1 **(a)** Fig. 2.1, **on the insert**, shows a yeast cell with scars resulting from its reproductive process.

(i) Name the process of asexual reproduction in yeast.

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

(ii) Outline the process of asexual reproduction in yeast.

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

(b) **(i)** A yeast cell can continue producing new cells until its surface is covered by scars.

The surface area of a sphere is given by the formula $4\pi r^2$, where $\pi = 3.14$.

The area of a circle is given by the formula πr^2.

Assuming that the cell in Fig. 2.1 contained no scars, calculate how many potential new cells could be produced by this cell.

Show your working.

Answer = ... **[2]**

(ii) Even when the environmental conditions are perfect, one yeast cell rarely produces the calculated number of potential new cells.

Suggest why the reproductive potential of the yeast cell is not reached.

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.....

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

(c) Yeast cells separate after cell division. In a multicellular organism, the cells do not separate but become organised to form the body structure.

Describe how the cells in a multicellular organism are organised.



In your answer you should use appropriate technical terms, spelled correctly.

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..... **[5]**

[Total: 11]

2 **(a)** Yeast reproduces asexually by a process called budding. During this process, cell division occurs.

(i) Name the type of cell division that occurs in asexual reproduction.

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

(ii) Before the division of the nucleus of a cell, the genetic material must replicate.

Explain why this is essential.

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

(b) Unlike yeast, the nuclei of most eukaryotic organisms contain homologous pairs of chromosomes.

Explain what is meant by a *homologous pair of chromosomes*.

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..... **[3]**

(c) In most multicellular organisms, the cells produced by cell division are organised into tissues.

(i) State what is meant by the term *tissue*.

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

(ii) Complete Table 1.1 below comparing two types of epithelium, squamous epithelium and ciliated epithelium.

For each type of epithelium, state **one** function of the tissue and **one** specific location in the human body where it is found.

Table 1.1

type of epithelium	function of tissue	specific location in the human body
squamous		
ciliated		

[4]

[Total: 12]

3 **(a)** Complete the following paragraph about cells by using the most appropriate term(s).

Cells that are not specialised but still have the ability to divide are called ..... cells. Such cells can be found in the ..... of the long bones of mammals. These cells can ..... into other types of cell, such as erythrocytes that carry oxygen in the blood. In plants, ... tissue also contains cells that are not specialised. **[4]**

(b) Sponges are simple eukaryotic multicellular organisms that live underwater on the surface of rocks.

Sponges have a cellular level of organisation. This means that they have no tissues.

Each cell type is specialised to perform a particular function.

One type of cell found in a sponge is a collar cell. Collar cells are held in position on the inner surface of the body of the sponge.

Fig. 2.1 is a diagram showing a vertical section through the body of a sponge and an enlarged drawing of a collar cell.

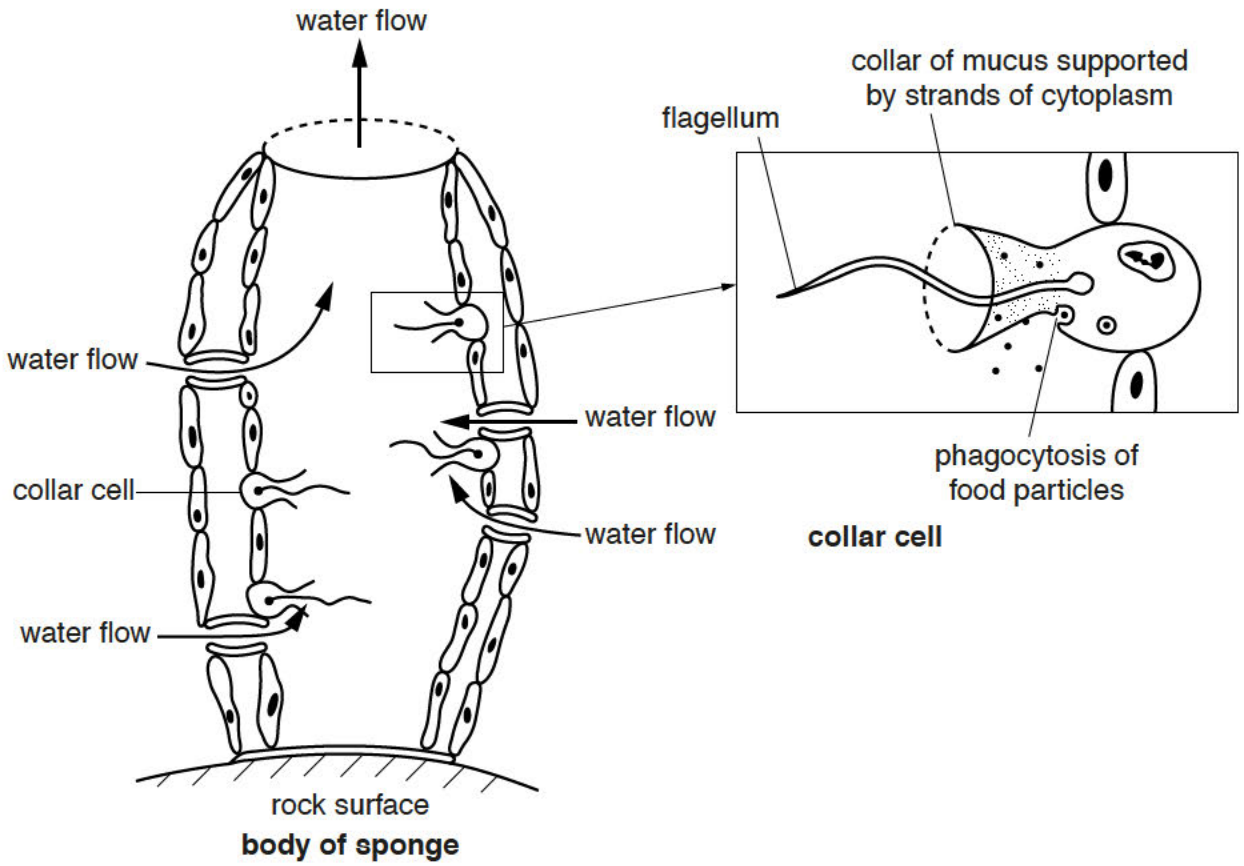


Fig. 2.1

(i) Suggest **one** function of the flagellum in the collar cell.

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

(ii) Suggest **one** possible role for the collar of mucus in the cell.

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

(c) In more advanced organisms, cells are organised into tissues consisting of one or more types of specialised cells.

Describe how cells are organised into tissues, using **xylem** and **phloem** as examples.

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..... **[4]**

[Total: 10]

4 In plants, dividing cells can be found in meristematic tissue.

(a) Name **two** parts of a plant where meristematic tissue can be found.

.....

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

(b) In an investigation, a student observed the cells in a stained section of meristematic tissue. The student counted how many cells could be seen in each stage of the cell cycle.

Table 4.1 shows the results.

Table 4.1

stage of cell cycle	percentage cells in stage (%)
interphase	82.00
prophase	4.34
metaphase	3.23
anaphase	3.23
telophase	7.20

(i) Explain why the meristematic tissue needed to be stained for this investigation.

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

(ii) Name the type of nuclear division that occurs in a plant meristem.

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

(c) Using the results shown in Table 4.1, calculate the percentage of the cell cycle taken up by nuclear division.

Show your working.

Answer = ... % **[2]**

(d) State **one** way in which the products of **meiosis** are different from the products of nuclear division in meristematic tissue.

.....

.....

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

[Total: 8]

5 **(a)** Name the type of nuclear division that produces two genetically identical nuclei.

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

(b) There are a number of stages during cell division.

The list, **J** to **N**, describes some processes that occur during the division of an animal cell.

J	the cell surface membrane is constricted
K	the nuclear envelope reforms
L	sister chromatids are pulled apart
M	the chromosomes condense
N	the chromosomes move to the equator

Match each letter, **J** to **N**, with a stage of cell division in the list below.

The first one has been completed for you.

prophase ..... M .....

metaphase .....

anaphase .....

telophase .....

cytokinesis ..... **[4]**

(c) During interphase the genetic material is copied.

State **two** other processes that occur during interphase.

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

(d) Suggest **two** ways that cell division in plants differs from cell division in animals.

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

[Total: 9]