AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.1.1

Sexual and asexual reproduction

Past-paper questions

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

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

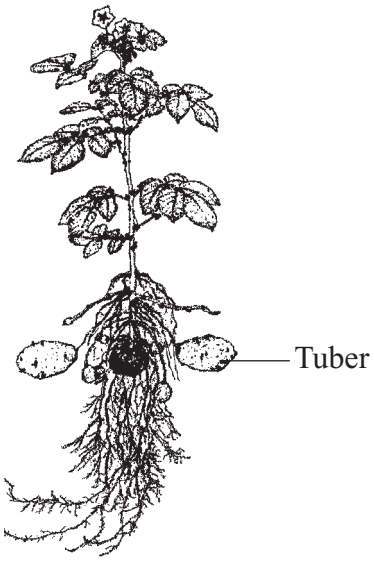
4.6.1.1 Sexual and asexual reproduction

Question 01

March 2007 | BLY1B | Original Q9 | Legacy

QUESTION NINE

The diagram shows a potato plant.



Potato tubers are produced by cell division. Potato plants can reproduce sexually and asexually.

The tubers can be removed and replanted. This produces more potato plants of the same type.

The masses of the tubers of 15 potato plants of the same type were measured using an electronic balance. The results are shown in the table.

Plant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mass of tubers in kg	2.5	1.7	2.3	4.1	2.2	1.9	2.5	3.8	4.6	1.9	3.6	1.3	2.5	2.9	1.2

9A What was the range of the mass of the tubers on the potato plants?

1 1.2 – 2.5 kg

2 1.2 – 4.6 kg

3 1.3 – 4.6 kg

4 1 – 15 kg

9B The sensitivity of the balance is . . .

1 0.001 kg

2 0.01 kg

3 0.1 kg

4 1.0 kg

9C Which of the following is **not** a possible reason for the difference in mass of the tubers produced by the potato plants?

1 Some of the plants were growing in the shade.

2 The plants received different amounts of nutrients.

3 The tubers were produced by sexual reproduction.

4 The plants were watered at different time intervals.

9D A plant nursery wants to produce large numbers of young plants quickly and cheaply.

Which technique would be used?

1 growing the seeds produced by sexual reproduction

2 taking cuttings

3 transplanting embryo plants to other plants

4 using genetic engineering

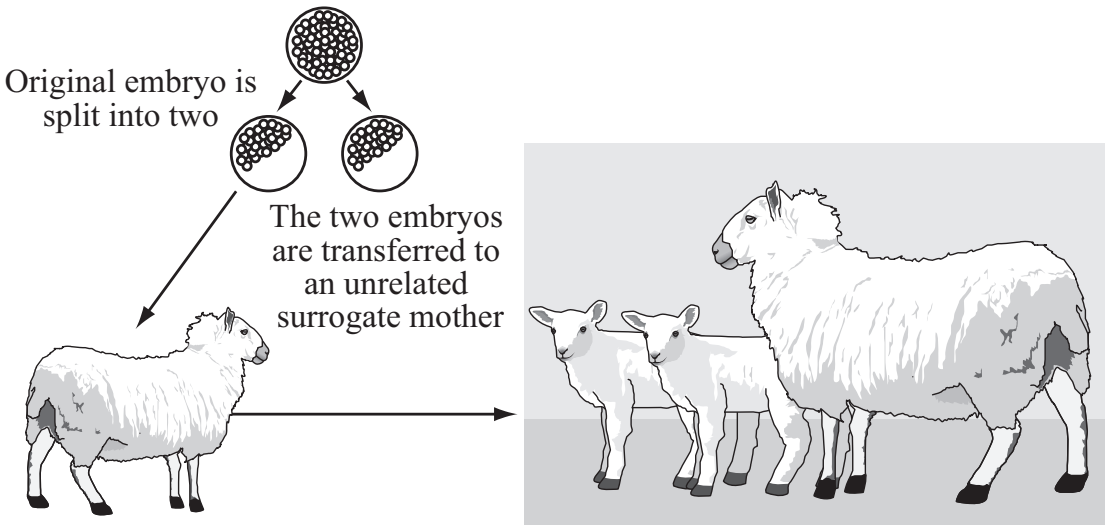
END OF TEST

4.6.1.1 Sexual and asexual reproduction

Question 02

June 2007 | BLY1F | Original Q3 | Legacy

3 The diagram shows one way of cloning sheep.



The surrogate mother gives birth to twins

Use words from the box to complete the sentences.

asexual	**clones**	**different**	**gametes**
identical	**joining**	**sexual**	**splitting**

The original embryo in the diagram developed following the ..... of an egg and a sperm. This is called ..... reproduction. The twins in the diagram have ..... genetic information. This is because the two embryos were produced by ..... reproduction. Because of this they are known as ..... .

(5 marks)

5

4.6.1.1 Sexual and asexual reproduction

Question 03

November 2007 | BLY1B | Original Q5 | Legacy

QUESTION FIVE

New individuals of animals and plants can be produced by different methods.

Match methods, **A**, **B**, **C** and **D**, with the numbers **1–4** in the sentences.

A tissue culture

B taking cuttings

C sexual reproduction

D transplanting embryos

A method used to produce plants quickly and cheaply is . . . **1** . . . .

A method using small groups of cells from a plant is . . . **2** . . . .

A method that involves joining of male and female gametes is . . . **3** . . . .

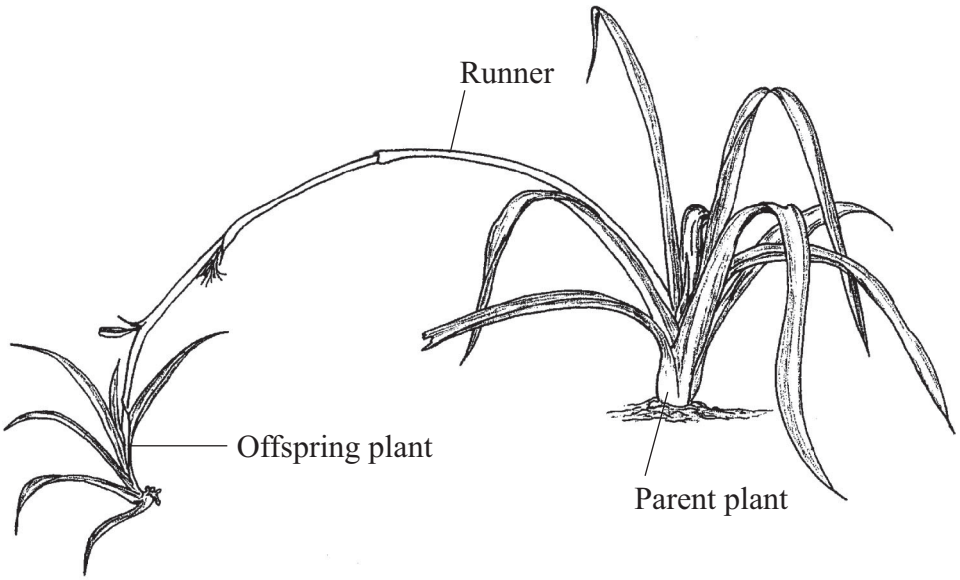
A method that involves splitting apart cells from a developing animal and then putting them into host mothers is . . . **4** . . . .

4.6.1.1 Sexual and asexual reproduction

Question 04

January 2008 | BLY2F | Original Q3 | Legacy

3 The diagram shows a spider plant during one type of reproduction.



Complete the sentences using words from the box.

asexual	**characteristics**	**chromosomes**	
gametes	**genes**	**mitosis**	**sexual**

(a) The colour and shape of the leaves of a spider plant are known as ..... .

(1 mark)

(b) The shape of the leaves is controlled by ..... .

(1 mark)

(c) The thread-like structures inside the nucleus of the cells are called ..... .

(1 mark)

(d) The spider plant produces new cells in the runner by a process called ..... .

(1 mark)

(e) This type of reproduction is called ..... reproduction.

(1 mark)

5

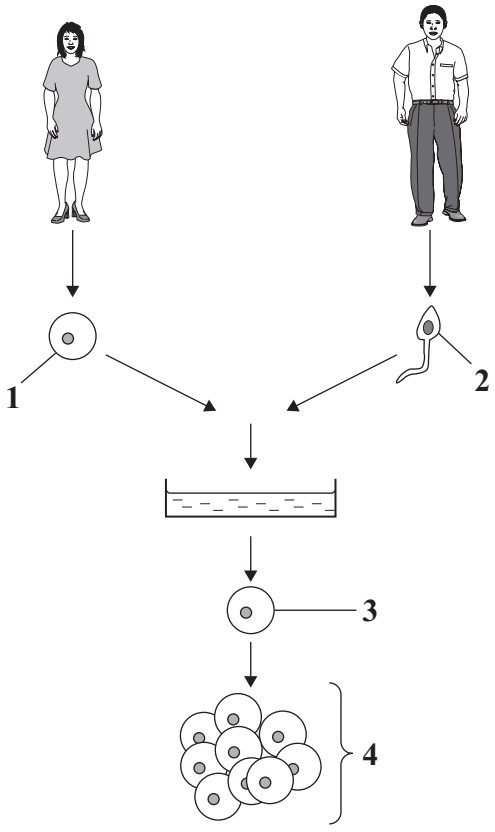
4.6.1.1 Sexual and asexual reproduction

Question 05

March 2008 | BLY1AP | Original Q3 | Legacy

QUESTION THREE

This question is about IVF (in-vitro fertilisation).



Match structures, **A**, **B**, **C** and **D**, with the numbers **1–4** on the diagram.

A egg

B embryo

C fertilised egg

D sperm

4.6.1.1 Sexual and asexual reproduction

Question 06

June 2008 | BLY1AP | Original Q1 | Legacy

QUESTION ONE

This question is about IVF (in vitro fertilisation).

Match structures, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A egg

B embryo

C fertilised egg

D sperm

1	removed from the ovary
2	donated by the father
3	inserted into womb
4	divides to form a ball of cells

4.6.1.1 Sexual and asexual reproduction

Question 07

June 2008 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

This question is about producing new animals and plants.

Match techniques, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A sexual reproduction

B taking cuttings

C tissue culture

D transplanting embryos

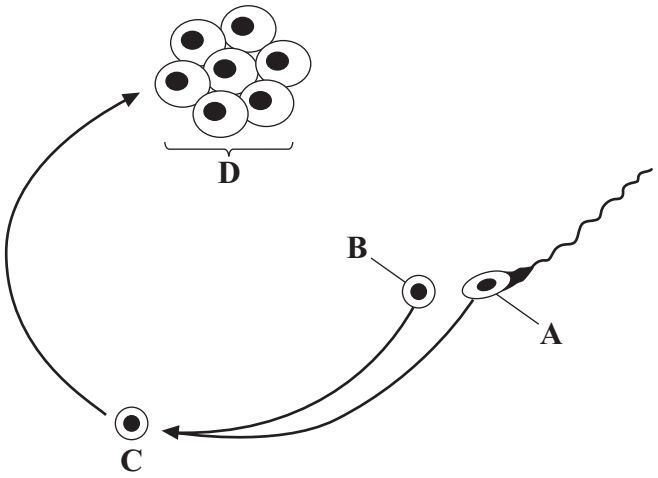
1	involves the joining of gametes
2	used to produce plants quickly and cheaply
3	involves host mothers
4	involves using small groups of cells

4.6.1.1 Sexual and asexual reproduction

Question 08

June 2008 | BLY1F | Original Q3 | Legacy

3 The diagram shows some of the stages in IVF (in-vitro fertilisation).



3 (a) Use words from the box to name structures **A**, **B**, **C** and **D**.

egg	**embryo**	**fertilised egg**	**ovary**	**sperm**

Structure **A** .....

Structure **B** .....

Structure **C** .....

Structure **D** .....

(4 marks)

3 (b) What do the doctors do next with structure **D**?

.....

.....

.....

.....

(2 marks)

Question 08 · continued

for mark

3 (c) The table gives statistics for an IVF clinic.

	Age of women treated			
	Below 35 years	**35–37 years**	**38–39 years**	**40–42 years**
Number of women treated	414	207	106	53
Number of women who produced one baby	90	43	17	1
Number of women who produced twins	24	8	4	1
Number of women who produced triplets	1	0	0	0

3 (c) (i) About what proportion of the treated women aged 35–37 produced one or more babies?

Draw a ring around your answer.

one quarter **one third** **half**

(1 mark)

3 (c) (ii) IVF treatment is not given by this clinic to women over 42 years of age.

Use data from the table to explain why.

.....

.....

.....

.....

.....

(2 marks)

3 (c) (iii) The committee which regulates IVF treatment now advises that only one embryo is used in each treatment.

Suggest **one** reason for this.

.....

.....

(1 mark)

10

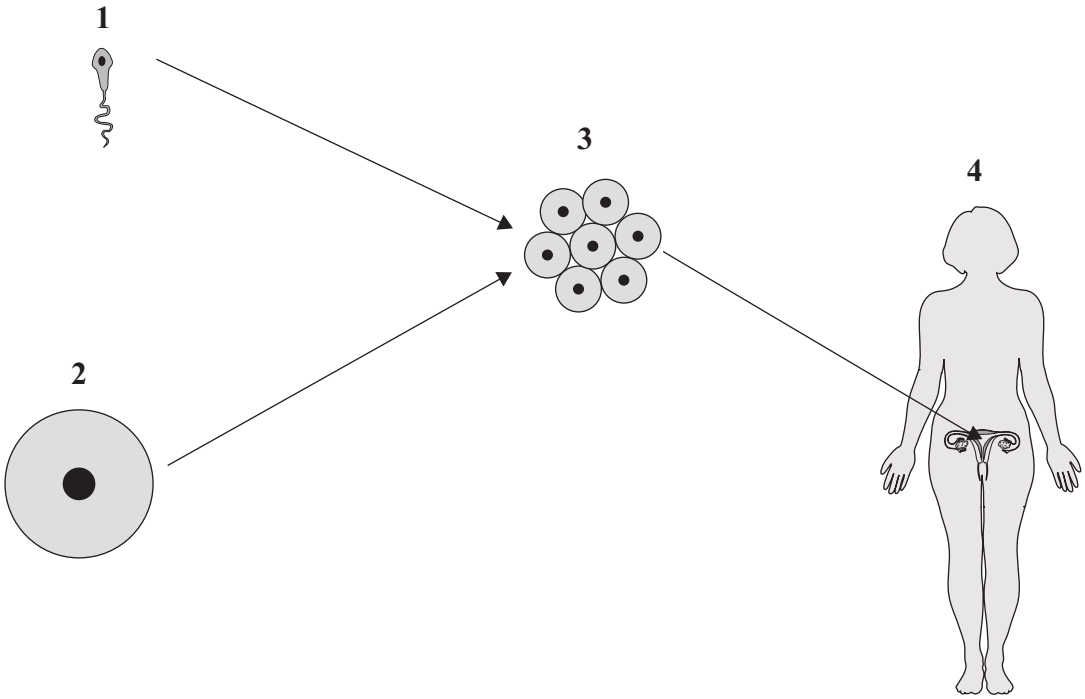
4.6.1.1 Sexual and asexual reproduction

Question 09

November 2008 | BLY1AP | Original Q2 | Legacy

QUESTION TWO

The diagram shows some of the stages in IVF (in vitro fertilisation).



Match statements, **A**, **B**, **C** and **D**, with the labels **1–4** in the diagram.

A removed from ovary

B womb (uterus)

C provided by father

D embryo

4.6.1.1 Sexual and asexual reproduction

Question 10

January 2009 | BLY1F | Original Q5 | Legacy

5 The photographs show a zorse and its parents, a zebra and a horse.

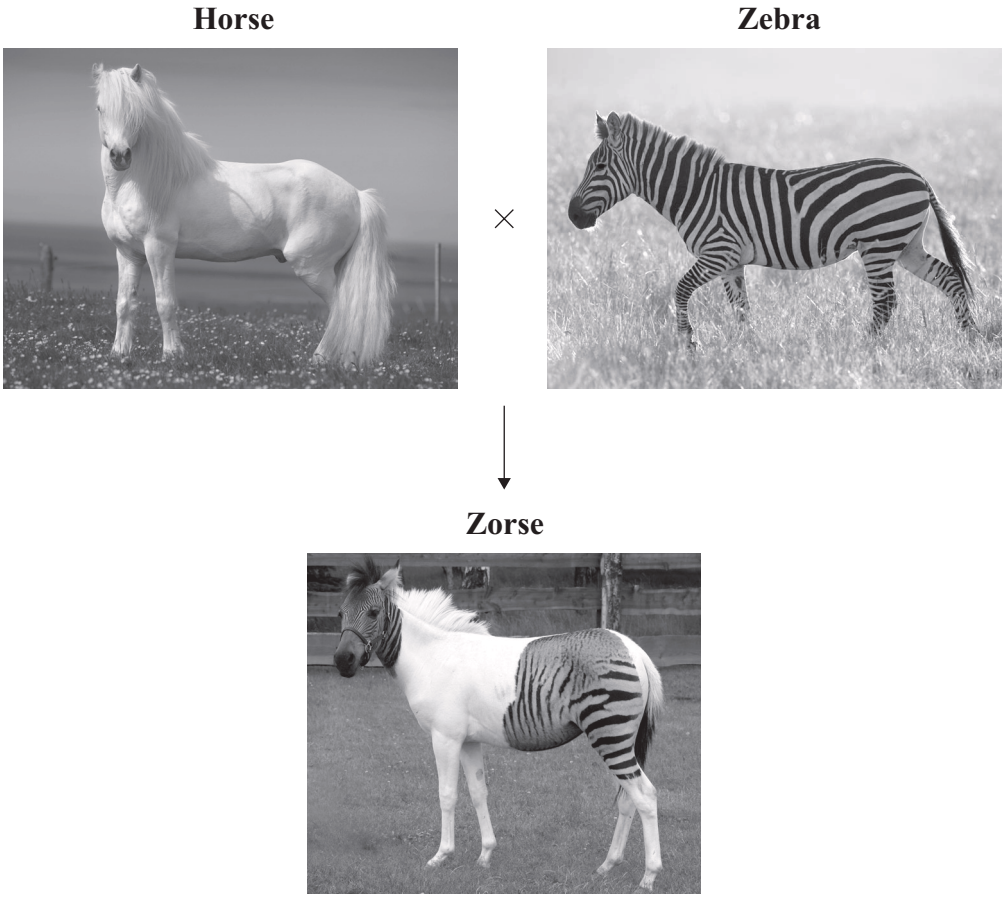


Photo of horse © Arctic-Images/Corbis
Photo of zebra © Arthur Morris/Corbis
Photo of zorse © Udo Richter/epa/Corbis

5 (a) Draw a ring around the correct answer to complete the sentence.

The zorse was produced by

cloning
asexual reproduction
sexual reproduction

.

(1 mark)

4.6.1.1 Sexual and asexual reproduction

Question 10 · continued

for mark

5 (b) Explain the appearance of the zorse.

Use **both** words from the box in your explanation.

gametes	**genes**

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

4

4.6.1.1 Sexual and asexual reproduction

Question 11

January 2009 | BLY1F | Original Q6 | Legacy

6 In-vitro fertilisation (IVF) is used to help infertile women to have babies.

The table gives statistics from one clinic that gives IVF treatment.

	Age of women given IVF treatment			
	Under 35 years	35–37 years	38–39 years	40–42 years
Number of women treated	425	208	106	53
Number of single births	90	44	17	1
Number of sets of twins	24	8	4	1
Number of sets of triplets	1	0	0	0

Use data from the table to help you to answer these questions.

6 (a) How many of the women aged 38–39 had babies?

.....

.....

(1 mark)

6 (b) What proportion of the treated women aged 35–37 had twins?

.....

.....

(1 mark)

6 (c) For which age group was IVF treatment most successful?

.....

.....

(1 mark)

4.6.1.1 Sexual and asexual reproduction

Question 11 · continued

for mark

6 (d) Give **two** disadvantages of IVF treatment.

1 .....

.....

.....

2 .....

.....

.....

(2 marks)

5

Turn over for the next question

4.6.1.1 Sexual and asexual reproduction

Question 12

March 2009 | BLY1AP | Original Q4 | Legacy

QUESTION FOUR

The table shows the effectiveness of in vitro fertilisation (IVF) treatment in a fertility clinic in 2004 and 2005.

	2004				2005			
Age of women	Under 35	35–37	38–40	Over 40	Under 35	35–37	38–40	Over 40
Number of IVF treatments	130	100	29	20	142	62	33	11
Average number of embryos transferred	2.6	2.8	3.3	3.6	2.5	2.8	3.0	3.2
Percentage of successful pregnancies	43	30	21	13	43	48	30	27

Match figures, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A 30

B 48

C 99

D 142

1	the number of IVF treatments for women under 35 in 2005
2	the highest percentage of successful pregnancies
3	the number of embryos transferred to women aged 38–40 in 2005
4	the number of successful pregnancies for women aged 35–37 in 2004

4.6.1.1 Sexual and asexual reproduction

Question 13

November 2009 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

This question is about reproduction in animals and plants.

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the sentences.

A clones

B cuttings

C gametes

D variations

Sexual reproduction involves the joining of . . . **1** . . . .

The offspring from sexual reproduction are a mixture of genetic information from two parents.

This leads to . . . **2** . . . .

Asexual reproduction involves genetic information from only one parent.

The offspring are genetically identical to the parent and are known as . . . **3** . . . .

An asexual method of producing plants is by taking . . . **4** . . . .

4.6.1.1 Sexual and asexual reproduction

Question 14

2 Humans reproduce sexually.

Draw a ring around the correct answer to complete each sentence.

2 (a) (i) At fertilisation [chromosomes / genes / sex cells] join together.

(1 mark)

2 (a) (ii) At fertilisation a single cell forms, which has new pairs of [chromosomes. / nuclei. / sex cells.]

(1 mark)

2 (b) Cystic fibrosis can be inherited by children whose parents do not have it.

2 (b) (i) A person who has cystic fibrosis has [two / three / four] copies of the cystic fibrosis allele.

(1 mark)

2 (b) (ii) The cystic fibrosis allele is [large. / recessive. / strong.]

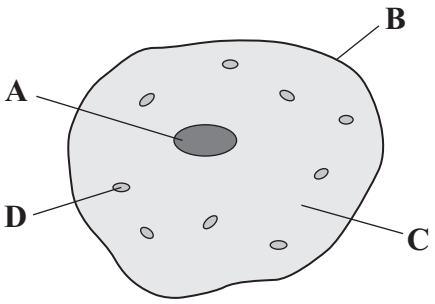
(1 mark)

4.6.1.1 Sexual and asexual reproduction

Question 14 · continued

for mark

2 (c) The diagram shows a human body cell.



Choose the correct answer from the box to complete each sentence.

cell membrane	**cell wall**	**cytoplasm**	**nucleus**

2 (c) (i) The part of the cell labelled **B** is the ..... .

(1 mark)

2 (c) (ii) The part of the cell labelled **C** is the ..... .

(1 mark)

2 (d) Which part of the cell, **A**, **B**, **C** or **D**:

2 (d) (i) contains the allele for cystic fibrosis ☐

(1 mark)

2 (d) (ii) is affected by cystic fibrosis? ☐

(1 mark)

8

4.6.1.1 Sexual and asexual reproduction

Question 15

March 2010 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

This question is about reproduction.

Match words, **A**, **B**, **C** and **D**, with the statements **1–4** in the table.

A genes

B gametes

C characteristics

D nucleus

1	cells which fuse to form offspring
2	control the development of features
3	the part of a cell which contains chromosomes
4	features we can see, such as eye colour

4.6.1.1 Sexual and asexual reproduction

Question 16

March 2010 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

Tasmanian tigers are similar to Tasmanian devils. Tasmanian tigers became extinct in the 20th century.

The picture shows a Tasmanian tiger.



Scientists are trying to create living Tasmanian tigers. They are using cells from the well-preserved remains of a pregnant Tasmanian tiger. They are trying several methods.

Match methods, **A**, **B**, **C** and **D**, with the descriptions **1–4** in the table.

A sexual reproduction

B tissue culture

C embryo transplants

D adult cell cloning

	Description
1	Splitting cells from the Tasmanian tiger embryo and transplanting them into the womb of a Tasmanian devil.
2	Joining female gametes from the Tasmanian tiger with male sperm cells from a Tasmanian devil.
3	Growing small groups of cells in a special nutrient solution.
4	Transferring the nucleus from a Tasmanian tiger skin cell into a Tasmanian devil egg cell. After the cell is given an electric shock, it is transferred to the womb of a female Tasmanian devil.

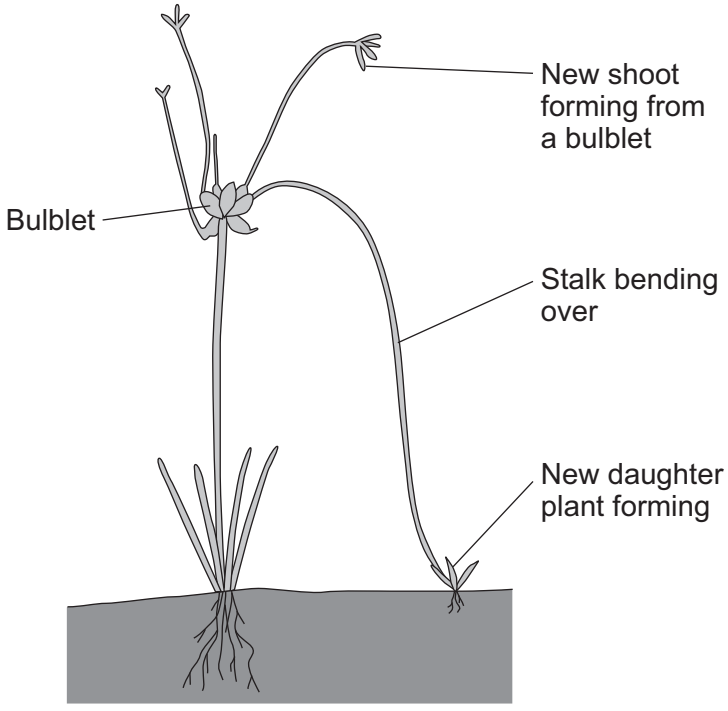
4.6.1.1 Sexual and asexual reproduction

Question 17

June 2010 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

Walking onion plants grow a bunch of bulblets (tiny bulbs).
The bulblets start to grow and the stalks bend over with the weight of the new growth. This makes the onion plant seem to walk across the garden.



Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the sentences.

A bulblet

B clone

C gamete

D parent

Producing plants in this way is called asexual reproduction.

Asexual reproduction needs only one . . . **1** . . . .

Asexual reproduction does **not** involve production of a . . . **2** . . . .

The daughter plant is formed from a . . . **3** . . . .

The daughter plant is identical to the parent plant so it is called a . . . **4** . . . .

4.6.1.1 Sexual and asexual reproduction

Question 18

June 2010 | BLY1F | Original Q4 | Legacy

4 We breed animals with the characteristics that we prefer.

4 (a) The photograph shows a rabbit with some of its babies.



Use words from the box to complete the sentences about inheritance in rabbits.

characteristic	**chromosome**	**gene**	**gamete**

4 (a) (i) The colour of a rabbit's fur is known as a ..... .

(1 mark)

4 (a) (ii) This colour is controlled by a ..... .

(1 mark)

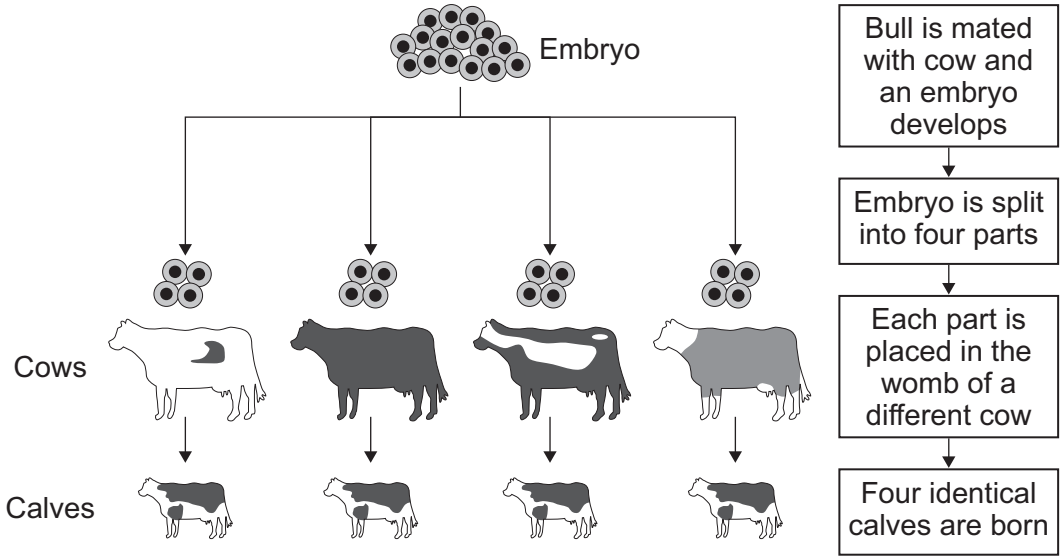
4 (a) (iii) Each sex cell of a rabbit is known as a ..... .

(1 mark)

4.6.1.1 Sexual and asexual reproduction

Question 18 · continued

4 (b) The diagram shows one way of producing calves.



Use words from the box to complete the sentences.

asexual	**clones**	**cuttings**	**gametes**	**genetic**	**sexual**

A bull was mated with a cow.

This is ..... reproduction.

The embryo produced was split into four parts.

The calves in the diagram have identical genetic information.

This is because the calves were produced by ..... reproduction.

The identical calves are known as ..... .

(3 marks)

6

4.6.1.1 Sexual and asexual reproduction

Question 19

January 2011 | BLY1F | Original Q7 | Legacy

7 In-vitro fertilisation (IVF) is used to help some women get pregnant.

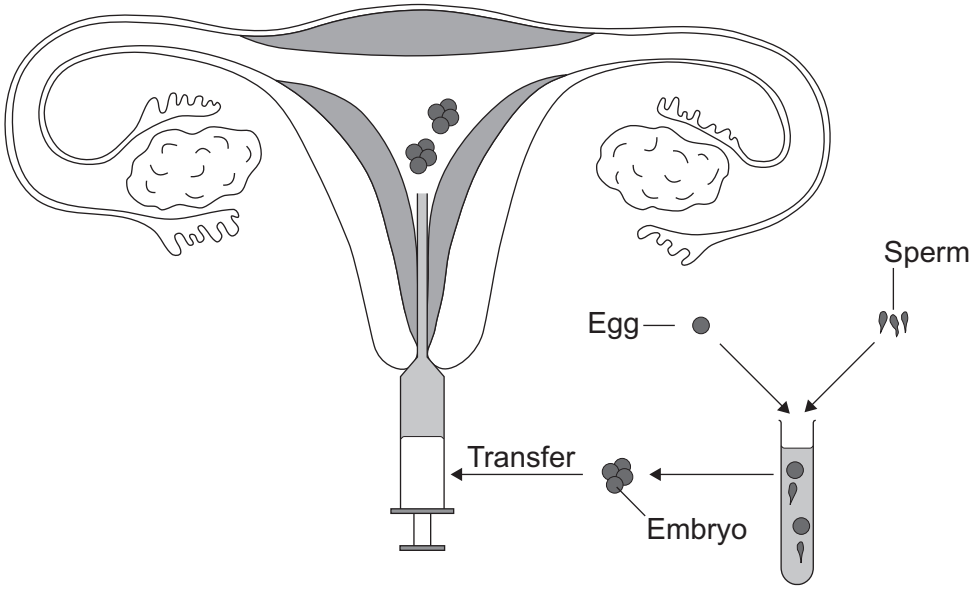
7 (a) Name the **two** hormones used in IVF treatment.

1 .....

2 .....

(2 marks)

7 (b) The diagram shows the process of IVF.



Describe the process of IVF. Use information from the diagram to help you.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

6

4.6.1.1 Sexual and asexual reproduction

Question 20

March 2011 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

We can now produce animals and plants with characteristics we prefer.

Match words, **A**, **B**, **C** and **D**, with the statements **1**–**4** in the table.

A embryo transplants

B sexual reproduction

C taking cuttings

D tissue culture

1	a quick and cheap way of reproducing a plant
2	produces clones of an animal
3	produces offspring using small groups of cells from a plant
4	produces offspring with a variety of different characteristics

4.6.1.1 Sexual and asexual reproduction

Question 21

November 2011 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

We can now produce animals and plants with the characteristics we want.

Match words, **A**, **B**, **C** and **D**, with the statements **1**–**4** in the table.

A adult cell cloning

B sexual reproduction

C taking cuttings

D tissue culture

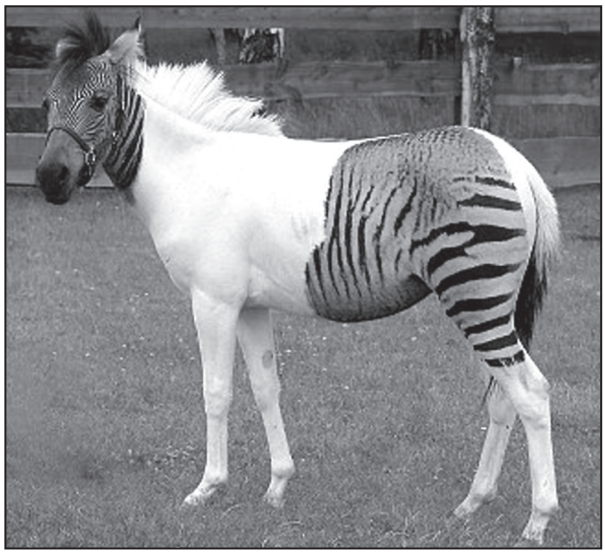
	Information
1	used by gardeners to produce clones of a plant
2	the joining of one egg with one sperm
3	enables hundreds of identical individuals to be produced from a few cells from the parent
4	placing a nucleus from a skin cell into an egg cell with no nucleus

4.6.1.1 Sexual and asexual reproduction

Question 22

January 2012 | BL1FP | Original Q7 | Legacy

7 The photograph shows a zorse.



A zorse is a cross between a male zebra and a female horse.
The zorse has characteristics of both parents.

7 (a) The zorse was produced by *sexual reproduction*.

7 (a) (i) What is *sexual reproduction*?

.....

.....

(1 mark)

7 (a) (ii) The zorse has characteristics of a zebra and a horse.

Why?

.....

.....

.....

.....

(2 marks)

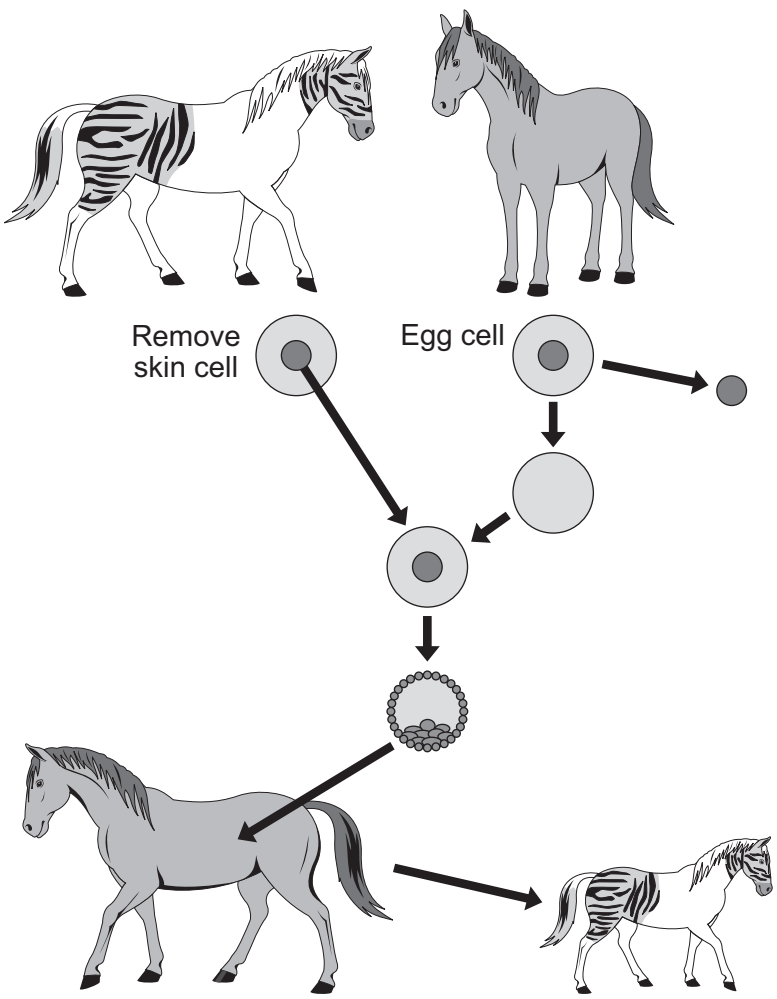
Question 7 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 22 · continued

7 (b) Zorses are **not** able to breed.
Scientists could produce more zorses from this zorse by adult cell cloning.

The diagram shows how the scientists might clone a zorse.



4.6.1.1 Sexual and asexual reproduction

Question 22 · continued

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Use information from the diagram and your own knowledge to describe how adult cell cloning could be used to clone a zorse.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(6 marks)

9

4.6.1.1 Sexual and asexual reproduction

Question 23

January 2013 | BL1FP | Original Q7 | Legacy

7 (a) Complete the sentences about evolution.

Draw a ring around the correct answer to complete each sentence.

7 (a) (i) Darwin suggested the theory of evolution by | artificial / natural / asexual | selection.

(1 mark)

7 (a) (ii) Darwin's theory of evolution says that all species of living things have evolved from | artificial / complex / simple | life forms.

(1 mark)

7 (a) (iii) Most scientists believe that life first developed about | three billion / three million / three thousand | years ago.

(1 mark)

7 (b) Darwin's theory of evolution was only slowly accepted by other people.

Give **two** reasons why.

1 .....

.....

2 .....

.....

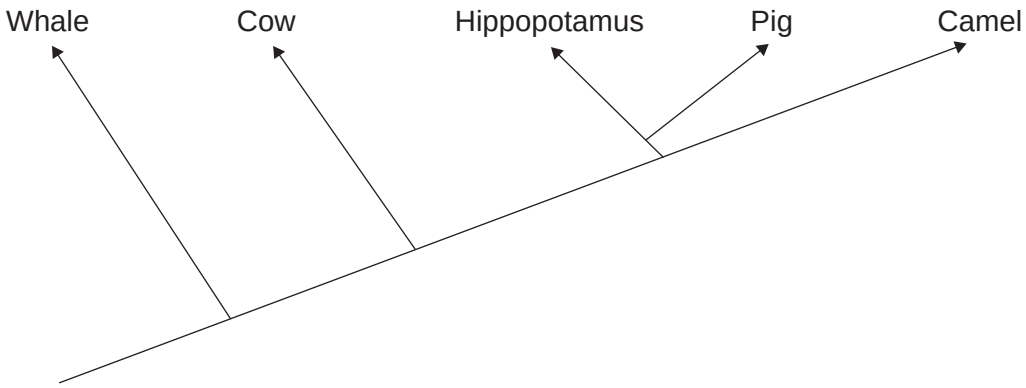
(2 marks)

4.6.1.1 Sexual and asexual reproduction

Question 23 · continued

7 (c) **Diagram 1** shows one model of the relationship between some animals.

Diagram 1



7 (c) (i) Complete the sentence.

The model shown in **Diagram 1** is an evolutionary ..... .

(1 mark)

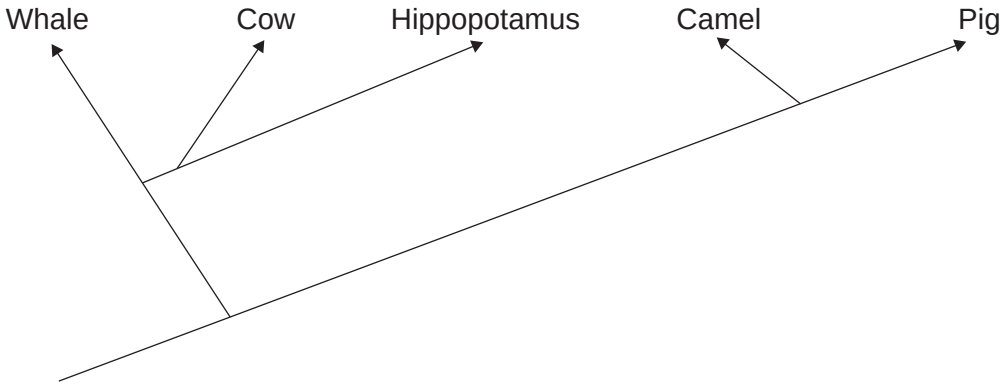
7 (c) (ii) Which **two** of the animals in **Diagram 1** are most closely related?

..... and .....

(1 mark)

7 (c) (iii) **Diagram 2** shows a more recent model of the relationship between the animals.

Diagram 2



Suggest **one** reason why scientists have changed the model of the relationships between the animals shown in the diagram.

Draw a ring around the correct answer.

more powerful computers | **new evidence from fossils** | **new species discovered**

(1 mark)

8

4.6.1.1 Sexual and asexual reproduction

Question 24

January 2013 | BL2FP | Original Q2 | Legacy

2 When humans reproduce, chromosomes and genes are passed on to the next generation.

In each of the following questions, draw a ring around the correct answer to complete the sentence.

2 (a) A gene is a small section of

cellulose.
DNA.
protein.

(1 mark)

2 (b) The sex chromosomes in the human male are

X and X.
X and Y.
Y and Y.

(1 mark)

2 (c) (i) Most human body cells contain

23 chromosomes.
46 chromosomes.
92 chromosomes.

(1 mark)

2 (c) (ii) The number of chromosomes in a human gamete (sex cell)

is

the same number as
half the number
twice the number

in body cells.

(1 mark)

2 (d) Gametes are produced by

fertilisation.
meiosis.
mitosis.

(1 mark)

5

4.6.1.1 Sexual and asexual reproduction

Question 25

June 2013 | BL1FP | Original Q6 | Legacy

6 The photographs show two breeds of cow.

Friesian cow



Jersey cow



In parts **(a)** and **(b)** draw a ring around the correct answer to complete each sentence.

6 (a) Cows produce their young (calves) by

asexual reproduction.
cloning.
sexual reproduction.

(1 mark)

6 (b) Cows and their calves have many similar characteristics.

6 (b) (i) The information for characteristics is carried by

clones.
embryos.
genes.

(1 mark)

6 (b) (ii) The information for characteristics is passed to the next generation in cells

called

body cells.
gametes.
neurones.

(1 mark)

4.6.1.1 Sexual and asexual reproduction

Question 25 · continued

6 (c) Friesian and Jersey cows can both be used for meat or to produce milk.

The information shows features of Friesian and Jersey cows.

Friesian cows	Jersey cows
Body mass up to 600 kg	Body mass up to 400 kg
Milk contains 3.4% protein	Milk contains 3.8% protein
Can be milked for 325 days after giving birth	Can be milked for 250 days after giving birth
Produce no milk for 55 days before having a calf	Produce no milk for 45 days before having a calf
Produce > 30 litres of milk per day	Produce < 30 litres of milk per day

Use **only** the information above to answer these questions.

In your answers you must make comparisons between the two breeds of cow.

6 (c) (i) Give **two** advantages of a farmer keeping Friesian cows and **not** Jersey cows.

1 .....

.....

2 .....

.....

(2 marks)

6 (c) (ii) Give **two** advantages of a farmer keeping Jersey cows and **not** Friesian cows.

1 .....

.....

2 .....

.....

(2 marks)

Question 6 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 25 · continued

6 (d) Cow's milk is different from human milk. Cow's milk should **not** be given to young human babies.

Scientists in China have *genetically engineered* cows to produce human milk. Milk from these cows can be fed to young human babies.

6 (d) (i) What is *genetic engineering*?

Tick (✓) **one** box.

Genes from one organism are transferred to a different organism ☐

Cells are separated from an embryo and are transferred to host mothers ☐

The nucleus from a body cell is transferred to an egg cell ☐

(1 mark)

6 (d) (ii) Some people are worried about using milk from genetically engineered cows, to feed human babies.

Give **one** reason why.

.....

.....

(1 mark)

9

4.6.1.1 Sexual and asexual reproduction

Question 26

June 2013 | BL2FP | Original Q3 | Legacy

3 (a) (i) Mitosis and meiosis are types of cell division.

For each feature in the table, tick (✓) **one** box to show if the feature occurs:

- only in mitosis
- only in meiosis.

Feature	Only in mitosis (✓)	Only in meiosis (✓)
Produces new cells during growth and repair		
Produces gametes (sex cells)		
Produces genetically identical cells		

(2 marks)

3 (a) (ii) Name the organ that produces gametes (sex cells) in:

a man .....

a woman. .....

(2 marks)

3 (b) **X** and **Y** chromosomes are the sex chromosomes. They determine a person's sex.

What sex chromosomes will be found in the body cells of:

3 (b) (i) a man .....

(1 mark)

3 (b) (ii) a woman? .....

(1 mark)

3 (c) A man and a woman decide to have a child.

What is the chance that the child will be a boy? .....

(1 mark)

7

4.6.1.1 Sexual and asexual reproduction

Question 27

June 2014 | BL1FP | Original Q5 | Legacy

5 Most cows produce milk with a fat content of 3.4%.

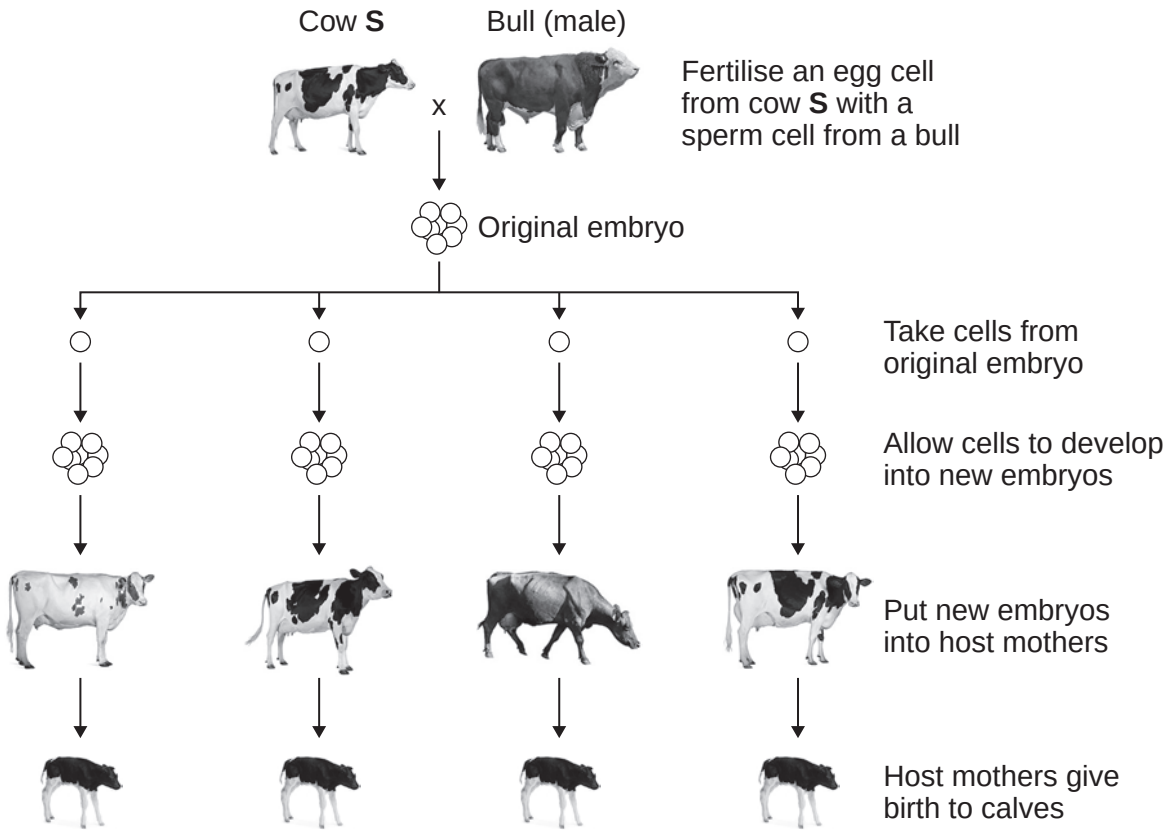
Cow **S** produces milk with a fat content of 1.2%.

Only cow **S** has the gene to produce this low-fat milk.

5 (a) A farmer plans to develop more cows like cow **S**.

Figure 6 shows how the farmer plans to do this.

Figure 6



5 (a) (i) An egg cell from cow **S** is fertilised by a sperm cell from a bull. This is part of sexual reproduction.

What is the scientific name for sex cells such as egg cells and sperm cells?

[1 mark]

.....

4.6.1.1 Sexual and asexual reproduction

Question 27 · continued

5 (a) (ii) After fertilisation, cells are taken from the original embryo.

These cells develop into new embryos.

Which part of the host mother's body should each new embryo be put into?

[1 mark]

.....

5 (b) (i) The calves born to all of the host mothers are genetically identical to each other.

Draw a ring around the correct answer to complete the sentence.

[1 mark]

The calves are genetically identical to each other because

they

- are formed from the same original embryo.
- have the same host mother.
- have the same two parents.

5 (b) (ii) What term is used to describe the method of producing calves shown in **Figure 6**?

Tick (✓) **one** box.

[1 mark]

- Adult cell cloning ☐
- Embryo transplantation ☐
- Genetic modification ☐

5 (b) (iii) Why are the calves born to the host mothers **not** genetically identical to cow **S**?

[1 mark]

.....

.....

5

4.6.1.1 Sexual and asexual reproduction

Question 28

June 2014 | BL2FP | Original Q5 | Legacy

5 In sexual reproduction, an egg fuses with a sperm.

5 (a) (i) Draw a ring around the correct answer to complete the sentence.

[1 mark]

An egg and a sperm fuse together in the process of

- cloning.
- fertilisation.
- mitosis.

5 (a) (ii) Egg cells and sperm cells each contain the structures given in the box.

chromosome	**gene**	**nucleus**

List these three structures in size order, starting with the smallest.

[2 marks]

1 ..... (smallest)

2 .....

3 ..... (largest)

5 (a) (iii) The egg and the sperm contain genetic material.

Draw a ring around the correct answer to complete the sentence.

[1 mark]

The genetic material is made of

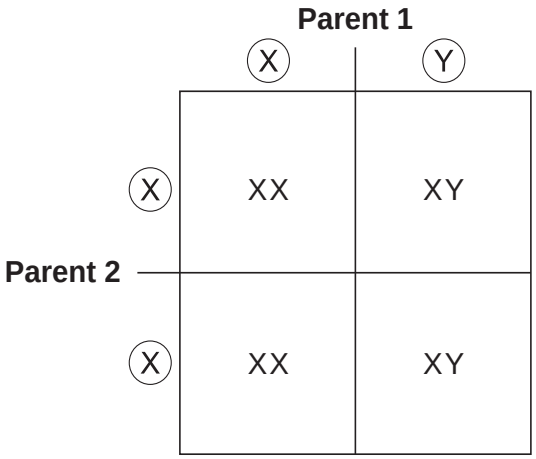
- carbohydrate.
- DNA.
- protein.

4.6.1.1 Sexual and asexual reproduction

Question 28 · continued

5 (b) **Figure 8** shows the inheritance of **X** and **Y** chromosomes.

Figure 8



5 (b) (i) **On Figure 8**, draw a tick (✓) on the part of the diagram that shows a sperm cell.

[1 mark]

5 (b) (ii) What is the chance of having a female child?

Give the reason for your answer.

[2 marks]

.....

.....

.....

.....

7

4.6.1.1 Sexual and asexual reproduction

Question 29

June 2016 | BL2FP | Original Q6 | Legacy

6 (a) Which organ of the human body produces egg cells?

[1 mark]

Draw a ring around the correct answer.

liver **ovary** **testis**

6 (b) An egg joins with a sperm and develops into an embryo.

How many chromosomes are there in each cell of a human embryo?

[1 mark]

Draw a ring around the correct answer.

23 **46** **48**

6 (c) Some women find it difficult to have a baby. A doctor may suggest that these women should use In Vitro Fertilisation (IVF) to help them have a baby.

Table 2 shows how successful IVF was for women of different ages at one clinic.

Table 2

Age of women in years	Percentage of women who had a baby
<35	35
35–37	31
38–39	25
40–42	32
43–44	7
>44	0

6 (c) (i) A student thought that the result for women aged 40–42 was anomalous.

Suggest why the student thought this result was anomalous.

[1 mark]

_____

_____

6 (c) (ii) Describe the general trend in the results in **Table 2**.

You should ignore the anomalous result.

[1 mark]

_____

_____

4.6.1.1 Sexual and asexual reproduction

Question 29 · continued

6 (d) Some babies are born with a faulty chromosome.

Scientists investigated whether the chance of having a baby with a faulty chromosome is also related to the age of the woman.

Table 3 shows the scientists' results.

Table 3

Age of women in years	Number of women per 1000 who had a baby with a faulty chromosome
25	2.0
30	2.6
35	6.1
40	19.6
45	66.0

6 (d) (i) A 45-year-old woman is more likely than a 25-year-old woman to have a baby with a faulty chromosome.

How many times more likely?

[2 marks]

Answer = _____ times

6 (d) (ii) Suggest **two** reasons why many fertility clinics will **not** accept women over 40 years of age for IVF treatment.

Use information from **Table 2** and **Table 3** in your answer.

[2 marks]

1 _____

2 _____

8

4.6.1.1 Sexual and asexual reproduction

Question 30

June 2018 | 8461/1F | Original Q6

0 6 Earthworms are small animals that live in soil. Earthworms have no specialised gas exchange system and absorb oxygen through their skin.

0 6 . 1 What is the name of the process in which oxygen enters the skin cells?

[1 mark]

Tick **one** box.

Active transport ☐

Diffusion ☐

Osmosis ☐

Respiration ☐

Table 3 shows information about four skin cells of an earthworm.

Table 3

Cell	Percentage of oxygen	
	Outside cell	Inside cell
A	9	8
B	12	8
C	12	10
D	8	12

0 6 . 2 Which cell has the smallest difference in percentage of oxygen between the outside and the inside of the cell?

[1 mark]

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

4.6.1.1 Sexual and asexual reproduction

Question 30 · continued

0 6 . 3 Which cell will oxygen move **into** the fastest?

[1 mark]

Tick **one** box.

A		B		C		D	

0 6 . 4 Earthworms have a large surface area to volume ratio.

Suggest why a large surface area to volume ratio is an advantage to an earthworm.

[1 mark]

0 6 . 5 The earthworm uses enzymes to digest dead plants.

Many plants contain fats or oils.

Which type of enzyme would digest fats?

[1 mark]

Question 6 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 30 · continued

June 2018 | 8461/1F | Original Q6

0 6 . 6 Earthworms move through the soil.

This movement brings air into the soil.

Dead plants decay faster in soil containing earthworms compared with soil containing **no** earthworms.

Explain why.

[3 marks]

0 6 . 7 When earthworms reproduce, a sperm cell from one earthworm fuses with an egg cell from a different earthworm.

Name the process when an egg cell and a sperm cell fuse.

[1 mark]

0 6 . 8 Some types of worm reproduce by a process called fragmentation.

In fragmentation, the worm separates into two or more parts. Each part grows into a new worm.

What type of reproduction is fragmentation?

[1 mark]

10

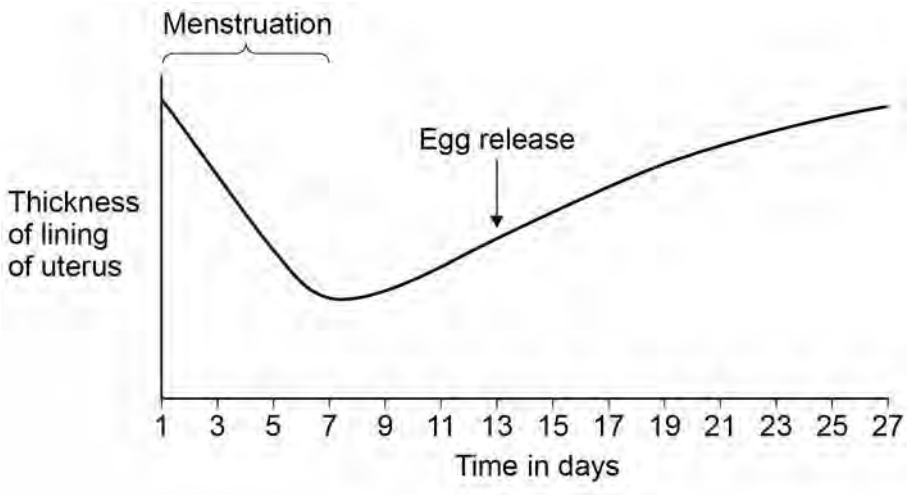
4.6.1.1 Sexual and asexual reproduction

Question 31

June 2018 | 8461/2F | Original Q2

0 2 **Figure 2** shows some changes that occur during the menstrual cycle.

Figure 2



0 2 . 1 **Figure 2** shows that the lining of the uterus thickens between days 7 and 27.

What is the purpose of thickening the lining of the uterus?

[1 mark]

Tick **one** box.

To allow implantation of the embryo ☐

To break down waste ☐

To prevent sperm reaching the egg ☐

0 2 . 2 Which hormone causes thickening of the lining of the uterus?

[1 mark]

Tick **one** box.

Auxin ☐

Oestrogen ☐

Testosterone ☐

4.6.1.1 Sexual and asexual reproduction

Question 31 · continued

0 2 . 3 On which day is fertilisation most likely to occur?

Use information from **Figure 2**.

[1 mark]

Contraception can be used to lower the chance of pregnancy.

0 2 . 4 Draw **one** line from each method of contraception to how the method works.

[3 marks]

Method of contraception	How the method works
Contraceptive pill	Barrier to prevent sperm reaching the egg
Diaphragm	Contains hormones to stop eggs maturing
Spermicidal cream	Kills sperm
	Slows down sperm production

Question 2 continues on the next page

0 2 . 5 **Table 2** gives information about some different methods of contraception.

Table 2

Method	Number of pregnancies per 100 women in one year	Possible Side effects
Diaphragm and spermicidal cream	8	Usually none, but can cause bladder infection in some women
Condom	2	None
Contraceptive pill	1	Mood swings, headaches, high blood pressure, blood clots, breast cancer

A man and a woman decide to use the condom as their method of contraception.

Suggest **three** reasons for this decision.

Use information from **Table 2** and your own knowledge.

[3 marks]

1 _____

_____

2 _____

_____

3 _____

_____

9

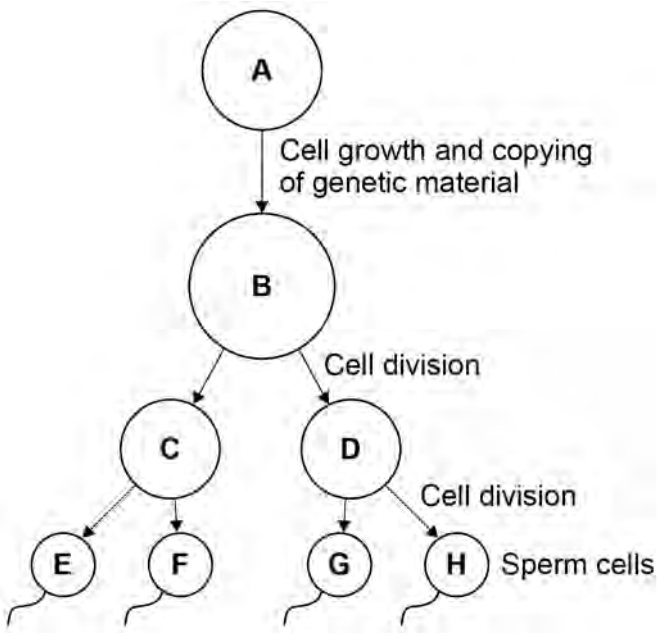
4.6.1.1 Sexual and asexual reproduction

Question 32

June 2019 | 8461/2F | Original Q3

0 3 **Figure 6** shows the production of sperm cells in humans.

Figure 6



0 3 . 1 Cell **A** is a normal body cell.

How many chromosomes are there in cell **A**?

[1 mark]

Tick (✓) **one** box.

23 ☐ 46 ☐ 48 ☐ 92 ☐

0 3 . 2 What is the mass of DNA in cell **E**?

[1 mark]

Tick (✓) **one** box.

A quarter of the mass of the DNA in cell **A** ☐

Half the mass of the DNA in cell **A** ☐

The same mass as the DNA in cell **A** ☐

Twice the mass of the DNA in cell **A** ☐

4.6.1.1 Sexual and asexual reproduction

Question 32 · continued

0 3 . 3 What type of cell division produces sperm cells?

[1 mark]

Tick (✓) **one** box.

- Binary fission ☐
- Differentiation ☐
- Meiosis ☐

0 3 . 4 Sometimes there are errors in copying the genetic material.

What term describes an error in the genetic material?

[1 mark]

Tick (✓) **one** box.

- Absorption ☐
- Fertilisation ☐
- Mitosis ☐
- Mutation ☐

0 3 . 5 A woman has three children, aged 4, 6 and 9 years.

Why are the children **not** genetically identical?

[2 marks]

4.6.1.1 Sexual and asexual reproduction

Question 32 · continued

In sexual reproduction, a sperm cell fuses with an egg cell to form a new single cell.

An embryo develops from the single cell.

The cell divides three times to produce the embryo.

0 3 . 6 How many cells are there in the embryo after three cell divisions?

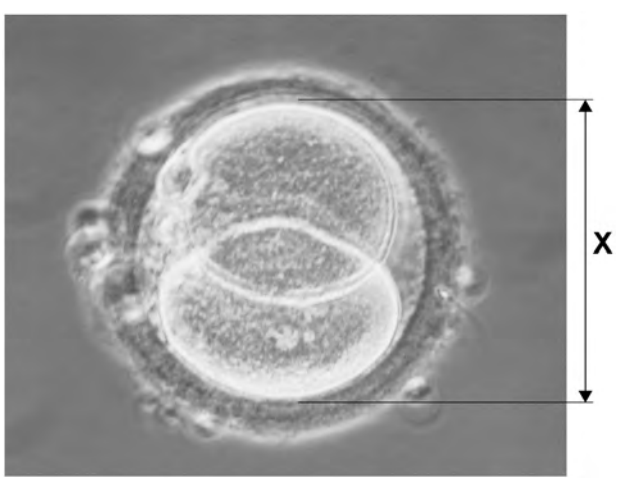
[1 mark]

Tick (✓) **one** box.

3 ☐ 6 ☐ 8 ☐ 9 ☐

Figure 7 shows a different human embryo.

Figure 7



0 3 . 7 Measure image length **X** on **Figure 7**.

[1 mark]

Give your answer in millimetres (mm).

X = _____ mm

4.6.1.1 Sexual and asexual reproduction

Question 32 · continued

0 3 . 8 The image in **Figure 7** has been magnified ×500

Calculate the real length of the embryo.

Use the equation:

$$\text{real length of the embryo} = \frac{\text{image length}}{\text{magnification}}$$

Give your answer in micrometres (μm).

1 mm = 1000 μm

[3 marks]

Real length of the embryo = _____ μm

0 3 . 9 The embryo may **not** implant in the lining of the uterus.

The embryo will then be lost from the woman's body several days later.

Explain why the woman may **not** notice this has happened.

[2 marks]

13

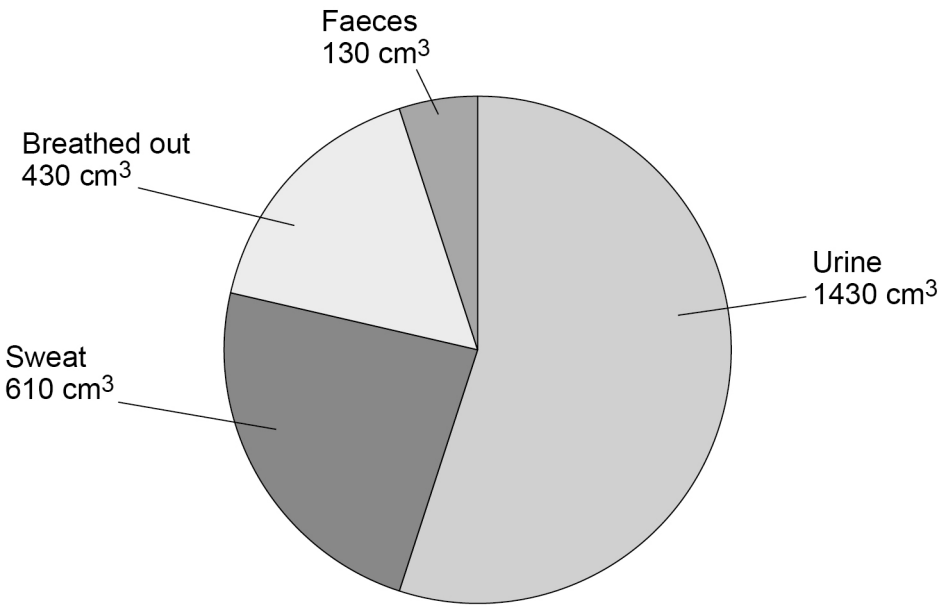
4.6.1.1 Sexual and asexual reproduction

Question 33

November 2020 | 8461/2F | Original Q4

0 4 **Figure 5** shows the water loss from a person on one day.

Figure 5



0 4 . 1 The total water loss was 2600 cm^3.

Calculate the percentage of the total water loss that was lost as urine.

[2 marks]

Percentage lost as urine = _____ %

4.6.1.1 Sexual and asexual reproduction

Question 33 · continued

A marathon race is 42 km long.

0 4 . 2 What happens to the volume of water lost as sweat when a person runs a marathon?

[1 mark]

0 4 . 3 What must marathon runners do to prevent themselves becoming dehydrated?

[1 mark]

0 4 . 4 Complete the sentences.

[3 marks]

Choose answers from the box.

digestion	**excretion**	**fertilisation**	**filtration**	**reabsorption**

Blood entering the kidneys goes through the process of

_____ .

Glucose is **not** found in urine because of _____.

Urine is removed from the body in the process of _____.

Question 4 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 33 · continued

0 4 . 5 People with kidney failure can have dialysis or a kidney transplant.

Dialysis is often needed 3 times each week and can take over 4 hours each time.

Dialysis usually happens in a hospital.

Kidney transplants require a donor and major surgery.

Describe the advantages **and** disadvantages of having a kidney transplant instead of having dialysis.

[4 marks]

11

4.6.1.1 Sexual and asexual reproduction

Question 34

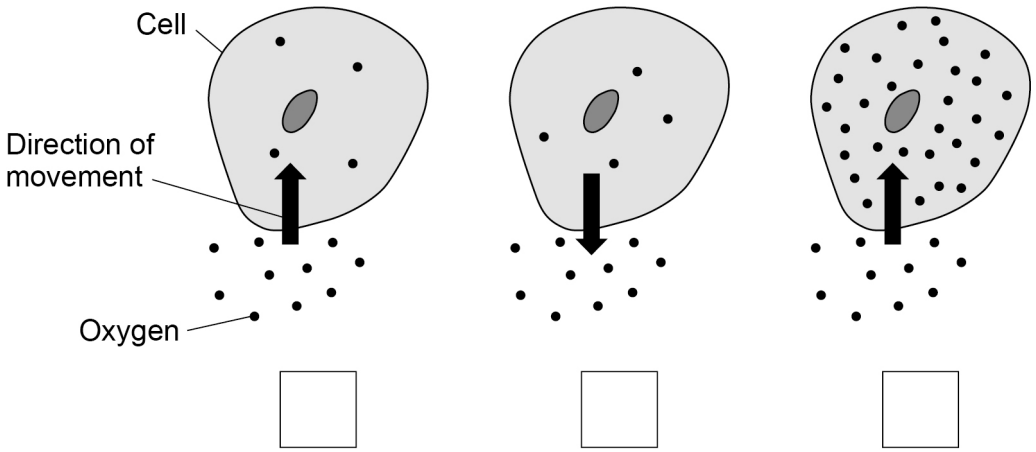
November 2021 | 8461/1F | Original Q1

0 1 This question is about cells.

0 1 . 1 Which diagram shows oxygen moving by diffusion?

[1 mark]

Tick (✓) **one** box.



0 1 . 2 Complete the sentences.

[3 marks]

Choose answers from the box.

carbon dioxide	**chlorophyll**	**energy**
light	**mineral ions**	**water**

Plant cells absorb substances from the soil.

Plant cells use osmosis to absorb _____.

Plant cells use active transport to absorb _____.

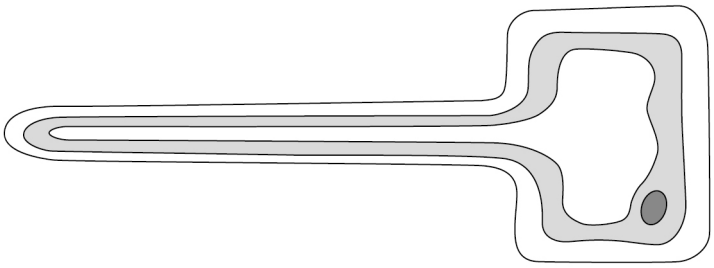
Active transport moves substances against the concentration gradient and needs _____.

4.6.1.1 Sexual and asexual reproduction

Question 34 · continued

Figure 1 shows a specialised cell that absorbs substances from the soil.

Figure 1



0 1 . 3 Name the type of specialised cell in **Figure 1**.

[1 mark]

0 1 . 4 Describe how the cell in **Figure 1** is adapted to increase the absorption of substances from the soil.

[1 mark]

Question 1 continues on the next page

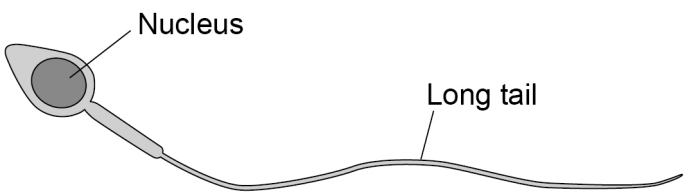
4.6.1.1 Sexual and asexual reproduction

Question 34 · continued

A sperm cell is another specialised cell.

Figure 2 shows a sperm cell.

Figure 2



0 1 . 5 Draw **one** line from each feature to how the feature helps the sperm cell carry out its function.

[2 marks]

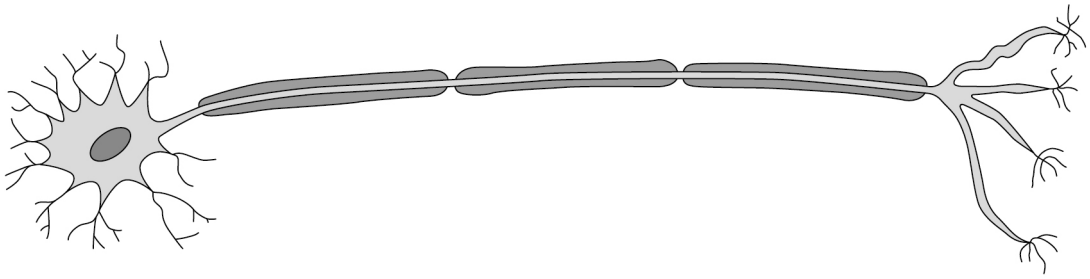
Feature of sperm cell	How the feature helps
Contains a nucleus	To break the outer layer of the egg
	To help the cell to swim to the egg
Has a long tail	To provide the chromosomes for fertilisation
	To release energy

4.6.1.1 Sexual and asexual reproduction

Question 34 · continued

Figure 3 shows another specialised cell.

Figure 3



0 1 . 6 Name the type of cell in **Figure 3**.

Describe **one** feature of the cell that helps it to carry out its function.

[2 marks]

Name of the cell _____

Feature of the cell _____

_____

10

4.6.1.1 Sexual and asexual reproduction

Question 35

November 2021 | 8461/2F | Original Q8

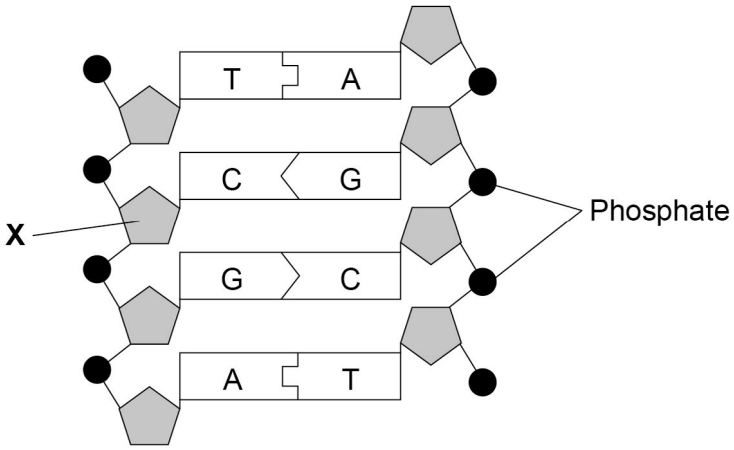
0 8 The nucleus of a cell contains DNA.

0 8 . 1 Name the structures inside the cell nucleus that contain DNA.

[1 mark]

Figure 13 shows part of a DNA molecule.

Figure 13



0 8 . 2 Name the part of the DNA molecule labelled **X**.

[1 mark]

0 8 . 3 What type of substances are labelled **A**, **C**, **G** and **T** in **Figure 13**?

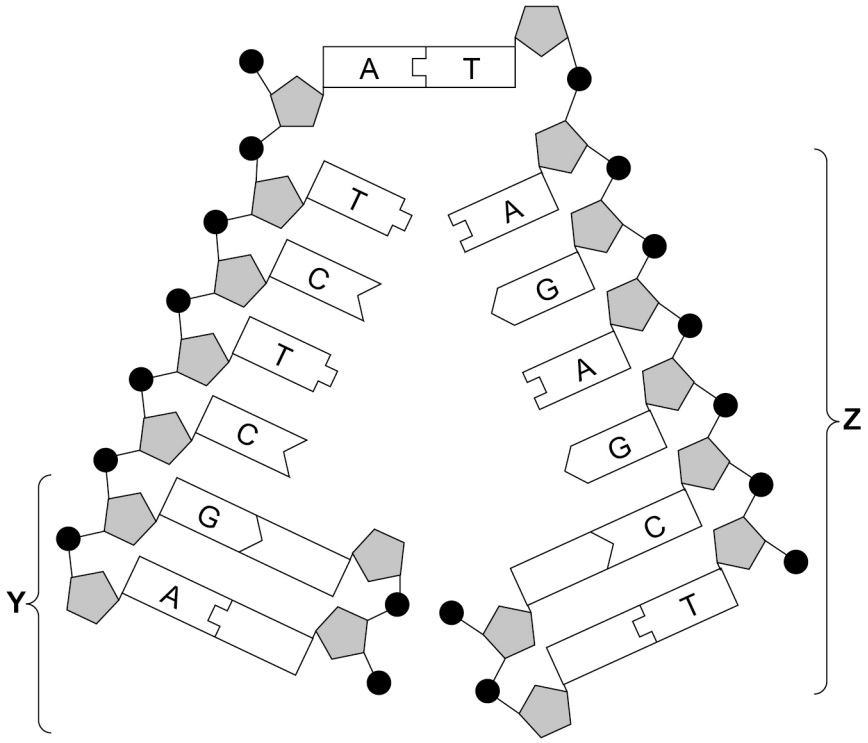
[1 mark]

4.6.1.1 Sexual and asexual reproduction

Question 35 · continued

Figure 14 shows another section of a DNA molecule.

Figure 14



0 8 . 4 Four of the substances you named in Question **08.3** are **not** labelled in part **Y** of **Figure 14**.

Label each of these substances with the correct letter, **A**, **C**, **G** or **T**.

Use information from other parts of **Figure 14** to help you.

[1 mark]

0 8 . 5 What is happening to the DNA in part **Z** of **Figure 14**?

[1 mark]

Tick (✓) **one** box.

- Differentiation ☐
- Evolution ☐
- Fertilisation ☐
- Replication ☐

4.6.1.1 Sexual and asexual reproduction

Question 35 · continued

0 8 . 6 A gene is a length of DNA.

What type of substance does a gene code for?

[1 mark]

0 8 . 7 Most human body cells contain 6×10^{-12} grams of DNA.

What mass of DNA will a human sperm cell contain?

[1 mark]

Tick (✓) **one** box.

- 6×10^{-6} grams ☐
- 6×10^{-12} grams ☐
- 3×10^{-6} grams ☐
- 3×10^{-12} grams ☐

0 8 . 8 What is the name of the type of cell division that produces sperm cells?

[1 mark]

Tick (✓) **one** box.

- Binary fission ☐
- Differentiation ☐
- Meiosis ☐
- Mitosis ☐

8

4.6.1.1 Sexual and asexual reproduction

Question 36

June 2022 | 8461/2F | Original Q5

0 5 In the human female, an egg is released from one of the ovaries about once every four weeks.

During the four weeks, the lining of the uterus thickens and then breaks down.

This is called the menstrual cycle.

0 5 . 1 Which **two** hormones are female reproductive hormones?

[2 marks]

Tick (✓) **two** boxes.

- Adrenaline ☐
- Oestrogen ☐
- Progesterone ☐
- Testosterone ☐
- Thyroxine ☐

0 5 . 2 Follicle stimulating hormone (FSH) is another female reproductive hormone.

What is the function of FSH in the menstrual cycle?

[1 mark]

Tick (✓) **one** box.

- FSH causes an egg to mature in the ovary. ☐
- FSH causes breast development. ☐
- FSH causes the uterus lining to break down. ☐

4.6.1.1 Sexual and asexual reproduction

Question 36 · continued

0 5 . 3 Sperm cells can survive inside a woman's reproductive organs for five days.

An egg cell can survive for one day after ovulation.

In one woman ovulation occurred on day 14.

Give the range of days on which sexual intercourse could result in fertilisation.

[1 mark]

From day _____ to day _____

0 5 . 4 If a man and a woman have sexual intercourse and do **not** want to produce a baby, they may use contraception.

Explain how different methods of contraception prevent pregnancy.

[6 marks]

10

4.6.1.1 Sexual and asexual reproduction

Question 37

June 2022 | 8461/2F | Original Q8

0 8 There are two types of reproduction:

- sexual reproduction
- asexual reproduction.

0 8 . 1 Complete **Table 4** to compare sexual reproduction with asexual reproduction.

Write a tick (✓) in the box if the statement is true.

The first row has been completed for you.

[2 marks]

Table 4

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

0 8 . 2 Gametes are formed in sexual reproduction.

Name the male gamete formed in flowering plants.

[1 mark]

_____

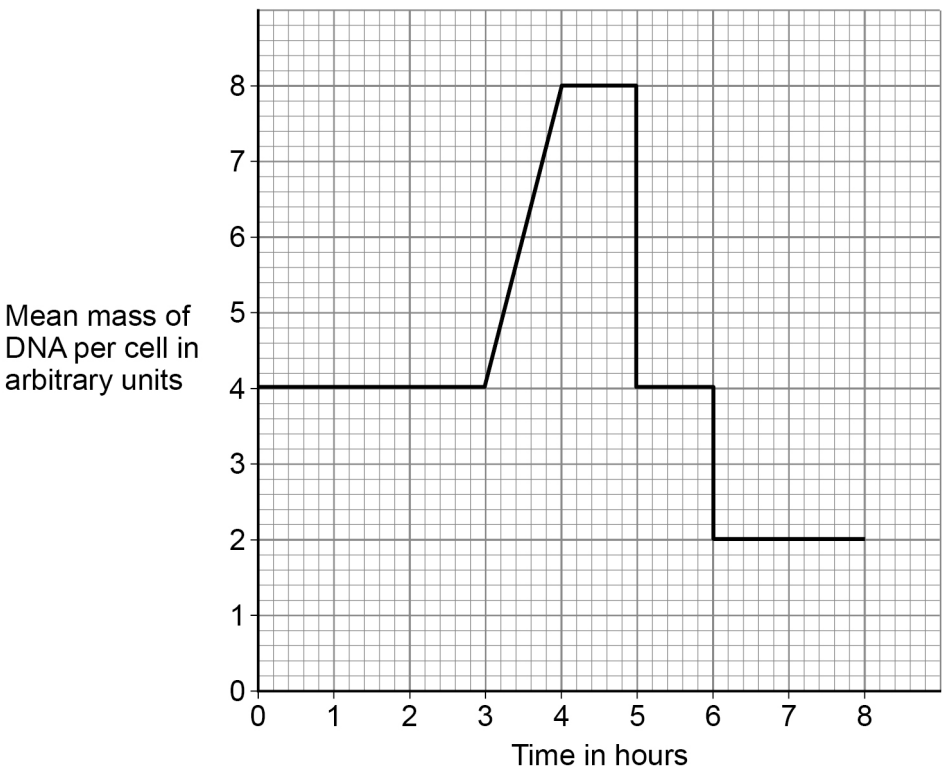
Question 8 continues on the next page

Question 37 · continued

Cell division by meiosis forms gametes.

Figure 12 shows the mean mass of DNA per cell before, during and after meiosis.

Figure 12



Use information from **Figure 12** to answer questions **08.3** to **08.6**.

0 8 . 3 When is the DNA in the chromosomes being copied?

[1 mark]

Tick (✓) **one** box.

Between 0 and 3 hours ☐

Between 3 and 4 hours ☐

Between 4 and 5 hours ☐

Between 5 and 6 hours ☐

4.6.1.1 Sexual and asexual reproduction

Question 37 · continued

June 2022 | 8461/2F | Original Q8

0 8 . 4 Cells divide twice during meiosis.

Which **two** times in **Figure 12** show one cell dividing into two cells?

[2 marks]

Tick (✓) **two** boxes.

- 3 hours ☐
- 4 hours ☐
- 5 hours ☐
- 6 hours ☐
- 8 hours ☐

0 8 . 5 What is the mean mass of DNA in arbitrary units in a sperm cell?

[1 mark]

Tick (✓) **one** box.

2 ☐ 4 ☐ 8 ☐ 16 ☐

0 8 . 6 What is the mean mass of DNA in arbitrary units in each cell in an embryo?

[1 mark]

Tick (✓) **one** box.

2 ☐ 4 ☐ 8 ☐ 16 ☐

8

4.6.1.1 Sexual and asexual reproduction

Question 38

0 4 Malaria is caused by a protist.

The protist is passed from one person to another person by mosquitos.

0 4 . 1 Which term describes the mosquito?

[1 mark]

Tick (✓) **one** box.

Bacterium ☐

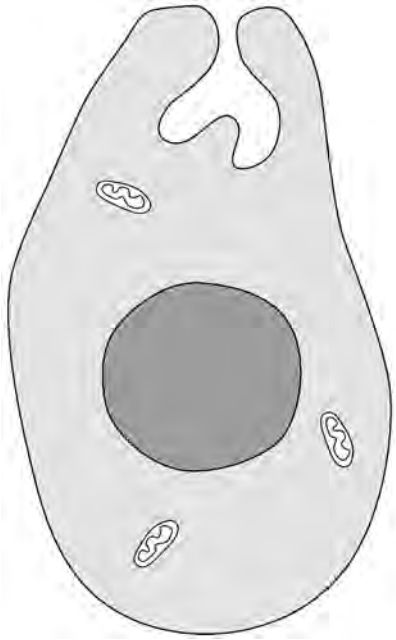
Gene ☐

Vector ☐

0 4 . 2 The malarial protist is a eukaryotic cell.

Figure 2 shows a malarial protist.

Figure 2



4.6.1.1 Sexual and asexual reproduction

Question 38 · continued

Give **two** features of the malarial protist that show the cell is eukaryotic and **not** prokaryotic.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 3 Which organism is prokaryotic?

[1 mark]

Tick (✓) **one** box.

Cow ☐

Grass ☐

Salmonella ☐

0 4 . 4 The malarial protist reproduces asexually.

What is a feature of asexual reproduction?

[1 mark]

Tick (✓) **one** box.

Only one parent is involved. ☐

The offspring show genetic variation. ☐

Two gametes fuse. ☐

Question 4 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 38 · continued

0 4 . 5 Mitosis occurs in the malarial protist during asexual reproduction.

The protist has 14 chromosomes.

How many chromosomes will each new protist cell have after mitosis?

[1 mark]

Tick (✓) **one** box.

7 ☐ 14 ☐ 21 ☐ 28 ☐

0 4 . 6 When a person has malaria, the protists destroy red blood cells.

What change would happen in the blood of a person with malaria?

[1 mark]

Tick (✓) **one** box.

Decreased antibodies ☐

Decreased haemoglobin ☐

Increased plasma ☐

Increased platelets ☐

Question 38 · continued

0 4 . 7 It is estimated that 210 million people are infected with malaria every year. Half of these infected people survive the disease.

Calculate how many people would survive the disease in 3 years if the estimate is correct.

Give your answer in standard form.

[4 marks]

Number of people (in standard form) = _____

0 4 . 8 The spread of malaria can be controlled by using mosquito nets to avoid being bitten.

Describe **two** other ways that people can reduce the chance of being bitten by mosquitos.

Do **not** refer to mosquito nets in your answer.

[2 marks]

1 _____

2 _____

Question 4 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 38 · continued

0 4 . 9 Different types of disease may interact.

Scientists studied how having disorder **S** interacts with malaria.

The scientists calculated the chance of children with disorder **S** getting malaria.

Table 4 shows the results.

Table 4

Age in years	Percentage (%) chance of children with disorder S getting malaria
2	70
4	65
6	50
8	45

Describe the trend shown in **Table 4**.

Use data from **Table 4**.

[2 marks]

15

4.6.1.1 Sexual and asexual reproduction

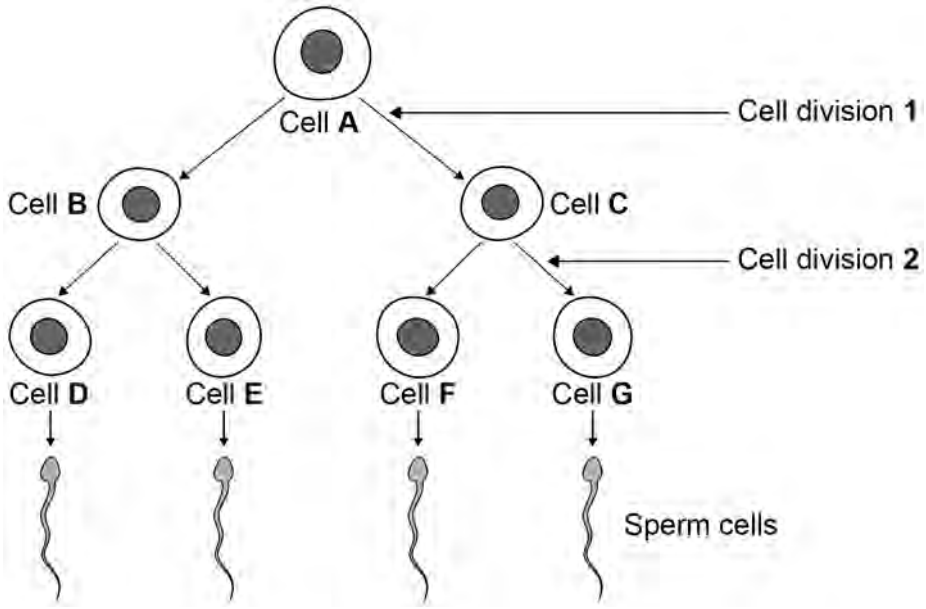
Question 39

June 2025 | 8461/2F | Original Q3

0 3 New cells are produced by cell division.

Figure 5 shows sperm formation in a human.

Figure 5



0 3 . 1 Where in the body are sperm cells produced?

[1 mark]

_____

0 3 . 2 How many chromosomes are there in cell **A** and in cell **D**?

Choose answers from the box.

[2 marks]

23	24	46	92

Cell **A** _____

Cell **D** _____

4.6.1.1 Sexual and asexual reproduction

Question 39 · continued

0 3 . 3 Complete the sentence.

Choose the answer from the box.

[1 mark]

differentiation	evolution	fertilisation

A sperm cell joins with an egg cell in a process called _____.

Question 3 continues on the next page

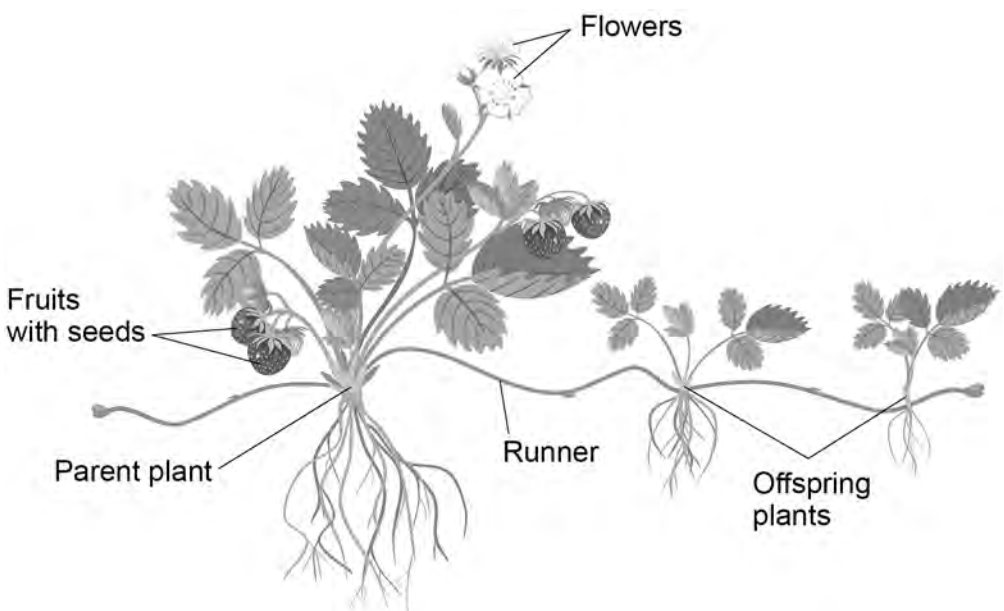
Question 39 · continued

Strawberry plants can reproduce both sexually and asexually.

Figure 6 shows a strawberry plant reproducing:

- sexually, using flowers, fruits and seeds
- asexually, using horizontal stems called runners.

Figure 6



0 3 . 4 Meiosis produces gametes.

What is the name of the male gamete in a flower?

[1 mark]

Tick (✓) **one** box.

Embryo ☐

Ovum ☐

Pollen ☐

4.6.1.1 Sexual and asexual reproduction

Question 39 · continued

0 3 . 5 Which process produces new cells in runners?

[1 mark]

Tick (✓) **one** box.

- Binary fission ☐
- Evolution ☐
- Mitosis ☐

0 3 . 6 Substances used for growth pass through the runners from the parent plant to the offspring plants.

Which **two** substances pass through the runners?

[2 marks]

Tick (✓) **two** boxes.

- Carbon dioxide ☐
- DNA ☐
- Insulin ☐
- Sugar ☐
- Water ☐

Question 3 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 39 · continued

Sexual reproduction and asexual reproduction each have different advantages for the strawberry plant.

0 3 . 7 Give **one** advantage of reproducing **sexually**.

[1 mark]

0 3 . 8 Give **one** advantage of reproducing **asexually**.

[1 mark]

10