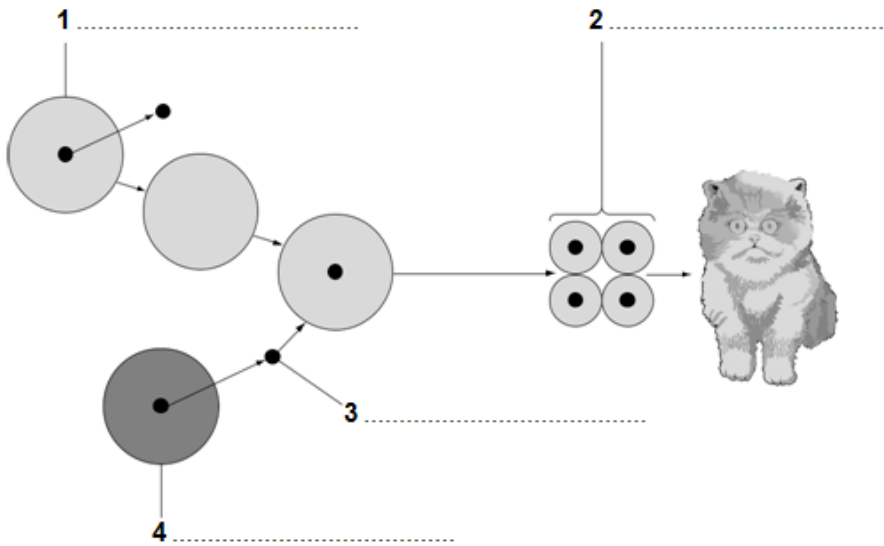


Cloning 2

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

(4 marks)

(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 . . .

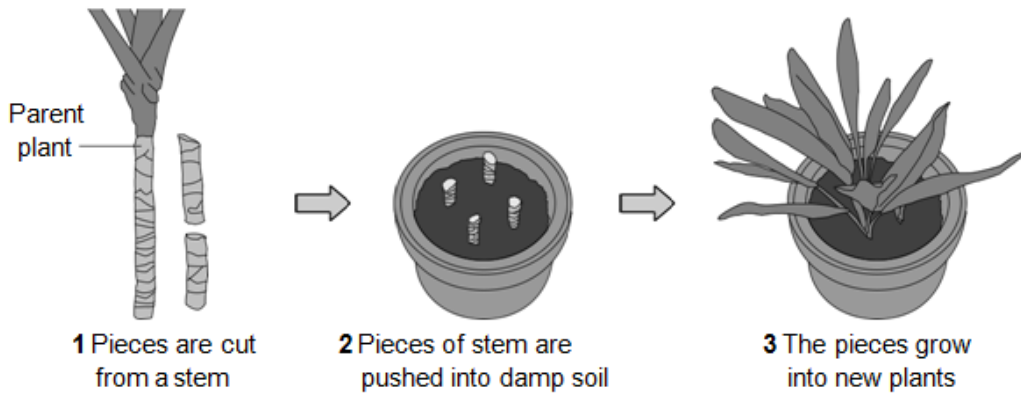
the method used in animal cloning has not been evaluated.

the method is very expensive.

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

(1 mark)

Q:2 (a) The drawings show one way of producing new plants. The new plants are identical to the parent plant.



Use words from the box to complete the sentences.

asexual characteristics clones engineering genes sexual

The colour and shape of the leaves are known as _____.

The information for leaf colour is stored in parts of chromosomes

called _____.

The new plants are known as _____.

The new plants have been produced by _____ reproduction.

(4 marks)

(b) (i) Name one other way of producing plants that are identical to their parents.

(1 mark)

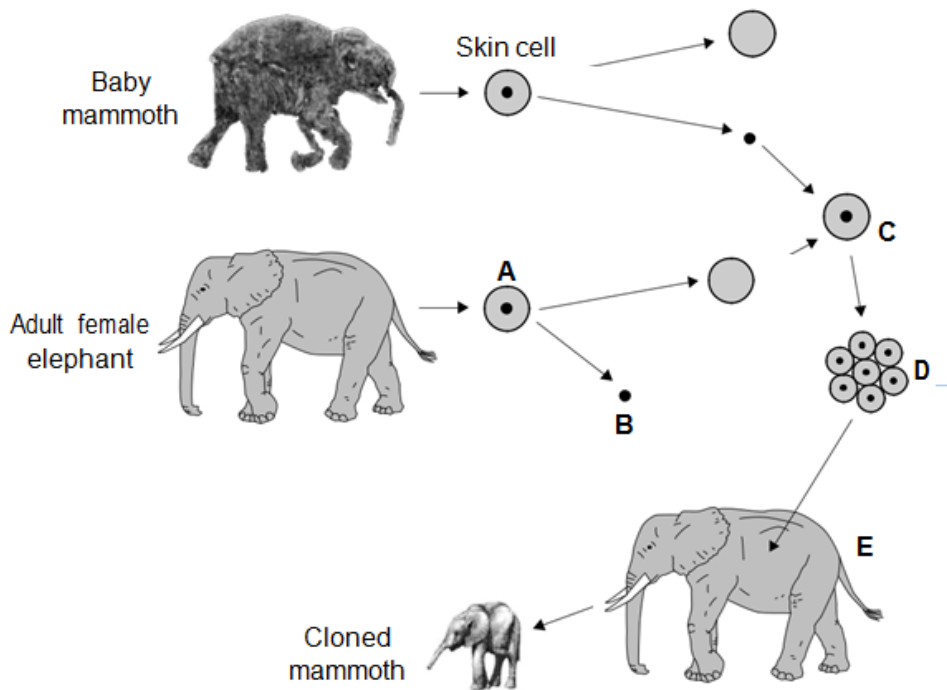
(b) (ii) Name one way of producing animals that are identical to each other.

(1 mark)

Q:3 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.

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

skin cell egg cell sperm cell

(1 mark)

(c) (ii) Part B is removed from cell A. What part of the cell is part B?

Nucleus cytoplasm cell membrane

(1 mark)

(c) (iii) After cell C is formed, it divides into embryo cells. What is done to cell C to make it divide?

treated with enzymes.

Cell C is mixed with sperm cells.

given an electric shock.

(1 mark)

(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)

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

Why?

(1 mark)

Q:4 Most cows produce milk with a fat content of 3.4%.

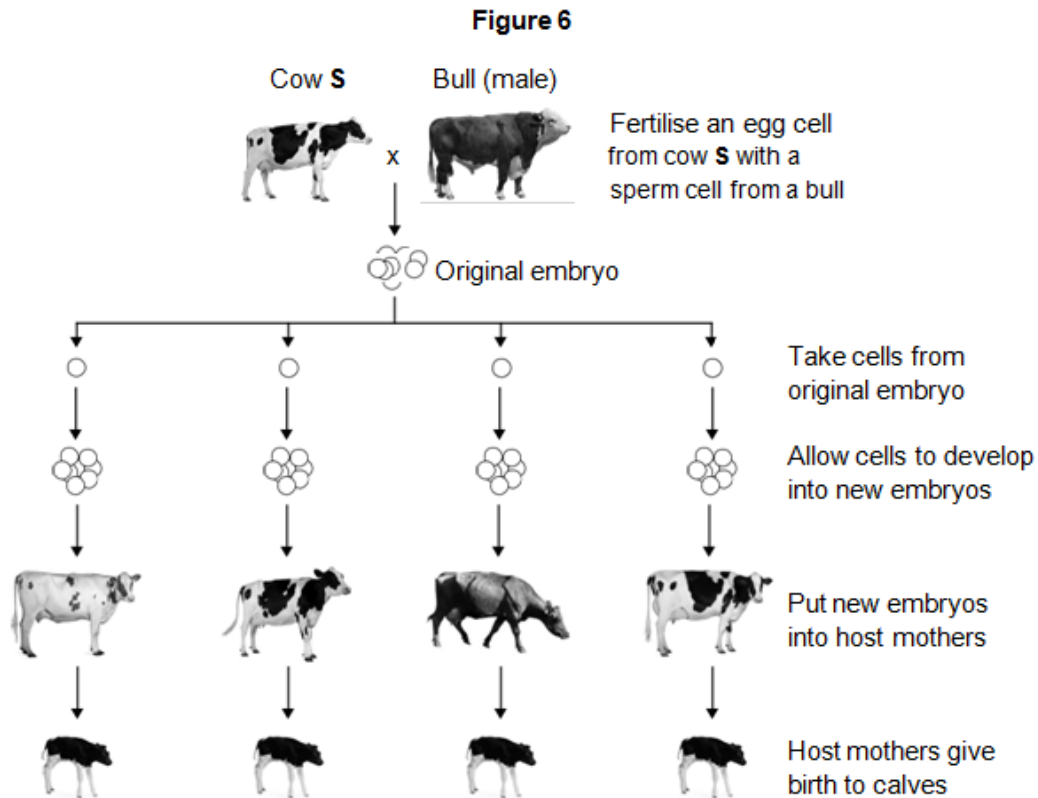
Cow S produces milk with a fat content of 1.2%.

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

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

Figure 6 shows how the farmer plans to do this.

Figure 6



(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]

(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]

(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.

The calves are genetically identical to each other because

are formed from the same original embryo.

they have the same host mother.

have the same two parents.

[1 mark]

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

Tick (☑) one box.

Adult cell cloning

Embryo transplantation

Genetic modification

[1 mark]

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

[1 mark]

Q:5 As embryos develop, some genes in cells are turned off and some genes are turned on. This allows cells to become specialised for particular functions.

Usually, after cells have become specialised, they cannot change again into different types of cells.

(a) What is a gene?

[2 marks]

(b) Scientists have developed a way to change specialised cells back into embryo-like cells by a method called iPS.

Read the information in the box.

Cells made using iPS can be changed into different types of cells.

Scientists plan to take skin cells from an endangered species of monkey called a drill and change these cells into iPS cells. These iPS cells can then be changed into egg cells or sperm cells.

After fertilisation, the embryo can be inserted into the womb of a female of a non-endangered species called a mandrill. The mandrill is closely related to the drill.

Describe similarities and differences between the iPS method and adult cell cloning.

[4 marks]

(c) Suggest one advantage of trying to preserve endangered species such as the drill.

[1 marks]

Q:6 Modern scientists use cloning techniques.

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

Tick (☑) one box.

Joining male and female sex cells

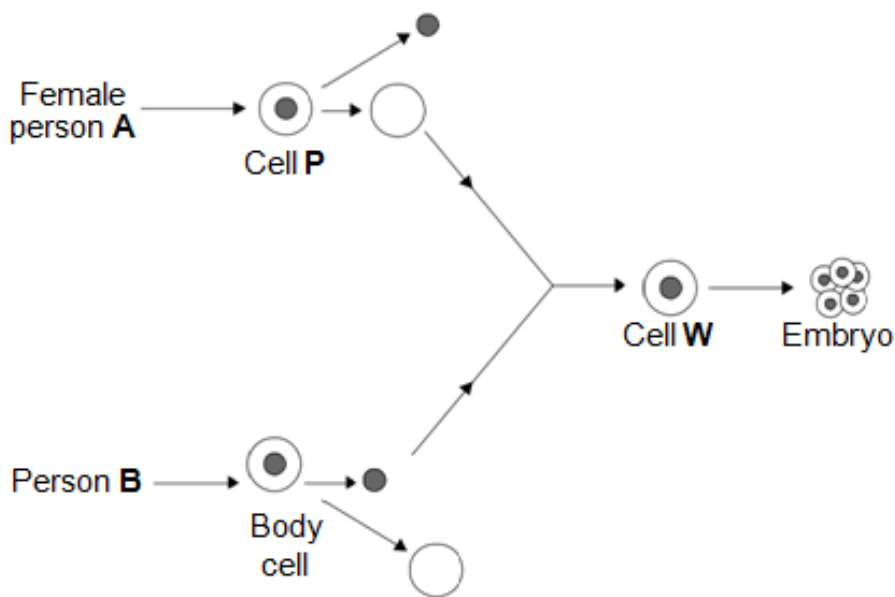
Taking cuttings from plants

Transferring genes from one plant to another plant

[1 mark]

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

Figure 5



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

Tick (☑) one box.

Adult cell cloning

Embryo transplant

Tissue culture

[1 mark]

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

Draw a ring around the correct answer.

an egg cell a skin cell a sperm cell

[1 mark]

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

cell membrane cytoplasm nucleus

The _____ of cell P is removed and is discarded.

[1 mark]

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

an electric shock enzymes hormones

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

[1 mark]

(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]

(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.

1 _____

2 _____

[2 marks]

TOTAL MARKS=