AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.1.2.2

Mitosis and the cell cycle

Past-paper questions

Tier	**Higher**
Question groups	**4**
Available paper years	**2018–2024**

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/1H | Original Q6

0 6 This question is about stem cells.

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

[1 mark]

_____

_____

0 6 . 2 What 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

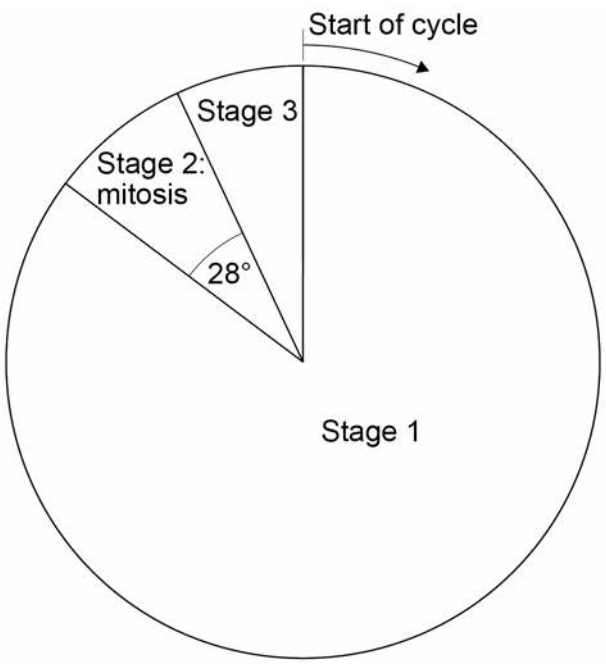
4.1.2.2 Mitosis and the cell cycle

Question 01 · continued

Embryonic stem cells divide by mitosis.

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

Figure 9



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

4.1.2.2 Mitosis and the cell cycle

Question 01 · continued

0 6 . 4 The time taken for this complete cell cycle is 15 hours.

Calculate how many hours the cell spent in mitosis.

Give your answer to 3 significant figures.

[2 marks]

Time spent in mitosis = _____ hours

0 6 . 5 Describe what happens in each of the three stages of the cell cycle.

[5 marks]

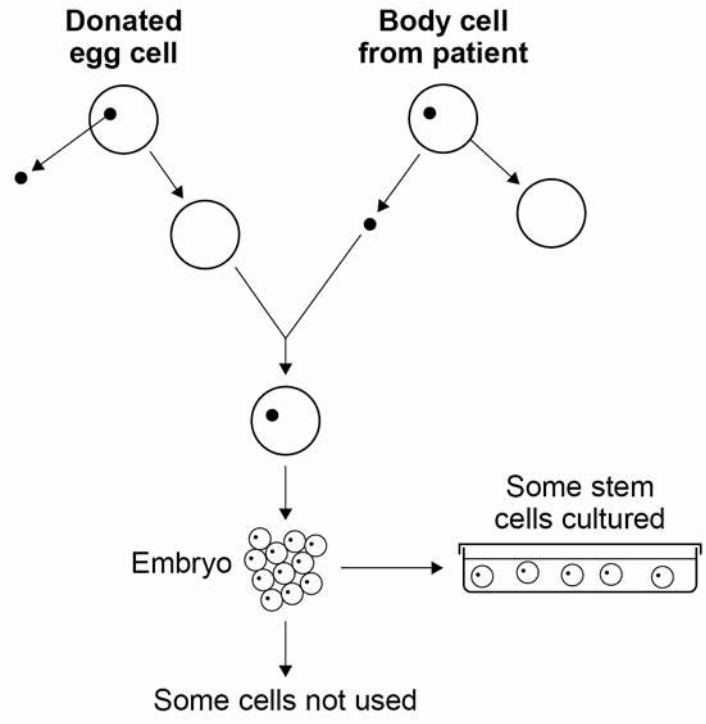
Question 6 continues on the next page

4.1.2.2 Mitosis and the cell cycle

Question 01 · continued

0 6 . 6 **Figure 10** shows how embryonic stem cells are produced in therapeutic cloning for use in patients.

Figure 10



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

_____

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4.1.2.2 Mitosis and the cell cycle

Question 02

June 2022 | 8464/B/1H | Original Q2

0 2 This question is about cell division.

0 2 . 1 Write the biological structures from the box in the correct order of size.

[1 mark]

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

Smallest ↓ Largest

_____

_____

_____

_____

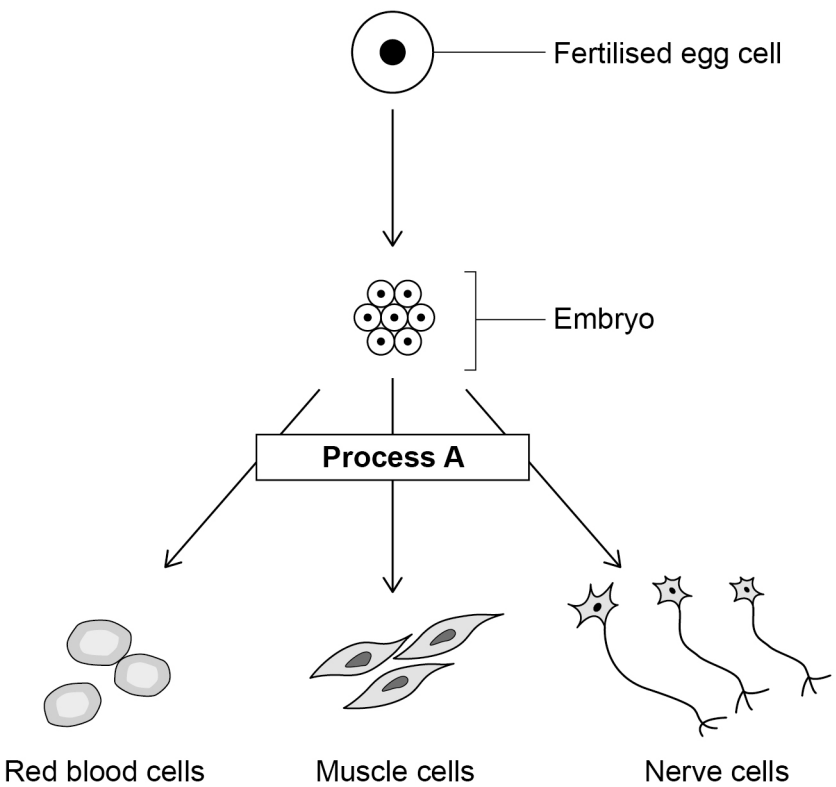
Question 2 continues on the next page

4.1.2.2 Mitosis and the cell cycle

Question 02 · continued

Figure 3 shows how a fertilised egg cell can produce specialised cells.

Figure 3



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

[1 mark]

0 2 . 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 02 · continued

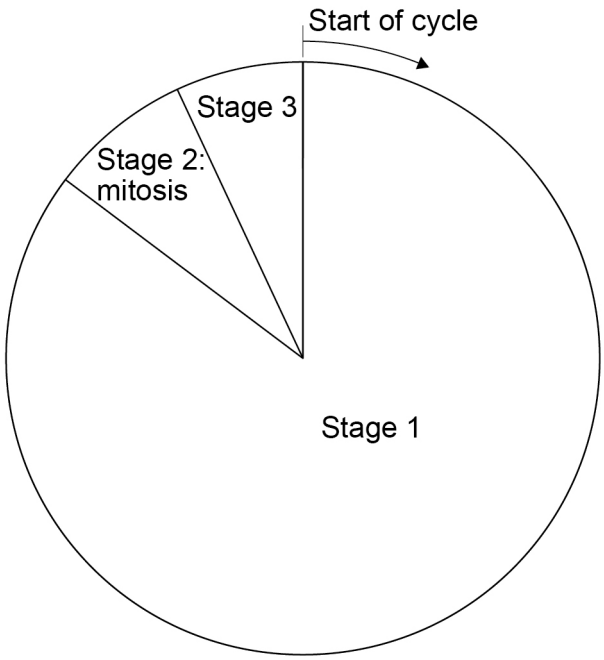
0 2 . 4 In humans a fertilised egg cell contains 23 pairs of chromosomes.

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

[1 mark]

0 2 . 5 **Figure 4** represents a cell cycle for a human embryonic cell.

Figure 4



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 _____

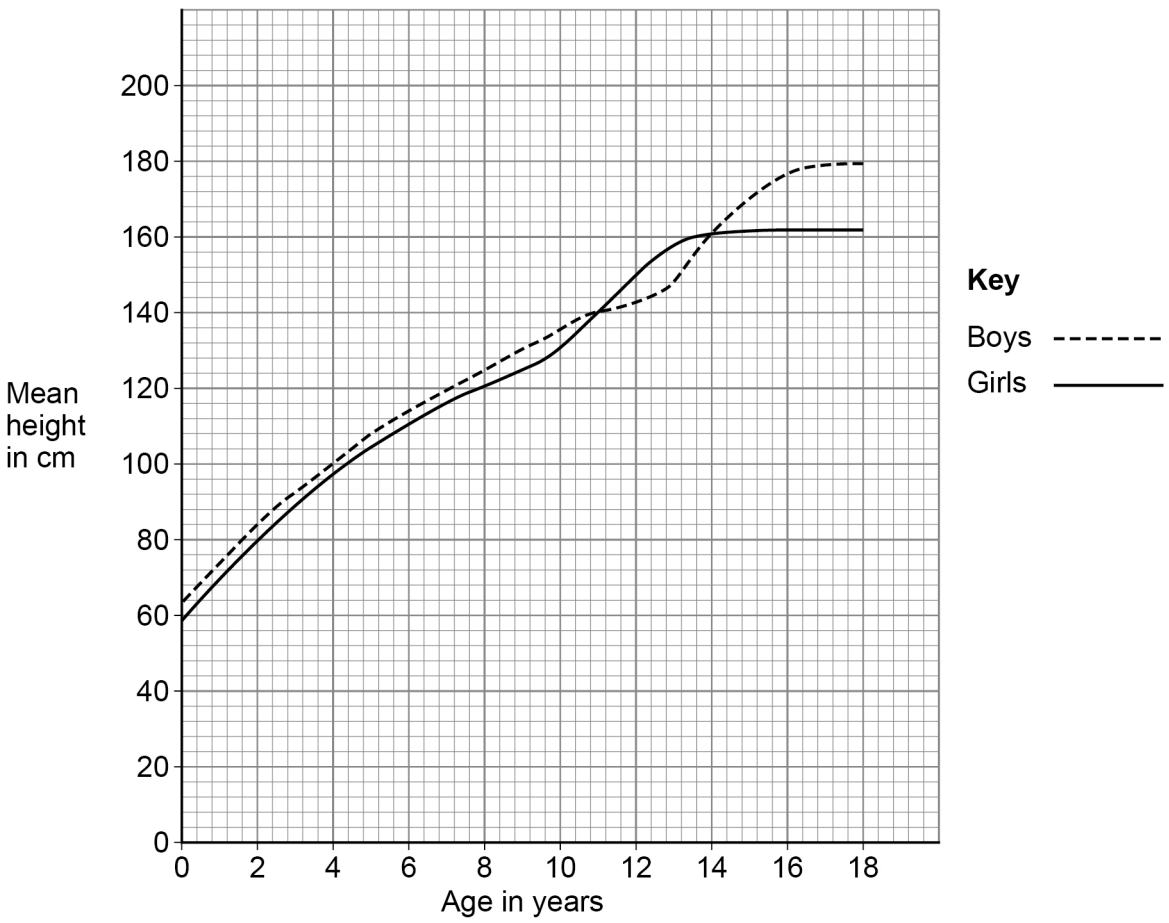
4.1.2.2 Mitosis and the cell cycle

Question 02 · continued

Cell division is important in the growth of multicellular organisms.

0 2 . 6 **Figure 5** shows the mean height of boys and of girls from birth to age 18 years.

Figure 5



4.1.2.2 Mitosis and the cell cycle

Question 02 · continued

Compare the growth of boys with the growth of girls.

Use data from **Figure 5** in your answer.

[6 marks]

0 2 . 7 Give **one** way that cell division by mitosis is important in **fully grown** animals.

[1 mark]

14

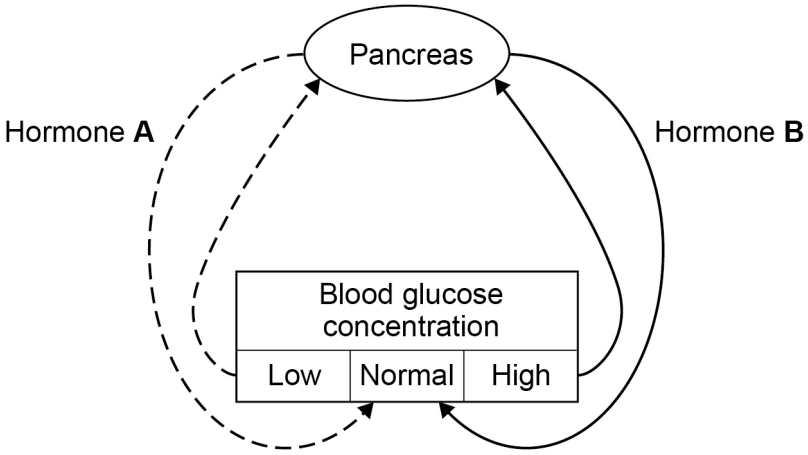
4.1.2.2 Mitosis and the cell cycle

Question 03

0 5 Blood glucose concentration in the human body needs to be kept within the normal range.

Figure 4 shows that two hormones control blood glucose concentration.

Figure 4



0 5 . 1 Name the type of hormonal control shown in **Figure 4**.

[1 mark]

_____

0 5 . 2 Name hormones **A** and **B** in **Figure 4**.

[1 mark]

A _____

B _____

4.1.2.2 Mitosis and the cell cycle

Question 03 · continued

0 5 . 3 Explain how the two hormones in **Figure 4** keep the blood glucose concentration within the normal range for 3 hours after a meal.

[6 marks]

Question 5 continues on the next page

4.1.2.2 Mitosis and the cell cycle

Question 03 · continued

Female reproductive hormones are used to treat infertility in women.

0 5 . 4 Follicle Stimulating Hormone (FSH) and then Luteinising Hormone (LH) can be injected into a woman to help her become pregnant by sexual intercourse.

Explain how injecting FSH and then LH will help a woman to become pregnant.

[3 marks]

0 5 . 5 In some women the injections of FSH and LH are the first steps for In Vitro Fertilisation (IVF).

Describe the remaining steps in IVF.

[4 marks]

4.1.2.2 Mitosis and the cell cycle

Question 03 · continued

0 5 . 6 There are two different processes of cell division in humans.

Describe **three** differences between cell division to form sperm cells compared with cell division to form liver cells.

[3 marks]

1 _____

_____

_____

2 _____

_____

_____

3 _____

_____

_____

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4.1.2.2 Mitosis and the cell cycle

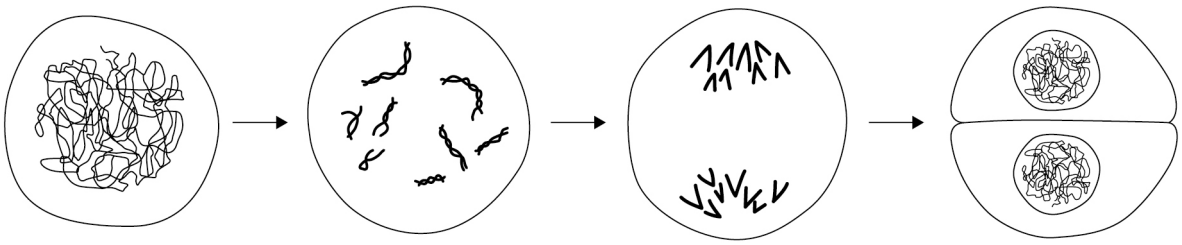
Question 04

June 2024 | 8464/B/1H | Original Q6

0 6 Smoking increases the risk of lung cancer.

0 6 . 1 **Figure 5** shows a lung cell dividing.

Figure 5



Describe the process of the cell cycle shown in **Figure 5**.

[4 marks]

4.1.2.2 Mitosis and the cell cycle

Question 04 · continued

0 6 . 2 Lung cancer is malignant.

Explain what is meant by a malignant tumour.

[3 marks]

Question 6 continues on the next page

4.1.2.2 Mitosis and the cell cycle

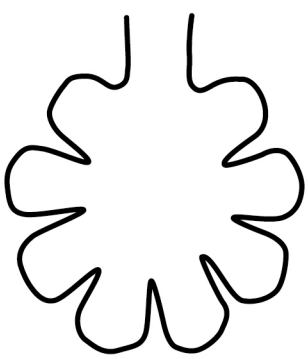
Question 04 · continued

0 6 . 3 Smoking can damage the lungs in different ways.

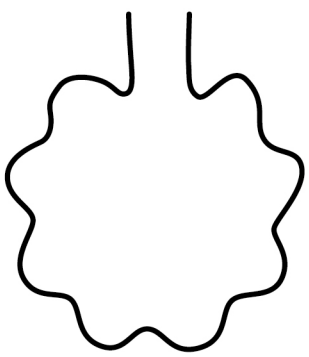
Figure 6 shows alveoli from the lungs of two people.

Figure 6

Person A
Alveolus from a person who does **not** smoke



Person B
Alveolus from a person who does smoke



Person **A** and person **B** do the same exercise.

Explain why person **B** breathes much faster than person **A** during the exercise.

[4 marks]

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