

Cell Division

Question Paper

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Biology
Exam Board	AQA
Topic	4.1 Cell Biology
Sub-Topic	Cell Division
Difficulty Level	Bronze Level
Booklet	Question Paper

Time Allowed: 52 minutes

Score: /51

Percentage: /100

Grade Boundaries:

Q1. When an organism grows, new cells are produced by cell division.

- (a) What type of cell division happens to produce new body cells?

Tick **one** box.

Differentiation

☐

Meiosis

☐

Mitosis

☐

(1)

- (b) Why can cancers grow very large?

Tick **one** box.

Cancer cells are specialised

☐

Cell division is slow

☐

Cell division is uncontrolled

☐

(1)

- (c) Give **one** factor which increases the risk of getting cancer.

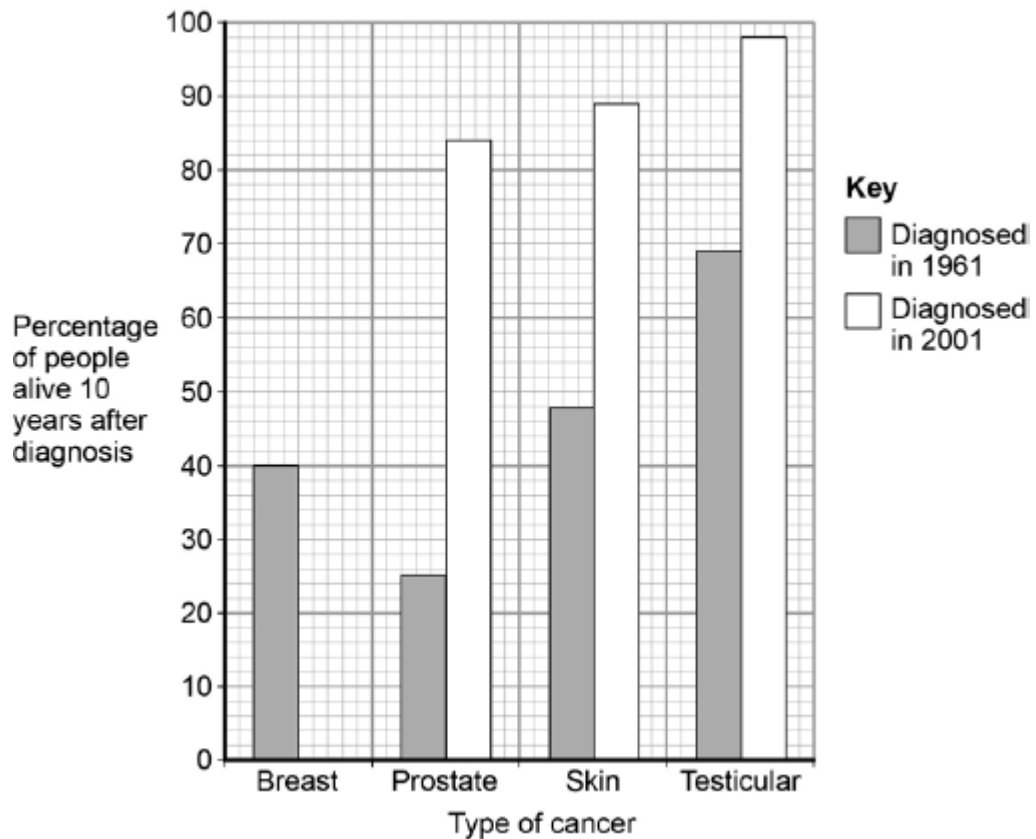
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(1)

- (d) Survival rates for people with cancer have improved a lot.

People who are alive 10 years after diagnosis are usually considered to be cured.

The figure below shows data for people diagnosed with cancer in 1961 and 2001.



78% of people diagnosed with breast cancer in 2001 were alive 10 years later.

Complete the figure above to show this information.

(1)

- (e) Which type of cancer diagnosed in 1961 had the highest survival rate?

Tick **one** box.

Breast

☐

Prostate

☐

Skin

☐

Testicular

☐

(1)

- (f) Which type of cancer shows the biggest improvement in the percentage of people alive after 10 years?

Tick **one** box.

Breast

☐

Prostate

☐

Skin

☐

Testicular

☐

(1)

- (g) Suggest **two** reasons why the survival rates for all cancers have increased.

1

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2

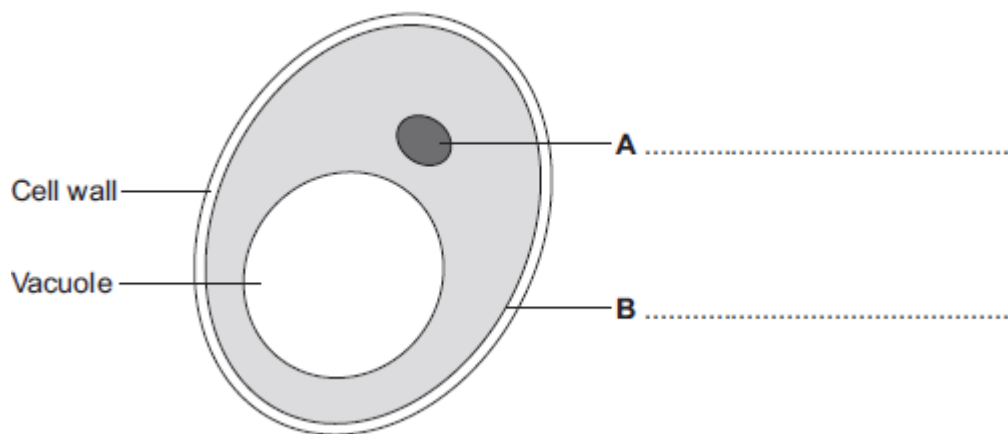
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(2)

(Total 8 marks)

Q2. 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?

.....

.....

(1)

- (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
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Human stem cells may come from

.....

(1)

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

cystic fibrosis	paralysis	polydactyly
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Human stem cells can be used to treat

.....

(1)
(Total 5 marks)

Q3.In sexual reproduction, an egg fuses with a sperm.

- (a) (i) Draw a ring around the correct answer to complete the sentence.

An egg and a sperm fuse together in the process of

cloning.
fertilisation.
mitosis.

(1)

- (ii) Egg cells and sperm cells each contain the structures given in the box.

chromosome	gene	nucleus
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List these three structures in size order, starting with the smallest.

1 (smallest)

2

3 (largest)

(2)

- (iii) The egg and the sperm contain genetic material.

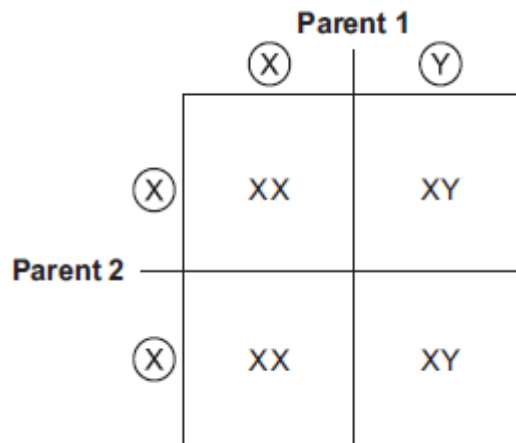
Draw a ring around the correct answer to complete the sentence.

The genetic material is made of

carbohydrate.
DNA.
protein.

(1)

- (b) The diagram below shows the inheritance of **X** and **Y** chromosomes.



- (i) Draw a tick (✓) on the part of the diagram that shows a sperm cell.

(1)

- (ii) What is the chance of having a female child?

Give the reason for your answer.

.....

.....

.....

.....

(2)

(Total 7 marks)

- Q4.(a)** (i) Mitosis and meiosis are types of cell division.

For each feature in the table, tick (✓) **one** box to show if the feature occurs:

- only in mitosis

- only in meiosis.

Feature	Only in mitosis (✓)	Only in meiosis (✓)
Produces new cells during growth and repair		
Produces gametes (sex cells)		
Produces genetically identical cells		

(2)

- (ii) Name the organ that produces gametes (sex cells) in:

a man

a woman.

(2)

- (b) X and Y chromosomes are the sex chromosomes. They determine a person's sex.

What sex chromosomes will be found in the body cells of:

- (i) a man

(1)

- (ii) a woman?

(1)

- (c) A man and a woman decide to have a child.

What is the chance that the child will be a boy?

(1)

(Total 7 marks)

- Q5.** Stem cells can be collected from human embryos and from adult bone marrow. Stem cells can develop into different types of cell.

The table gives information about using these two types of stem cell to treat patients.

Stem cells from human embryos	Stem cells from adult bone marrow
It costs £5000 to collect a few cells.	It costs £1000 to collect many cells.
There are ethical issues in using embryo stem cells.	Adults give permission for their own bone marrow to be collected.
The stem cells can develop into most other types of cell.	The stem cells can develop into only a few types of cell.
Each stem cell divides every 30 minutes.	Each stem cell divides every four hours.
There is a low chance of a patient's immune system rejecting the cells.	There is a high chance of a patient's immune system rejecting the cells.
More research is needed into the use of these stem cells.	Use of these stem cells is considered to be a safe procedure.

Scientists are planning a new way of treating a disease, using stem cells.

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

- (a) Give **three** advantages of using stem cells from embryos instead of from adult bone marrow.

- 1
- 2
- 3

(3)

- (b) Give **three** advantages of using stem cells from adult bone marrow instead of from embryos.

- 1
- 2
- 3

(3)

(Total 6 marks)

Q6. The diagram shows a strawberry plant.

The parent plant grows side shoots.

New plants grow on the side shoots.



Mackean

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The new plants will all have the same inherited characteristics as the original parent plant.

Complete the sentences to explain why.

Use words from the box.

asexual	differentiation	embryos	fertilisation
gametes	genes	mitosis	sexual

(a) The new plant is produced by reproduction.

(1)

(b) In this type of reproduction, body cells divide by

(1)

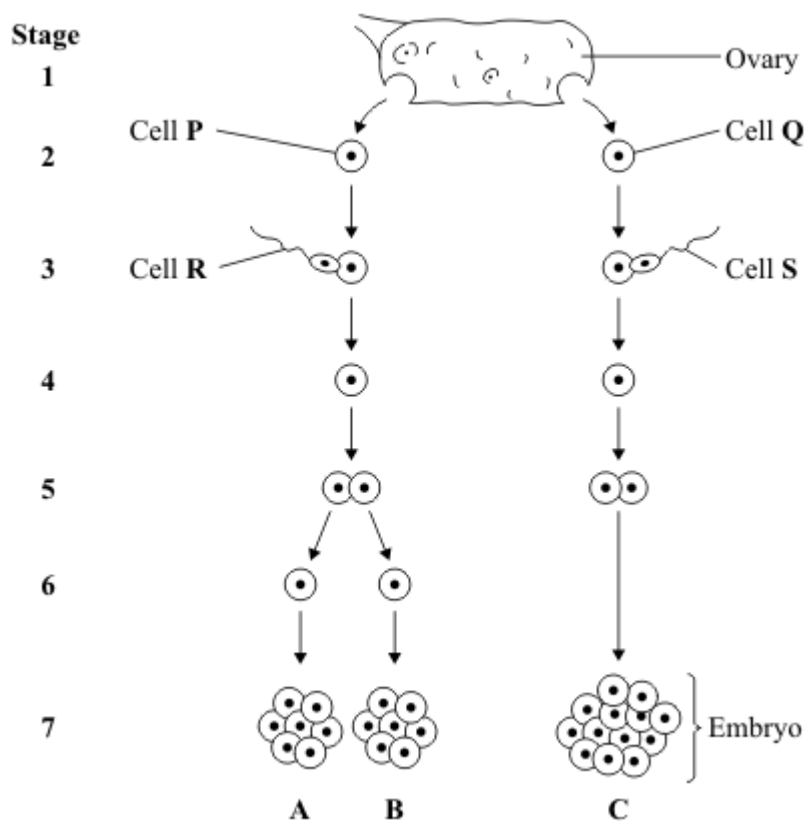
(c) The new plant has the same as the parent plant.

(1)

(Total 3 marks)

- Q7.** A woman gives birth to triplets.
Two of the triplets are boys and the third is a girl.
The triplets developed from two egg cells released from the ovary at the same time.

The diagram shows how triplets **A**, **B** and **C** developed.



- (a) Which stages on the diagram show gametes?

Draw a ring around your answer.

1 and 2

2 and 3

3 and 7

1 and 7

(1)

- (b) Embryo **B** is male.

Which of the following explains why embryo **B** is male?

Tick (✓) **one** box.

Cell **P** has an X chromosome; cell **R** has an X chromosome.

☐

Cell **P** has a Y chromosome; cell **R** has an X chromosome.

☐

Cell **P** has an X chromosome; cell **R** has a Y chromosome.

☐

(1)

- (c) The children that develop from embryos **A** and **C** will **not** be identical.

Explain why.

You may use words from the box in your answer.

egg	genes	sperm
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.....

.....

.....

.....

.....

(2)

- (d) Single cells from an embryo at **Stage 7** can be separated and grown in a special solution.

- (i) What term describes cells that are grown in this way?

Draw a ring around your answer.

lleles

screened cells

stem cells

(1)

- (ii) What happens when the cells are placed in the special solution?

Tick (✓) **two** boxes.

The cells divide ☐

The cells fertilise ☐

The cells differentiate ☐

The cells separate ☐

(2)

- (iii) Give **one** use of cells grown in this way.

.....
.....

(1)

- (iv) Some people might object to using cells from embryos in this way.

Give **one** reason why.

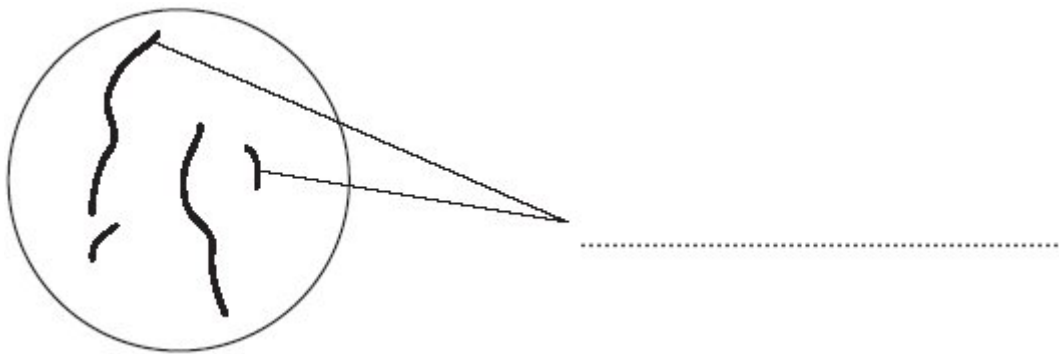
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(1)

(Total 9 marks)

Q8. **Diagram 1** shows the nucleus of a body cell as it begins to divide by mitosis.

Diagram 1



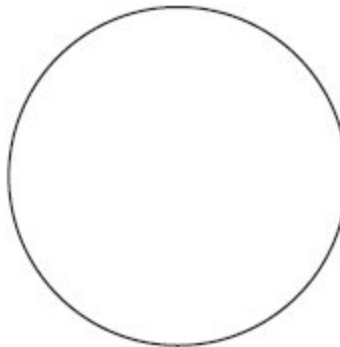
- (a) Use a word from the box to label **Diagram 1**.

alleles	chromosomes	gametes
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(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)