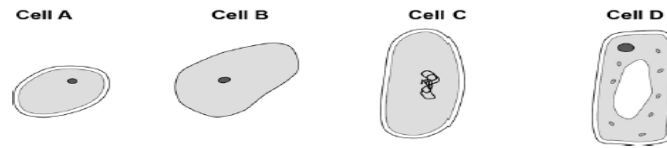


Q1.

The figure below shows four different types of cell.



(a) Which cell is a plant cell?

Give **one** reason for your answer.

Cell _____

Reason _____

(2)

(b) Which cell is an animal cell?

Give **one** reason for your answer.

Cell _____

Reason _____

(2)

(c) Which cell is a prokaryotic cell?

Give **one** reason for your answer.

Cell _____

Reason _____

(2)

(d) A scientist observed a cell using an electron microscope.

The size of the image was 25 mm.

The magnification was $\times 100\,000$

Calculate the real size of the cell.

Use the equation:

$$\text{magnification} = \frac{\text{image size}}{\text{real size}}$$

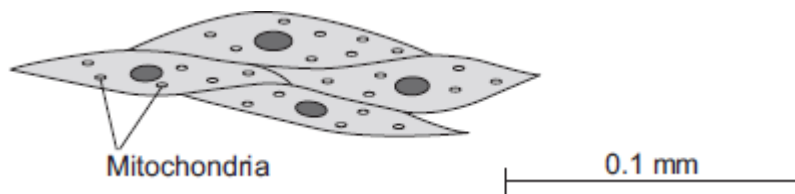
Give your answer in micrometres.

Real size = _____ micrometres

(3)

Q2.

The image below shows some muscle cells from the wall of the stomach, as seen through a light microscope.



(a) Describe the function of muscle cells in the wall of the stomach.

(2)

(b) **Figure above** is highly magnified.

The scale bar in **Figure above** represents 0.1 mm.

Use a ruler to measure the length of the scale bar and then calculate the magnification of **Figure above**.

Magnification = _____ times

(2)

(c) The muscle cells in **Figure above** contain many mitochondria.

What is the function of mitochondria?

(2)

(d) The muscle cells also contain many ribosomes. The ribosomes cannot be seen in

Figure above.

(i) What is the function of a ribosome?

(1)

(ii) Suggest why the ribosomes **cannot** be seen through a light microscope.

(1)

Q3.

The photograph shows a red blood cell in part of a blood clot. The fibres labelled **X** are produced in the early stages of the clotting process.



(a) Suggest how the fibres labelled **X** help in blood clot formation.

(1)

(b) The average diameter of a real red blood cell is 0.008 millimetres.
On the photograph, the diameter of the red blood cell is 100 millimetres.

Use the formula to calculate the magnification of the photograph.

$$\text{Diameter on photograph} = \text{Real diameter} \times \text{Magnification}$$

Magnification = _____

(2)

(c) Some blood capillaries have an internal diameter of approximately 0.01 millimetres.

(i) Use information given in part (b) to explain why only one red blood cell at a time can pass through a capillary.

(1)

(ii) Explain the advantages of red blood cells passing through a capillary one at a time.

(3)

Mark schemes

Q1.

(a) **D** 1

any **one** from:

- has chloroplasts
- has a (large) vacuole
ignore has a (cell) wall

1

(b) **B** 1

does **not** have a (cell) wall

*allow has only a nucleus, (cell) membrane **and** cytoplasm*

1

(c) **C** 1

any **one** from:

- genetic material is not in a nucleus
allow no nucleus
- has a single loop of DNA

1

(d) real size = 25 / 100 000 1

0.00025 1

(conversion to) 0.25 (µm)

allow 0.25 (µm) with no working shown for 3 marks

1

[9]

Q2.

(a) contract / shorten 1
ignore relax
*do **not** allow expand*

to churn / move / mix food

accept peristalsis / mechanical digestion

ignore movement unqualified

1

- (b) 400
acceptable range 390-410
allow 1 mark for answer in range of 39 to 41
allow 1 mark for answer in range of 3900 to 4100 2
- (c) to transfer energy for use
allow to release / give / supply / provide energy
*do **not** allow to 'make' / 'produce' / 'create' energy*
allow to make ATP
ignore to store energy 1
- by (aerobic) respiration **or** from glucose
*do **not** allow anaerobic*
*energy released **for** respiration = max 1 mark* 1
- (d) (i) to make protein / enzyme
ignore 'antibody' or other named protein 1
- (ii) too small / very small
allow light microscope does not have sufficient magnification / resolution
allow ribosomes are smaller than mitochondria
ignore not sensitive enough
ignore ribosomes are transparent 1

[8]

Q3.

- (a) hold cells together **or** prevent flow of cells **or** trap cells 1
- (b) 12500
if correct answer, ignore working / lack of working

$$\frac{100}{0.008}$$
for 1 mark

ignore any units 2
- (c) (i) size RBC approximately same size capillary **or**
 no room for more than one cell **or**
only one can fit **or**
 RBC is too big
allow use of numbers
*do **not** accept capillaries are narrow*

1

- (ii) more oxygen released (to tissues) **or**
more oxygen taken up (from lungs)

1

and any **two** from:

- slows flow **or** more time available
- shorter distance (for exchange) **or** close to cells / capillary wall
- more surface area exposed

2