Questions are for both separate science and combined science students

Q1.

Cake and bread each contain the same two types of carbohydrate.

(a) Describe the chemical tests that could be used to show the presence of the two types of carbohydrate in cake.

Include a risk assessment in your answer.

(6)

A student investigated three types of bread.

For each type of bread, the student:

- put a square piece of bread into their mouth
- did **not** chew the bread
- recorded the time taken for the bread to taste sweet.

The table below shows the results.

Type of bread	Time taken for bread to taste sweet in seconds
Brown	43
White	35
Wholemeal	57

(b) What was the dependent variable in the investigation?

_____

_____

(1)

(c) Give **one** control variable the student should have used in the investigation.

_____

_____

(1)

(d) During the investigation, the bread began to taste sweet in the student's mouth.

Explain why the bread tasted sweet.

_____

_____

_____

_____

_____

_____

(3)

(e) Suggest **one** reason why the results of the investigation were **not** valid.

Do **not** refer to control variables in your answer.

_____

_____

(1)

(Total 12 marks)

Q2.

Cancer is caused by changes in cells that result in uncontrolled cell division.

(a) Before a cell begins to divide, its DNA replicates to form two copies of each chromosome.

Describe **one other** change that occurs in a cell **before** the cell begins to divide.

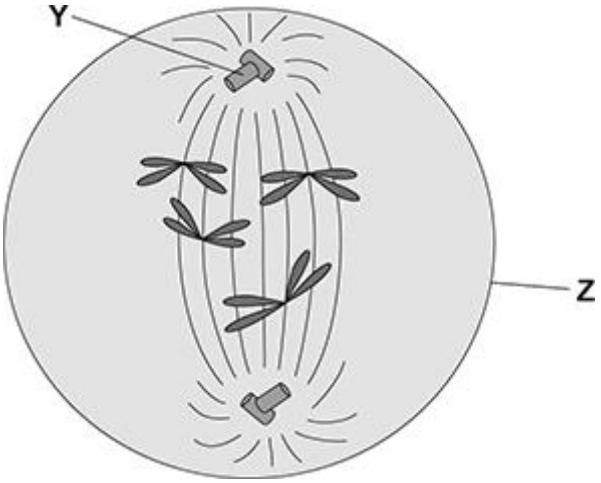
_____

_____

(1)

Figure 1 shows a cell during one of the stages of cell division.

Figure 1



(b) Name structure **Z** in **Figure 1**.

_____

(1)

(c) Structure **Y** in **Figure 1** is a cylinder.

For structure **Y**:

- real volume = 24 500 000 nm^3
- real radius = 125 nm.

The length of a cylinder is calculated using the equation:

$$\text{length} = \frac{\text{volume}}{\pi \times \text{radius}^2}$$

The length of the image of structure **Y** in **Figure 1** is 4 mm.

Calculate the magnification of structure **Y** in **Figure 1**.

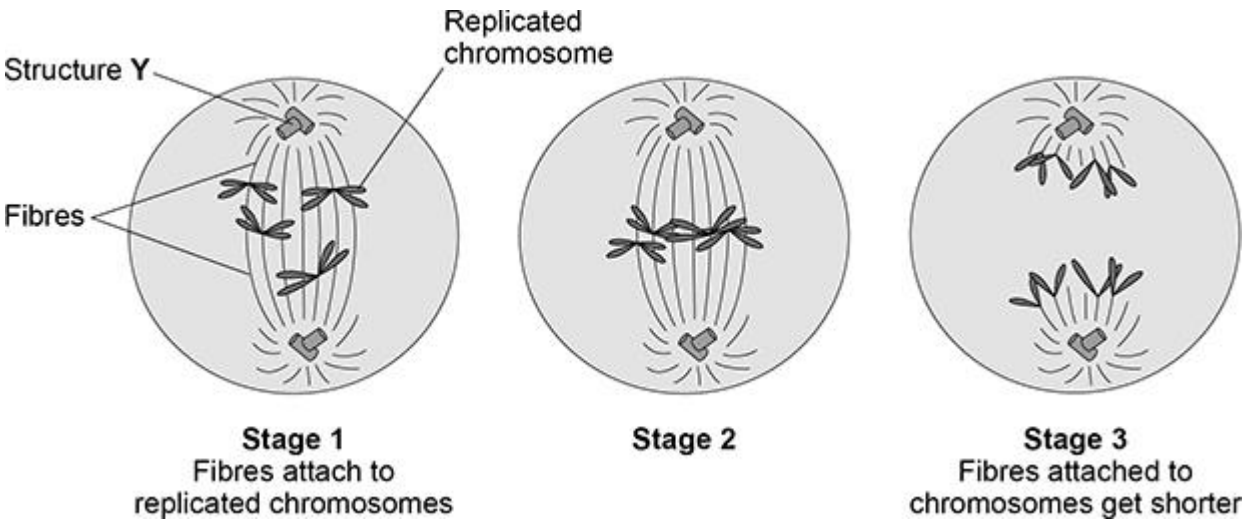
Use $\pi = 3.14$

Magnification = × _____

(6)

Figure 2 shows some of the stages of cell division.

Figure 2



Some cancer drugs prevent cell division.

Drug **X** prevents the fibres from attaching to the replicated chromosomes in **stage 1**.

(d) Explain why a cell **cannot** complete division when affected by drug **X**.

_____

_____

_____

_____

(2)

(e) Give the reason why a drug that stops cell division helps to treat cancer.

_____

_____

(1)

(f) New cancer drugs are tested in clinical trials.

Preclinical testing happens before clinical trials.

What is involved in preclinical testing of drugs?

Tick (✓) **one** box.

Testing the drugs for side effects	☐
Testing the drugs on live tissues in a laboratory	☐
Testing the drugs to find the optimum dose	☐
Testing the drugs with chemicals in a laboratory	☐

(1)

(Total 12 marks)