**Q1.**

**Figure 1** shows an animal cell and a bacterial cell.

**Figure 1: **

(a)     Compare the structure of the cells in **Figure 1**.

Complete the sentences. Choose the answers from the box.

|  |  |  |
| --- | --- | --- |
| **cell membrane** | **cell wall** | **chloroplast** |
| **cytoplasm** |  | **nucleus** |

**Only** the animal cell contains a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

**Only** the bacterial cell contains a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . **(2)**

**Figure 2** shows a section through a leaf.

**Figure 2**

****

(b)     The function of palisade cells is to photosynthesise.

Describe **one** way palisade cells are adapted to carry out their function.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

(c)     Complete **Table 1** to show whether each structure is a tissue, an organ or an organ system.

Tick **one** box for each structure.

|  |
| --- |
| **Table 1** |
| **Structure** | **Tissue** | **Organ** | **Organ system** |
| Leaf |   |   |   |
| Xylem |   |   |   |
| Roots, stem and leaves |   |   |   |

**(2)**

A student observed palisade cells using a microscope.

The microscope had four objective lenses, each with a different magnification.

(d)     Which objective lens should the student use first?

Tick **one** box.

Give a reason for your answer.

|  |  |
| --- | --- |
| ×4 magnification |  |
| ×10 magnification |  |
| ×40 magnification |  |
| ×100 magnification |  |

Reason \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2)**

The student measured the width of 5 different palisade cells at a total magnification of ×400

(e)     Eyepiece lenses are usually ×5 or ×10 magnification.

What combination of eyepiece and objective lenses would give a total magnification of ×400?

Eyepiece lens \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Objective lens \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(1)**

(f)      **Table 2** shows the student’s results.

|  |
| --- |
| **Table 2** |
| **Cell** | **Width of cell image in mm** |
| 1 | 12 |
| 2 | 13 |
| 3 | 16 |
| 4 | 10 |
| 5 | 11 |

(f)      Calculate the mean width of the palisade cell images.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mean width = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mm

**(1)**

(g)     Calculate the real width of a palisade cell.

Use the mean width you calculated in part (f).

Use the equation:



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Real width = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mm

**(2)**

**(Total 11 marks)**

**Q2.**

This question is about cell structures.

(a)  Draw **one** line from each cell structure to the type of cell where the structure is found.

|  |  |  |
| --- | --- | --- |
| **Cell Structure** |   | **Type of cell where the structure is found** |
|  |
| Nucleus |   | Prokaryotic cells |
|  |
| Permanent vacuole |   | Plant cells only |
|  |
| Plasmid |   | Eukaryotic cells |

**(2)**

(b)  **Figure 1** shows a plant cell.

**Figure 1**

****

What are the names of structures **A**, **B** and **C**?

Tick **one** box.

|  |  |  |  |
| --- | --- | --- | --- |
| **Structure A** | **Structure B** | **Structure C** |   |
| Chloroplast | Vacuole | Cell wall |  |
| Nucleus | Chloroplast | Cell membrane |  |
| Vacuole | Mitochondrion | Cell membrane |  |
| Vacuole | Ribosome | Cell wall |  |

**(1)**

A student observed slides of onion cells using a microscope. **Figure 2** shows two of the slides the student observed.

**Figure 2: **

The cells on the slides are **not** clear to see.

(c)  Describe how the student should adjust the microscope to see the cells on Slide A more clearly.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

(d)  Describe how the student should adjust the microscope to see the cells on Slide B more clearly. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(2)**

(e)  The student made the necessary adjustments to get a clear image.

**Figure 3** shows the student’s drawing of one of the cells.

**Figure 3**

****

The real length of the cell was 280 micrometres (µm). Calculate the magnification of the drawing.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Magnification = × \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(3)**

 **(Total 9 marks)**