Cell Structure (F)

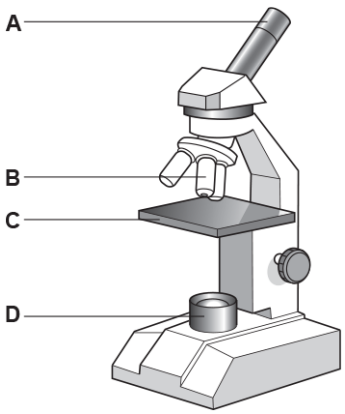
1. A light microscope resolution is 0.2 μm. An electron microscope resolution is 0.0001 μm.

How many times closer can two objects be seen as separate objects by using an electron microscope compared to using a light microscope?

A 2x
B 20x
C 200x
D 2000x

Your answer ☐ **[1]**

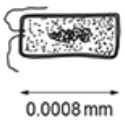
2. The diagram shows a light microscope.



Which label is pointing to the eyepiece lens?

Your answer ☐ **[1]**

3. Look at the bacterial cell that causes disease in humans.



The human eye can see objects 0.1 mm in size.

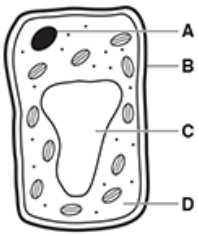
What **minimum** magnification will be needed before the eye can see this bacterial cell?

A 12.5×
B 125×
C 1250×
D 12500×

Your answer ☐ **[1]**

4. The diagram shows a plant cell observed using a light microscope.

Which label is pointing to a structure that contains genetic material?



Your answer ☐ **[1]**

5. A student uses a microscope to look at plant cells on a slide.

Which of these methods should they use first?

A Highest power objective lens and focus moving the lens away from the slide
B Highest power objective lens and focus moving the lens towards the slide
C Lowest power objective lens and focus moving the lens away from the slide
D Lowest power objective lens and focus moving the lens towards the slide

Your answer ☐

[1]

6. The microscope used by the student has an eyepiece lens with a magnification of 10×.

Which objective lens would give an image magnification of 200×?

A 10×
B 20×
C 30×
D 200×

Your answer ☐

[1]

7 (a). Cells contain structures that have different features.

Complete the table using structures from this list.

cell membrane **chloroplast** **mitochondria**

nucleus **ribosomes**

Feature	Structure
Contains chlorophyll for photosynthesis	
Contains enzymes for respiration	
Has receptor molecules for communication	

[3]

(b). A student uses a light microscope to see cheek cells.

One cell is shown in **Fig. 16.1**.

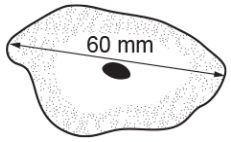


Fig. 16.1

i. The actual size of the cheek cell is 0.03 mm.

Calculate the magnification of the drawing.

Use the equation: magnification = measured size ÷ actual size

Magnification = × ..... **[2]**

ii. Which type of substance is used to make structures inside the cell easier to see when using a light microscope?

_____ **[1]**

8 (a). The diagram shows cells that are important in the process of **transpiration** in plants.

The diameter of cell **X** has been magnified 500×.

Calculate the actual diameter of cell **X**.

Use the equation: actual diameter = measured size ÷ magnification

Diameter = ... mm **[2]**

(b). Light microscopes let us see objects as small as 0.2 micrometres.

The diameter of cells similar to cell **X**, can vary between 0.008 mm and 0.5 mm.
(1 mm = 1000 micrometres)

Is it possible to see all these types of cells using a light microscope?

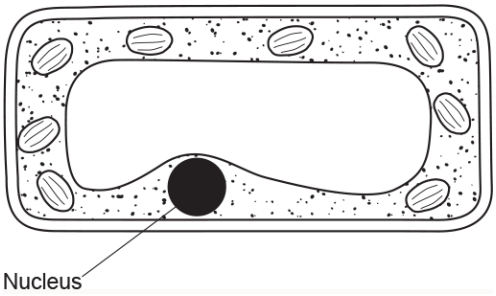
Explain your answer.

---**[2]**

(c). State why electron microscopy has increased our knowledge of sub-cellular structures.

---**[1]**

9. Look at the diagram showing a plant cell.

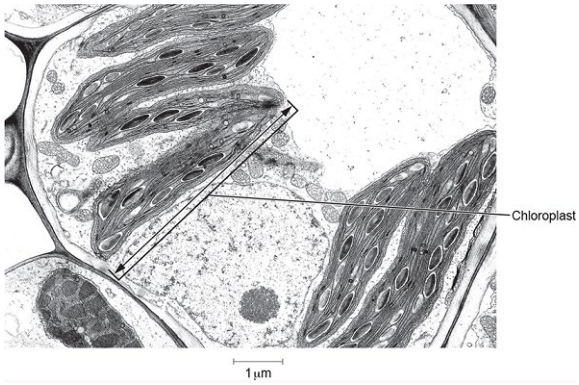


i. The diameter of the nucleus in the diagram is 10 millimetres. The actual size of the nucleus is 10 **micrometres.**

Calculate the magnification of the diagram.

Answer = _____ × **[2]**

ii. Look at the picture of part of a plant cell.



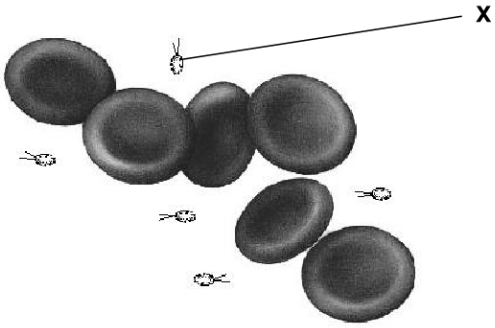
Use the arrow on the picture and the scale to estimate the length of the chloroplast.

Answer = _____ µm **[1]**

10. Probash is ill and is having tests in hospital. The doctors took a sample of blood from Probash.

They looked at the specimen under a light microscope.

This is a picture of what they saw.



From this picture, the doctors decide that Probash's illness is caused by bacteria (labelled X).

i. Why do the doctors not think that the structures labelled **X** are viruses?

_____ **[1]**

ii. What equipment could the doctors use to get a clearer image to confirm their ideas?

_____ **[1]**

11. The diameter of a human egg cell is 120μm.
What is the diameter in mm?
1μm = 1×10^{-3}mm.

A. 1.2×10^{-1}
B. 1.2×10^{-2}
C. 1.2×10^{-3}
D. 1.2×10^{-4}

Your answer ☐

[1]

12. Which does **not** contain DNA?

A. cell membrane
B. chromosome
C. nucleus
D. plasmid

Your answer ☐

[1]

13 (a). A student prepares onion cell slides to view under a microscope. Put the stages in the correct order by writing the numbers **1** to **5** in the boxes.

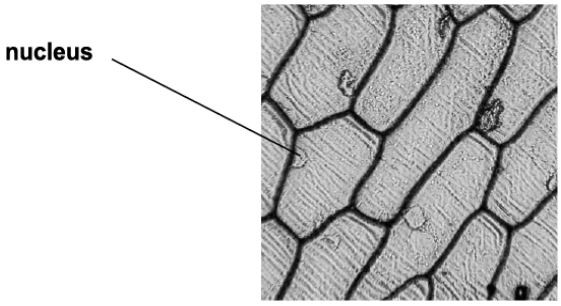
	add a drop of iodine solution
	cut the onion in to pieces
	peel off a thin layer of onion tissue
	put on a cover slip
	put the onion tissue on a slide

[2]

(b). Explain why the iodine solution is used.

---**[2]**

(c). Look at the image below of some onion cells.



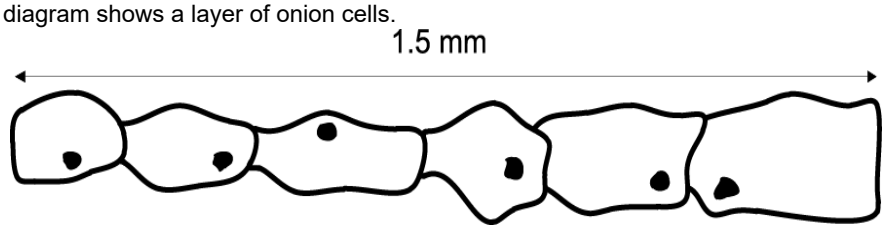
i. Explain how the contents of the nucleus allow it to carry out its function.

---**[2]**

ii. Explain why there are **no** chloroplasts in these onion cells.

---**[2]**

(d). The diagram shows a layer of onion cells.



The actual length of the layer is 1.5 mm.

Calculate the average length of one onion cell.

answer = …… mm **[2]**

(e). A student thinks that using the highest magnification of a microscope is always best.

Explain why this may **not** be true.

--- **[2]**

14. A student uses a microscope.

The magnification on the eyepiece lens is ×10.

The magnification on the objective lens is ×4.

What is the total magnification?

A. 2.5
B. 6
C. 14
D. 40

Your answer ☐

[1]

END OF QUESTION PAPER