

0 6

This question is about stem cells.

0 6 . 1Give **one** place in a plant where stem cells are found.**[1 mark]**

0 6 . 2What is **one** economic use of plant stem cells?**[1 mark]**Tick **one** box.

To create genetically modified crops

To create new species of plants

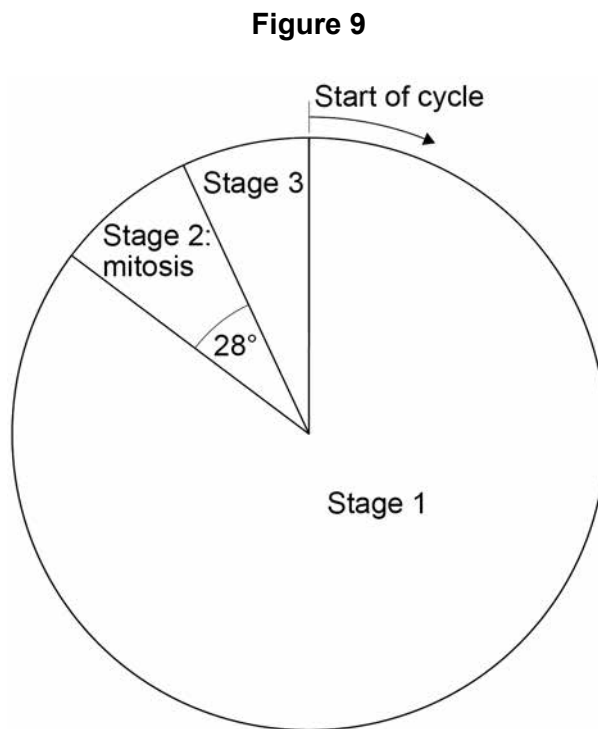
To increase variation in plants

To produce large numbers of identical plants

Question 6 continues on the next page**Turn over ►**

Embryonic stem cells divide by mitosis.

Figure 9 represents a cell cycle for a human embryonic stem cell.



0 6 . 3 The mass of DNA in the cell at the start of the cycle is 6 picograms.

A picogram is 10^{-3} nanograms.

Convert 6 picograms to grams.

Give your answer in standard form.

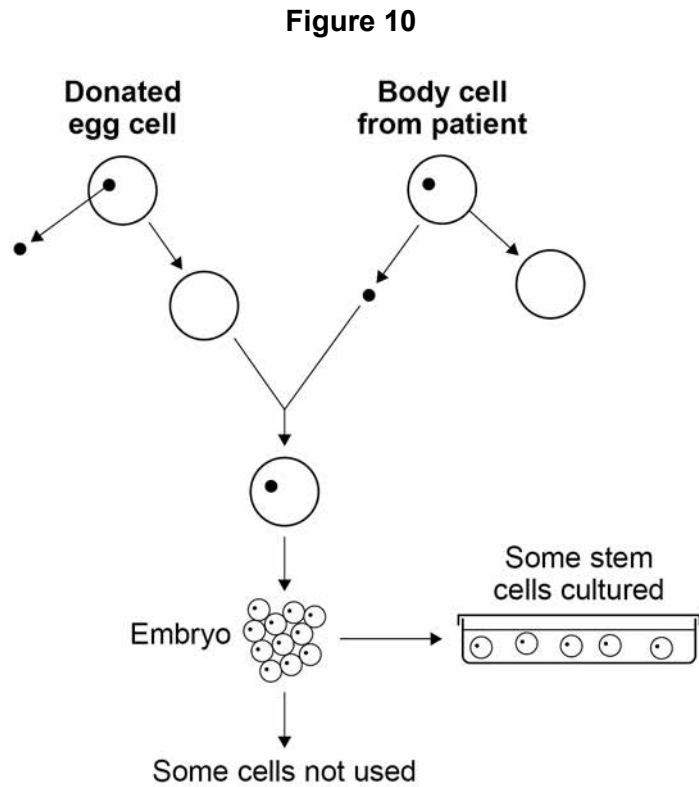
[1 mark]

Mass = _____ g



0 6 . 6

Figure 10 shows how embryonic stem cells are produced in therapeutic cloning for use in patients.



Give **two** advantages and **two** disadvantages of therapeutic cloning in medical treatments.

Use **Figure 10** to help you.

[4 marks]

Advantage 1 _____

Advantage 2 _____

Disadvantage 1 _____

Disadvantage 2 _____

END OF QUESTIONS

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	<p>stage 1 cell growth or increase in number of organelles</p> <p><u>DNA</u> replicates or two copies of each chromosome form</p> <p>stage 2 / mitosis one set of chromosomes moves to each end of cell</p> <p>nucleus divides</p> <p>stage 3 cytoplasm / cell membrane divides to form two (genetically) identical cells</p>	<p>max 4 if correct sequence but no reference to stage numbers</p> <p>max 4 marks if no stage numbers given ignore names of phases</p> <p>marks can be awarded for labelled diagrams</p> <p>allow increase in named organelle eg ribosomes / mitochondria</p> <p>allow DNA duplicates / doubles ignore genetic information replicates if this statement given as part of stage 2 allow max 4 marks</p> <p>allow chromosomes separate or are pulled apart</p> <p>allow nucleus splits into two</p> <p>allow cytokinesis</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>AO1 4.1.2.1 4.1.2.2</p>

<p>06.6</p>	<p>any two from:</p> <p>advantages:</p> <ul style="list-style-type: none"> • may be used to cure / treat (current / future) diseases or cure medical conditions or produce replacement cells / tissues / organs • cells / tissues of any type could be produced • cells unlikely to be rejected by the patient • many cells produced • cells produced could be used for research • would reduce waiting time for organ transplants <p>any two from:</p> <p>disadvantages:</p> <ul style="list-style-type: none"> • potential life is killed / destroyed • shortage of donors / eggs • egg donation / collection has risks • do not yet know risks /side effects of the procedure on the patient • may transfer (viral) infection • poor success rate to produce viable eggs / embryo 	<p>ignore references to cost</p> <p>allow example eg diabetes / paralysis</p> <p>ignore used for medical treatments</p> <p>allow cells differentiate into many types</p> <p>ignore identical cells are produced unqualified</p> <p>ignore references to cost</p> <p>ignore unethical unqualified</p> <p>ignore references to religion / beliefs</p> <p>allow embryo is destroyed</p> <p>ignore cells destroyed or wasted</p> <p>allow may cause tumours / cancer</p>	<p>2</p> <p>2</p>	<p>AO1 AO3 4.1.2.3 4.1.1.4 4.6.2.4</p>
<p>Total</p>			<p>14</p>	