1 **(a)** **(i)** Explain what is meant by the term *tissue*.

.....

.....

.....

..... **[2]**

(ii) Name **one** type of epithelial tissue found in the lungs.

.....

..... **[1]**

(b) Explain why the lungs can be considered to be an organ.

.....

.....

.....

..... **[2]**

(c) In the lungs, goblet cells secrete mucus. The mucus is then moved by cilia.

Name **one** cellular structure from the list below that is associated with each of the following functions. You must select a structure once only.

mitochondria **ribosome** **Golgi vesicle** **centriole** **nucleus** **cytoskeleton**

(i) release of energy .....

(ii) movement of cilia .....

(iii) secrete mucus ..... **[3]**

[Total: 8]

2 A student carried out an investigation involving uptake of the stain methylene blue by yeast cells.

The investigation involved adding methylene blue to a suspension of yeast cells. Samples of the stained yeast cells were heated to different temperatures.

The student then observed the cells at high power under a light microscope.

The results are shown in Table 3.1.

Table 3.1

temperature (°C)	cells observed stained blue (%)	colour of solution surrounding cells
10	98	colourless
20	96	colourless
30	97	colourless
40	96	colourless
50	73	colourless
60	12	light blue
70	2	blue
80	0	blue

(a) (i) Yeast cells take up methylene blue by active transport.

Using **only** the information provided in Table 3.1, outline the evidence that supports this statement.

.....

.....

.....

.....

..... **[2]**

(ii) Suggest why some cells did **not** stain blue at 20 °C.

.....

..... **[1]**

(b) **(i)** Suggest **one** change that occurred to the plasma (cell surface) membranes of the yeast cells at temperatures above 60 °C.

.....

.....

..... **[1]**

(ii) Explain why the stained yeast cells lost their colour at higher temperatures.

.....

.....

.....

.....

..... **[2]**

(c) The student concluded that yeast cells are killed between 50 °C and 70 °C.

Suggest **one** way in which the student could have improved the **accuracy** of this experiment and **one** way in which he could have improved the **reliability**.

accuracy .....

.....

.....

reliability .....

.....

..... **[2]**

(d) The student placed a small sample of the yeast suspension on a microscope slide and observed it under high power.

Fig. 3.1 shows what the student observed.



Fig. 3.1

Cell **Z** is undergoing a process called *budding*.

Outline the process of budding in yeast.

.....

.....

.....

.....

..... **[2]**

[Total: 10]

3 Fig. 4.1 shows diagrams of two different types of cells, **X** and **Y**.

The cells are **not** drawn to scale.

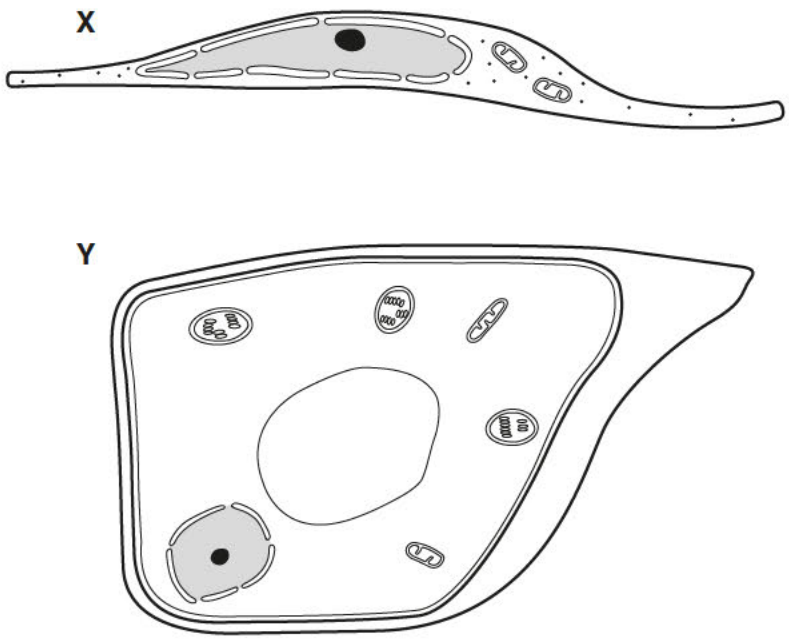


Fig. 4.1

(a) (i) State, using **only the information in Fig. 4.1**, two **differences** between plant cells and animal cells.

1 .....

.....

2 .....

..... **[2]**

(ii) Cell **Y** is a guard cell.

State, using **only the information in Fig. 4.1**, one adaptation of this cell and explain how the adaptation allows the cell to carry out its function.

adaptation .....

explanation .....

.....

..... **[2]**

(b) Fig. 4.2 shows drawings of the six chromosomes inside an animal cell viewed during late prophase of mitosis.

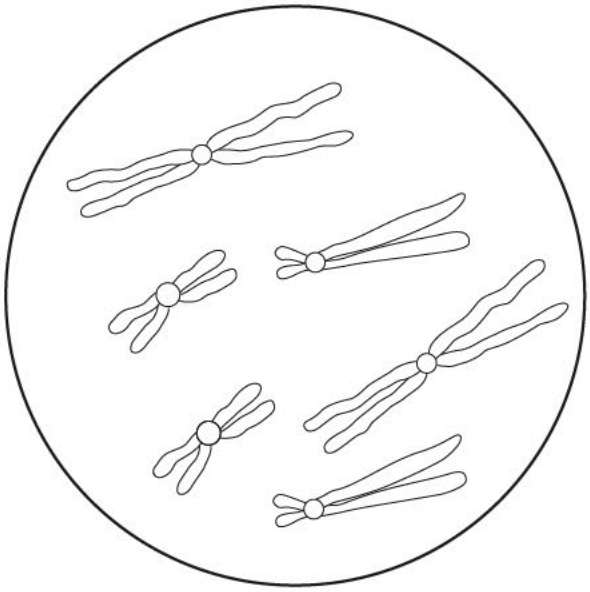
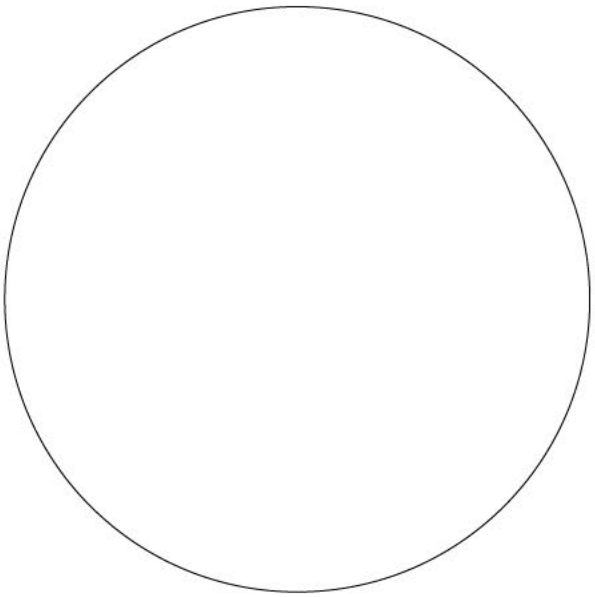


Fig. 4.2

(i) Identify **one pair** of *homologous chromosomes* in Fig. 4.2 by drawing around each chromosome in the pair **on the diagram**. **[1]**

(ii) The nucleus of a sperm cell is produced by **meiosis**.

Draw a diagram in the space below to represent the chromosomes that are present in the nucleus of a sperm cell from **the same animal**.



[2]

[Total: 7]