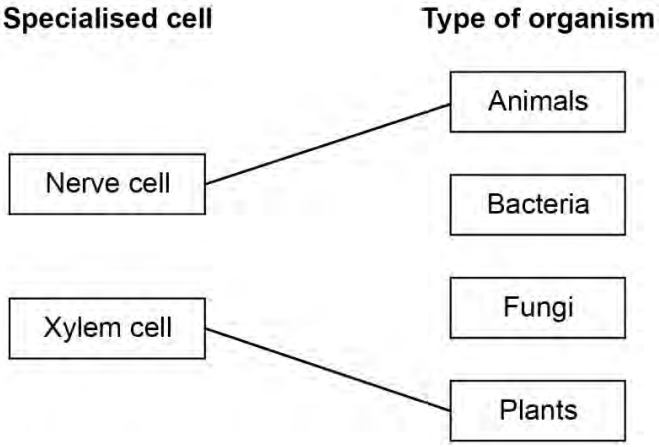
Question	Answers	Extra information	Mark	AO / Spec Ref.
01.1	cytoplasm		1	AO1 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.2	any **one** from: • chromosome(s) • gene(s)	allow DNA / allele allow genetic material ignore genetic information	1	AO1 4.1.1.1 4.1.1.2 4.1.2.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.3	any **one** from: • (cell) wall • (permanent / large) vacuole • chloroplast	ignore cellulose ignore chlorophyll	1	AO1 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.4	water		1	AO1 4.1.3.3 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.5	any **one** from: • fertilisation • to swim to the egg • to provide chromosomes / DNA for the egg • to carry chromosomes / DNA from the male	allow to fuse / join with an egg allow to penetrate the egg allow to reach the egg ignore swim unqualified allow to provide genetic material / information for the egg	1	AO1 4.1.1.3

Question	Answers	Mark	AO / Spec Ref.
01.6	 do **not** accept more than one line from a box on the left	1 1	AO1 4.1.1.3 4.2.3.1 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.7	active transport diffusion		1 1	AO1 4.1.3.1 4.1.3.3 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.8			1 1 1	AO2 4.1.3.1 4.1.3.2 4.4.2.1

Substance	Direction of movement of substance		
	ONLY from blood to muscle cells	ONLY from muscle cells to blood	From blood to muscle cells AND from muscle cells to blood
Carbon dioxide		✓	
Oxygen	✓		
Water			✓

do **not** accept more than one tick in any row

Total Question 1	12

4.1.1.5 Microscopy

Answer 13 · Mark scheme

June 2025 | 8461/1F | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.1	pathogens antitoxins	in this order only	1 1	AO1 4.3.1.1 AO1 4.3.1.6 4.2.2.3

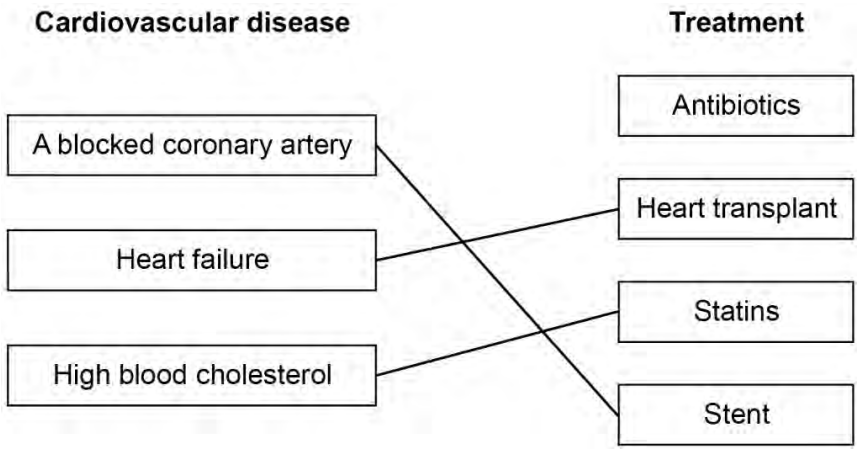
Question	Answers	Extra information	Mark	AO / Spec Ref.
03.2	*measurement* 60 (mm) *conversion* 60 000 (µm) *substitution* $= \frac{60\,000}{4\,000}$ *real width* 15 (µm)	allow measurement in the range 59 (mm) to 61 (mm) allow correct conversion from incorrect measurement allow correct substitution using incorrect conversion allow correct calculation using incorrectly converted value	1 1 1 1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.3	capillary		1	AO3 4.2.2.2 4.2.2.3

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.4	(blood in arteries) has high pressure (so need thick walls) to withstand / maintain the pressure **or** (so need thick walls) to prevent bursting	ignore to increase the pressure allow **2** marks for to withstand / maintain high pressure	1 1	AO3 4.2.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.5	deposits / build-up / increase of fat(ty material)	allow deposits / build-up / increase of cholesterol allow deposits / build-up / increase of plaque	1	AO1 4.2.2.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.6	less / no blood flow (so) less / no oxygen / glucose transported (to heart / body)	 allow **2** marks for less oxygenated blood flows if no other marks awarded allow **1** mark for idea that it will lead to a heart attack	1 1	AO1 4.2.2.4

Question	Answers	Mark	AO / Spec Ref.
03.7	 do **not** accept more than one line from a box on the left	1 1 1	AO1 4.2.2.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
03.8	because it cannot be spread / passed on (from one person to another) **or** because it is not caused by a pathogen / bacterium / virus / fungus / protist / microorganism / microbe	allow not contagious / infectious ignore because it is a lifestyle disease	1	AO2 4.2.2.4

Total Question 3	16

4.1.1.5 Microscopy

AQA

GCSE
BIOLOGY
8461/1F

Paper 1 Foundation Tier

Mark scheme

June 2020

Version: 1.0 Final Mark Scheme

jun2084611F/MS

4.1.1.5 Microscopy

MARK SCHEME – GCSE BIOLOGY – 8461/1F – JUNE 2020

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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MARK SCHEME – GCSE BIOLOGY – 8461/1F – JUNE 2020

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.

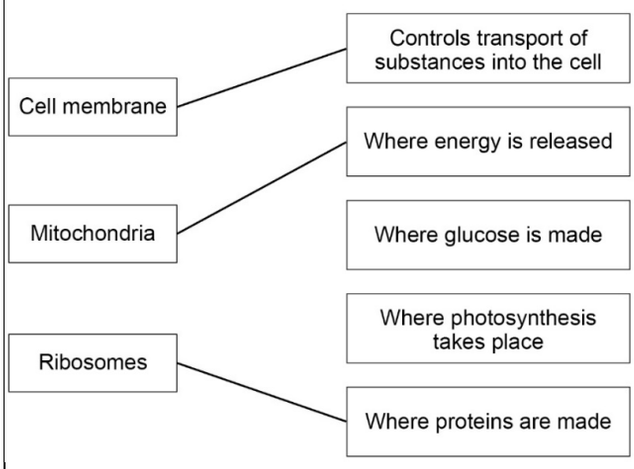
You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

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.

4.1.1.5 Microscopy

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

4.1.1.5 Microscopy

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**	

4.1.1.5 Microscopy

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

4.1.1.5 Microscopy

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**	

4.1.1.5 Microscopy

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

4.1.1.5 Microscopy

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**	

4.1.1.5 Microscopy

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**

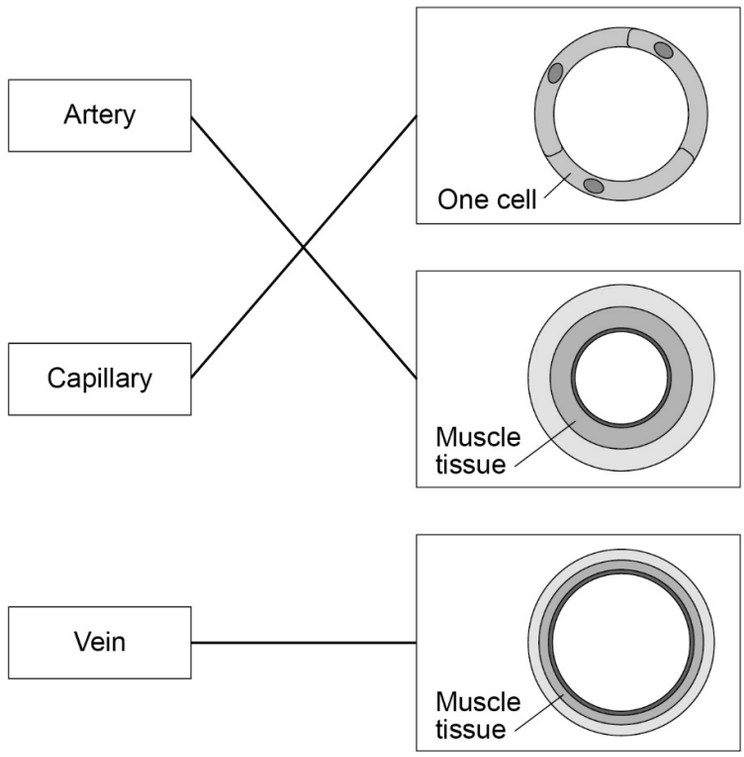
4.1.1.5 Microscopy

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

4.1.1.5 Microscopy

05.9	placebos		1	AO1 4.3.1.9
Total			**14**	

4.1.1.5 Microscopy

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

4.1.1.5 Microscopy

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

4.1.1.5 Microscopy

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**	

4.1.1.5 Microscopy

MARK SCHEME – GCSE BIOLOGY – 8461/1F – JUNE 2020

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

4.1.1.5 Microscopy

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

4.1.1.5 Microscopy

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**	

4.1.1.5 Microscopy

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	

4.1.1.5 Microscopy

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		

4.1.1.5 Microscopy

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**	

4.1.1.5 Microscopy

Answer 07 · Examiner comments November 2020 | 8461/1F | Original Q1

Question 1 (low demand)

A common misconception seen in **01.4** was that the mitochondria are the site of glucose production. In **01.7**, several students didn't appear to read the question carefully enough, with some subtracting 15 from 60, and some multiplying the values. Students are advised to check their answers carefully, as 60 ÷ 15 = 3 was seen on multiple occasions. In questions where students are asked to calculate magnification, care must be taken not to give (incorrect) units.

Answer 08 · Examiner comments November 2020 | 8461/1F | Original Q6

Question 6 (low & standard demand)

A lack of specificity in use of scientific language meant that few students were able to accurately articulate their ideas in **06.2**, resulting in a high level of discrimination between lower- and higher-attaining students. Many students referenced thick cell walls, lots of muscle in cells, as well as arteries having a large surface area.

06.3 highlighted that some students may not have been exposed to alternative images of blood cells, and many thought that the blood cells were actually cell parts, such as nuclei and cytoplasm. Half of the students gained marks in this question.

In **06.7** several students were able to make the link between platelets and blood clotting, but many incorrectly stated that the blood would clot too much as a result of reduced platelets.

4.1.1.5 Microscopy

Answer 10 · Examiner comments

June 2022 | 8461/1F | Original Q4

Question 4 (Low and standard demand)

04.1 Over 70% of students gained full marks in this question, correctly identifying the parts of the microscope and their functions.

04.2 Nearly 80% of students were able to identify that iodine solution was used to stain the cells.

04.3 Over 90% of students were able to identify that a thin layer of onion allowed light to pass through the cells.

04.4 Over two thirds of students gained full marks in this question. Of those that did not, the most common error was calling a first aider for the plan to minimise the risk.

04.5 Inaccurate measurements of line A-B resulted in some incorrect final lengths of cell Z. However, in the main, most students used the scaffolding provided well and scored well in this question part. Errors in measurement from the line given were largely due to students attempting conversions or calculations on their measurement before completing the answer line. Some responses contained a final solution that was incorrect and would indicate that a calculator was not used in the examination.

04.6 It was common to see only one box ticked in this question, and in **04.7**; students are reminded to read the instructions given in the question carefully. Nearly 50% of students scored full marks and just under 50% scored 1 mark in this question.

04.7 Over 70% of students gained both marks in this question with the most common incorrect answers being to ‘use a ruler to draw the cells’ and to ‘add colour’.

4.1.1.5 Microscopy

Answer 11 · Examiner comments

June 2024 | 8461/1F | Original Q5

Question 5 (low and standard demand)

05.1 73% of students scored one mark in this question, in comparison to 24% who scored two marks. The most common incorrect response was the selection of monoclonal antibodies rather than viruses. Students should be reminded to check the instructions given at the start of the question, as a minority only ticked one box, rather than two.

05.2 48% of students correctly identified mitosis as being the type of cell division occurring in cancer cells. The majority of incorrect responses were for binary fission.

05.3 69% of students achieved two marks in this question, but it was clear from the number of answer changes that many had deliberated over their responses to this question. Students should be reminded that if they change their minds in any question, they should clearly cross out and rewrite their answers rather than relying on unclear arrows which may possibly be misinterpreted.

05.4 86% of students answered this question correctly.

05.5 66% of students answered this question correctly.

05.6 53% of students gave the correct answer. Many students found identifying the cell membrane from a cell photograph more difficult than from a diagram. The context of cell division led some to give 'egg cell' or 'zygote' and others to suggest the 'nucleus' in their answer. Other incorrect responses included 'cell wall' despite the fact that the picture was of an animal cell.

05.7 In this calculation, which was well answered, nearly two thirds of students achieved full marks. Students were asked to calculate the real width of a cell using figures and an equation given in the question. Most students managed to complete the substitution step correctly although some used the figures the wrong way round. The further requirement to convert the answer obtained in millimetres into micrometres proved more difficult for some.

05.8 Students were often uncertain about the correct choice of words in this question. Many believed that preclinical testing of cancer drugs should be carried out on people and that safety checks should be completed using plants. 28% of students achieved both marks in this question, and 34% achieved one mark.

05.9 54% of students were able to identify a placebo as being a tablet that does not contain an active drug. This question elicited a variety of responses including 'paracetamol', 'aspirin' and 'antibiotics' and no credit was given for descriptions alone. Phonetic spellings of the term were credited and seen frequently.

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4.1.1.5 Microscopy

Answer 12 · Examiner comments

June 2025 | 8461/1F | Original Q1

Question 1 (low demand)

01.1 84% of students were able to identify the cytoplasm of the animal cell.

01.2 Just over two thirds of students were able to identify one structure found in the nucleus, with the most common answer seen being DNA. Students should be reminded that at all levels of demand, reference to 'genetic information' is not creditworthy. A small number of students did not read the question properly, giving the function of the nucleus instead.

01.3 Nearly 80% of students answered correctly with the most common incorrect responses being nucleus, cytoplasm or cell membrane, indicating that students had misread the question.

01.4 Nearly 80% of students answered correctly.

01.5 75% of students answered this question correctly, but this question was an example of where ineffective articulation of language was seen, such as 'to impregnate the egg' or

4.1.1.5 Microscopy

Answer 12 · Examiner comments

'to ferment the egg by swimming'. Most students who did not gain credit here gave answers that were incomplete or too vague. The function of a sperm cell is more than the function of its flagellum, and so 'to swim' was insufficient. Other answers which were unable to gain credit included 'for reproduction' or 'to make a baby'. Similarly, reference to DNA / genetic material required the additional qualification of provision 'for the egg' or 'from the male' and, without this, the mark could not be awarded. Some responses referred only to the adaptations of the sperm cell. Although correct, adaptations alone were insufficient. Occasionally, students misread the question and answered in terms of 'stem cells', and confusion between 'egg cell' and 'embryo' was sometimes seen.

01.6 70% of students scored full marks in this question, however, a small number drew more than one line from a box on the left. The most common incorrect answer was a line connecting xylem to fungi. Students should be advised to make very clear any changes they may decide to make in their answers - ambiguous responses gain no credit.

01.7 50% of students scored full marks in this question, with a further 40% scoring one mark.

01.8 Students found this question quite challenging with only 35% scoring full marks, and around a third scoring one mark. Students were required to apply their knowledge in a slightly different context than usual. Gas exchange is, perhaps, most frequently considered in the lungs and this may have led some students to answer in terms of carbon dioxide going out from the blood and oxygen going into it. The idea that water might move anywhere other than from the soil into root hair cells added to the general level of uncertainty. Students were specifically asked to tick the selected boxes, but they occasionally wrote words instead, and these were usually impossible to interpret.

4.1.1.5 Microscopy

Answer 13 · Examiner comments

June 2025 | 8461/1F | Original Q3

Question 3 (low demand)

03.1 85% of students scored both marks in this question. The most commonly seen error was confusion between antitoxins and antibiotics.

03.2 Over half of all students scored full marks in this question, with the next most common mark being 3, indicating that the majority of students found this question easy to access. Guidance was provided through the use of scaffolding for each of the steps involved and this allowed many students to access at least 3 marks. A mistake made in one step did not necessarily preclude credit being awarded elsewhere. Common errors included:

- incorrect measurements of the white blood cell, giving answers in cm or inches, or referring to the vertical line rather than to the horizontal line for width.
- incorrectly carrying out the conversion by dividing, rather than multiplying, by 1000
- incorrectly transferring numbers from one step to another by omitting or adding zeros
- using the original pre-conversion width, rather than the calculated one in micrometres, in the final substitution.

03.3 Just under half of all students were able to identify the capillary shown in the figure.

4.1.1.5 Microscopy

Answer 13 · Examiner comments

June 2025 | 8461/1F | Original Q3

03.4 Although some students had a clear appreciation of why arteries needed to have thick walls, many (40%) were unable to gain even one mark here. The reasons behind this reflected both a lack of understanding and ineffective expression. MP1 required reference to high pressure, i.e. the conditions that made thick walls essential, and not just to 'pressure' without qualification that the pressure was 'high'. References to volume, rate of flow, direction of flow or the concentration of blood were also not creditworthy. To achieve MP2, responses then had to go on further, with an explanation of what the thick walls allowed or prevented. Responses that did not gain credit here were either:

- too vague, such as 'to stop damage', 'to prevent bleeding' or 'to keep the blood inside'.
- incorrect, such as 'to pump blood around', 'stop backflow' or 'protect from pathogens'.

03.5 10% of students did not attempt this question and a further 60% did not score credit. Many misinterpreted what was being asked for and answered in terms of risk factors, such as 'smoking', outcomes such as 'reduced blood flow' or treatments such as 'stents'. In some cases, responses were too vague to be creditworthy, such as 'blockages occur'. Incorrect answers included 'muscles in the walls contract', 'they shrink' or 'fatty acids build up'.

03.6 Many students gave answers which matched MP1 but fewer gained MP2 and as such, 50% of students scored one mark, with a further 15% scoring two marks. Responses such as 'it will create a blockage', 'it can lead to a reduction (or increase) in blood pressure', 'it causes blood to clot', 'it leads to blood flowing backwards' or 'the vessels are more likely to burst' were either insufficient or incorrect and gained no credit.
A significant number of students gained the fall-back mark by referring to the idea of the narrowed arteries leading to a heart attack.

03.7 Nearly half of all students scored full marks in this question, with the most common being a link between 'high blood cholesterol' and 'antibiotics'. The majority of students correctly associated 'heart failure' with 'heart transplant'.

03.8 Nearly three quarters of students gained credit in this question. Responses which were unable to gain credit included 'it cannot be treated', 'it is caused by the build-up of plaque', 'it has symptoms which are not easy to see' and 'it happens inside the body'.