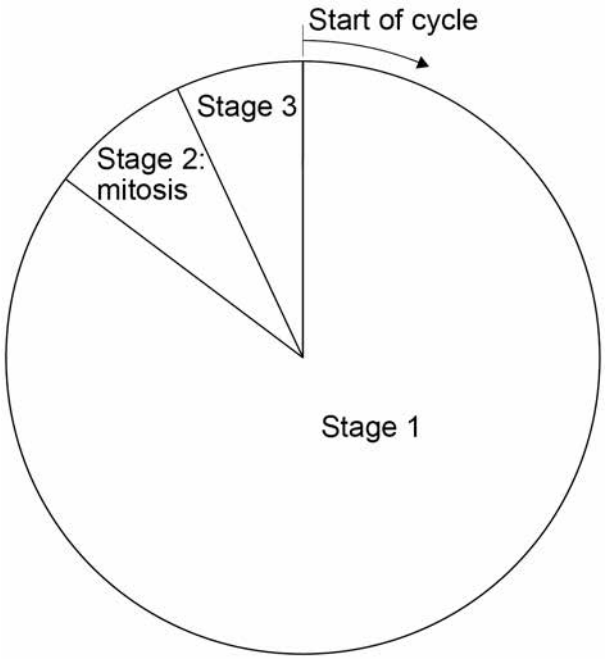
*Do not write outside the box*

**0 5** Cells divide in a series of stages called the cell cycle.

Stage 2 of the cycle is mitosis.

**Figure 10** shows a simplified cell cycle for a human body cell.

**Figure 10**




**0 5 . 1** Draw **one** line from each stage in the cell cycle to what happens during that stage.

**[2 marks]**

| Stage in the cell cycle | What happens during that stage |
|---|---|
| Stage 1 | Nucleus divides |
| Stage 2 | Cell divides into two |
| Stage 3 | Copies of the DNA are made |

*Do not write outside the box*

**0 5 . 2** The mass of DNA in a human body cell at the start of the cell cycle is 6 picograms.

What mass of DNA will be in each of the new cells produced by this cell division?

**[1 mark]**

Tick **one** box.

- 3 picograms ☐
- 6 picograms ☐
- 9 picograms ☐
- 12 picograms ☐

**0 5 . 3** Stem cells are undifferentiated cells.

Which statement about stem cells is correct?

**[1 mark]**

Tick **one** box.

- Animal stem cells are found in meristems ☐
- Animal stem cells divide by meiosis ☐
- Meristem cells in plants can differentiate throughout the life of the plant ☐
- Meristem cells in plants can only differentiate into one type of cell ☐

**Question 5 continues on the next page**

*Do not write outside the box*

Stem cells from human embryos can differentiate into most types of human cell.

Research is being done into the use of embryonic stem cells in medical treatments.

The long-term effects of using embryonic stem cells in patients are not well understood.

In therapeutic cloning, human embryos are produced using a donated human egg cell and a cell from the patient.

- The embryo produced contains the same genetic information as the patient.
- Stem cells are taken from the embryo and stimulated to divide to form cells the patient needs.
- The embryo is then destroyed.

**0 5 . 4** Suggest **two** advantages of therapeutic cloning.

**[2 marks]**

1 _____

_____

2 _____

_____

**0 5 . 5** Suggest **two** disadvantages of therapeutic cloning.

**[2 marks]**

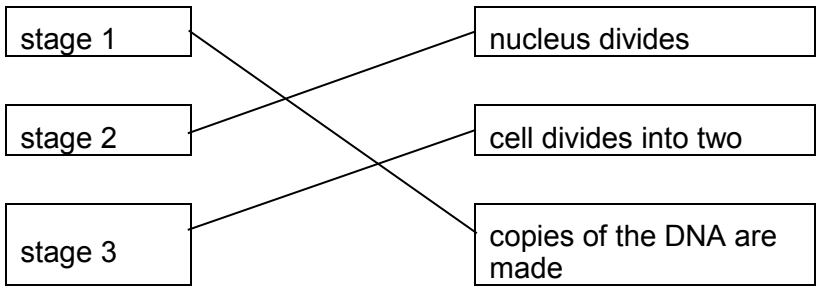
1 _____

_____

2 _____

_____

**8**

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **05.1** |  <br>allow **1** mark for 1 or 2 correct<br><br>credit can be given where students have matched the boxes correctly, for example numbering the boxes | | 2 | AO1<br>4.1.2.2 |
| **05.2** | 6 picograms | | 1 | AO2<br>4.1.2.2 |
| **05.3** | meristem cells in plants can differentiate throughout the life of the plant | | 1 | AO1<br>4.1.2.3 |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **05.4** | any **two** from:<br>• may cure / treat diseases **or** cure medical conditions **or** produce replacement cells / tissues / organs<br>• cells unlikely to be **rejected** by patient<br>• cells / tissues of any type can be produced<br>• many cells produced<br>• cells produced could be used for research<br>• would reduce waiting time for transplants | ignore references to cost<br>ignore all reference to producing babies / IVF<br><br>allow example eg diabetes / paralysis<br>allow cells can be stored for future use<br>ignore used in medical treatments<br>ignore patient makes / grows cells / tissues / organs<br><br>ignore same genetic information<br><br>ignore differentiated into most types of cells | 2 | AO3<br>4.1.2.3<br>4.1.1.4<br>4.6.2.4 |
| **05.5** | any **two** from:<br>• (potential) life is killed / destroyed<br>• shortage of donors / eggs<br>• egg donation / collection has risks<br>• do not yet know risks / side effects of the procedure on the patient<br>• may transfer (viral) infection<br>• poor success rate | ignore references to cost<br>ignore unethical unqualified<br>Ignore reference to religion / beliefs<br><br>allow embryo is killed<br>ignore embryo is destroyed<br>ignore embryo is a life / becomes a baby<br><br>ignore long term effects are not well understood<br>allow may cause tumours / cancer<br><br>allow in terms of viable egg / embryo / cell / tissue / organ production | 2 | AO3<br>4.1.2.3<br>4.1.1.4<br>4.6.2.4 |
| **Total** | | | **8** | |