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Level: IGCSE Oxford AQA Biology (9201)
Subject: Biology
Topic: IGCSE AQA Biology
Type: Topic Question

To be used by all students preparing for IGCSE Oxford AQA Biology (9201)
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Biology **IGCSE AQA**

Key skills

1. This question is about the cell cycle.

(a) Chromosomes are copied during the cell cycle.

Where are chromosomes found?

Tick **one** box.

- Cytoplasm ☐
- Nucleus ☐
- Ribosomes ☐
- Vacuole ☐

(1)

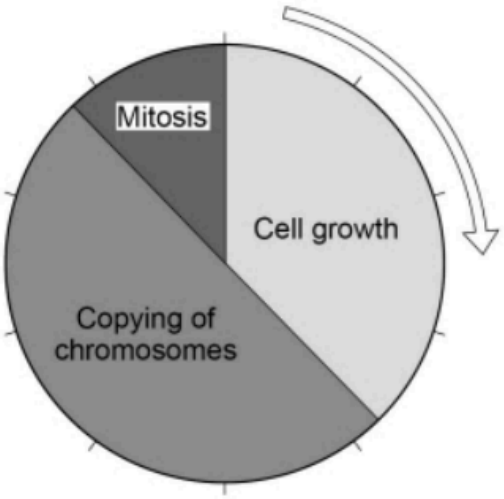
(b) What is the name of a section of a chromosome that controls a characteristic?

_____

(1)

Figure 1 shows information about the cell cycle.

Figure 1



(c) Which stage of the cell cycle in **Figure 1** takes the most time?

Tick **one** box.

Cell growth ☐

Copying of chromosomes ☐

Mitosis ☐

(1)

(d) During mitosis cells need extra energy.

Which cell structures provide most of this energy?

Tick **one** box.

Chromosomes ☐

Cytoplasm ☐

Mitochondria ☐

Ribosomes ☐

(1)

(e) The cell cycle in **Figure 1** takes two hours in total.

The cell growth stage takes 45 minutes.

Calculate the time taken for mitosis.

_____

_____

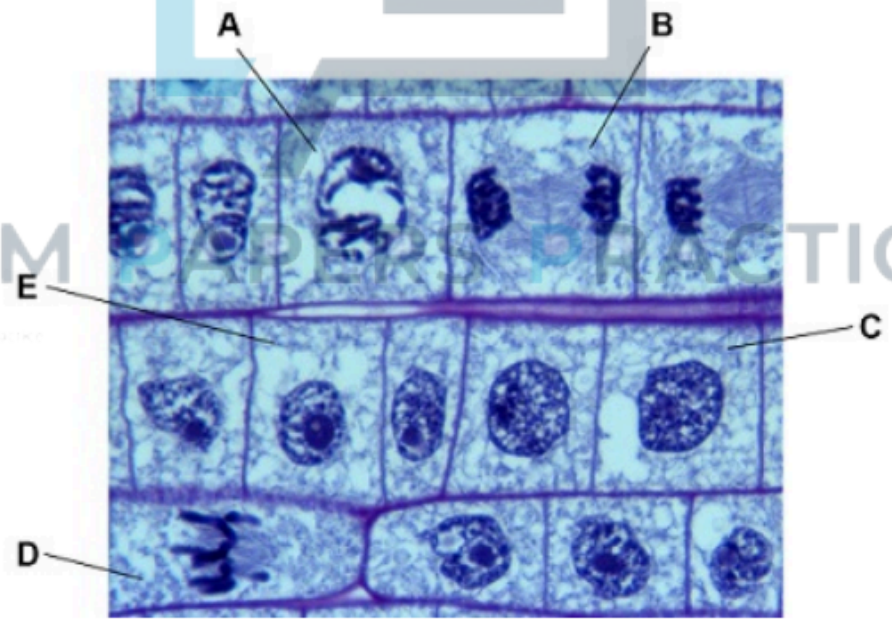
_____

_____

Time = _____ minutes

(2)

Figure 2 shows some cells in different stages of the cell cycle.



(f) Which cell is **not** dividing by mitosis

Tick **one** box.

A		B		C		D	

(1)

(g) Cell **E** in **Figure 2** contains 8 chromosomes.

Cell **E** divides by mitosis.

How many chromosomes will each new cell contain?

Tick **one** box.

2 ☐

4 ☐

8 ☐

16 ☐

(1)

(h) Why is mitosis important in living organisms?

Tick **one** box.

To produce gametes ☐

To produce variation ☐

To release energy ☐

To repair tissues ☐

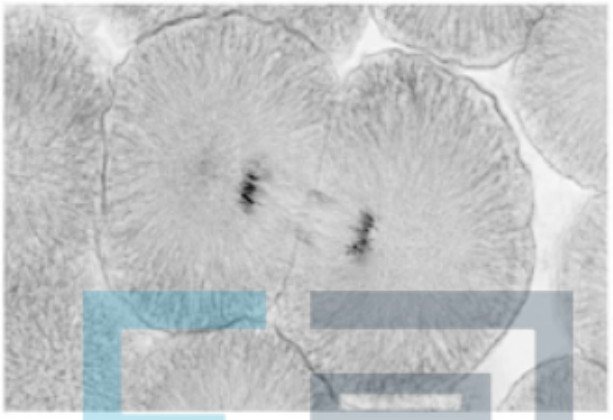
(1)

(Total 9 marks)

2. **Figure 1** shows photographs of some animal cells at different stages during the cell cycle.

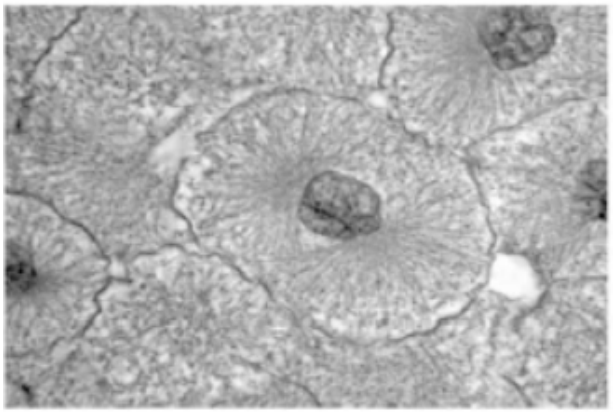
Figure 1

A



B

C



A © Ed Reschke/Photolibrary/Getty Images
B © Ed Reschke/Oxford Scientific/Getty Images
C © Ed Reschke/Photolibrary/Getty Images

(a) Which photograph in **Figure 1** shows a cell that is **not** going through mitosis?

Tick **one** box.

A ☐ **B** ☐ **C** ☐

(1)

(b) Describe what is happening in photograph **A.**

_____

_____

_____

_____

(2)

(c) A student wanted to find out more about the cell cycle.

The student made a slide of an onion root tip.

She counted the number of cells in each stage of the cell cycle in one field of view.

The table below shows the results.

		Stages in the cell cycle				
	Non-dividing cells	**Stage 1**	**Stage 2**	**Stage 3**	**Stage 4**	**Total**
Number of cells	20	9	4	2	1	36

Each stage of the cell cycle takes a different amount of time.

Which stage is the fastest in the cell cycle?

Give a reason for your answer.

Stage _____

Reason _____

_____

(2)

(d) The cell cycle in an onion root tip cell takes 16 hours.

Calculate the length of time **Stage 2** lasts in a typical cell.

Give your answer to 2 significant figures.

_____

_____

_____

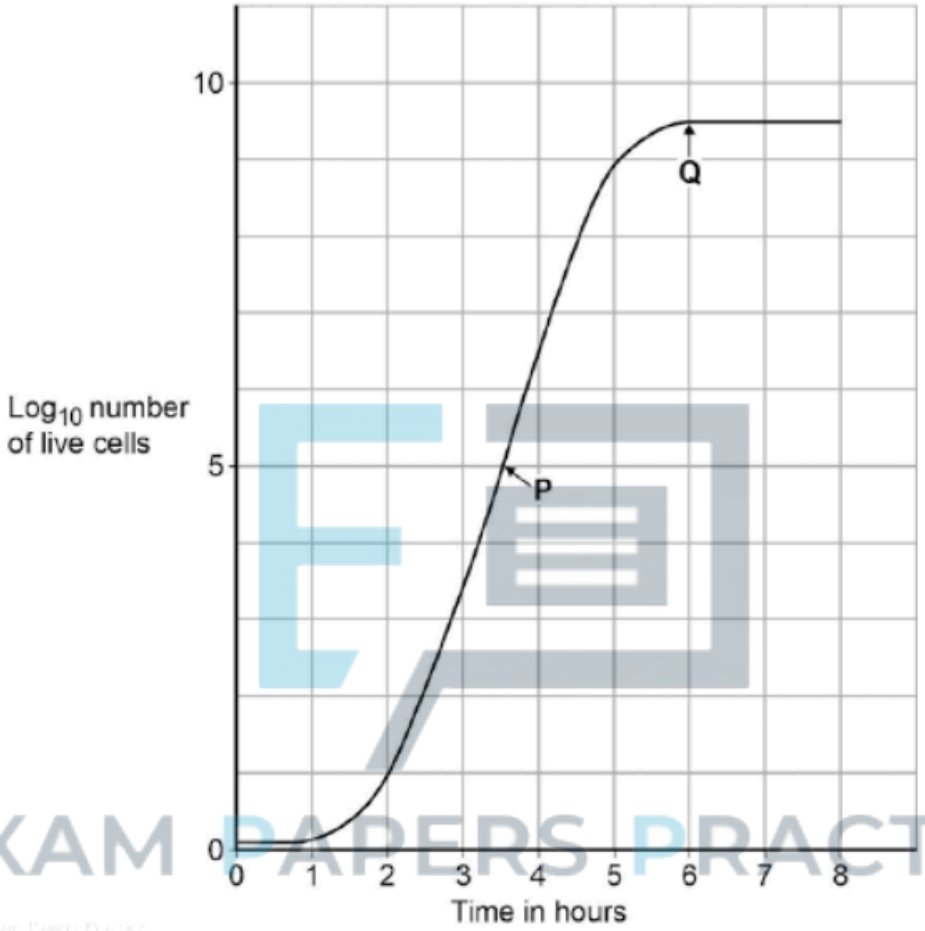
_____

Time in **Stage 2** = _____ minutes

(3)

(e) Bacteria such as *Escherichia coli* undergo cell division similar to mitosis.

Figure 2



What type of cell division causes the change in number of *E. coli* cells at **P**?

_____

(1)

(f) Suggest why the number of cells levels out at **Q.**

_____

_____

_____

_____

_____

(2)

(Total 11 marks)

3. 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)

4. (a) How many pairs of chromosomes are there in a body cell of a human baby?

_____

(1)

(b) Place the following in order of size, **starting with the smallest,** by writing numbers **1 – 4** in the boxes underneath the words.

chromosome	nucleus	gene	cell
☐	☐	☐	☐

(1)

(c) For a baby to grow, its cells must develop in a number of ways.

Explain how each of the following is part of the growth process of a baby.

(i) Cell enlargement

_____

(1)

(ii) The process of cell division by mitosis

_____

_____

_____

_____

_____

(3)

(d) Why is cell specialisation (differentiation) important for the development and growth of a healthy baby from a fertilised egg?

_____

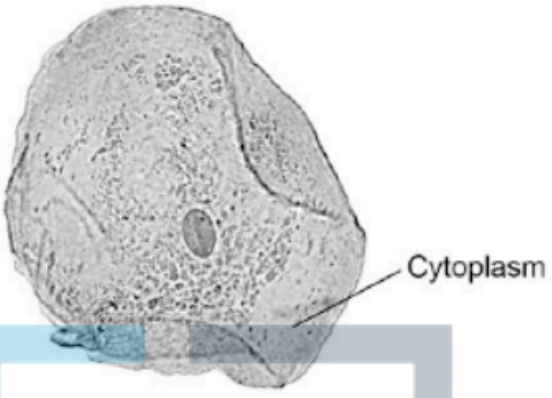
_____

(2)

(Total 8 marks)

5. **Figure 1** shows a human cheek cell viewed under a light microscope.

Figure 1



(a) Label the nucleus **and** cell membrane on **Figure 1**.

(2)

(b) Cheek cells are a type of body cell.

Body cells grow through cell division.

What is the name of this type of cell division?

Tick **one** box.

Differentiation ☐

Mitosis ☐

Specialisation ☐

(1)

(c) Ribosomes and mitochondria are **not** shown in **Figure 1**.

What type of microscope is needed to see ribosomes and mitochondria?

_____

(1)

(d) What is the advantage of using the type of microscope you named in part **(c)**?

Tick **one** box.

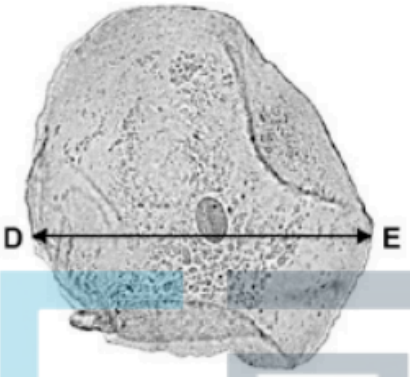
- ☐ Cheaper
- ☐ Higher magnification
- ☐ Lower resolution

(1)

(e) The cheek cell in **Figure 2** is magnified 250 times.

The width of the cell is shown by the line **D** to **E**.

Figure 2



Calculate the width of the cheek cell in micrometres (µm).

Complete the following steps.

Measure the width of the cell using a ruler _____ mm

Use the equation to work out the real width of the cell in mm:

$$\text{real size} = \frac{\text{image size}}{\text{magnification}}$$

_____ mm

Convert mm to µm _____ µm

(3)

(f) A red blood cell is 8 μm in diameter.

A bacterial cell is 40 times smaller.

Calculate the diameter of the bacterial cell.

Tick **one** box.

- 0.02 μm ☐
- 0.2 μm ☐
- 2.0 μm ☐
- 20.0 μm ☐

(1)

(Total 9 marks)