AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.2.5

Cloning (biology only)

Past-paper questions

Tier	**Foundation**
Question groups	**36**
Available paper years	**2007–2024**

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.

4.6.2.5 Cloning (biology only)

Question 01

March 2007 | BLY1B | Original Q6 | Legacy

QUESTION SIX

It may be possible to clone humans.

There are a number of reasons why scientists might want to do this.

There are a number of reasons why governments might wish to ban human cloning.

Decisions must be made about whether human cloning should be allowed.

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

A A cloned human could have an identical twin 30 years younger than himself or herself.

B Many cloned animals have died early in their lives.

C The first scientist to clone a human will be famous.

D The techniques needed to clone humans could be used to produce human organs for transplants.

	Reason
1	It is an ethical reason why scientists would want to clone humans.
2	It is an unethical reason why scientists would want to clone humans.
3	It is a reason why governments might wish to ban human cloning.
4	It is an issue about which society needs to decide.

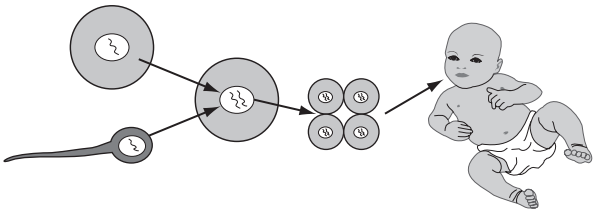
4.6.2.5 Cloning (biology only)

Question 02

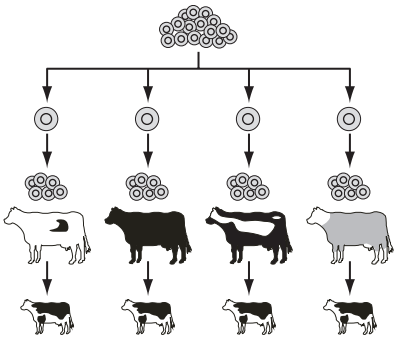
June 2007 | BLY1B | Original Q6 | Legacy

QUESTION SIX

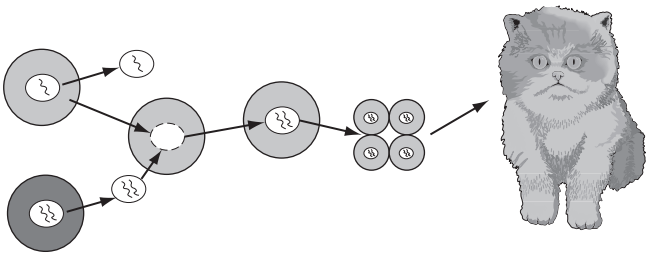
The diagrams show four methods of producing new individuals of animals or plants.



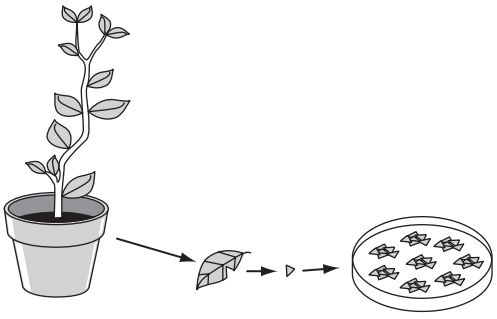
1



2



3



4

Match statements, **A**, **B**, **C** and **D**, with the diagrams **1–4**.

A fusion of two gametes

B fusion cell cloning

C transplanting embryos

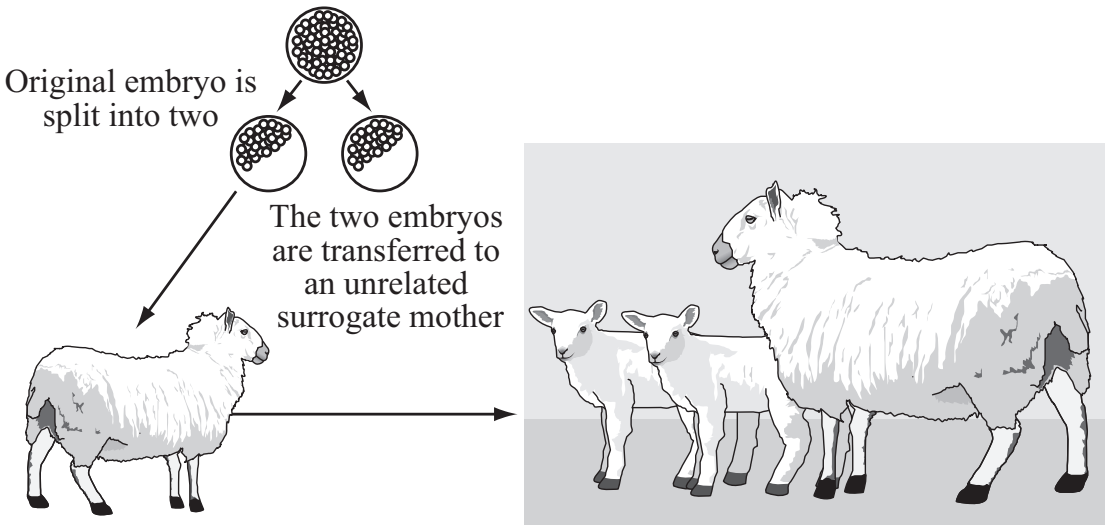
D tissue culture

4.6.2.5 Cloning (biology only)

Question 03

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

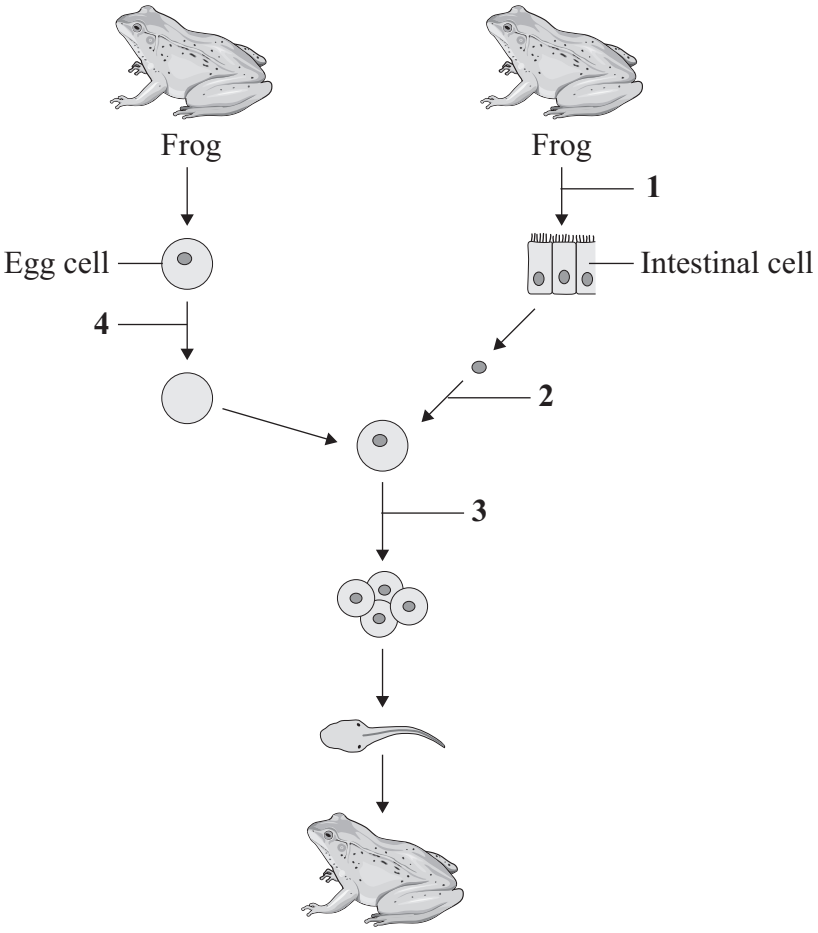
4.6.2.5 Cloning (biology only)

Question 04

November 2007 | BLY1B | Original Q2 | Legacy

QUESTION TWO

The diagram shows a method that may be used to clone frogs.



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

A egg cell nucleus removed

B intestinal cell nucleus inserted into egg cell

C cells from the intestine removed from frog

D egg develops into an embryo

4.6.2.5 Cloning (biology only)

Question 05

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** . . . .

4.6.2.5 Cloning (biology only)

Question 06

January 2008 | BLY1F | Original Q5 | Legacy

5 Scientists have produced many different types of GM (genetically modified) food crops.

(a) Use words from the box to complete the sentence about genetic engineering.

clones	**chromosomes**	**embryos**	**genes**

GM crops are produced by cutting ..... out of the

..... of one plant and inserting them into the cells of a crop plant.

(2 marks)

(b) Read the information about GM food crops.

- Herbicide-resistant GM crops produce higher yields.
- Scientists are uncertain about how eating GM food affects our health.
- Insect-resistant GM crops reduce the total use of pesticides.
- GM crops might breed naturally with wild plants.
- Seeds for GM crops can be bought from only one manufacturer.
- The numbers of bees will fall in areas where GM crops are grown.

Use this information to answer these questions.

(i) Give **two** reasons why some farmers are in favour of growing GM crops.

1 .....

.....

2 .....

.....

(2 marks)

(ii) Give **two** reasons why many people are against the growing of GM crops.

1 .....

.....

2 .....

.....

(2 marks)

6

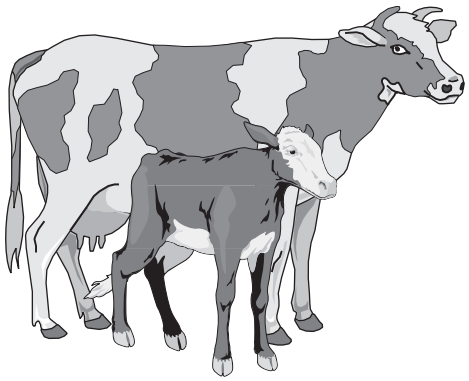
4.6.2.5 Cloning (biology only)

Question 07

March 2008 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

The drawing shows a cow and her calf.



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

A genes

B gametes

C embryos

D characteristics

The colour and the pattern of the skin of the calf are known as . . . **1** . . . .

The information for coat colour is stored in parts of chromosomes called . . . **2** . . . .

This information is passed from the cow to the calf in cells called . . . **3** . . . .

Calves can be cloned by splitting apart cells from . . . **4** . . . .

4.6.2.5 Cloning (biology only)

Question 08

March 2008 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

Read the passage:

> The *Agrobacterium tumefaciens* bacterium will accept genes from another organism. The bacterium can then transfer those genes from itself into plants. The plant then grows a lump of cells (a gall) that contain the genes from the bacterium. New plants, containing the genes, can be grown from galls. This technique has been used to transfer genes from a firefly into a tobacco plant, which then glows in the dark.

9A The transfer of genes from the firefly into the bacterium is an example of . . .

1 asexual reproduction.

2 cloning.

3 genetic engineering.

4 transplantation.

9B From which structure in the firefly would scientists cut out the gene that causes glowing?

1 gamete

2 chromosome

3 enzyme

4 cell

9C Cells from the tobacco plants containing the new genes would have to be cloned. This cloning would be carried out using . . .

1 embryo transplantation.

2 adult cell cloning.

3 genetic engineering.

4 tissue culture.

4.6.2.5 Cloning (biology only)

9D What was the most likely reason for carrying out this experiment?

1 to make tobacco plants grow taller

2 to remove genes from fireflies

3 to see whether genes could be transferred from animals to plants

4 to grow plants from galls

END OF TEST

4.6.2.5 Cloning (biology only)

Question 09

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

4.6.2.5 Cloning (biology only)

Question 10

June 2008 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

This question is about adult cell cloning.

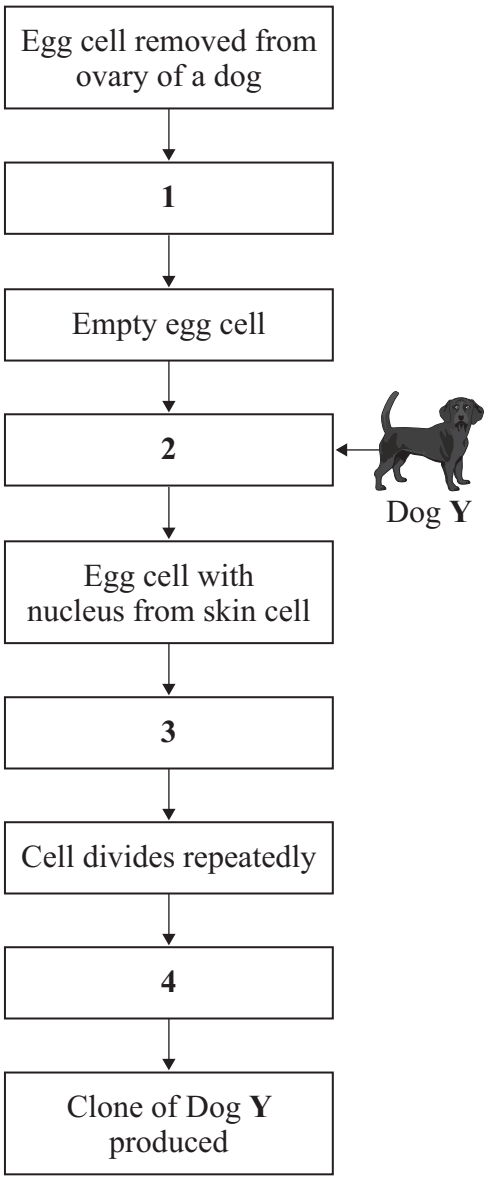
Match stages, **A**, **B**, **C** and **D**, with the labels **1–4** on the diagram to explain how clones of dogs can be produced.

A nucleus transferred from skin cell of Dog **Y**

B electric shock applied

C ball of cells inserted into womb of female

D nucleus removed from egg cell



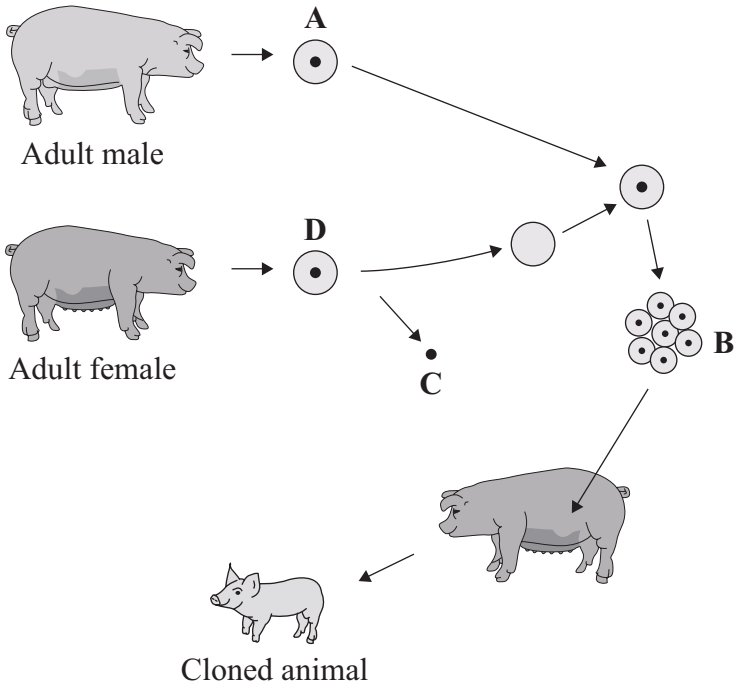
4.6.2.5 Cloning (biology only)

Question 11

November 2008 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

The diagram shows how pigs are cloned.



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

1	body cell
2	nucleus
3	embryo
4	egg cell

4.6.2.5 Cloning (biology only)

Question 12

January 2009 | BLY1F | Original Q5 | Legacy

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

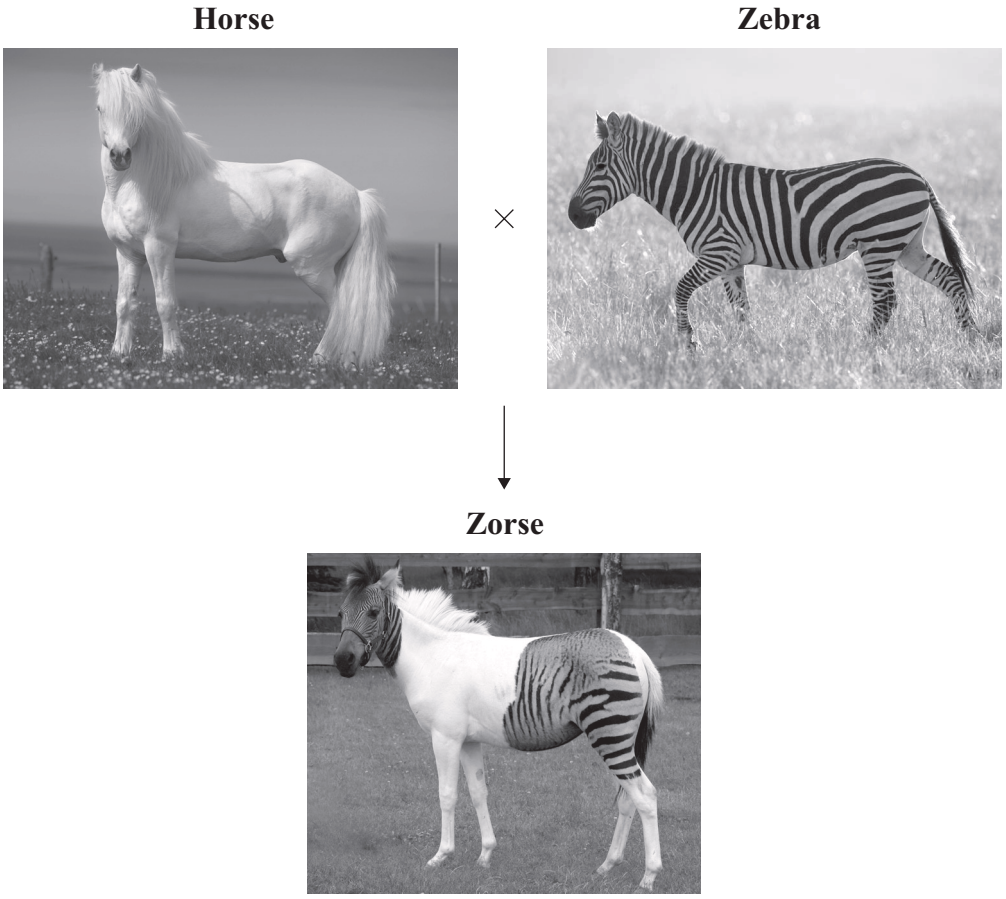


Photo of horse © Arctic-Images/Corbis
Photo of zebra © Arthur Morris/Corbis
Photo of zorse © Udo Richter/epa/Corbis

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)

4.6.2.5 Cloning (biology only)

Question 12 · 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

4.6.2.5 Cloning (biology only)

Question 13

June 2009 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

There are several different methods of cloning animals and plants.

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

A adult cell cloning

B embryo transplants

C taking cuttings

D tissue culture

	Description of method of cloning
1	splitting apart cells from a developing animal and transplanting them into a host mother
2	placing a nucleus from a skin cell into an egg cell with no nucleus
3	using small groups of cells from part of a plant
4	producing many new plants from old plants quickly and cheaply

4.6.2.5 Cloning (biology only)

Question 14

June 2009 | BLY1F | Original Q4 | Legacy

4 Some organisms are in danger of extinction.
The photograph shows an African elephant feeding on tree leaves.



4 (a) Read the information about elephants and humans in Africa.

- The African elephant is the largest land animal.
- The African elephant feeds on lots of leaves.
- Adult African elephants have no natural predators.
- Elephants are killed by poachers for their ivory tusks.
- African elephants live for about 70 years.
- Most African elephants live in large herds.
- Land available to elephants is disappearing rapidly.

The African elephant is now extinct in many parts of Africa.

Use information from the list to give **three** reasons why.

1.....

.....

2.....

.....

3.....

.....

(3 marks)

4.6.2.5 Cloning (biology only)

Question 14 · continued

for mark

4 (b) Organisms that are in danger of extinction can be cloned.

List A gives the names of three different cloning techniques.

List B gives information about these techniques.

Draw a line from each technique in **List A** to the correct information about it in **List B**.

List A **Technique**	**List B** **Information**
Adult cell cloning	Small groups of cells from parts of a plant are grown on a special jelly.
Embryo transplanting	Cells from a developing animal are separated before they become specialised and then placed into host mothers.
Tissue culture	Genes are cut out from chromosomes and inserted into other organisms.
	A nucleus is removed from an unfertilised egg cell. The nucleus from a body cell is inserted into the egg cell. An electric shock causes the egg to start to divide.

(3 marks)

6

4.6.2.5 Cloning (biology only)

Question 15

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** . . . .

4.6.2.5 Cloning (biology only)

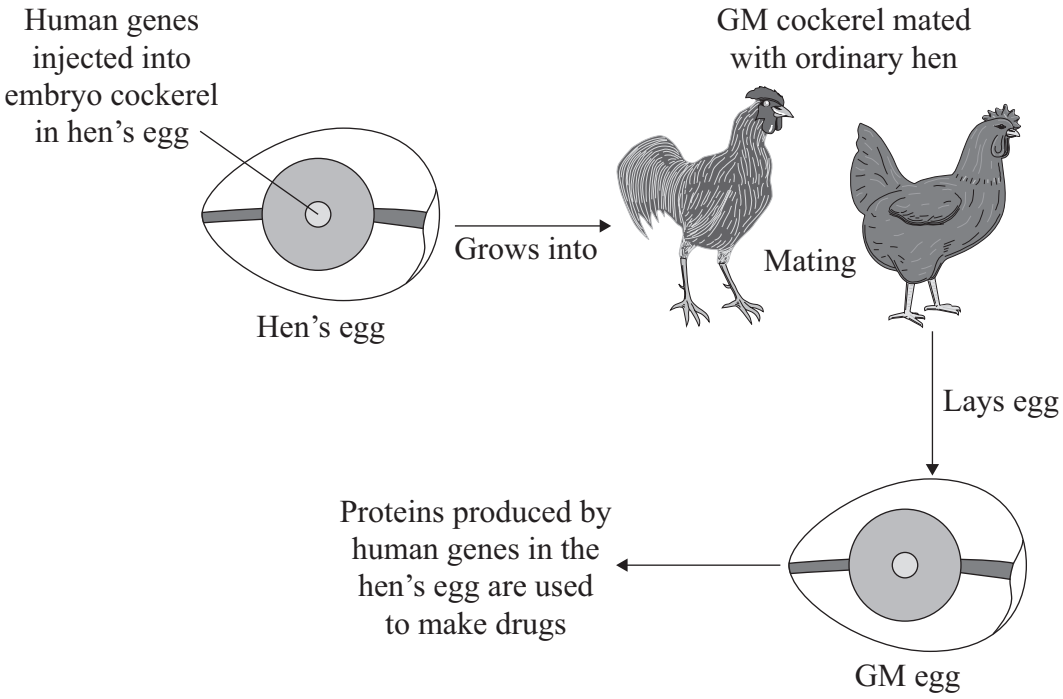
Question 16

January 2010 | BLY1F | Original Q4 | Legacy

4 Scientists have discovered how to produce genetically modified (GM) hens' eggs.

Some proteins produced in GM eggs can be used as drugs to treat humans.

The diagram shows how this is done.



4 (a) Which type of reproduction is involved when the cockerel mates with the hen?

Tick (✓) **one** box.

Asexual ☐

Cloning ☐

Sexual ☐

(1 mark)

4 (b) From which part of a human are the genes cut?

Tick (✓) **one** box.

Chromosome ☐

Embryo ☐

Gland ☐

(1 mark)

4.6.2.5 Cloning (biology only)

Question 16 · continued

for mark

4 (c) Read the information about genetically modified animals.

- GM animals might escape and breed with wild animals.
- Genetic modification can produce fast-growing animals for food.
- Genetic modification can be used to clone animals in danger of extinction.
- Using GM animals can reduce the number of animals used in medical research.
- Animals have the right to be free from genetic modification.

Use **only** this information to answer these questions.

4 (c) (i) Give **two** reasons why many people are in favour of genetically modified animals.

1 .....

.....

2 .....

.....

(2 marks)

4 (c) (ii) Give **two** reasons why many people are against genetically modified animals.

1 .....

.....

2 .....

.....

(2 marks)

6

4.6.2.5 Cloning (biology only)

Question 17

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.

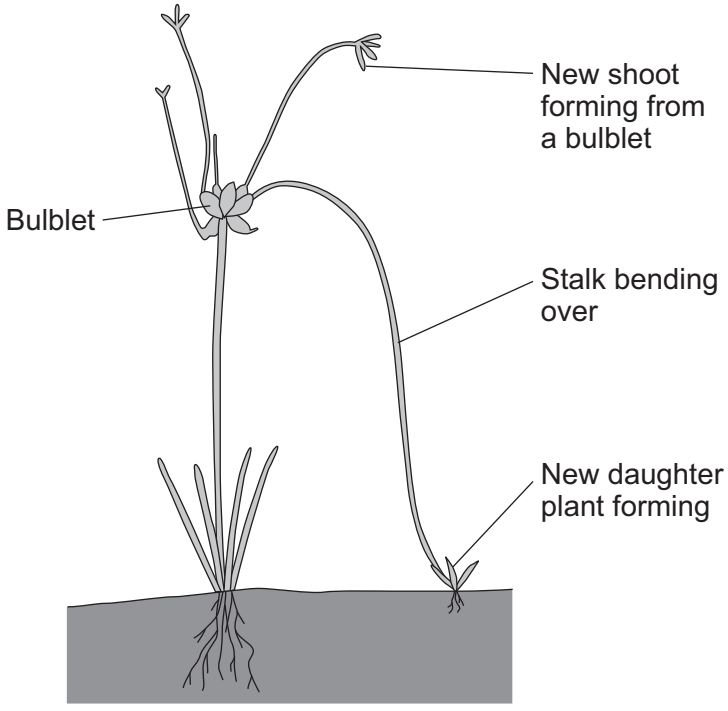
4.6.2.5 Cloning (biology only)

Question 18

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** . . . .

4.6.2.5 Cloning (biology only)

Question 19

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)

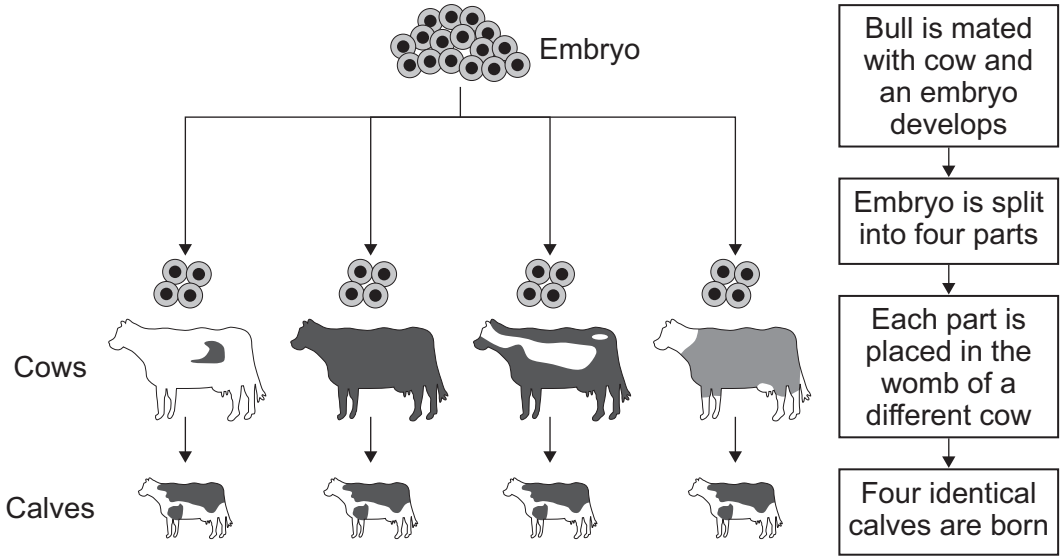
4 (a) (iii) Each sex cell of a rabbit is known as a ..... .

(1 mark)

4.6.2.5 Cloning (biology only)

Question 19 · 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

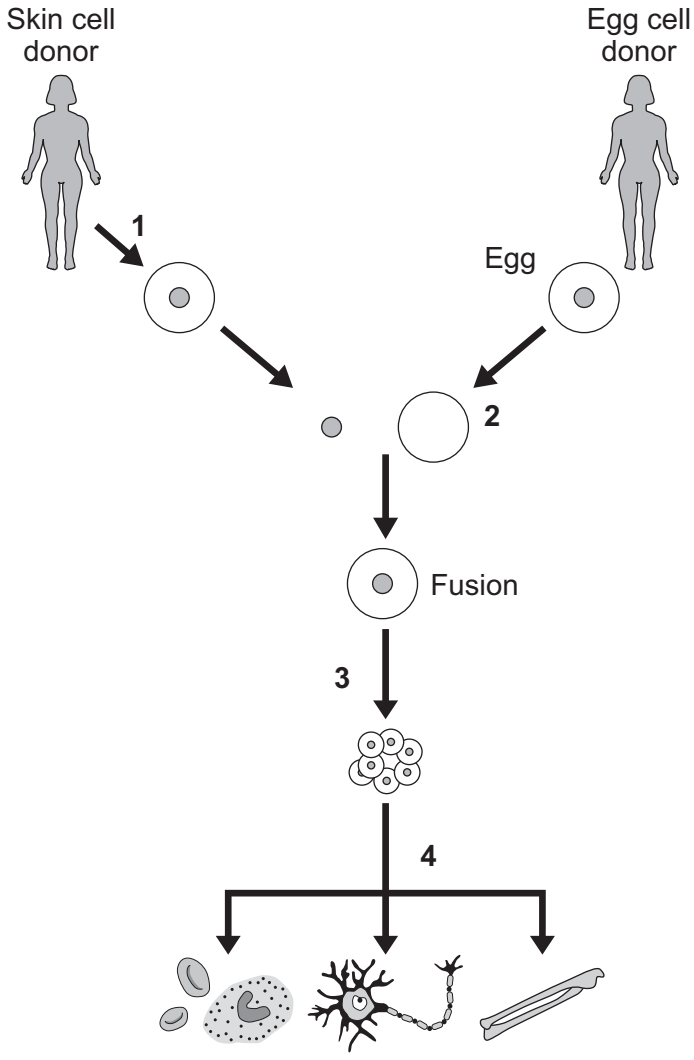
4.6.2.5 Cloning (biology only)

Question 20

November 2010 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

Fusion cell cloning can make different types of body cell. The diagram shows one way of doing this.



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

A A skin cell is taken from a donor.

B The new cell divides to make a group of similar cells.

C Different types of body cell are produced.

D The nucleus is removed, leaving cytoplasm.

4.6.2.5 Cloning (biology only)

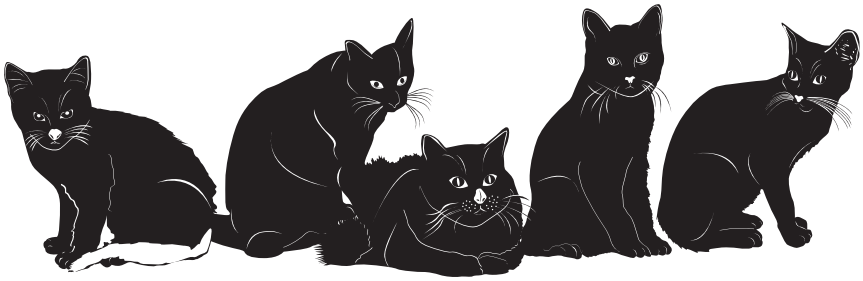
Question 21

November 2010 | BLY1BP | Original Q4 | Legacy

QUESTION FOUR

These young kittens look like their parents.

Kittens look like their parents because information is passed from the parents to their young. The information is about characteristics such as fur colour.



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

A chromosomes

B clones

C gametes

D genes

1	are kittens with identical characteristics
2	control one characteristic, eg fur colour
3	are sex cells
4	are thread-like structures carrying the information

4.6.2.5 Cloning (biology only)

Question 22

January 2011 | BLY1F | Original Q4 | Legacy

4 We can now produce organisms with the characteristics we want the organisms to have.

List A gives the names of four ways of producing organisms.

List B gives information about the ways of producing organisms.

Draw **one** line from each way of producing organisms in **List A** to the correct information in **List B**.

List A **Ways of producing organisms**	**List B** **Information**
	Taking part of the stem from a plant, then putting this part of the stem in wet soil in a plant pot.
Embryo transplantation	
	Growing groups of cells from a plant on special jelly.
Genetic engineering	
	Transferring genes from one organism to a different organism.
Taking cuttings	
	Growing plants from seeds in a garden.
Tissue culture	
	Separating groups of cells from a very young developing animal then putting the groups of cells into host mothers.

(4 marks)

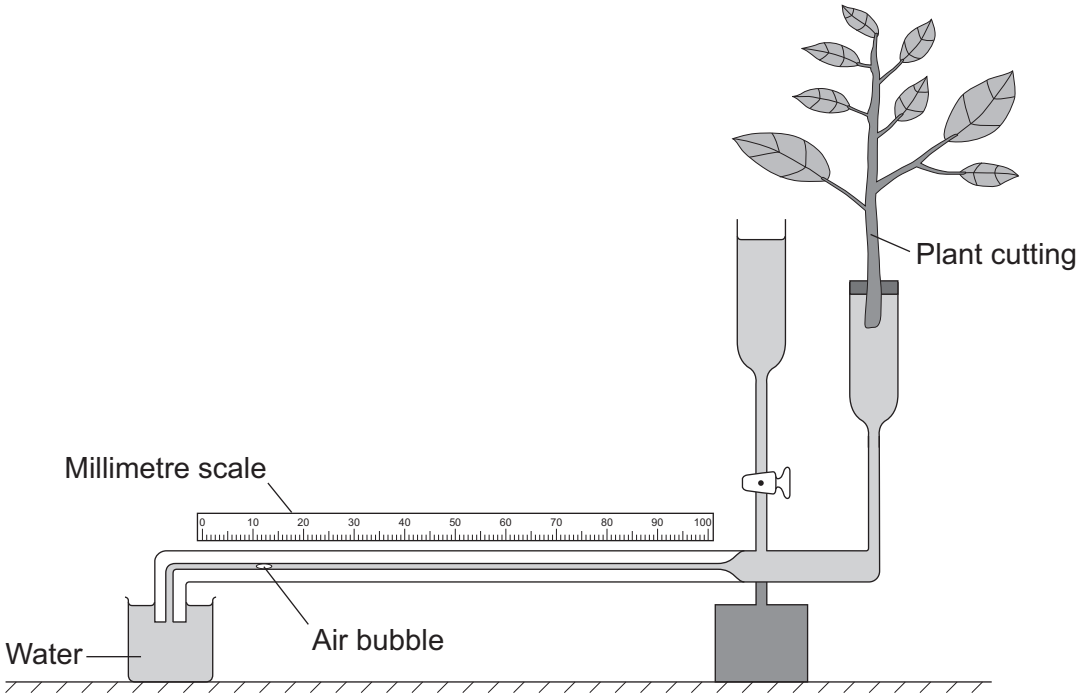
4

4.6.2.5 Cloning (biology only)

Question 23

January 2011 | BLY3F | Original Q4 | Legacy

4 Some students used the apparatus shown in the diagram to measure the rate of water uptake by a plant cutting.



The students set up the apparatus in three different conditions:

- no wind at 15°C
- no wind at 25°C
- wind at 25°C

For each experiment, the students recorded the movement of the air bubble along the scale.

4 (a) (i) Name the **two** variables that the students chose to change in these experiments.

1 .....

2 .....

(2 marks)

4 (a) (ii) It was important to use the same plant cutting each time to make these experiments fair.

Explain why.

.....

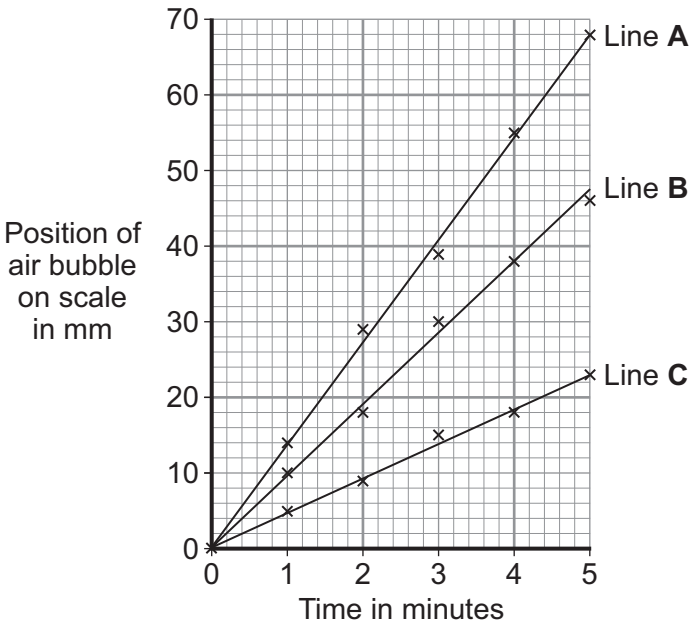
.....

(1 mark)

4.6.2.5 Cloning (biology only)

Question 23 · continued

4 (b) The graph shows the students' results.



Which line on the graph, **A**, **B** or **C**, shows the results for each of the three different experiments?

Write each of the letters **A**, **B** or **C** in the correct boxes in the table.

Condition	Letter
No wind at 15°C	
No wind at 25°C	
Wind at 25°C	

(2 marks)

4 (c) Water is lost from the leaves of the plant cutting.

Name this process.

Draw a ring around **one** answer.

distillation **respiration** **transpiration**

(1 mark)

6

4.6.2.5 Cloning (biology only)

Question 24

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

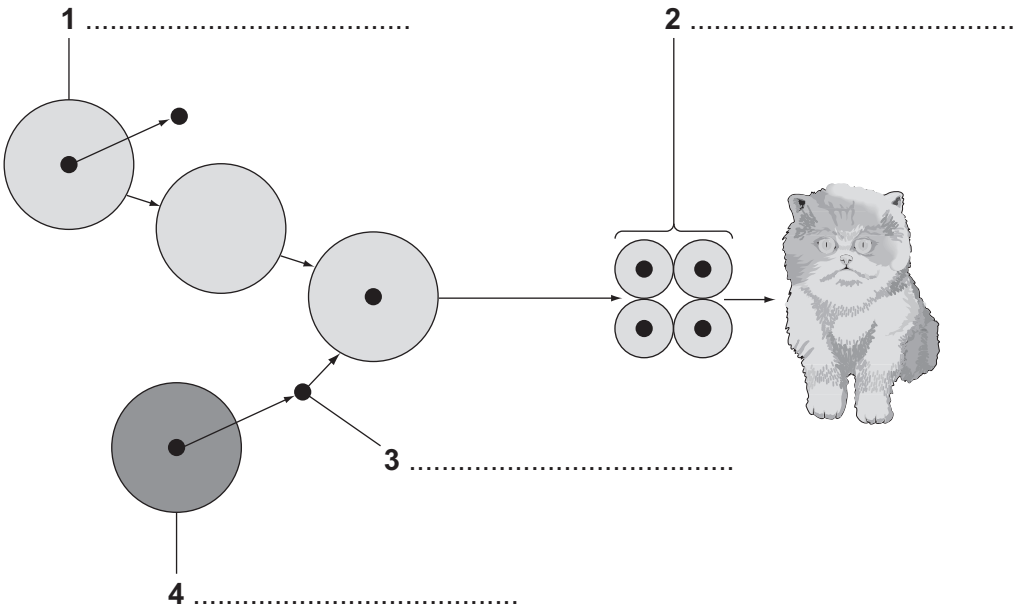
4.6.2.5 Cloning (biology only)

Question 25

June 2011 | BLY1F | Original Q3 | Legacy

3 It is possible to clone pets.

The diagram shows one way of cloning a pet cat, using the nucleus from a cat skin cell.



embryo	**egg**	**nucleus**	**skin cell**	**sperm**

3 (a) Use words from the box to label structures **1**, **2**, **3** and **4** on the diagram.

(4 marks)

3 (b) The cloning of humans is not allowed.

Tick (✓) **one** box to complete the sentence.

One **ethical** reason for banning the cloning of humans is that . . .

the method used in animal cloning has not been evaluated. ☐

the method is very expensive. ☐

the child created by cloning would not have been able to give permission. ☐

(1 mark)

5

4.6.2.5 Cloning (biology only)

Question 26

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

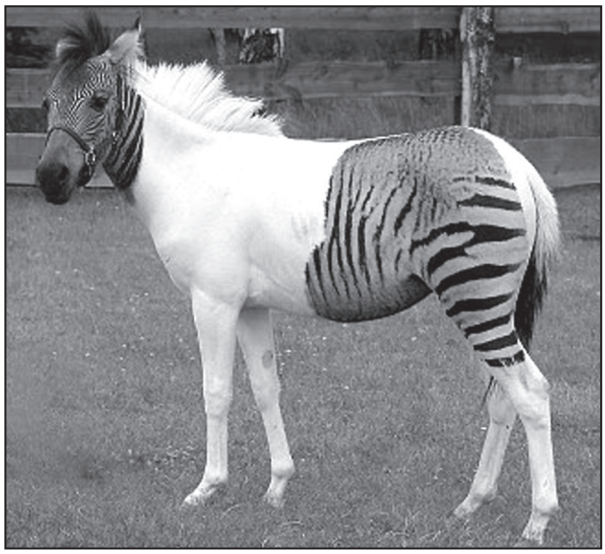
D tissue culture

	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

4.6.2.5 Cloning (biology only)

Question 27

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)

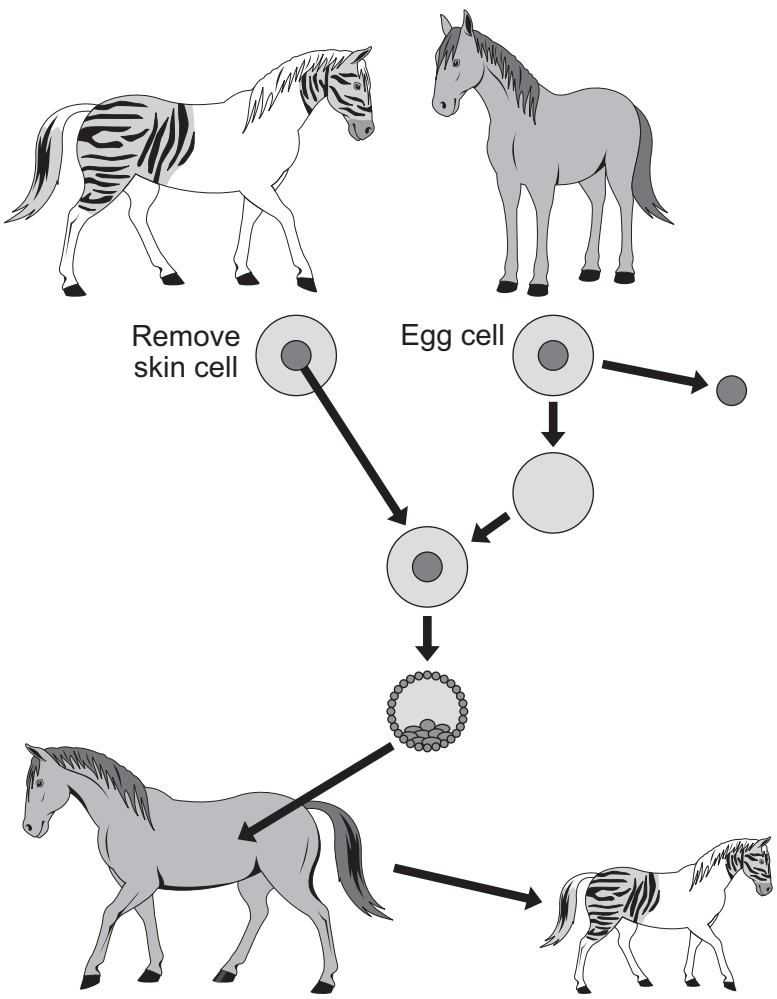
Question 7 continues on the next page

4.6.2.5 Cloning (biology only)

Question 27 · 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.



4.6.2.5 Cloning (biology only)

Question 27 · 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

4.6.2.5 Cloning (biology only)

Question 28

June 2012 | BL1FP | Original Q4 | Legacy

4 When animals die, they usually fall to the ground and decay.
In 1977 the body of a baby mammoth was discovered.
The baby mammoth died 40 000 years ago and its body froze in ice.

The picture shows the mammoth.



© Ria Novosti/Science Photo Library

4 (a) Explain why the body of the baby mammoth did **not** decay.

.....

.....

.....

.....

(2 marks)

4.6.2.5 Cloning (biology only)

Question 28 · continued

4 (b) Mammoths are closely related to modern elephants.
The pictures show these two animals.

What scientists think a mammoth looked like



© Christian Darkin/Science Photo Library

Modern elephant



Mammoths are *extinct*. What does *extinct* mean?

.....

.....

(1 mark)

Question 4 continues on the next page

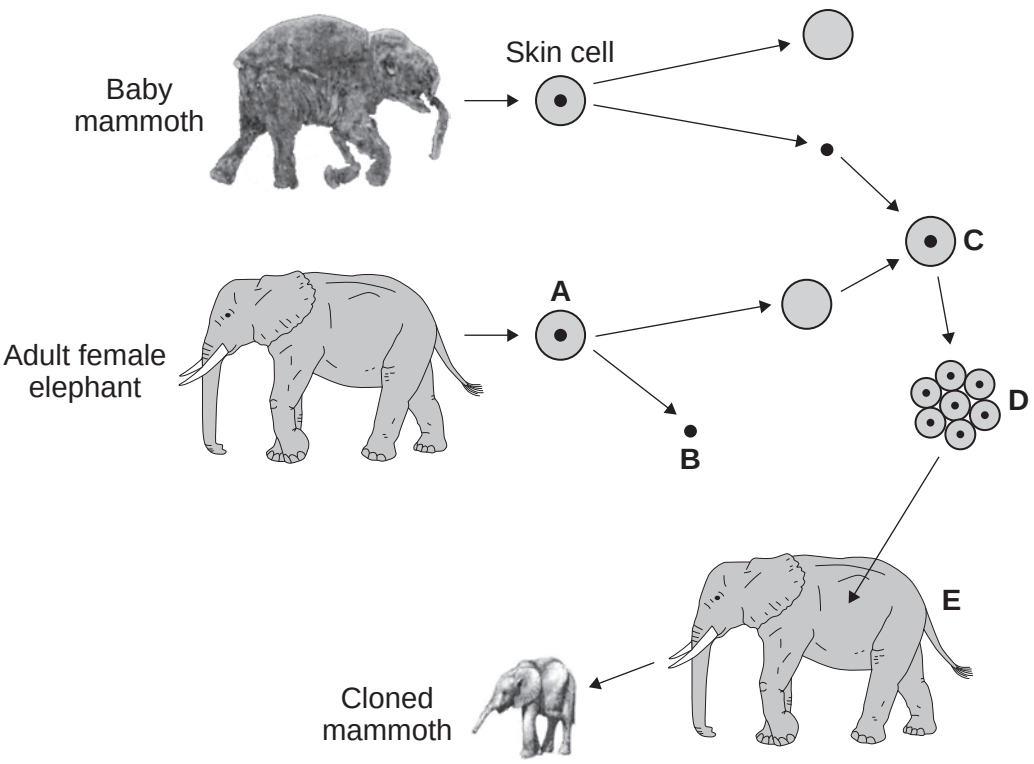
4.6.2.5 Cloning (biology only)

Question 28 · continued

4 (c) Scientists believe they may be able to use adult cell cloning to recreate a living mammoth.

The scientists will use a skin cell from the baby mammoth.

The diagrams show how the skin cell will be used.



In each question, draw a ring around the correct answer.

4 (c) (i) What type of cell is cell **A**?

skin cell **egg cell** **sperm cell**

(1 mark)

4 (c) (ii) Part **B** is removed from cell **A**.

What part of the cell is part **B**?

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

(1 mark)

4.6.2.5 Cloning (biology only)

Question 28 · continued

4 (c) (iii) After cell **C** is formed, it divides into embryo cells.

What is done to cell **C** to make it divide?

Cell **C** is

- treated with enzymes.
- mixed with sperm cells.
- given an electric shock.

(1 mark)

4 (c) (iv) The embryo cells form a ball of cells. The ball of cells will be put into female elephant, **E**.

Which part of elephant **E** is the ball of cells put into?

womb **stomach** **ovary**

(1 mark)

4 (d) The scientists expect any offspring of the adult cell cloning to look like a mammoth and **not** like an elephant.

Why?

.....

.....

(1 mark)

8

4.6.2.5 Cloning (biology only)

Question 29

June 2013 | BL1FP | Original Q4 | Legacy

4 There are two forms of peppered moth, dark and pale.
Birds eat the moths when the moths are resting on tree bark.

Pollution in the atmosphere may:
- kill lichens living on tree bark
- make the bark of trees go black.

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

Lichens are very sensitive to air pollution caused by

carbon dioxide.

nitrogen.

sulfur dioxide.

(1 mark)

4 (b) The photographs show the two forms of peppered moth, on tree bark.



Tree bark covered with lichens

Tree bark made black by pollution

4.6.2.5 Cloning (biology only)

Question 29 · continued

4 (b) (i) The dark form of the peppered moth was produced by a change in the genetic material of a pale moth.

Use **one** word from the box to complete the sentence.

characteristic	**clone**	**mutation**

A change in genetic material is called a ..... .

(1 mark)

4 (b) (ii) In the 19th century, pollution made the bark of many trees go black.

Explain why:

- the population of the pale form of the moth in forests decreased
- the population of the dark form of the moth in forests increased.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

Question 4 continues on the next page

4.6.2.5 Cloning (biology only)

Question 29 · continued

4 (c) (i) The larvae (young) of the peppered moths eat the leaves of birch trees.

The diagram shows the food chain:

birch trees → peppered moth larvae → birds

Draw a pyramid of biomass for this food chain.

Label the pyramid.

(2 marks)

4 (c) (ii) Which **two** reasons explain the shape of the pyramid you drew in part **(c)(i)**?

Tick (✓) **two** boxes.

Some material is lost in waste from the birds ☐

The trees are much larger than peppered moth larvae ☐

Peppered moth larvae do not eat all the leaves from the trees ☐

The trees do not use all of the Sun's energy ☐

(2 marks)

9

4.6.2.5 Cloning (biology only)

Question 30

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)

4.6.2.5 Cloning (biology only)

Question 30 · continued

June 2013 | BL1FP | Original Q6 | Legacy

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

4.6.2.5 Cloning (biology only)

Question 30 · 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

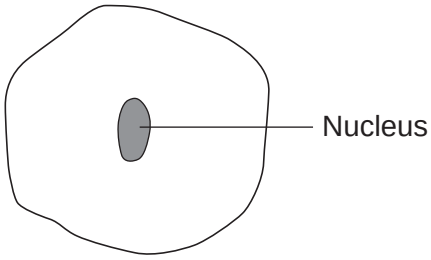
4.6.2.5 Cloning (biology only)

Question 31

June 2014 | BL1FP | Original Q1 | Legacy

1 **Figure 1** shows a cell.

Figure 1



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

1 (a) (i) In the nucleus of a cell, genes are part of

chromosomes.
membranes.
receptors.

[1 mark]

1 (a) (ii) Different genes control different

characteristics
gametes
nuclei

of an organism.

[1 mark]

1 (a) (iii) Studying the similarities and differences between organisms allows us to

classify
clone
grow

the organisms.

[1 mark]

1 (b) Complete the following sentence.

[1 mark]

Living things can be grouped into animals, microorganisms and ..... .

4

4.6.2.5 Cloning (biology only)

Question 32

June 2015 | BL1FP | Original Q4 | Legacy

4 Modern scientists use cloning techniques.

4 (a) Which **one** of the following is a method of producing cloned plants?

Tick (✓) **one** box.

[1 mark]

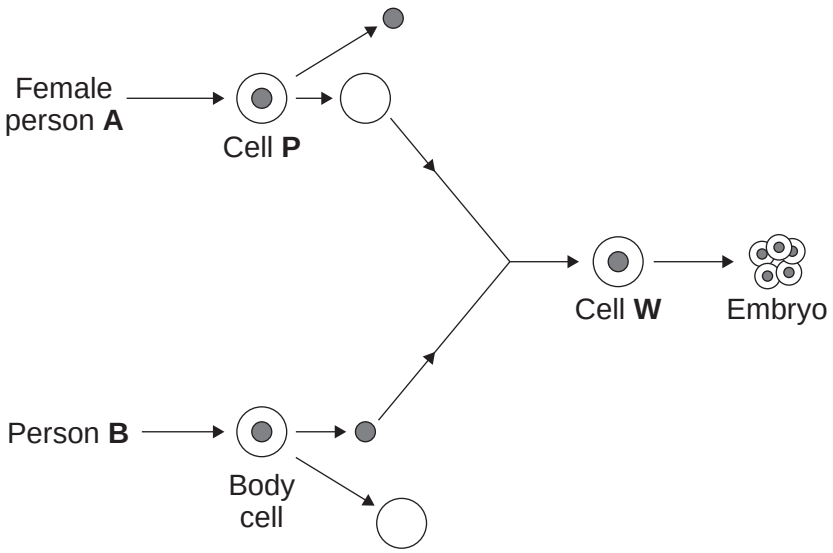
Joining male and female sex cells ☐

Taking cuttings from plants ☐

Transferring genes from one plant to another plant ☐

4 (b) **Figure 5** shows a method that could be used in the future to produce a human.

Figure 5



4 (b) (i) What is the name of the method shown in **Figure 5**?

Tick (✓) **one** box.

[1 mark]

Adult cell cloning ☐

Embryo transplant ☐

Tissue culture ☐

4.6.2.5 Cloning (biology only)

Question 32 · continued

4 (b) (ii) What type of cell is cell **P**?

Draw a ring around the correct answer.

[1 mark]

an egg cell **a skin cell** **a sperm cell**

4 (b) (iii) Use the correct answer from the box to complete the sentence.

[1 mark]

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

The ..... of cell **P** is removed and is discarded.

4 (b) (iv) Use the correct answer from the box to complete the sentence.

[1 mark]

an electric shock	**enzymes**	**hormones**

To make cell **W** divide to form an embryo, the cell must be treated with

..... .

4 (b) (v) The embryo must be placed in an adult female to develop into a child.

Where, in the adult female, should the embryo be placed?

[1 mark]

.....

4 (c) Some children have kidney disease. Kidney disease cannot be cured.
In the future, scientists could make a healthy clone of a child with kidney disease.
One kidney could then be transplanted from the cloned child into the child with kidney disease. The cloned child would still live with only one remaining kidney.

Suggest **two** reasons why people might disagree with cloning a child to get a kidney for transplanting.

[2 marks]

1 .....

.....

2 .....

.....

8

4.6.2.5 Cloning (biology only)

Question 33

0 2 Plants are made up of cells, tissues and organs.

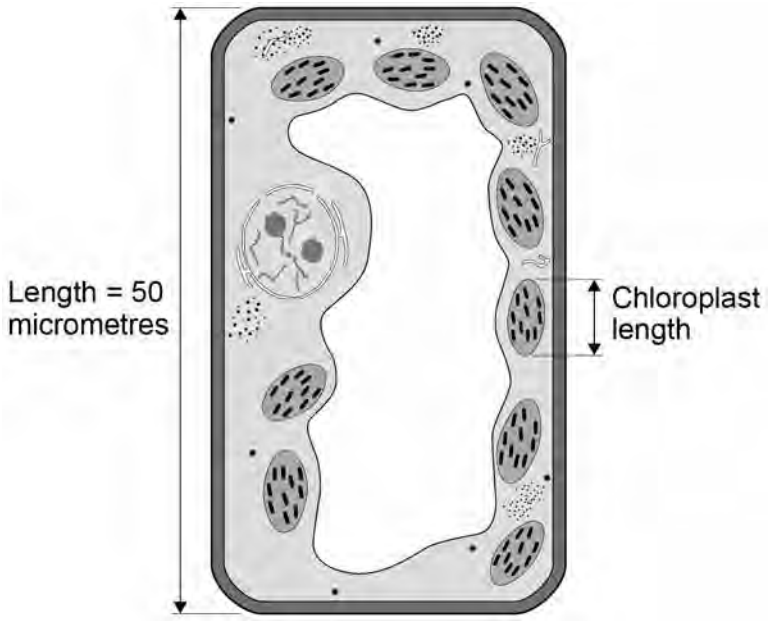
0 2 . 1 Draw **one** line from each level of organisation to the correct plant part.

[2 marks]

Level of organisation	Plant part
	Leaf
Organ	Root hair
	Spongy mesophyll
Tissue	Vacuole
	Xylem cell

Figure 3 shows a plant cell drawn to scale.

Figure 3



4.6.2.5 Cloning (biology only)

Question 33 · continued

0 2 . 2 Where in a plant would the cell in **Figure 3** be found?

[1 mark]

Tick **one** box.

- Epidermis ☐
- Palisade mesophyll ☐
- Phloem ☐
- Xylem ☐

0 2 . 3 Calculate the length of the chloroplast labelled in **Figure 3**.

[2 marks]

Length = _____ micrometres

0 2 . 4 Cells in plant roots do **not** photosynthesise.

Give **one** reason why.

[1 mark]

4.6.2.5 Cloning (biology only)

Question 33 · continued

0 2 . 5 As a plant grows, new root hair cells are formed from unspecialised cells.

How does an unspecialised cell become a new root hair cell?

[1 mark]

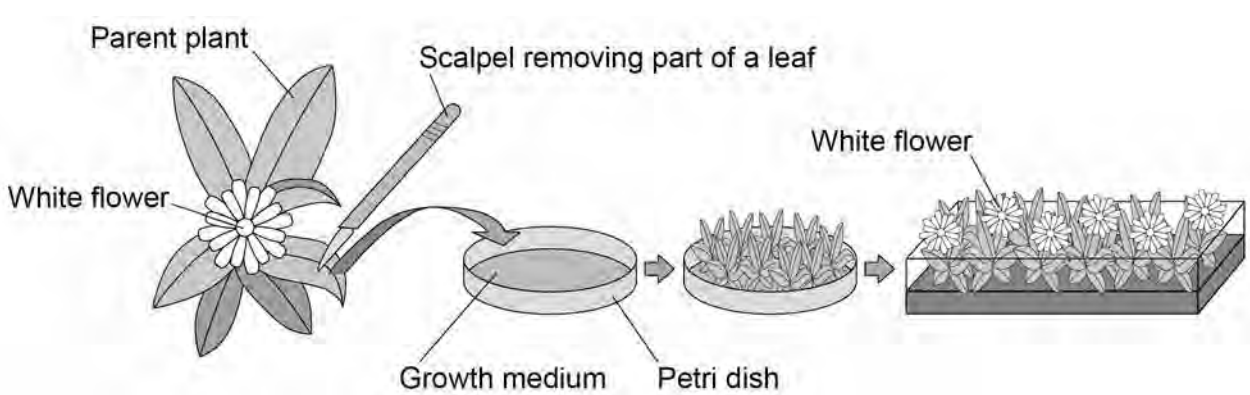
Tick **one** box.

- Differentiation ☐
- Metabolism ☐
- Transpiration ☐
- Transport ☐

Scientists can clone plants using tissue culture.

Figure 4 shows the process of tissue culture.

Figure 4



4.6.2.5 Cloning (biology only)

Question 33 · continued

0 2 . 6 Why might scientists want to clone plants?

[1 mark]

Tick **one** box.

To create new species of plants. ☐

To introduce variation into plants. ☐

To protect endangered plants from extinction. ☐

To reduce disease resistance in plants. ☐

0 2 . 7 What is the advantage of cloning plants using tissue culture?

[1 mark]

Tick **one** box.

No special equipment is needed. ☐

Plants can be produced quickly. ☐

The flowers are all different colours. ☐

The offspring are all genetically different. ☐

0 2 . 8 The growth medium in **Figure 4** helps the plants to grow.

Name **one** substance in the growth medium.

[1 mark]

_____

_____

10

4.6.2.5 Cloning (biology only)

Question 34

June 2019 | 8461/2F | Original Q5

0 5 **Figure 10** shows a flightless bird called the dodo (*Raphus cucullatus*).

Figure 10



The dodo:

- was 1 m tall
- had a mass of 20 kg
- lived in rainforests on a tropical island
- ate fruits
- made its nest on the ground.

A female dodo laid only one egg each year.

Humans arrived on the island in the year 1507. By 1681 the dodo was extinct.

0 5 . 1 What is the genus of the dodo?

[1 mark]

Tick (✓) **one** box.

Animal ☐

Bird ☐

Raphus ☐

4.6.2.5 Cloning (biology only)

Question 34 · continued

0 5 . 2 Before the arrival of humans, there were no other large animals living on the island.

Suggest **two** reasons why the dodo became extinct soon after the arrival of humans.

[2 marks]

1 _____

_____

2 _____

_____

Today, humans are cutting down large areas of tropical rainforests.

0 5 . 3 Suggest **one** use of the land after the trees have been removed.

[1 mark]

_____

_____

0 5 . 4 Why does the removal of trees cause an increase in carbon dioxide in the atmosphere?

[2 marks]

Tick (✓) **two** boxes.

- There are fewer animals. ☐
- There is less photosynthesis. ☐
- There is less respiration. ☐
- The soil dries out. ☐
- The trees are burned. ☐

4.6.2.5 Cloning (biology only)

Question 34 · continued

0 5 . 5 What effect would an increase in carbon dioxide in the atmosphere have on global air temperature?

[1 mark]

Tick (✓) **one** box.

Decrease ☐

Increase ☐

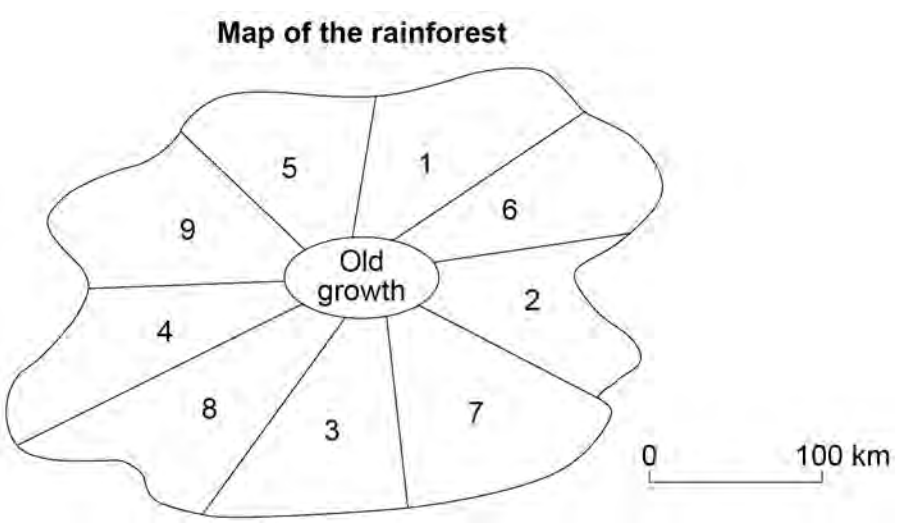
Stay the same ☐

'Sustainable forestry' reduces the harmful effects of cutting down trees on the environment.

Figure 11 shows a method of 'sustainable forestry'.

Numbers 1–9 show different parts of a rainforest.

Figure 11



The trees are cut down in the sequence 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9

- The trees are cut down in only one area at any one time.
- It takes 30 years to cut down the trees in each area.
- The trees in the 'Old growth' area are never cut down.

4.6.2.5 Cloning (biology only)

Question 34 · continued

0 5 . 6 How many years would it take to cut down the trees in all of the numbered areas in **Figure 11**?

[2 marks]

Number of years = _____

0 5 . 7 The rainforest contains:

- 750 species of trees
- 400 species of birds
- 150 species of butterflies
- many other species of plants and animals.

Explain how the pattern of cutting down trees shown in **Figure 11** stops the biodiversity of the rainforest being reduced.

[4 marks]

13

4.6.2.5 Cloning (biology only)

Question 35

June 2023 | 8461/2F | Original Q9

0 9 Reproduction can produce offspring which are:

- genetically different

  or

- genetically identical.

Farmers grow tomato plants in greenhouses.

The tomatoes are sold in supermarkets.

0 9 . 1 Suggest **one** advantage of growing tomato plants that are genetically different.

[1 mark]

0 9 . 2 Suggest **one** advantage of growing tomato plants that are genetically identical.

[1 mark]

0 9 . 3 Scientists can grow genetically identical tomato plants using tissue culture.

What is tissue culture?

[1 mark]

0 9 . 4 Genetically identical tomato plants growing in the same garden do **not** all grow to the same height.

Give **one** reason why.

[1 mark]

4.6.2.5 Cloning (biology only)

Question 35 · continued

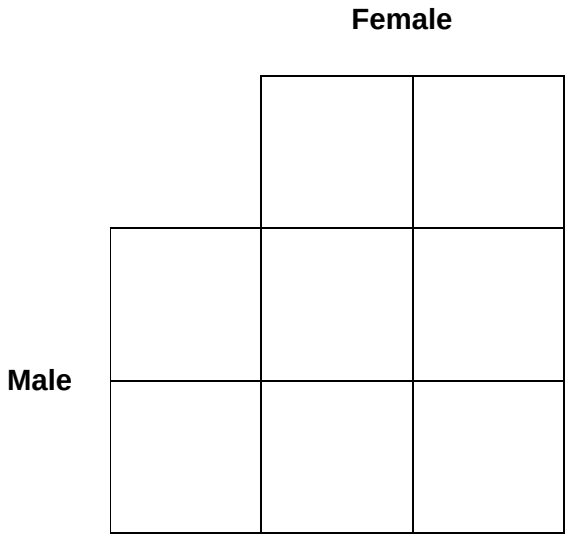
The sex of dogs is determined by **X** and **Y** chromosomes in the same way as in humans.

0 9 . 5 Complete the Punnett square diagram in **Figure 15** to show the inheritance of sex in dogs.

Use the symbols **X** and **Y**.

[3 marks]

Figure 15



0 9 . 6 A female dog gave birth to six offspring.

Why would you expect there to be three male offspring and three female offspring?

Use your answer to Question **09.5**.

[1 mark]

Question 9 continues on the next page

Question 35 · continued

Farmers keep chickens for:

- meat production
- egg production.

Some varieties of chicken grow more quickly and are more suitable for meat production.

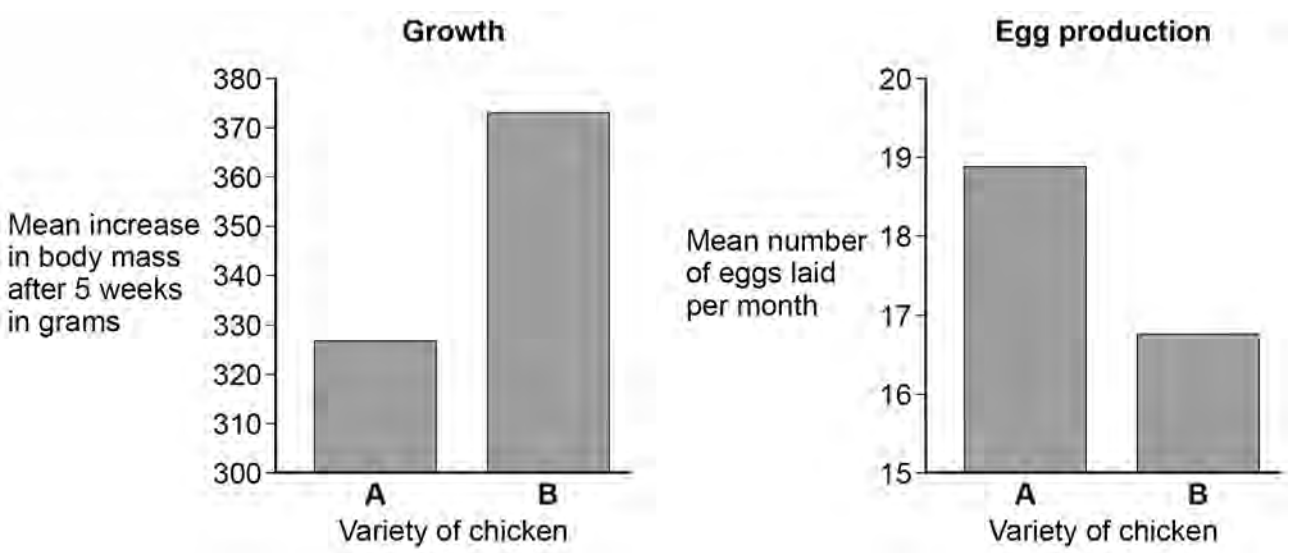
Other varieties of chicken produce more eggs.

A farmer keeps two varieties of chicken, **A** and **B**.

The farmer investigated the growth rates and egg-production rates of both varieties.

Figure 16 shows the results.

Figure 16



0 9 . 7 Suggest **two** control variables the farmer should have used in this investigation.

[2 marks]

1 _____

_____

2 _____

_____

4.6.2.5 Cloning (biology only)

Question 35 · continued

June 2023 | 8461/2F | Original Q9

0 9 . 8 **Figure 16** shows mean values from 500 chickens of each variety.

Give the reason the farmer used a large number of chickens.

[1 mark]

0 9 . 9 The farmer wants to produce a new variety of chicken that is good for **both** meat production **and** egg production.

Describe how selective breeding of chicken varieties **A** and **B** can produce the new variety of chicken.

[4 marks]

15

4.6.2.5 Cloning (biology only)

Question 36

0 7

Gardeners can grow plants from:

- seeds
- cuttings taken from adult plants.

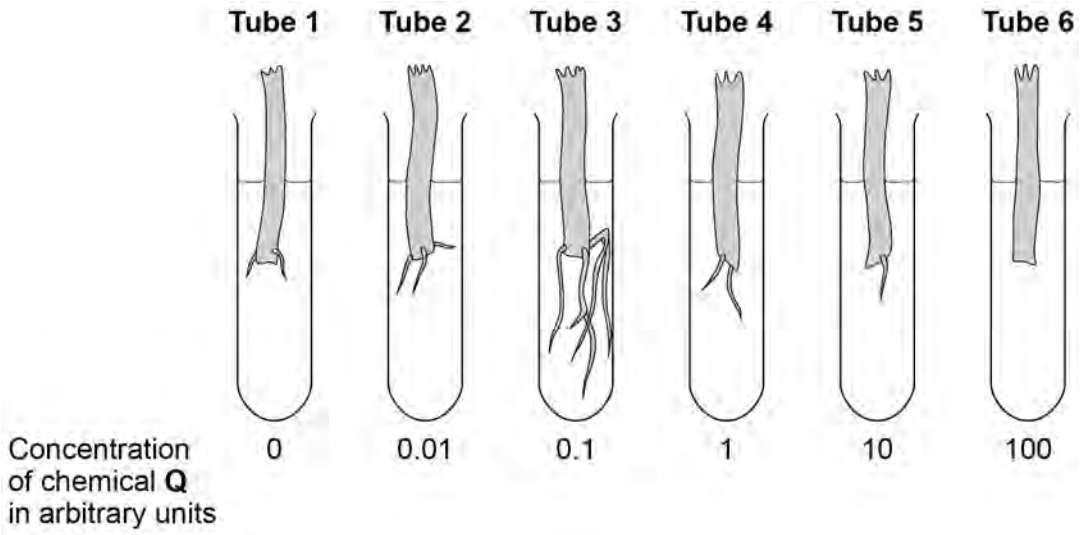
A gardener investigated the growth of roots on cuttings from a geranium plant.

This is the method used.

1. Take 6 cuttings from the stems of the same plant.
2. Prepare 6 test tubes, each containing a different concentration of a solution of chemical **Q**.
3. Place 1 cutting in each test tube with the cut end of each stem in the solution.
4. Leave the test tubes at room temperature for 10 days.

Figure 8 shows the results.

Figure 8



4.6.2.5 Cloning (biology only)

Question 36 · continued

0 7 . 1 Tube **1** contains no chemical **Q**.

Tube **1** is a control.

Why did the gardener include tube **1** in the investigation?

[1 mark]

0 7 . 2 How many times more concentrated is chemical **Q** in tube **6** than in tube **2**?

[2 marks]

Number of times more concentrated = _____

0 7 . 3 What was the best concentration of chemical **Q** for stimulating root growth?

[1 mark]

Tick (✓) **one** box.

- 0.01 arbitrary units ☐
- 0.1 arbitrary units ☐
- 1 arbitrary unit ☐
- 10 arbitrary units ☐

0 7 . 4 Give evidence from **Figure 8** that a high concentration of chemical **Q** may be toxic to geranium plants.

[1 mark]

4.6.2.5 Cloning (biology only)

Question 36 · continued

0 7 . 5 The gardener has four types of geranium plant: **A**, **B**, **C** and **D**.

Plant **A** produces larger, more brightly-coloured flowers than any of the other plants.

The gardener wants to grow more plants of type **A**.

Explain why the gardener chooses to take cuttings from plant **A** instead of growing seeds from plant **A**.

[4 marks]

9