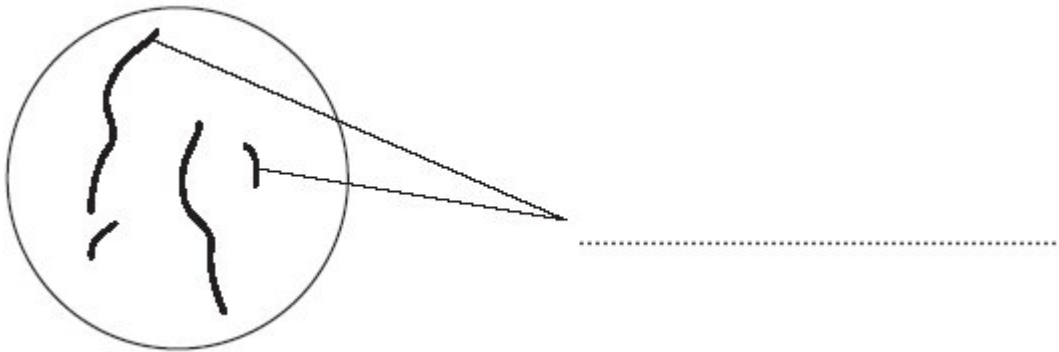


1

**Diagram 1** shows the nucleus of a body cell as it begins to divide by mitosis.

**Diagram 1**



(a) Use a word from the box to label **Diagram 1**.

alleles

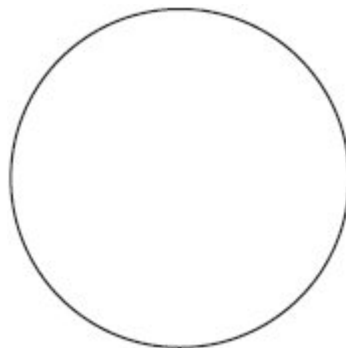
chromosomes

gametes

(1)

(b) Complete **Diagram 2** to show what the nucleus of one of the cells produced by this mitosis would look like.

**Diagram 2**



(1)

(c) Stem cells from a recently dead embryo can be grown in special solutions.

Some facts about stem cells are given below.

- Stem cells from an embryo can grow into any type of tissue.
- Stem cells may grow out of control, to form cancers.
- Large numbers of stem cells can be grown in the laboratory.
- Stem cells may be used in medical research or to treat some human diseases.
- Patients treated with stem cells need to take drugs for the rest of their life to prevent rejection.
- Collecting and growing stem cells is expensive.

Use **only** the information above to answer these questions.

(i) Give **two** advantages of using stem cells.

1 .....

.....

2 .....

.....

**(2)**

(ii) Give **two** disadvantages of using stem cells.

1 .....

.....

2 .....

.....

**(2)**

**(Total 6 marks)**

## Mark schemes

- 1** (a) chromosomes 1
- (b) diagram showing four separate chromosomes two long and two short (as in diagram 1)  
*allow each chromosome shown as two joined chromatids*  
*do **not** allow if chromosomes touching each other* 1
- (c) (i) any **two** from:  
  - can grow into any type of tissue / named tissue
  - used in medical research
  - used to treat human diseases
  - large numbers can be grown2
- (ii) any **two** from:  
  - expensive
  - grow out of control / ref cancers
  - may be rejected
  - need for drugs (for rest of life)2
- [6]**