AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.1.1.4

Cell differentiation

Past-paper questions

Tier	**Foundation**
Question groups	**2**
Available paper years	**2018–2025**

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.

4.1.1.4 Cell differentiation

Question 01

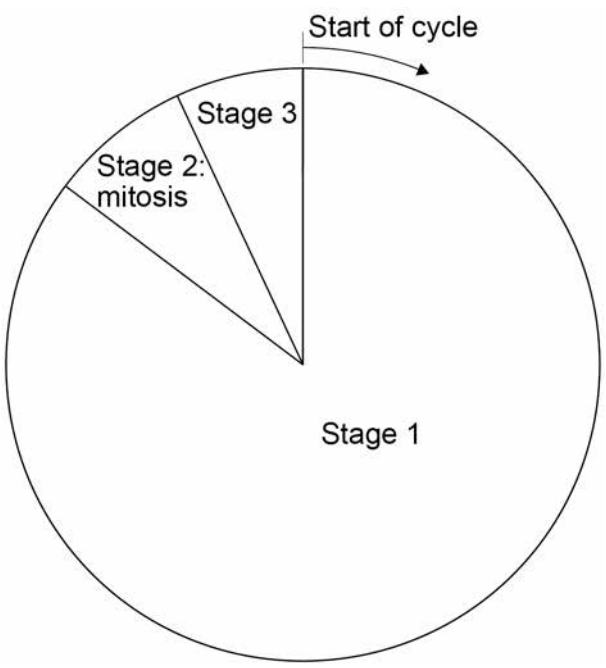
June 2018 | 8464/B/1F | Original Q5

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

4.1.1.4 Cell differentiation

Question 01 · continued June 2018 | 8464/B/1F | Original Q5

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

4.1.1.4 Cell differentiation

Question 01 · continued June 2018 | 8464/B/1F | Original Q5

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 _____

_____

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4.1.1.4 Cell differentiation

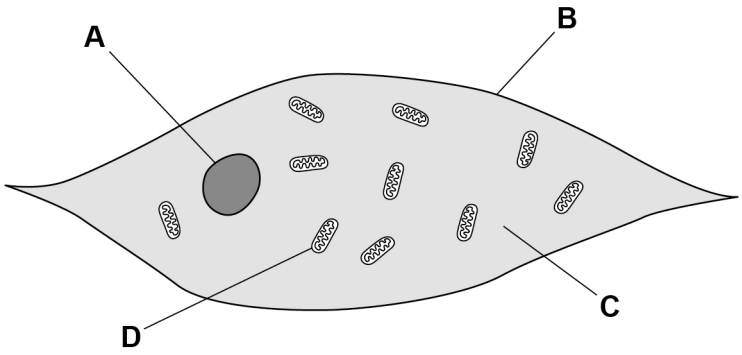
Question 02

June 2025 | 8464/B/1F | Original Q1

0 1 This question is about cells.

Figure 1 shows a muscle cell.

Figure 1



0 1 . 1 The nucleus and cytoplasm are parts of a muscle cell.

Draw **one** line from each part of the muscle cell to the correct label from **Figure 1**.

[2 marks]

Part of the muscle cell	Label from Figure 1
	A
Cytoplasm	B
Nucleus	C
	D

4.1.1.4 Cell differentiation

Question 02 · continued

0 1 . 2 What is the function of the nucleus?

[1 mark]

0 1 . 3 What part of a cell controls the movement of substances into the cell?

[1 mark]

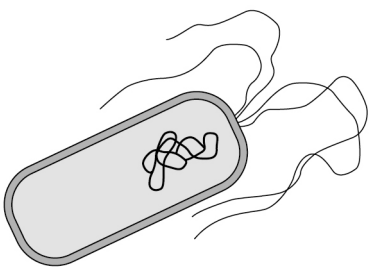
Question 1 continues on the next page

4.1.1.4 Cell differentiation

Question 02 · continued

Figure 2 shows a bacterial cell.

Figure 2



0 1 . 4 What type of cell is the bacterial cell in **Figure 2**?

[1 mark]

Tick (✓) **one** box.

A fungal cell ☐

A prokaryotic cell ☐

A sperm cell ☐

0 1 . 5 Which are **two** features of bacterial cells?

[2 marks]

Tick (✓) **two** boxes.

Bacterial cells are larger than animal cells. ☐

Bacterial cells contain a loop of DNA. ☐

Bacterial cells contain a nucleus. ☐

Bacterial cells contain chloroplasts. ☐

Bacterial cells have a cell wall. ☐

4.1.1.4 Cell differentiation

Question 02 · continued

Stem cells are cells that are **not** specialised.

Stem cells can be collected from human bone marrow.

0 1 . 6 What type of stem cells are found in bone marrow?

[1 mark]

Tick (✓) **one** box.

- Adult stem cells ☐
- Embryonic stem cells ☐
- Meristem cells ☐

0 1 . 7 Which process produces stem cells in humans?

[1 mark]

Tick (✓) **one** box.

- Digestion ☐
- Mitosis ☐
- Respiration ☐

Question 1 continues on the next page

0 1 . 8 Stem cells can be used to produce blood cells.

A blood transfusion is when a patient is given blood cells.

Table 1 compares two different methods of providing blood cells that can be given to a patient.

Table 1

Blood cells produced from stem cells in a laboratory	Blood cells from a blood donation
• A small sample of blood is taken from a person. • All of the new blood cells can function for 120 days. • The stem cells from the blood sample can produce unlimited quantities of blood cells.	• 470 cm^3 of blood is collected from a person. • The cells can function for between 1 and 120 days.

A scientist stated:

'Blood cells produced from stem cells are better to use for a blood transfusion than blood cells from a donation.'

Suggest **two** reasons that support the scientist's statement.

[2 marks]

1 _____

_____

2 _____

_____

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