

Cells and Microscopy

Q1.a(2018)

Figure 9 shows a diagram of a red blood cell from a turtle and a diagram of a red blood cell from a human.

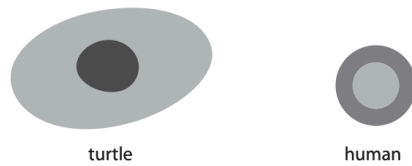


Figure 9

(i) These cells are animal cells.

Animal cells do not have

(1)

- ☐ A cytoplasm
- ☐ B a cell membrane
- ☐ C a cell wall
- ☐ D mitochondria

Q1.b(2018)

The actual length of the red blood cell from a turtle is $20.5\ \mu\text{m}$.

Calculate the length of the magnified image of the red blood cell of the turtle when magnified $400\times$.

(2)

..... μm

Q1.c(2018)

The width of the human red blood cell, when magnified $400\times$, is $3.08\ \text{mm}$.

Calculate the actual width of the cell and show your answer in standard form.

(2)

..... mm

Q1.d(2018)

Red blood cells are carried in veins and arteries.

Figure 10 shows the equipment used to measure the elasticity of an artery.

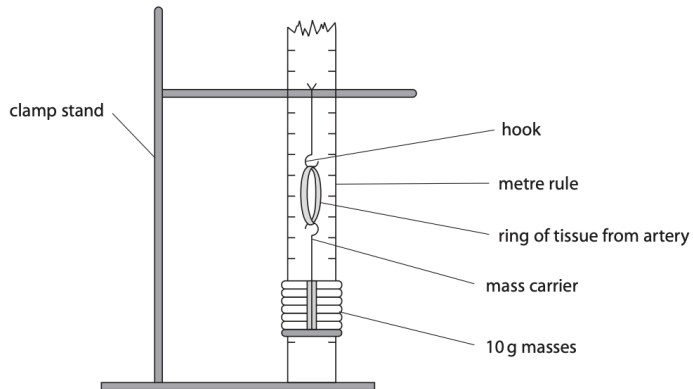


Figure 10

- (i) Describe a method you could use to see how much the ring of tissue from an artery could stretch before it no longer returned to its original size.

(3)

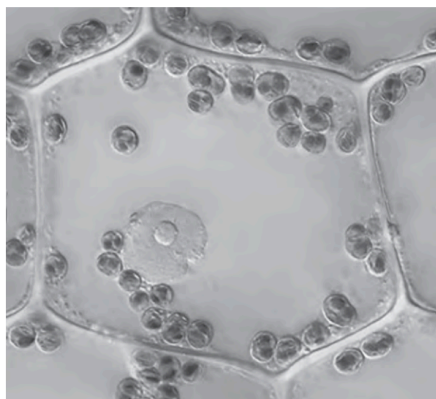
Q1.e(2018)

Give **one** safety precaution you need to take when handling animal tissue such as blood vessels.

(1)

Q2.(2019,4)

Figure 7 shows a plant cell as seen under a light microscope.



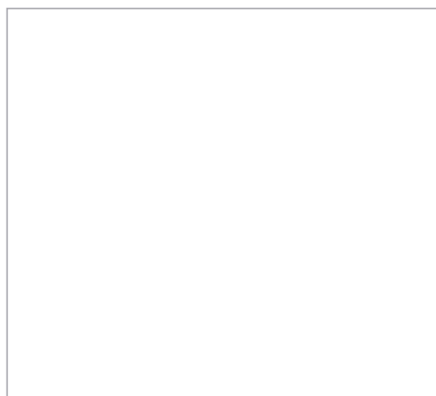
(Source: © HERVE CONGE, ISM/SCIENCE PHOTO LIBRARY)

Figure 7

(a) Draw this plant cell in the box below.

Label **three** parts of this cell.

(4)



Q3.(2019,4)

(b) Mitochondria cannot be seen with a light microscope.

What is the function of mitochondria in a plant cell?

(1)

- ☐ **A** respiration
- ☐ **B** make proteins
- ☐ **C** photosynthesis
- ☐ **D** store water

Q4.a(2019,4)

A student wanted to investigate the movement of water into and out of cells in potatoes.

The student had the equipment shown in Figure 8.

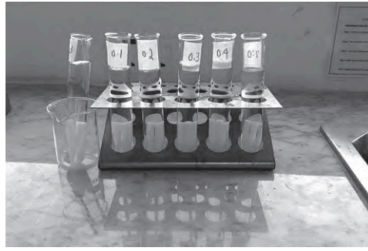


Figure 8

The test tubes in the rack contain different concentrations of sodium chloride solution.

The solutions were 0.1 M, 0.2 M, 0.3 M, 0.4 M and 0.5 M sodium chloride solution.

The test tube in the beaker contains distilled water.

There are three potato chips in each of the six test tubes.

- (i) State why the test tube in the beaker only contains distilled water and three potato chips.

(1)

Q4.b(2019,4)

State **two** variables that need to be controlled in this investigation.

(2)

Q4.c(2019,4)

Explain why the chips in the 0.5 M sodium chloride solution lost mass.

(3)

Q5.a(2020,4)

A slide of potato cells was viewed using a light microscope.

Figure 12 is a drawing of the slide showing starch grains in the potato cells.

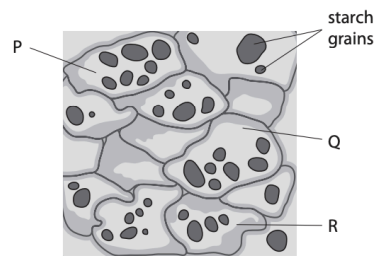


Figure 12

- (a) (i) Calculate the mean number of starch grains in potato cells P, Q and R.

(1)

..... starch grains

Q5.b(2020,4)

- (ii) Which structures are found in plant cells but are **not** found in animal cells?

(1)

- ☐ A cell membrane, nucleus, chloroplast
- ☐ B cell wall, cell membrane, cytoplasm
- ☐ C nucleus, large vacuole, chloroplast
- ☐ D cell wall, chloroplast, large vacuole

Q6.a(2021,4)

Figure 1 shows human blood seen using a light microscope.

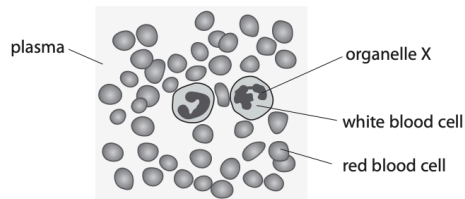


Figure 1

- (a) (i) The organelle labelled X controls the activities of the white blood cell.

What is the name of organelle X?

(1)

- ☐ A mitochondrion
- ☐ B ribosome
- ☐ C chromosome
- ☐ D nucleus

Q6.b(2021,4)

Key concepts

<http://www.pcfgstudy.com>

Use words from the box to complete the sentences.

(2)

gas	haemoglobin	hormone
liquid	platelet	solid

Red blood cells contain the substance

Blood plasma is a

Q6.c(2021,4)

Figure 2 shows a white blood cell on a 100 μm scale.

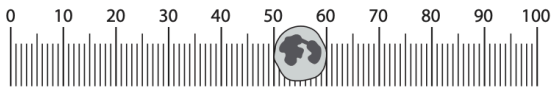


Figure 2

State the width of the white blood cell.

(1)

..... μm

Q6.d(2021,4)

Figure 1 shows human blood seen using a light microscope.

Explain why using an electron microscope shows the structures in the white blood cells more clearly.

(2)

.....

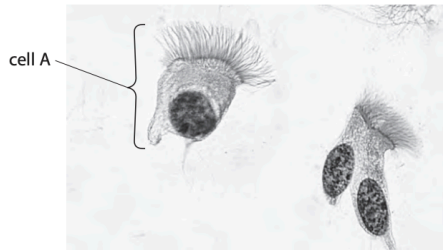
.....

.....

.....

Q7.a(2021,4)

Figure 11 shows ciliated epithelial cells from the airways of a human as seen using a light microscope.



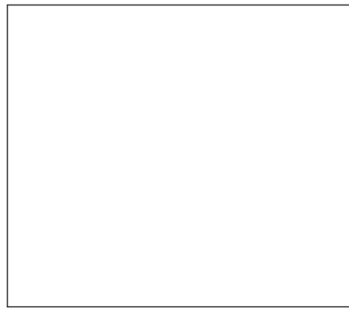
(Source: © Jose Luis Calvo/Shutterstock)

Figure 11

(i) Draw the cell labelled A in the box below.

Label **three** parts of this cell on your diagram.

(4)



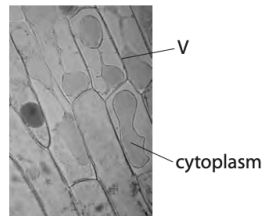
Q7.b(2021,4)

State the function of the ciliated epithelial cells in the airways of the human breathing system.

(1)

Q8.a(2022,4)

Figure 3 shows some onion cells that have been soaked in a concentrated salt solution.



(Source: © Rattiya Thongdumhyu/Shutterstock)

Figure 3

(i) The cells in Figure 3 have been stained.

Give **one** reason why the cells have been stained.

(1)

Q8.b(2022,4)

Which is the name of the structure labelled V?

(1)

- ☐ A chloroplast
- ☐ B vacuole
- ☐ C nucleus
- ☐ D cell wall

Q8.c(2022,4)

The salt solution outside the cell has a higher concentration than the solution inside the cell.

Explain why the cytoplasm shrinks away from the sides of the cell when the cells are in salt solution.

(2)

.....

.....

.....

.....

Q8.d(2022,4)

Figure 4 shows the equipment used to prepare a microscope slide of onion cells.



Figure 4

Describe how this equipment could be used to prepare a slide of onion cells to view under a microscope.

(3)

.....

.....

.....

.....

.....

Q8.e(2022,4)

- (c) A student investigated the percentage change in mass of potato cylinders placed in sucrose solutions of different concentrations.

Figure 5 shows the results of the student's investigation.

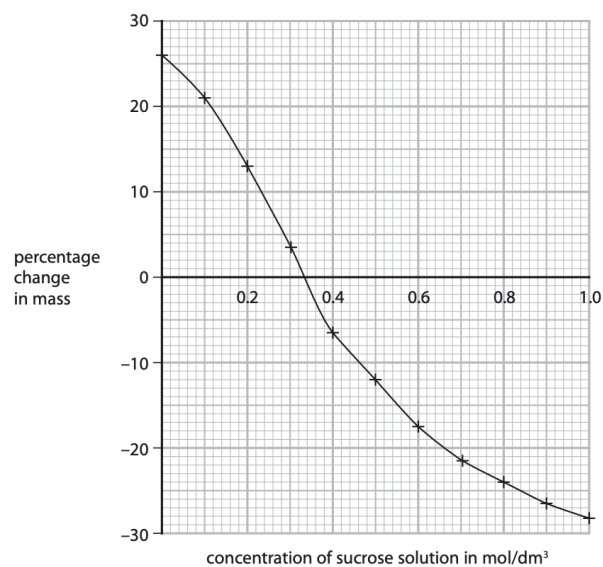


Figure 5

State **two** conclusions that can be made from these results.

(2)

Q9.a(2024,4)

Key concepts

Scientists use microscopes to study cells.

Figure 1 shows a light microscope.

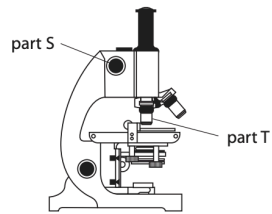


Figure 1

(a) Draw **one** straight line from each part of the microscope to its function.

(2)

part of microscope

function

	to stain the cells
part S	to focus the image so that it is clear
	to magnify the image
part T	to hold the slide in place
	to provide light to see the image

Q9.b(2024,4)

Figure 2 shows two photographs of bacteria.

Photograph A was taken through a light microscope.

Photograph B was taken using an electron microscope.

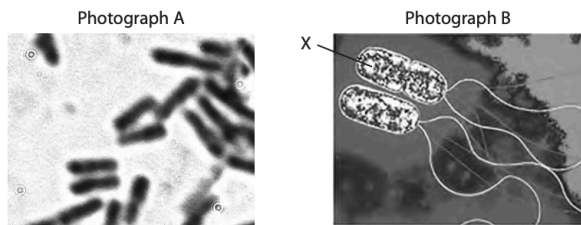
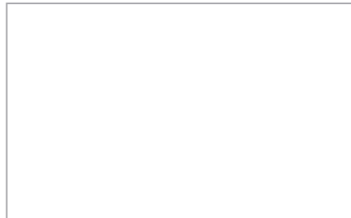


Figure 2

(i) Draw, in the box, the bacterial cell labelled X.

Label **one** part of the bacterial cell on your diagram.

(3)



Q9.c(2024,4)

- (ii) State **one** advantage of using a light microscope and **one** advantage of using an electron microscope to study these bacterial cells.

(2)

A light microscope

.....

.....

An electron microscope

.....

.....