Questions are for both separate science and combined science students

Q1.

Cancer occurs when there is uncontrolled cell division.

(a) Which **two** factors can cause cancer?

Tick (✓) **two** boxes.

Antibiotics	☐
Ionising radiation	☐
Monoclonal antibodies	☐
Salmonella	☐
Viruses	☐

(2)

(b) What type of cell division occurs in cancerous cells?

Tick (✓) **one** box.

Binary fission	☐
Fertilisation	☐
Mitosis	☐

(1)

(c) Complete the sentences.

Choose answers from the box.

decrease	**fertilise**	**grow**	**replicate**

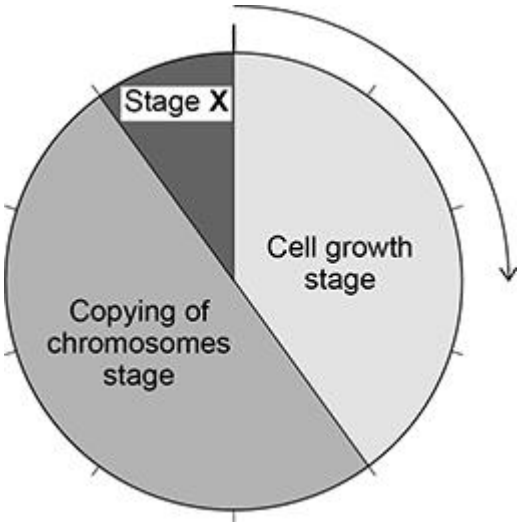
Before a cell divides, the cell needs to _____.

Before a cell divides, the DNA in the nucleus needs to _____.

(2)

Figure 1 shows the cell cycle.

Figure 1



(d) What percentage of the time taken for the cell cycle does the cell growth stage take?

Use **Figure 1**.

Tick (✓) **one** box.

10% ☐ 20% ☐ 40% ☐ 90% ☐

(1)

(e) What happens during stage **X** of the cell cycle in **Figure 1**?

Tick (✓) **one** box.

Chromosomes are pulled to each end of the cell. ☐

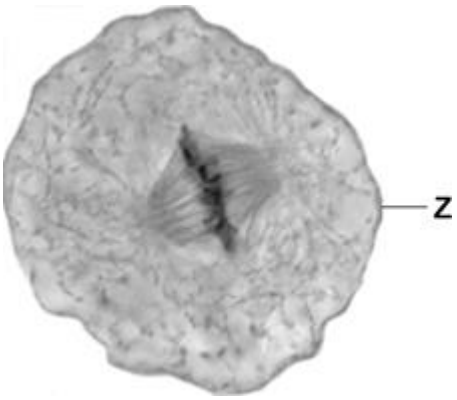
The cell increases in size and mass. ☐

The number of mitochondria increases. ☐

(1)

Figure 2 shows an animal cell during cell division.

Figure 2



(f) Name structure **Z** in **Figure 2**.

_____

(1)

(g) The image of the cell in **Figure 2**:

- is magnified 800 times
- has a width of 50 mm.

Calculate the real width of the cell in **Figure 2**.

Give your answer in micrometres (μm).

Use the equation:

$$\text{real width of cell} = \frac{\text{width of image of cell}}{\text{magnification}}$$

1 mm = 1000 μm

_____

_____

_____

_____

_____

Real width of cell = _____ μm

(3)

Some drugs can treat cancer.

(h) Complete the sentences.

Choose answers from the box.

cells	people	plants	viruses

Preclinical testing of cancer drugs is done using _____.

To check if the drug is safe, the drug is tested on _____.

(2)

(i) In drug trials some patients are given a tablet which does **not** contain the drug.

What name is given to the tablet that does **not** contain the drug?

_____

(1)

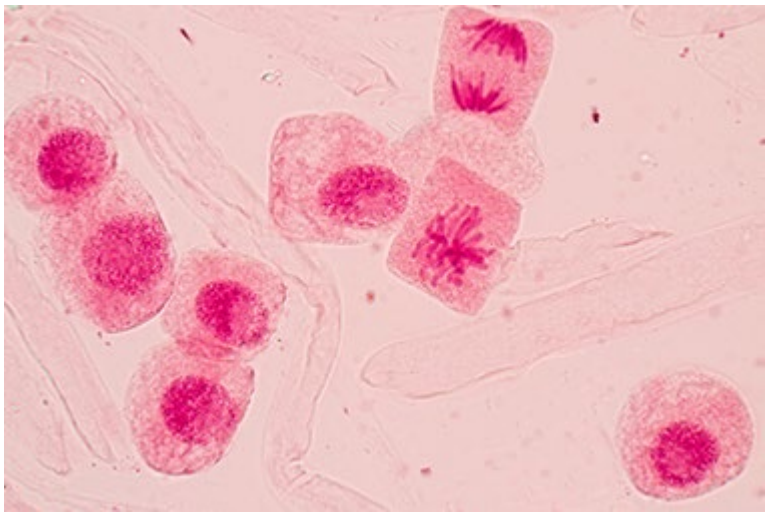
(Total 14 marks)

Q2.

Figure 1 shows animal cells.

Some of the cells are dividing by mitosis for growth and repair.

Figure 1



(a) What fraction of the cells in **Figure 1** is dividing by mitosis?

Tick (✓) **one** box.

$\frac{1}{8}$ ☐ $\frac{1}{4}$ ☐ $\frac{1}{2}$ ☐ $\frac{3}{4}$ ☐

(1)

(b) The cells which are **not** dividing in **Figure 1** each contain 10 chromosomes.

One of these cells divides by mitosis to produce two new cells.

How many chromosomes will each new cell contain after mitosis?

Tick (✓) **one** box.

5 ☐ 10 ☐ 15 ☐ 20 ☐

(1)

(c) Cells divide in a series of stages called the cell cycle.

Complete the sentences.

Choose answers from the box.

contracts	**divides**	**grows**
reacts	**relaxes**	**replicates**

Before mitosis occurs, the cell _____.

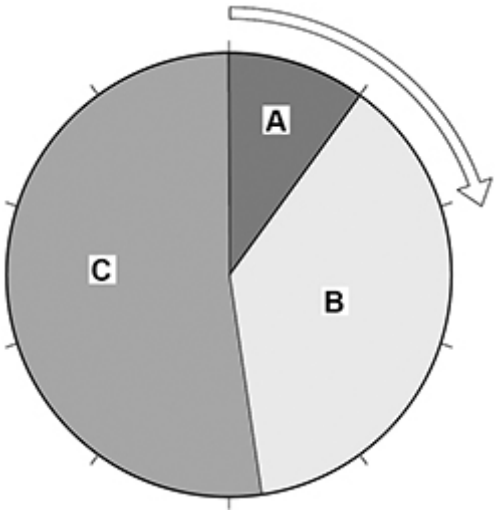
The genetic material in the cell doubles when the DNA _____.

After the chromosomes have been pulled to each end of the cell, the cytoplasm _____.

(3)

Figure 2 shows the time taken to complete different stages of the cell cycle.

Figure 2



(d) Which stage of the cell cycle takes the most time?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐

(1)

(e) What percentage of time in the cell cycle is stage **A**?

Tick (✓) **one** box.

5% ☐ 10% ☐ 15% ☐ 25% ☐

(1)

Stem cells divide by mitosis.

Scientists can use stem cells from an embryo to create heart cells in a laboratory.

(f) Which organ system contains heart cells?

Tick (✓) **one** box.

Circulatory system ☐

Digestive system ☐

Nervous system ☐

Respiratory system ☐

(1)

(g) Name **one** medical condition that could be treated using heart cells created from an embryo.

_____

(1)

(h) Give **one** reason why a patient may **not** want to be treated with heart cells created from an embryo.

_____

_____

(1)

(Total 10 marks)