**Q1.**

Human cells and yeast cells have some parts that are the same.

(a)     The diagram shows a yeast cell.



Parts **A** and **B** are found in human cells and in yeast cells. On the diagram, label parts **A** and **B**.

**(2)**

(b)     Many types of cell can divide to form new cells.

Some cells in human skin can divide to make new skin cells.

Why do human skin cells need to divide?

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(c)     Human stem cells can develop into many different types of human cell.

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

|  |  |  |
| --- | --- | --- |
| **embryos** | **hair** | **nerve cells** |

Human stem cells may come from

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

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

|  |  |  |
| --- | --- | --- |
| **cystic fibrosis** | **paralysis** | **polydactyly** |

Human stem cells can be used to treat

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

**(Total 5 marks)**

**Q2.**

 Cells in the human body are specialised to carry out their particular function.

(a)     The diagram shows a sperm cell.



The sperm cell is adapted for travelling to, then fertilising, an egg.

(i)      How do the mitochondria help the sperm to carry out its function?

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**(1)**

(ii)     The nucleus of the sperm cell is different from the nucleus of body cells.

Give **one** way in which the nucleus is different.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**(1)**

(b)     Stem cells from human embryos are used to treat some diseases in humans.

Explain why.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**(2)**

**(Total 4 marks)**

**Q3.**

The diagram shows how cells from human embryos can be used to grow ‘replacement body parts’ for humans.



(a)     How many chromosomes are in a **fertilised** human egg?

Tick **one** box.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 12 |  | 23 |  | 46 |  | 92 |  |

**(1)**

(b)     What is the process labelled **G**?

Tick **one** box.

|  |  |
| --- | --- |
| Fertilisation |  |
| Inheritance |  |
| Meiosis |  |
| Mitosis |  |

**(1)**

(c)     When the embryo is three days old, it contains eight cells.

How many times has the fertilised egg cell divided by day three?

Tick **one** box.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2 |  | 3 |  | 4 |  | 8 |  |

**(1)**

(d)     Stem cells become specialised in the process labelled **H** in the diagram.

What is the process labelled **H**?

Tick **one** box.

|  |  |
| --- | --- |
| Differentiation |  |
| Evolution |  |
| Genetic modification |  |
| Selective breeding |  |

**(1)**

(e)     Which **two** parts would be found in all the cells in the diagram.

Tick **two** boxes.

|  |  |
| --- | --- |
| Cell membrane |  |
| Cell wall |  |
| Chloroplasts |  |
| Cytoplasm |  |
| Plasmids |  |

**(2)**

(f)      Why might stem cells from human embryos be more useful than stem cells from adults?

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**(1)**

(g)     Some parents have stem cells from the umbilical cord of their baby collected and stored.

These stem cells can be used to treat diseases in the child later in life.

Why might stem cells from their own umbilical cord be used rather than stem cells from another embryo?

Tick **one** box.

|  |  |
| --- | --- |
| Less risk of rejection of umbilical cord stem cells. |  |
| Stem cells from another embryo can treat more diseases. |  |
| Umbilical cord stem cells are older. |  |

**(1)**

(h)     Some medical uses of stem cells are still experimental.

Why do some scientists have concerns about the use of stem cells?

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**(1)**

(i)      Some people object to the use of embryonic stem cells because of religious beliefs.

Give **one** other ethical concern about the use of embryonic stem cells?

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**(1)**

**(Total 10 marks)**