2. Organisation of the organism

2.2 Size of specimens

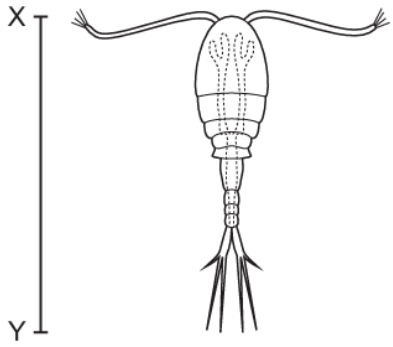
Paper 1 and 2

Question Paper

Paper 1

Questions are applicable for both core and extended candidates

1 The diagram shows an organism called a copepod. The magnification of the diagram is ×30.



The length of line XY is 45 mm.

What is the actual length of the copepod?

A 0.67 mm **B** 1.5 mm **C** 15 mm **D** 1350 mm

2 Which magnification formula is correct?

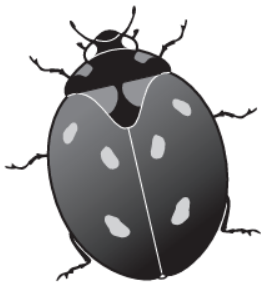
A magnification = actual size ÷ image size

B magnification = actual size + image size

C magnification = image size ÷ actual size

D magnification = image size × actual size

3 The image shows an animal.



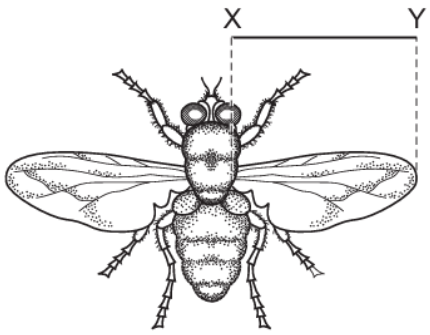
The length of the animal in the image is 36 mm.

The actual length of the animal is 12 mm.

What is the magnification of the image?

A ×0.3 **B** ×3 **C** ×43.2 **D** ×432

4 The diagram shows a fly.



The line XY represents the length of the wing.

The length of line XY is 26 mm.

The actual size of the wing between X and Y is 4 mm.

What is the magnification of the diagram?

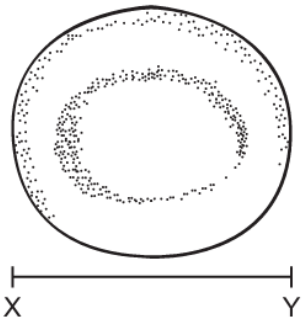
A ×0.15 **B** ×6.5 **C** ×22 **D** ×104

5 The diameter of an egg is 6.5 cm. A student draws the egg. The diameter of the egg in the drawing is 19.5 cm.

What is the magnification of the drawing?

A ×0.3 **B** ×3.0 **C** ×6.5 **D** ×300

6 A diagram of a human red blood cell is shown. The length of line XY on the diagram is 40 mm. The actual width of the cell is 0.008 mm.



What is the magnification of the diagram?

A ×500 **B** ×5000 **C** ×50 000 **D** ×500 000

7 A plant cell is viewed using a microscope with a magnification of ×500. The image of the cell has a width of 20 mm.

What is the actual width of the cell?

A 0.04 mm **B** 0.2 mm **C** 4 mm **D** 25 mm

8 A cell was viewed under a microscope. The actual length of the cell is 0.025 mm. The magnification of the image is ×400.

What is the length of the cell in the image?

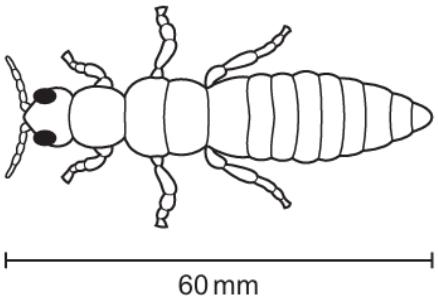
A 10 mm **B** 100 mm **C** 1600 mm **D** 16 000 mm

9 A student found four different worms in a sample of soil and drew diagrams of them. The diagrams were drawn with different magnifications.

Which worm was the longest?

	length of diagram / mm	magnification
A	60	×3
B	70	×1
C	100	×2
D	120	×5

10 The diagram shows an animal. The actual length of this animal is 0.6 mm.



What is the magnification of the diagram?

A ×10 **B** ×100 **C** ×1000 **D** ×10 000

11 What is the equation for calculating the magnification of a biological drawing?

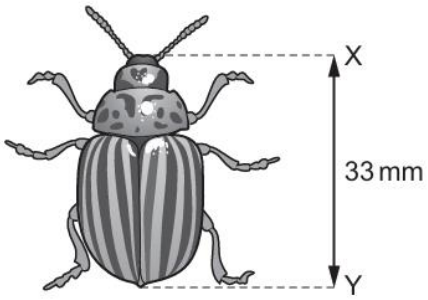
A magnification = actual size × image size × 100

B magnification = actual size ÷ image size

C magnification = image size ÷ actual size

D magnification = actual size × 100 ÷ image size

12 The diagram shows a beetle.



The actual size of the beetle between X and Y is 15 mm.

What is the magnification of the image?

A ×0.45 **B** ×2.2 **C** ×48 **D** ×495

13 A photograph shows a plant cell nucleus measuring 2 mm across.

If the magnification of the cell is ×500, what is the actual size of the nucleus?

A 0.00002 mm **B** 0.004 mm **C** 0.04 mm **D** 250 mm

14 The cell shown in the diagram has been magnified 3000 times. The diagram is 21 mm wide.

What is the actual diameter of the cell?

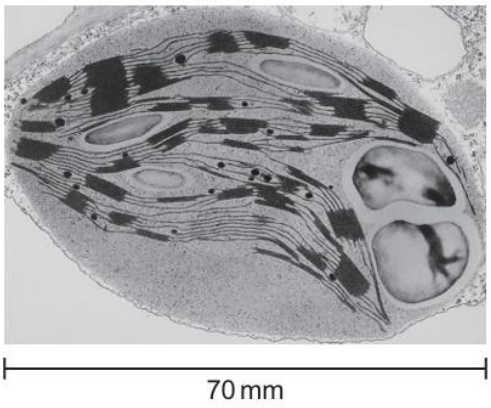
A 21 mm

B $\frac{21\text{mm}}{3000}$

C 21 mm × 3000

D $\frac{3000}{21\text{mm}}$

15 The photograph shows a chloroplast magnified ×7000.



What is the actual size of the chloroplast?

A 0.0001 mm **B** 0.001 mm **C** 0.01 mm **D** 100 mm

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

16 A student draws a red blood cell.

The diameter of the red blood cell they draw is 20 mm.

The actual diameter of the red blood cell is 0.008 mm.

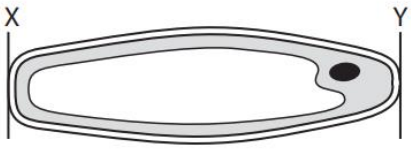
What is the magnification of the student's drawing?

A ×0.0004 **B** ×0.16 **C** ×250 **D** ×2500

17 The diagram shows an epidermal cell from an onion plant.

The distance between X and Y on the diagram is 60 mm.

The actual length of the cell between X and Y is 150 µm.



What is the magnification of the cell? **(extended only)**

A ×40 **B** ×250 **C** ×400 **D** ×2500

18 A specimen is viewed under a microscope with a ×10 magnification. The specimen image measures 30 mm.

What is the actual size of the specimen? **(extended only)**

A 3 µm **B** 30 µm **C** 300 µm **D** 3000 µm

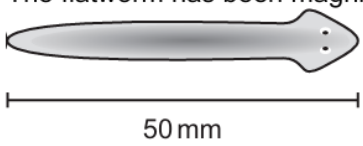
19 A tick is a type of arachnid.

The length of an adult tick is 2.3 mm.

What is the length of the tick in micrometres? **(extended only)**

A 0.23 μm **B** 23 μm **C** 230 μm **D** 2300 μm

20 The diagram shows a flatworm. The flatworm has been magnified by ×100.



What is the actual size of the flatworm? **(extended only)**

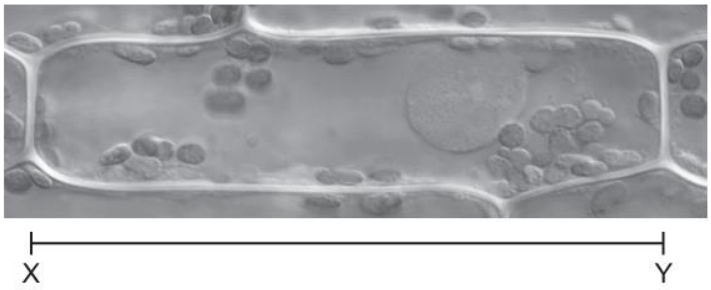
A 0.5 μm **B** 5 μm **C** 50 μm **D** 500 μm

21 The length of a bacterium in a diagram is 50 mm. The magnification of the diagram is ×5000.

What is the actual length of the bacterium? **(extended only)**

A 1 μm **B** 10 μm **C** 100 μm **D** 1000 μm

22 The photomicrograph shows a plant cell. The length of line XY is 90 mm. The actual length of the cell is 30 μm.

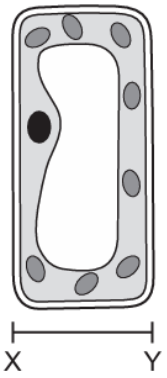


What is the magnification of the photomicrograph? **(extended only)**

A ×300 **B** ×3000 **C** ×33 000 **D** ×330 000

23 In the diagram of the palisade cell, the distance between X and Y is 20 mm.

The actual width of the cell between X and Y is 40 μm.



What is the magnification of the diagram? **(extended only)**

A ×200 **B** ×500 **C** ×2500 **D** ×5000

24 The length of a mitochondrion in a photomicrograph is 15 mm.

The actual length of the mitochondrion is 3 μm.

What is the magnification of the photomicrograph? **(extended only)**

A ×5 **B** ×45 **C** ×5000 **D** ×45 000

25 A photograph shows a plant cell nucleus measuring 2 mm across.

If the magnification of the cell is ×500, what is the actual size of the nucleus?

A 0.00002 mm **B** 0.004 mm **C** 0.04 mm **D** 250 mm

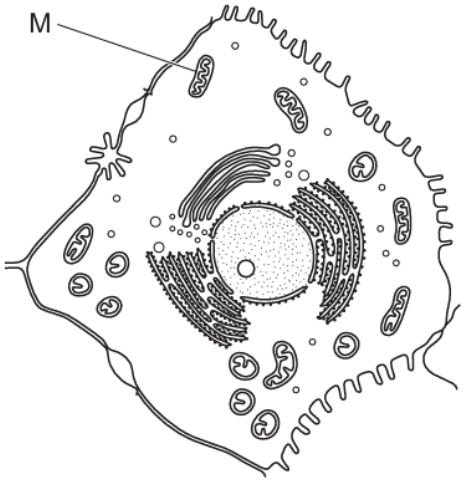
26 The diagram shows an image of a chloroplast. The image is 5 cm long.

The actual length of the chloroplast is 5 μm.

What is the magnification of the image? **(extended only)**

A ×10 **B** ×1000 **C** ×10 000 **D** ×100 000

27 The diagram shows a human liver cell.



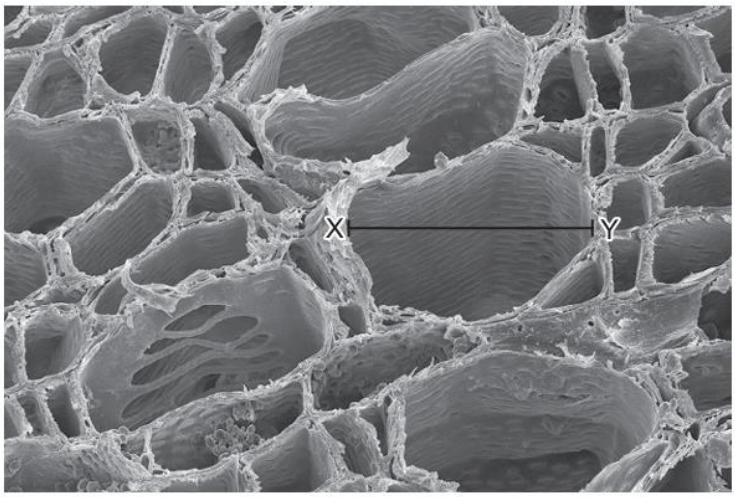
The length of structure M on the diagram is 6 mm.

The magnification of the diagram is x 2000.

What is the actual length of M? **(extended only)**

A 0.03 μm **B** 3 μm **C** 333 μm **D** 12 000 mm

28 The diagram shows a xylem vessel in a plant stem. The magnification is ×400.

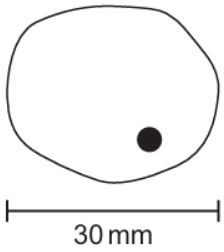


×400

What is the actual width of the xylem vessel along the line XY? **(extended only)**

A 8.75 μm **B** 14 μm **C** 87.5 μm **D** 140 μm

29 The diagram shows a cell with an actual size of 30 μm.



What is the magnification of the diagram? **(extended only)**

A ×10 **B** ×100 **C** ×1000 **D** ×10 000