AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.1.2.2

Mitosis and the cell cycle

Past-paper questions

Tier	**Foundation**
Question groups	**3**
Available paper years	**2018–2022**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.1.2.2 Mitosis and the cell cycle

Question 01

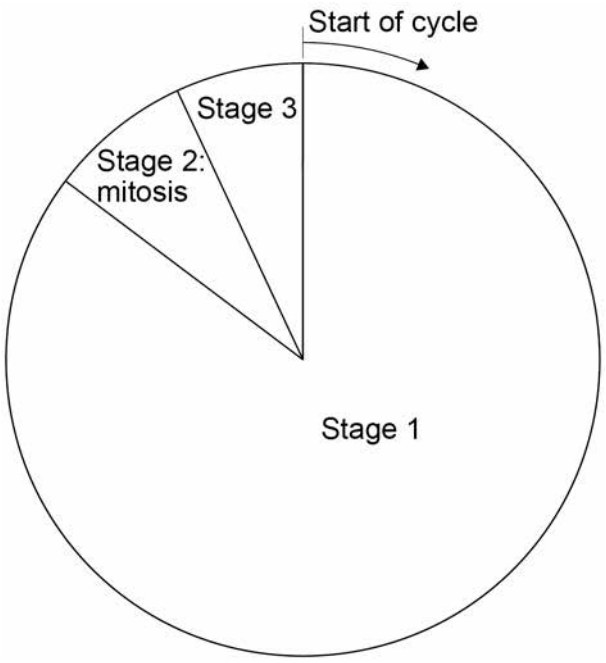
June 2018 | 8464/B/1F | Original Q5

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

4.1.2.2 Mitosis and the cell cycle

Question 01 · continued

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

4.1.2.2 Mitosis and the cell cycle

Question 01 · continued

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

4.1.2.2 Mitosis and the cell cycle

Question 02

June 2018 | 8464/B/2F | Original Q2

0 2 The genetic material in cells is made of DNA.

0 2 . 1 Which **two** of the following describe the structure of DNA?

[2 marks]

Tick **two** boxes.

- A double helix ☐
- A monomer ☐
- A polymer ☐
- A protein ☐
- A single strand ☐

0 2 . 2 Complete the sentences.

Choose answers from the box.

[2 marks]

clone	**disorder**	**gene**
genome		**mutation**

A small section of DNA which codes for one protein is called a _____ .

All the genetic material of an organism is called its _____ .

0 2 . 3 Gametes (sex cells) contain half the amount of DNA compared to body cells.

Give the names of the **two** types of gametes in humans.

[1 mark]

_____ and _____

0 2 . 4 What is the process called when the gametes join?

[1 mark]

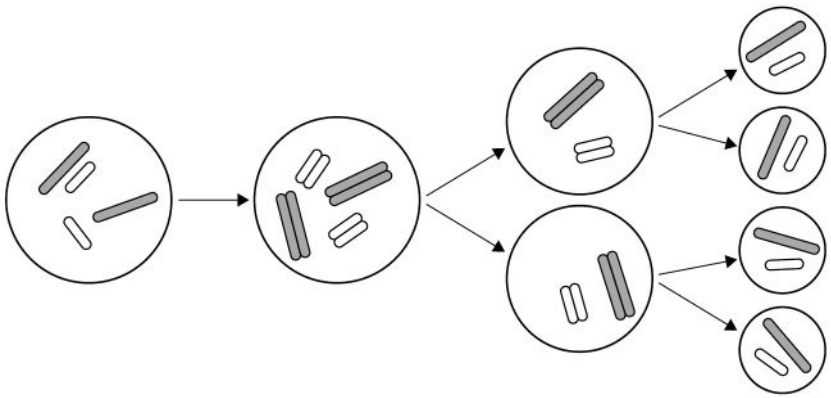
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4.1.2.2 Mitosis and the cell cycle

Question 02 · continued

0 2 . 5 **Figure 1** shows cell division by meiosis to form gametes.

Figure 1



Which **two** features in **Figure 1** show that this cell division is meiosis and **not** mitosis?

[2 marks]

Tick **two** boxes.

- The cell divides twice ☐
- The chromosomes pull apart into the new cells ☐
- The cytoplasm divides into new cells ☐
- The DNA is copied ☐
- The new cells have half the number of chromosomes ☐

8

4.1.2.2 Mitosis and the cell cycle

Question 03

June 2022 | 8464/B/1F | Original Q6

0 6 This question is about cell division.

0 6 . 1 Write the biological structures from the box in the correct order of size.

[1 mark]

cell	**chromosome**	**gene**	**nucleus**

Smallest ↓ Largest

_____

_____

_____

_____

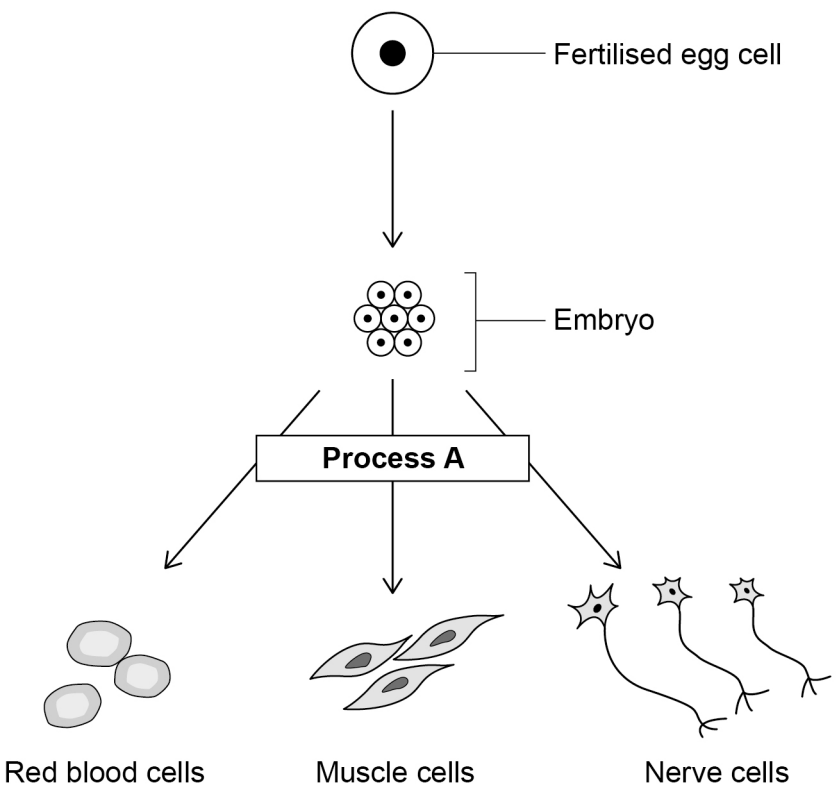
Question 6 continues on the next page

4.1.2.2 Mitosis and the cell cycle

Question 03 · continued

Figure 9 shows how a fertilised egg cell can produce specialised cells.

Figure 9



0 6 . 2 Name **Process A**.

[1 mark]

0 6 . 3 How many cell divisions are needed to form a 16-cell embryo from the original fertilised egg cell?

[1 mark]

Number of cell divisions = _____

4.1.2.2 Mitosis and the cell cycle

Question 03 · continued

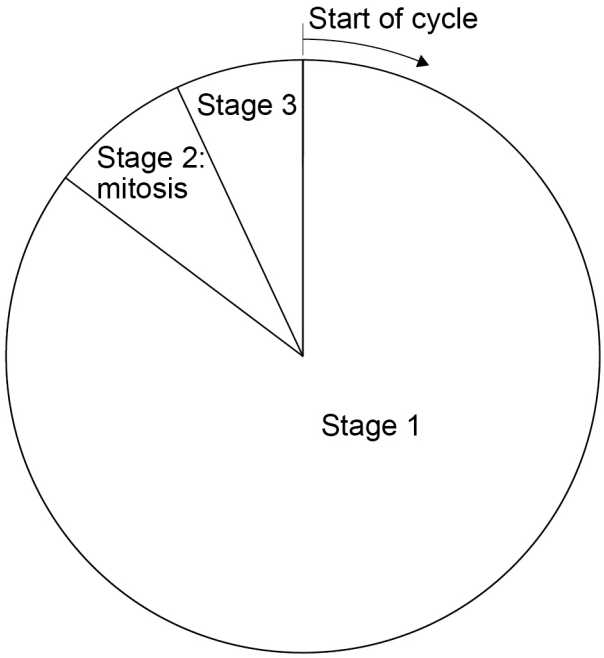
0 6 . 4 In humans a fertilised egg cell contains 23 pairs of chromosomes.

How many chromosomes will there be in each of the embryo cells?

[1 mark]

0 6 . 5 **Figure 10** represents a cell cycle for a human embryonic cell.

Figure 10



Describe **one** change in the cell that occurs during **each** of the stages of the cell cycle.

[3 marks]

Stage 1 _____

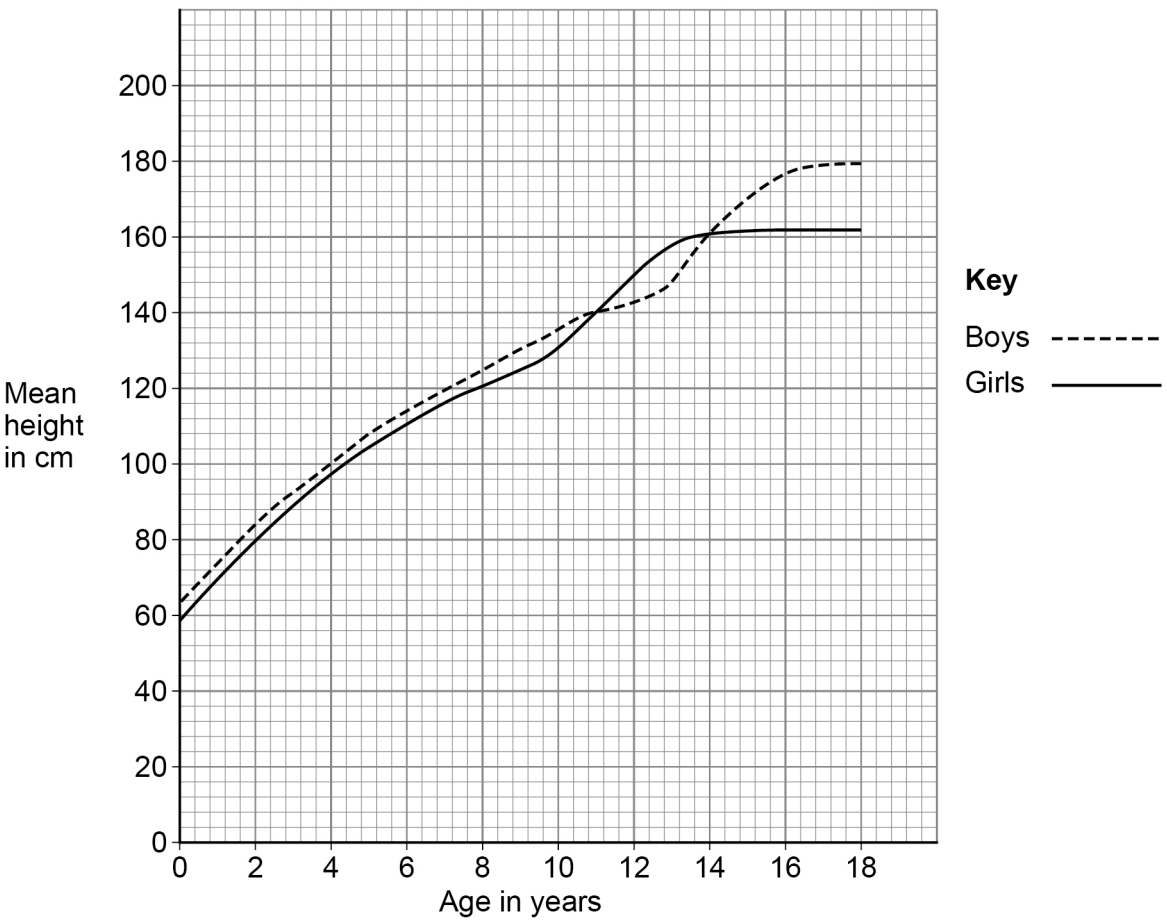
Stage 2 _____

Stage 3 _____

Cell division is important in the growth of multicellular organisms.

0 6 . 6 **Figure 11** shows the mean height of boys and of girls from birth to age 18 years.

Figure 11



4.1.2.2 Mitosis and the cell cycle

Question 03 · continued

Compare the growth of boys with the growth of girls.

Use data from **Figure 11** in your answer.

[6 marks]

0 6 . 7 Give **one** way that cell division by mitosis is important in **fully grown** animals.

[1 mark]

14