AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.1.1

Sexual and asexual reproduction

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**39**
Available paper years	**2007–2025**

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.

4.6.1.1 Sexual and asexual reproduction

Answer 01 · Mark scheme

March 2007 | BLY1B | Original Q9 | Legacy

Nine	**2**	**3**	**3**	**2**

4.6.1.1 Sexual and asexual reproduction

Answer 01 · Mark scheme

March 2007 | BLY1B | Original Q9 | Legacy

BLY1B (Evolution and Environment) Higher Tier

Question	Key		
One	**A**	cell	**1**
	B	chromosome	**4**
	C	enzymes	**2**
	D	gene	**3**
Two	**A**	parents	**4**
	B	politicians	**1**
	C	scientists	**2**
	D	society	**3**

	A	B	C	D
Three	**4**	**4**	**2**	**1**
Four	**2**	**3**	**3**	**2**
Five	**1**	**4**	**2**	**4**
Six	**3**	**4**	**4**	**3**
Seven	**1**	**2**	**4**	**4**
Eight	**1**	**1**	**1**	**3**
Nine	**2**	**3**	**4**	**3**

4.6.1.1 Sexual and asexual reproduction

Answer 02 · Mark scheme

June 2007 | BLY1F | Original Q3 | Legacy

The full source mark scheme begins on page 60. Follow original question 3 in that document.

Answer 03 · Mark scheme

November 2007 | BLY1B | Original Q5 | Legacy

Five	**A**	tissue culture	**2**
	B	taking cuttings	**1**
	C	sexual reproduction	**3**
	D	transplanting embryos	**4**

4.6.1.1 Sexual and asexual reproduction

Answer 04 · Mark scheme

Question 3

	answers	extra information	mark
(a)	characteristics		1
(b)	genes		1
(c)	chromosomes		1
(d)	mitosis		1
(e)	asexual		1
total			5

4.6.1.1 Sexual and asexual reproduction

Answer 04 · Mark scheme

January 2008 | BLY2F | Original Q3 | Legacy

BLY2F

Answer 05 · Mark scheme

March 2008 | BLY1AP | Original Q3 | Legacy

Three	**A**	egg	**1**
	B	embryo	**4**
	C	fertilised egg	**3**
	D	sperm	**2**

Answer 06 · Mark scheme

June 2008 | BLY1AP | Original Q1 | Legacy

Question	Key		
One	**A**	egg	**1**
	B	embryo	**3**
	C	fertilised egg	**4**
	D	sperm	**2**

Answer 07 · Mark scheme

June 2008 | BLY1BP | Original Q3 | Legacy

Three	**A**	sexual reproduction	**1**
	B	taking cuttings	**2**
	C	tissue culture	**4**
	D	transplanting embryos	**3**

4.6.1.1 Sexual and asexual reproduction

Answer 08 · Mark scheme

June 2008 | BLY1F | Original Q3 | Legacy

question	answers	extra information	mark
3(a)	A sperm		1
	B egg		1
	C fertilised egg		1
	D embryo		1
3(b)	insert into mother	ignore fertilise / check fertilisation / check viability	1
	womb / uterus		1
3(c)(i)	one quarter		1
3(c)(ii)	no / little chance of success over 42	the statement 'only 2 out of 53 became pregnant / had babies' gains **2** marks	1
	reference to table of only 2 women became pregnant		1
3(c)(iii)	so fewer twins / multiple births **or** multiple births more dangerous		1
Total			**10**

4.6.1.1 Sexual and asexual reproduction

Answer 08 · Mark scheme June 2008 | BLY1F | Original Q3 | Legacy

COMPONENT NUMBER: BLY1F

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: June 2008

Answer 09 · Mark scheme November 2008 | BLY1AP | Original Q2 | Legacy

Two	**A**	removed from ovary	**2**
	B	womb (uterus)	**4**
	C	provided by father	**1**
	D	embryo	**3**

4.6.1.1 Sexual and asexual reproduction

Answer 10 · Mark scheme

January 2009 | BLY1F | Original Q5 | Legacy

question	answers	extra information	mark
5(a)	sexual reproduction		1
5(b)	any **three** from: • coat colour inherited / controlled by genes • it has horse and zebra features • gets gametes from both parents • genes / DNA / chromosomes / genetic information in gametes • zorse receives genes / DNA / chromosomes / genetic information from parents		3
Total			**4**

4.6.1.1 Sexual and asexual reproduction

Answer 10 · Mark scheme

January 2009 | BLY1F | Original Q5 | Legacy

COMPONENT NUMBER: BLY1F

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

4.6.1.1 Sexual and asexual reproduction

Answer 11 · Mark scheme

January 2009 | BLY1F | Original Q6 | Legacy

question	answers	extra information	mark
6(a)	21		1
6(b)	1/26 or 8/208 or 4/104 or 2/52 **or** 3.8%	allow 'out of' in each case	1
6(c)	under 35		1
6(d)	any **two** from: • low success rate **or** not always successful • high number of multiple births • expensive • stressful / emotional • side effects		2
Total			**5**

4.6.1.1 Sexual and asexual reproduction

Answer 11 · Mark scheme

January 2009 | BLY1F | Original Q6 | Legacy

Biology BLY1F - AQA GCSE Mark Scheme 2009 January Series

COMPONENT NUMBER: BLY1F

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

Answer 12 · Mark scheme

March 2009 | BLY1AP | Original Q4 | Legacy

Four	**A**	30	**4**
	B	48	**2**
	C	99	**3**
	D	142	**1**

Answer 13 · Mark scheme

November 2009 | BLY1BP | Original Q3 | Legacy

Three	**A**	clones	**3**
	B	cuttings	**4**
	C	gametes	**1**
	D	variations	**2**

4.6.1.1 Sexual and asexual reproduction

Answer 14 · Mark scheme

January 2010 | BLY2F | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)(i)	sex cells		1
2(a)(ii)	chromosomes		1
2(b)(i)	two		1
2(b)(ii)	recessive		1
2(c)(i)	cell membrane	allow membrane	1
2(c)(ii)	cytoplasm		1
2(d)(i)	A		1
2(d)(ii)	B		1
Total			**8**

4.6.1.1 Sexual and asexual reproduction

Answer 14 · Mark scheme

January 2010 | BLY2F | Original Q2 | Legacy

BLY2F

Answer 15 · Mark scheme

March 2010 | BLY1BP | Original Q3 | Legacy

Three	**A**	genes	**2**
	B	gametes	**1**
	C	characteristics	**4**
	D	nucleus	**3**

Answer 16 · Mark scheme

March 2010 | BLY1BP | Original Q5 | Legacy

Five	**A**	sexual reproduction	**2**
	B	tissue culture	**3**
	C	embryo transplants	**1**
	D	adult cell cloning	**4**

	A	**B**	**C**	**D**

Answer 17 · Mark scheme

June 2010 | BLY1BP | Original Q3 | Legacy

No matching mark scheme was available in the supplied archive for this question.

4.6.1.1 Sexual and asexual reproduction

Answer 18 · Mark scheme June 2010 | BLY1F | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4(a)(i)	characteristic		1
4(a)(ii)	gene		1
4(a)(iii)	gamete		1
4(b)	sexual asexual clones		1 1 1
Total			**6**

4.6.1.1 Sexual and asexual reproduction

Answer 18 · Mark scheme

June 2010 | BLY1F | Original Q4 | Legacy

BLY 1F

4.6.1.1 Sexual and asexual reproduction

Answer 19 · Mark scheme

January 2011 | BLY1F | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)	FSH / follicle stimulating hormone LH / luteinizing hormone	allow FHS either order	1 1
7(b)	any **four** from: • egg(s) collected from ovary • (eggs) mixed with sperm **or** fertilisation occurs • fertilised egg divides • embryo formed • *(*embryos*)* inserted into womb / uterus • FSH matures egg **and** LH releases eggs	 allow eggs and sperm put into tube ignore references to vagina	4
Total			**6**

4.6.1.1 Sexual and asexual reproduction

Answer 19 · Mark scheme

January 2011 | BLY1F | Original Q7 | Legacy

BLY1F

Answer 20 · Mark scheme

March 2011 | BLY1BP | Original Q5 | Legacy

Five	**A**	embryo transplants		**2**	
	B	sexual reproduction		**4**	
	C	taking cuttings		**1**	
	D	tissue culture		**3**	
	A		**B**	**C**	**D**

Answer 21 · Mark scheme

November 2011 | BLY1BP | Original Q5 | Legacy

Five	**A**	adult cell cloning		**4**	
	B	sexual reproduction		**2**	
	C	taking cuttings		**1**	
	D	tissue culture		**3**	
	A		**B**	**C**	**D**

4.6.1.1 Sexual and asexual reproduction

Answer 22 · Mark scheme

January 2012 | BL1FP | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)(i)	fusion / joining / combining of gametes / egg **and** sperm / sex cells	accept fertilisation allow fusion / joining / combining DNA from two parents ignore meeting / coming together / mixing of gametes etc	1
7(a)(ii)	(mixture of) genes / DNA / genetic information / chromosomes from both parents / horse **and** zebra	ignore nucleus / inherited information but allow second mark if given dependent on sensible attempt at 1st mark	1 1

Question 7 continues on the next page . . .

4.6.1.1 Sexual and asexual reproduction

BL1FP

Question 7 continued

7(b)	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 2, 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	There is simple description of the early stages of adult cell cloning. However there is little other detail and the description may be confused or inaccurate.	There is an almost complete description of the early stages of the process and description of some aspects of the later stages. The description may show some confusion or inaccuracies.	There is a clear, detailed and accurate description of all the major points of how adult cell cloning is carried out.

Examples of Biology points made in the response could include: • skin cell from zorse • (unfertilised) egg cell from horse • remove nucleus from egg cell • take nucleus from skin cell • put into (empty) egg cell • (then give) electric shock • (causes) egg cell divides / embryo formed • (then) place (embryo) in womb / uterus	6

Total			**9**

4.6.1.1 Sexual and asexual reproduction

Answer 22 · Mark scheme

January 2012 | BL1FP | Original Q7 | Legacy

BL1FP

4.6.1.1 Sexual and asexual reproduction

Answer 23 · Mark scheme

January 2013 | BL1FP | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)(i)	natural		1
7(a)(ii)	simple		1
7(a)(iii)	three billion		1
7(b)	any **two** from: • reference to religion • insufficient evidence / couldn't prove it / no proof • mechanism of inheritance / variation not known • reference to other theories • reference to Darwin's status	ignore no evidence allow genes / DNA not known about	2
7(c)(i)	tree		1
7(c)(ii)	hippopotamus **and** pig	both required, either order allow hippo	1
7(c)(iii)	new evidence from fossils		1
Total			**8**

4.6.1.1 Sexual and asexual reproduction

Answer 23 · Mark scheme

January 2013 | BL1FP | Original Q7 | Legacy

BL1FP

4.6.1.1 Sexual and asexual reproduction

Answer 24 · Mark scheme

January 2013 | BL2FP | Original Q2 | Legacy

Question 2

question	answers	extra information	mark
2(a)	DNA		1
2(b)	X and Y		1
2(c)(i)	46 chromosomes		1
2(c)(ii)	half the number		1
2(d)	meiosis		1
Total			5

4.6.1.1 Sexual and asexual reproduction

Answer 24 · Mark scheme

January 2013 | BL2FP | Original Q2 | Legacy

BL2FP

4.6.1.1 Sexual and asexual reproduction

Answer 25 · Mark scheme

June 2013 | BL1FP | Original Q6 | Legacy

Question 6

question	answers	extra information	Mark
6(a)	sexual reproduction		1
6(b)(i)	genes		1
6(b)(ii)	gametes		1
6(c)(i)	any **two** from: • more meat (per cow) • more milk each day • can be milked for more time after giving birth / greater proportion of time	answers must be comparative ignore bigger unqualified accept '(produce) more milk', for **1** mark, if neither more milk each day nor can be milked for more time after giving birth are given	2
6(c)(ii)	(milk contains) more protein less time before having a calf when no milk produced	answers must be comparative	1 1
6(d)(i)	genes from one organism are transferred to a different organism		1
6(d)(ii)	(possible) harm to babies' long term health	allow don't know long-term / side effects (on baby) accept idea that there may be other things in (genetically engineered) cow's milk that might harm babies' health e.g. bacteria ignore ethical / religious arguments	1
Total			**9**

4.6.1.1 Sexual and asexual reproduction

Answer 26 · Mark scheme

June 2013 | BL2FP | Original Q3 | Legacy

Question 3

<table>
<tr><th>question</th><th>answers</th><th>extra information</th><th>mark</th></tr>
<tr><td>3(a)(i)</td><td>
<table>
<tr><th>Feature</th><th>Mitosis only</th><th>Meiosis only</th></tr>
<tr><td>Produces new cells during growth and repair</td><td>✓</td><td></td></tr>
<tr><td>Produces gametes (sex cells)</td><td></td><td>✓</td></tr>
<tr><td>Produces genetically identical cells</td><td>✓</td><td></td></tr>
</table>
All 3 correct = 2 marks
2 correct = 1 mark
0 or 1 correct = 0 marks
</td><td></td><td>2</td></tr>
<tr><td>3(a)(ii)</td><td>(a man) testis / testes
(a woman) ovary / ovaries</td><td>accept testicle(s)
do not accept ‘ova’ / ovule</td><td>1
1</td></tr>
<tr><td>3(b)(i)</td><td>XY / YX
or
X and Y</td><td></td><td>1</td></tr>
<tr><td>3(b)(ii)</td><td>XX
or
X and X or 2 X’s</td><td>accept X</td><td>1</td></tr>
<tr><td>3(c)</td><td>½ / 0.5 / 50% / 1:1 / 1 in 2</td><td>do not accept 1:2 / 50/50
allow 50:50
allow 2 in 4</td><td>1</td></tr>
<tr><td>Total</td><td></td><td></td><td>7</td></tr>
</table>

4.6.1.1 Sexual and asexual reproduction

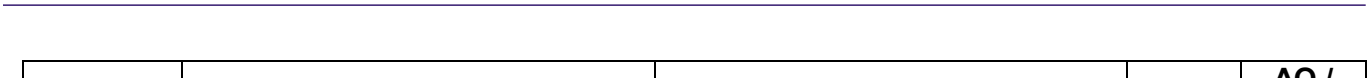
Answer 27 · Mark scheme June 2014 | BL1FP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.
5(a)(i)	gamete(s)	ignore reproductive cells	1	AO1 1.7.2a
5(a)(ii)	womb / uterus	allow phonetic spellings	1	AO1 1.7.2c
5(b)(i)	are formed from the same original embryo		1	AO2 1.7.2c
5(b)(ii)	embryo transplantation		1	AO1 1.7.2c
5(b)(iii)	any **one** from: • (calves will have some) genes / DNA from bull / sperm • idea that sexual reproduction produces variation	allow not all genes from the cow allow may be male allow idea that gene for low fat milk may not be passed on	1	AO2 1.7.2a
Total			**5**	

4.6.1.1 Sexual and asexual reproduction

Answer 27 · Mark scheme

June 2014 | BL1FP | Original Q5 | Legacy



4.6.1.1 Sexual and asexual reproduction

Answer 28 · Mark scheme June 2014 | BL2FP | Original Q5 | Legacy

5(a)(i)	fertilisation		1	AO1 2.7.1i
5(a)(ii)	in sequence: 1 gene 2 chromosome 3 nucleus	accept 1 next to gene, 2 next to chromosome and 3 next to nucleus in box allow 1 mark for smallest **or** largest in correct position	2	AO2 2.1.1a, 2.7.1b,e, 2.7.2f,g
5(a)(iii)	DNA		1	AO1 2.7.2f
5(b)(i)	On diagram: tick drawn next to **X** and / or **Y** from Parent 1	tick(s) must be totally outside grid squares allow ticks around "parent 1" extra ticks elsewhere cancel	1	AO1 2.7, 2.7.2a,b
5(b)(ii)	0.5 / ½ / 50% / 1:1 / 50:50 / 1 in 2 2 (out of 4) boxes are **XX** **or** half of the sperm contain an **X**-chromosome	allow 2/4 / 2 in 4 / 2 out of 4 / 'even(s)' / 'fifty – fifty' do **not** allow 1:2 or '50 / 50' or '50 – 50' allow **XY** is male and 2 (out of 4) boxes are **XY**	1 1	AO2 2.7, 2.7.2a,b
Total			**7**	

4.6.1.1 Sexual and asexual reproduction

Answer 28 · Mark scheme

June 2014 | BL2FP | Original Q5 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.

4.6.1.1 Sexual and asexual reproduction

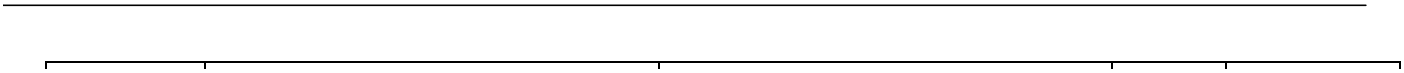
Answer 29 · Mark scheme June 2016 | BL2FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	ovary		1	AO1 2.7.1f
6(b)	46		1	AO1 2.7.1e/i 2.7.2b
6(c)(i)	does not fit the pattern **or** it is higher than the 3rd value / it should be lower than the 3rd value / it should be between the 3rd and 5th values	do **not** allow use of incorrect figures	1	AO3 2.7
6(c)(ii)	As age increases % of women (having a baby) decreases		1	AO2 2.7
6(d)(i)	33	allow 1 mark for $\frac{66}{2}$ if no answer / wrong answer	2	AO2 2.7, 2.7.3d
6(d)(ii)	low success rate more likely to have a baby with health problems / abnormalities / a faulty chromosome		1 1	AO3 2.7, 2.7.3d
Total			**8**	

4.6.1.1 Sexual and asexual reproduction

Answer 29 · Mark scheme

June 2016 | BL2FP | Original Q6 | Legacy



4.6.1.1 Sexual and asexual reproduction

Answer 30 · 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		reference to more is only needed once for the first two marking points		AO2 4.4.2.1 4.7.2.2
	more oxygen (in soil with earthworms)	allow earthworms bring oxygen to soil	1	
	(for) more (aerobic) respiration	do **not** accept anaerobic respiration	1	
	(of) bacteria / fungi / microorganisms / microbes / decomposers		1	
06.7	fertilisation	ignore sexual reproduction	1	AO1 4.6.1.1 4.6.1.2

4.6.1.1 Sexual and asexual reproduction

Answer 30 · Mark scheme

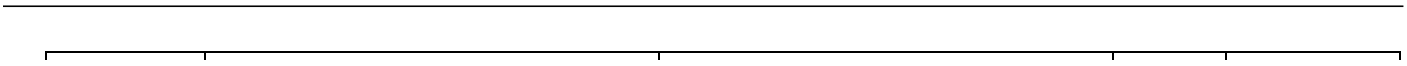
June 2018 | 8461/1F | Original Q6

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

4.6.1.1 Sexual and asexual reproduction

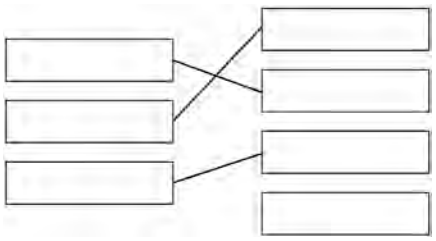
Answer 30 · Mark scheme

June 2018 | 8461/1F | Original Q6



4.6.1.1 Sexual and asexual reproduction

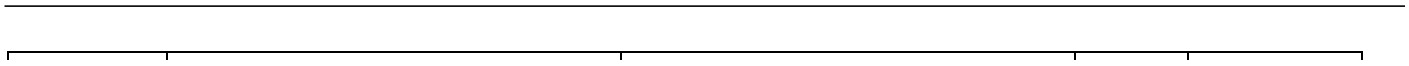
Answer 31 · Mark scheme June 2018 | 8461/2F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	to allow implantation of the embryo		1	AO1 4.5.3.4
02.2	oestrogen		1	AO1 4.5.3.4
02.3	13 / 14 / 15 / 16	allow any number in range 13 to 16 allow any range within these values eg 14–16	1	AO3 4.5.3.5
02.4		extra line from a method cancels the mark	1 1 1	AO1 4.5.3.5
02.5	more reliable than diaphragm / spermicidal cream low chance of pregnancy no side effects	allow fewer pregnancies than diaphragm / spermicidal cream allow only 1 more pregnancy than the pill (per 100 women per year) allow almost as good as the pill allow reference to one named example allow easy to get / buy allow easy to use allow prevent / reduce spread of STDs / gonorrhoea / HIV ignore cost	1 1 1	AO3 4.5.3.5
Total			**9**	

4.6.1.1 Sexual and asexual reproduction

Answer 31 · Mark scheme

June 2018 | 8461/2F | Original Q2



4.6.1.1 Sexual and asexual reproduction

Answer 32 · Mark scheme June 2019 | 8461/2F | Original Q3

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

4.6.1.1 Sexual and asexual reproduction

Answer 32 · Mark scheme

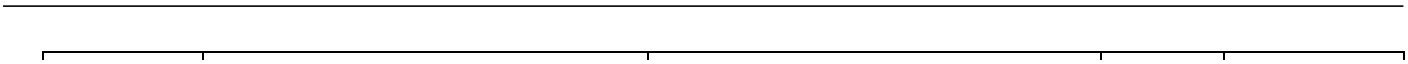
June 2019 | 8461/2F | Original Q3

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**	

4.6.1.1 Sexual and asexual reproduction

Answer 32 · Mark scheme

June 2019 | 8461/2F | Original Q3



4.6.1.1 Sexual and asexual reproduction

Answer 33 · Mark scheme

November 2020 | 8461/2F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	$\frac{1430}{2600} \times 100$ 55 (%)		1 1	AO2 4.5.1 4.5.3.3
04.2	(volume) increases	allow (volume) goes up	1	AO2 4.5.1 4.5.2.4 4.5.3.3
04.3	drink (a lot / more)		1	AO2 4.5.1 4.5.3.3
04.4	filtration reabsorption excretion	this order only	1 1 1	AO1 4.5.3.3

4.6.1.1 Sexual and asexual reproduction

Answer 33 · Mark scheme

November 2020 | 8461/2F | Original Q4

Question	Answers	Mark	AO / Spec. Ref.
04.5	**Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	3–4	AO3 4.5.3.3
	Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.	1–2	
	No relevant content	0	
	Indicative content **Advantages of kidney transplant** • no need for regular / long hospital visits **or** is a long-term solution • flexible lifestyle, such as can go on holidays • may not live near a hospital **or** reference to transport costs • no risk of infection from frequent needles / treatment • less / no need to control diet • maintains correct concentration of substances in blood / body • cheaper long term for NHS / hospital **Disadvantages of kidney transplant** • may be rejected • have to keep taking anti-rejection drugs **or** immunosuppressants • (suitable) donor may not be available **or** need for tissue matching • risk from surgery (e.g. anaesthesia or infection) • recovery from surgery will take a long time • does not last forever (therefore further surgery needed) For Level **2**, answers must refer to both advantages **and** disadvantages		
Total			**11**

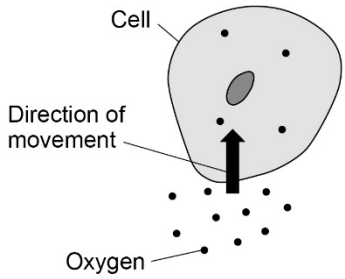
4.6.1.1 Sexual and asexual reproduction

Answer 33 · Mark scheme

November 2020 | 8461/2F | Original Q4

4.6.1.1 Sexual and asexual reproduction

Answer 34 · 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

4.6.1.1 Sexual and asexual reproduction

Answer 34 · 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**	

4.6.1.1 Sexual and asexual reproduction

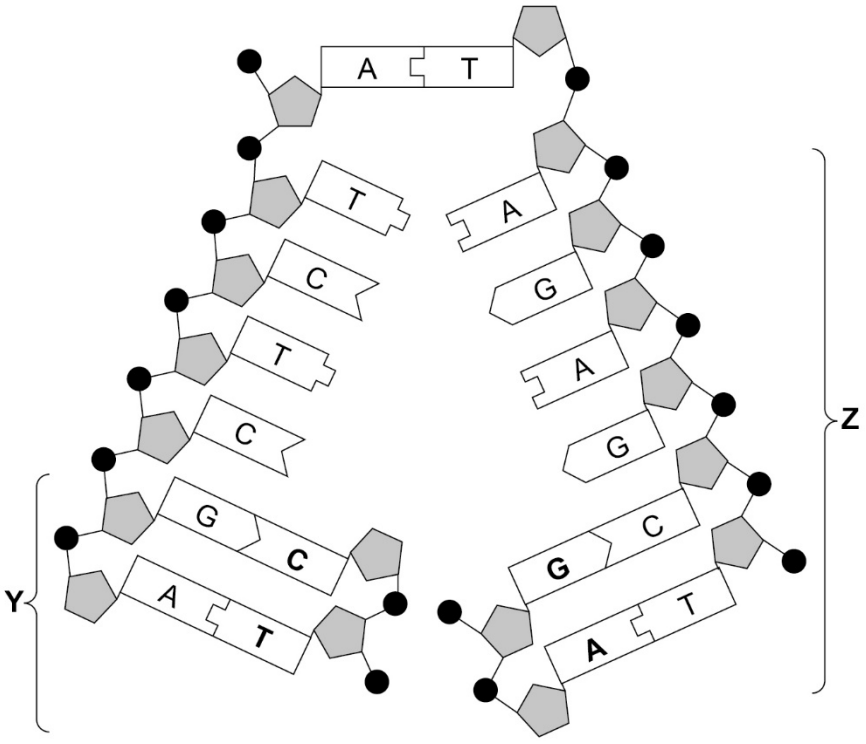
Answer 34 · Mark scheme

November 2021 | 8461/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.6.1.1 Sexual and asexual reproduction

Answer 35 · Mark scheme November 2021 | 8461/2F | Original Q8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	chromosome(s)	allow chromatid(s) / gene(s) / allele(s)	1	AO1 4.6.1.4
08.2	sugar	allow deoxyribose allow pentose do **not** accept ribose	1	AO1 4.6.1.5
08.3	base(s)	allow nitrogenous base(s) allow adenine **and** cytosine **and** guanine **and** thymine	1	AO1 4.6.1.5
08.4	 all four required for the mark		1	AO3 4.6.1.5

4.6.1.1 Sexual and asexual reproduction

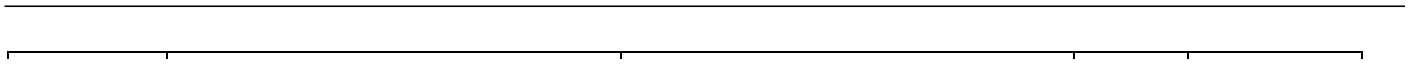
Answer 35 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.5	replication		1	AO3 4.6.1.5 4.1.2.2
08.6	protein	allow polypeptide	1	AO1 4.6.1.4
08.7	3×10^{-12} grams		1	AO2 4.6.1.2
08.8	meiosis		1	AO1 4.6.1.2
Total			**8**	

4.6.1.1 Sexual and asexual reproduction

Answer 35 · Mark scheme

November 2021 | 8461/2F | Original Q8



4.6.1.1 Sexual and asexual reproduction

Answer 36 · Mark scheme

June 2022 | 8461/2F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	oestrogen progesterone		1 1	AO1 4.5.3.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	FSH causes an egg to mature in the ovary		1	AO1 4.5.3.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	(from day) 9 (to day) 15	do **not** accept (from day) 15 (to day) 9	1	AO2 4.5.3.5

4.6.1.1 Sexual and asexual reproduction

Answer 36 · Mark scheme

June 2022 | 8461/2F | Original Q5

Question	Answers	Mark	AO / Spec. Ref.
05.4	**Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO1 4.5.3.4 4.5.3.5
	Level 2: Relevant points (reasons/causes) are identified and there are attempts at logical thinking. 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 thinking.	1–2	
	No relevant content	0	
	Indicative content • oral contraceptive / the 'pill' ○ (contains hormones / oestrogen / progesterone) to prevent egg / follicle maturing **or** prevents ovulation • injection / implant / skin patch ○ (contains hormones / oestrogen / progesterone) to prevent egg / follicle maturing **or** prevents ovulation • condom / femidom ○ prevents sperm reaching egg or prevents sperm entering woman's body / vagina • diaphragm ○ prevents sperm reaching egg / womb / oviduct • IUD ○ prevents implantation **or** releases hormone / progesterone to prevent ovulation **or** (releases copper ions to) thicken mucus and prevent sperm passage • spermicide ○ kills sperm • sterilisation / vasectomy / tubular ligation ○ prevents passage of sperm / egg • rhythm method ○ no egg available for fertilisation		

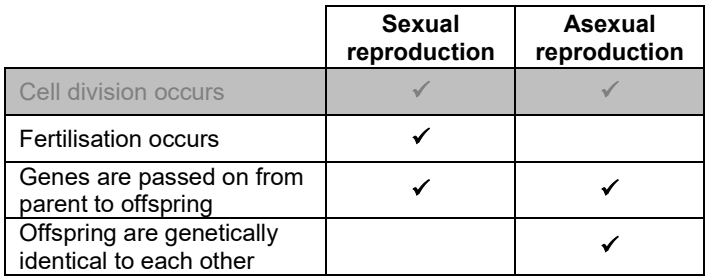
Total Question 5		**10**

4.6.1.1 Sexual and asexual reproduction

Answer 37 · Mark scheme

June 2022 | 8461/2F | Original Q8

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1			2	AO1 4.6.1.1

	Sexual reproduction	Asexual reproduction
Cell division occurs	✓	✓
Fertilisation occurs	✓	
Genes are passed on from parent to offspring	✓	✓
Offspring are genetically identical to each other		✓

allow **1** mark for 1 or 2 correct rows
ignore 'x' in blank boxes

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.2	pollen (grain)	allow nucleus in pollen (grain)	1	AO1 4.6.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.3	between 3 and 4 hours		1	AO2 4.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.4	5 hours 6 hours		1 1	AO2 4.6.1.2

4.6.1.1 Sexual and asexual reproduction

Answer 37 · Mark scheme

June 2022 | 8461/2F | Original Q8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.5	2		1	AO2 4.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.6	4		1	AO2 4.6.1.2

Total Question 8		**8**

4.6.1.1 Sexual and asexual reproduction

Answer 38 · Mark scheme

June 2023 | 8461/1F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.1	vector		1	AO1 4.3.1.5

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.2	any **two** from: • (it has) mitochondria • (it has a) nucleus • (it has) no plasmids	if neither mark awarded, allow **1** mark for protist has membrane-bound structures allow it does not have a loop of DNA allow other appropriate features do **not** accept (it has) cytoplasm do **not** accept (it has) a (cell) membrane do **not** accept it has no cell wall	2	AO2 4.3.1.5 4.1.1.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.3	Salmonella		1	AO2 4.1.1.1 4.3.1.3

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.4	only one parent is involved		1	AO1 4.3.1.5 4.6.1.1

4.6.1.1 Sexual and asexual reproduction

Answer 38 · Mark scheme June 2023 | 8461/1F | Original Q4

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.5	14		1	AO2 4.3.1.5 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.6	decreased haemoglobin		1	AO2 4.3.1.5 4.2.2.3

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.7		allow alternative route allow correct conversion to standard form at any stage		AO2 4.3.1.5
	$\frac{210\ 000\ 000}{2}$ **or** 105 000 000	allow $\frac{210 \text{ million}}{2}$ **or** 105 million	1	
	105 000 000 × 3	allow 105 million × 3	1	
	315 000 000	allow 315 million	1	
	3.15×10^8		1	

4.6.1.1 Sexual and asexual reproduction

Answer 38 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.8	any **two** from: • wear long(er) sleeves / clothes • use insect repellent or insecticides • don't go out in the evening • avoid going to countries / places with malaria / mosquitos • destroy breeding grounds • release sterile male mosquitos	ignore vaccination / anti-malarial drugs allow reduce bare skin exposure allow insect repellent methods such as citronella candles allow close doors / windows in the evening allow methods of destroying breeding grounds such as drain water holes allow other correct suggestions	2	AO2 4.3.1.5

Question	Answers	Extra information	Mark	AO / Spec Ref.
04.9	percentage / chance (of getting malaria) decreases (with age) correct use of data such as two pairs of data from **Table 4**	do **not** accept percentage / chance of having disorder **S** decreases with age allow use of processed data	1 1	AO3 4.2.2.5 4.3.1.5

Total Question 4	15

4.6.1.1 Sexual and asexual reproduction

Answer 39 · Mark scheme

June 2025 | 8461/2F | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	testis / testes / testicle(s)		1	AO1 4.5.3.4 4.6.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	**A** = 46 **D** = 23	if no other mark awarded allow **1** mark for **A** = 92 **and D** = 46	1 1	AO1 4.6.1.2 4.6.1.8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	fertilisation		1	AO1 4.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	pollen		1	AO1 4.6.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	mitosis		1	AO1 4.1.1.6 4.1.2.2 4.6.1.1 4.6.1.2 4.6.1.3

Answer 39 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.6	sugar water		1 1	AO2 4.4.1.3 4.2.3.2 4.6.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.7	any **one** from: • produces (genetic) variation (in offspring) • (seeds / fruits) can be dispersed (to new areas) • many seeds / offspring produced • offspring not competing (for light / water / ions) • can survive in a new environment • enables evolution	allow offspring are not (genetically) identical allow description of an advantage of variation eg not all killed by one pathogen / disease	1	AO1 4.6.1.1 4.6.1.3 4.6.2.2 4.6.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.8	any **one** from: • fast • many offspring produced • (genetically) identical offspring • only one parent needed • offspring less vulnerable (as attached to parent) • offspring receive water from parent • can out-compete other species • can colonise local area • less energy is needed	allow they are clones allow offspring receive named example of nutrient from parent allow pollinators / bees not required	1	AO1 4.6.1.1 4.6.1.3 4.6.2.2 4.6.3.1

Total Question 3	10

Version 1.0: 0707

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1F Unit Biology 1

Mark Scheme

2007 examination - June series

4.6.1.1 Sexual and asexual reproduction

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.

4.6.1.1 Sexual and asexual reproduction

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.

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.

3.8 Unexpected Correct Answers not in the Mark Scheme

The Examiner should use professional judgement to award credit where a candidate has given an unexpected correct answer which is not covered by the mark scheme. The Examiner should consult with the Team Leader to confirm the judgement. The Team Leader should pass this answer on to the Principal Examiner with a view to informing all examiners.

4.6.1.1 Sexual and asexual reproduction

BLY1F Question 1

	answers	extra information	mark
(a)(i)	any **two** from: • light • water • space • nutrients / ions / minerals / named • carbon dioxide / CO_2	list principle ignore oxygen / food / sun	2
(ii)	less competition for water **or** more water / nutrients / minerals available	ignore space / light / food	1
(b)	camouflage / same shape as leaf / looks like a leaf	allow ‘blends in’ ignore colour	1
total			4

4.6.1.1 Sexual and asexual reproduction

BLY1F Question 2

	answers	extra information	mark
(a)	any **three** from: • water • ions / minerals / salts • temperature • blood sugar • heart rate • blood pressure	 allow breathing / oxygen / carbon dioxide allow sodium / chloride, other ions neutral allow heat ignore urea	3
(b)	contraceptive drug fertility drug		1 1
(c)(i)	eg nicotine, alcohol, cocaine, heroin, painkillers, tranquilisers, LSD	allow cannabis / weed or other alternative names allow tobacco ignore smoking / ecstasy	1
(ii)	alters body chemistry **or** craving / needing / dependence withdrawal symptoms on stopping	allow psychological dependence allow withdrawal described allow ‘feel ill without it’	1 1
total			8

4.6.1.1 Sexual and asexual reproduction

BLY1F Question 3

	answers	extra information	mark
	joining		1
	sexual		1
	identical		1
	asexual		1
	clones		1
total			5

BLY1F Question 4

	answers	extra information	mark
(a)	7.8		1
(b)	14 / 13.6	allow answer 13 without working for **1** mark 7500 ÷ 550 gains **1** mark	2
(c)	produces / increases blood cholesterol	ignore obesity	1
	affects heart **or** affects blood vessels **or** affects blood pressure	 accept clogs blood vessels	1
(d)	(increases) blood pressure	ignore references to heart / blood vessels	1
total			6

4.6.1.1 Sexual and asexual reproduction

BLY1F Question 5

	answers	extra information	mark
(a)	fossils / teeth / bones / skeleton / foot prints	allow cave drawings do **not** accept scientists have seen them	1
(b)	only (some) bones remain / soft parts have decayed	accept 'no-one has ever seen one' allow no photos, no pictures, no drawings	1
(c)	any **two** from: • hunted by human • (new) predator • (new) competitor • (new) disease • environment changed / named environmental change • prey extinct / loss of food supply	 allow more predators allow natural disaster ignore not enough food	2
total			4

4.6.1.1 Sexual and asexual reproduction

BLY1F Question 6

	answers	extra information	mark
(a)(i)	56	accept 54 – 58	1
(ii)	increased		1
	reasonable qualification eg slowly then more quickly **or** to 174 / 176 **or** by 138 / 140		1
(b)	any **two** from:		2
	• no immunity **or** antibodies ineffective	accept no resistance	
	• no vaccines **or** humans not immunised		
	• idea of large scale contact **or** large scale travel	do **not** accept passed on ignore no cure	
total			5

4.6.1.1 Sexual and asexual reproduction

BLY1F Question 7

	answers	extra information	mark
(a)	scientists figures based on research / calculations / data **or** scientists sample whole area	ignore reasons based on bias	1
	fishermen based on impression / hearsay / experience **or** fishermen fish in well-stocked / limited areas	scientists sample a wider area = **2** marks fishermen only fish in well-stocked areas = **2** marks if no marks gained fishermens' opinion **and** scientists' opinion gains **1** mark	1
(b)	any **two** from: • economic considerations • political impact • pressure groups **or** fears of extinction	eg fear for jobs, profits, big demand for cod eg allow EU / government decide or laws will be passed	2
total			4

4.6.1.1 Sexual and asexual reproduction

BLY1F Question 8

	answers	extra information	mark
(a)	any **two** from: • area of bed sampled • sampling time • size of net • kicking action • net position	control variables from information given	2
(b)	any **two** from: • some animals not dislodged • some animals missed / through / escaped net • invertebrates difficult to identify • invertebrates from outside area	must be ideas related to a sample ignore reliability etc	2
(c)	10 to 99 **or** 10 – 99 **or** 99 to 10 **or** 99 – 10		1
(d)	any **two** from: • increased / goes up • 0 at sample 4 • to (more than) 100	allow increase implied from all data described	2
(e)	mayfly because not found downstream of point where sewage enters stream **or** only in the unpolluted water		1 1
total			9

4.6.1.1 Sexual and asexual reproduction

Answer 33 · Examiner comments — November 2020 | 8461/2F | Original Q4

Question 4 (low & standard demand)

This question was about water balance in the human body and the treatment of people with kidney failure. The most common error in calculating the percentage of water lost as urine was to simply subtract the volume of urine from the total volume. Some students went on to divide this total by 2600 or by 1430. Consequently, a significant proportion of students were not credited with any marks and half scored full marks.

In **04.2** some students appeared to misunderstand what they were being asked and rather than describing an 'increase' suggested that the water lost from the skin as sweat during a long-distance run 'evaporates', 'dries up' or 'decreases (due to evaporation)'. It was common for students to identify all three of the words required in **04.4**; however, a large proportion managed to get these words in the wrong order. Students appear to know what goes on in the kidney but could not associate the specific terms, 'filtration', 'reabsorption' and 'excretion', with the given descriptions.

For **04.5** references to the advantage of a kidney transplant as not needing frequent hospital visits and the disadvantages of possible rejection and long waiting lists were commonly described. However, many students got no further than these and only very rarely was there any suggestion regarding infection, dietary control, the need to take immunosuppressants or surgical risks. Some students gave a description without any attempt to identify whether these were advantages or disadvantages of transplants; whilst others just described advantages of both a transplant and dialysis.

Answer 36 · Examiner comments — June 2022 | 8461/2F | Original Q5

Question 5

This question was about the menstrual cycle and methods of contraception.

05.1 Almost two-thirds of students correctly selected *oestrogen* and *progesterone* as the female reproductive hormones. One in eight students included testosterone in their selection.

05.2 The role of FSH in causing eggs to mature in the ovary was known by almost two-thirds of students, although many thought it caused the breakdown of the uterus lining.

05.3 Given that a sperm cell could survive inside a woman's reproductive organs for five days and an egg for one day, with ovulation on day 14, the range of days when intercourse could result in fertilisation (i.e. 9 to 15) was correctly calculated by only one in twenty students. A wide range of suggestions was made, many of which bore little resemblance to the correct answer and it was difficult to understand how they had been arrived at.

05.4 Students who showed sufficient knowledge to get to Level 3 (about a quarter of students) frequently referred to condoms and the pill and how each of these works. Reference to the patch, an implant or the diaphragm were commonly made. Some students went somewhat over the top and suggested that castration (often in the vernacular) was an appropriate method of contraception and although this would be effective, the method was not credited. Weaker students often gave a list of methods but were unable to explain how they work. The most commonly understood method was the use of the condom, often described as stopping sperm from reaching the woman's body, the vagina or the egg.

4.6.1.1 Sexual and asexual reproduction

Answer 37 · Examiner comments

June 2022 | 8461/2F | Original Q8

Question 8

This was the first of three questions common to both the Foundation and Higher Tier papers. The topic was reproduction and meiosis.

08.1 Almost one third of students correctly selected whether each of the three statements applied to sexual and/or asexual reproduction. The most common error was not knowing that in *both* types of reproduction genes are passed from parents to offspring. A large proportion appeared to be using little more than guesswork.

08.2 A variety of plant parts, often not even of a flower, along with processes, sub-cellular structures and occasionally plant or even animal organs were suggested as the name of the male gamete in flowering plants. Fewer than a quarter gave the correct name, *pollen*.

08.3 and **08.4** Interpretation of the graph in **Figure 12**, which showed changing amounts of DNA in a cell before, during and after meiosis, was fairly good where, respectively, around 50 percent and 40 percent of students chose the correct period of DNA synthesis and the correct times of cell division. But it was odd that so many others chose 4-5 hours for copying of the DNA, a time when its mass remained constant, and chose times for cell division when the mass of DNA was not being halved.

08.5 and **08.6** Only one in seven suggested that the lowest value on the graph, at the end of meiosis, would be the amount of DNA in a sperm cell. In **08.6**, the suggested amount of DNA in an embryo was frequently a value lower than that given for the sperm cell, with fewer than one-third suggesting the same value as that found at the start of the graph.

4.6.1.1 Sexual and asexual reproduction

Answer 38 · Examiner comments

Question 4 (Low and standard demand)

04.1 Nearly two thirds of students knew the term 'vector' correctly describes the mosquito.

04.2 Although the question states that Figure 2 showed a (single) cell of a malarial protist, some students remained confused and believed that there were 'cells depicted within a cell'. Others incorrectly discussed the absence of plant cell features, such as 'no chloroplasts', while others got prokaryotic and eukaryotic cells muddled. Reference to size was ignored. While 25% of students failed to gain any marks, the most frequently seen correct feature was 'nucleus', followed by 'mitochondria'. Phonetic spellings were obviously allowed as students have difficulty in spelling both of these words. As in all questions of this nature, the 'list rule' applied so that where a student gave 3 answers, 2 of which were correct and 1 wrong, only one mark could be given.

04.3 Over two thirds of students gained the mark by selecting *Salmonella* to be prokaryotic. While the remaining students indicated 'cow' or 'grass', in equal amounts.

04.4 Around 77% of students knew that asexual reproduction involved only one parent.

04.5 It is clear that many students still remain unclear about the number of chromosomes involved in mitosis. Only around a third of students correctly selected '14' as the number of chromosomes each new protist cell would have after mitosis. The most common incorrect answer seen was '28', which was selected by a further third of the students.

04.6 Around half of students were correct in selecting 'decreased haemoglobin' as a change that would happen in the blood of a person with malaria.

04.7 Nearly 35% of students who are adept at mathematics found this question very straightforward and an easy route to four marks. A further 31% managed three marks, via many routes, but most commonly by reaching the point of 350 million but then failing to convert to standard form or incorrectly doing so. Others forgot that the question referred to 'millions' of people being infected and used 105 and 315 but, nevertheless, an answer of 3.15×10^2 was still awarded three marks.

04.8 Many students were aware of what should be done to reduce the chance of being bitten by mosquitoes but then used inadequate scientific language to express themselves and as such only around 13% of students gained both available marks. Answers such as 'cover yourself up' or 'use bug spray / repellent' were not credited. 'Wear more / thicker clothes' was also deemed insufficient and 'close windows / doors' also failed to get credit without qualifying that this was only important in the evenings. Some correctly suggested not going to places with mosquitoes or where there was an incidence of malaria and a few answers referred to destruction of breeding grounds. Other correct suggestions were also awarded credit, but overall 42% of students scored zero marks.

04.9 Nearly three quarters of students gained one mark here for correctly describing that the chance of getting malaria decreased with age. A few incorrectly understood the context of disorder S, however, and said that the likelihood of having this, rather than malaria, was lower as age increased. Even though the instruction given in the question was to use data

4.6.1.1 Sexual and asexual reproduction

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from Table 4 only around 10% of students went on to gain the second mark for an appropriate use of figures. Some, unfortunately, glanced too quickly at the results and believed there was a decrease of 5% every 2 years.

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Question 3 (Low and Standard demand)

03.1
Three quarters of students knew that sperm are produced in the testes/testicles. There were many alternative phonetic spellings of testes and testicles seen which were given credit. The most common incorrect answers were ovaries and penis along with other parts of the male and female reproductive organs. 'Genitalia' and colloquial terms were also frequently seen uncreditworthy answers, along with a few unexpected parts such as pancreas, stomach and spine.

03.2
All combinations of numbers were seen, including that for the compensation mark. Just under 40% of students gained both marks.

03.3
95% of students knew that fertilisation was the process where a sperm cell joins with an egg cell.

03.4
Over 50% of students knew that pollen is the male gamete in a flower.

03.5
60% of students knew that mitosis produces new cells in runners.

03.6
Over half of students could identify at least one substance that passes through the runners, with a further 25% being able to identify both sugar and water.

03.7
A third of students were able to give one advantage of reproducing sexually.
The most commonly awarded mark was for the idea of variation, either given in those terms or that the offspring would not be the same. All other bullet points were seen, with the idea of dispersal being the next most common. The most frequent reason for not gaining the mark here was for giving an advantage of asexual reproduction, possibly through having misread the question.

03.8
Over 50% of students were able to give one advantage of reproducing asexually with bullet points 1, 3 and 4 most commonly seen. Several students gave more than one idea in a single sentence e.g. ' it is faster because there is no need to find a mate'. A few students implied the idea of the offspring gaining resources from the parent plant but did not specify water or a named nutrient, instead referring to 'nutrients', so were unable to gain credit for bullet point 6. Others referred to asexual reproduction as being 'easier' without elaborating as to how this manifested itself. As with question **03.7** some students were unable to gain this mark because they gave an advantage of the other type of reproduction.