Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Magnification calculations

Time allowed: 15 minutes

Subject code **0610**

Biology

Questions from Paper 1 and Paper 2

You must have: a soft pencil, an eraser and a pen.

Total marks

/ 10

Instructions

- There are 10 questions. Each has four options: A, B, C and D.
- Choose one option for each question and record it as your teacher directs.
- If you change a choice, rub out the first one completely.

Information

- This paper has 10 questions worth 10 marks in total.

Advice

- Read every question through once before you write anything.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1 Which formula shows the correct way to calculate the actual size of an object?

A $\text{actual size} = \frac{\text{magnification}}{\text{image size}}$

B $\text{actual size} = \frac{\text{image size}}{\text{magnification}}$

C actual size = image size × magnification

D actual size = image size – magnification

Magnification and size of specimens Click for more variations

2 A cell is 65 μm across.

What is this measurement in mm?

A 0.00065 mm **B** 0.0065 mm **C** 0.065 mm **D** 0.65 mm

Magnification and size of specimens Click for more variations

3 A student makes a drawing of an animal.

The length of the animal in the drawing is 30 mm.

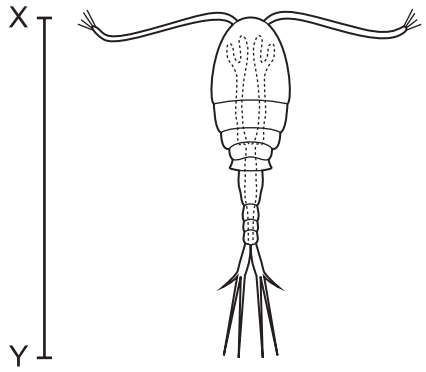
The actual length of the animal is 200 mm.

What is the magnification of the student's drawing?

A ×0.15 **B** ×6.67 **C** ×15 **D** ×6000

Magnification and size of specimens Click for more variations

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



The length of line XY is 45 mm.

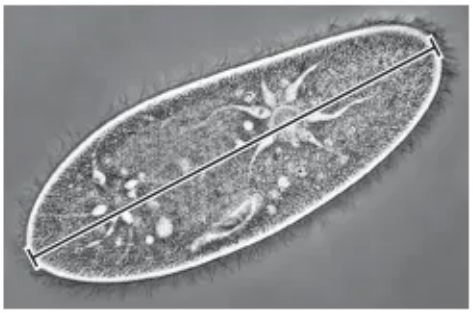
What is the actual length of the copepod?

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

Magnification and size of specimens Click for more variations

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5 The image shows a single-celled organism called a *Paramecium*.



The length of the *Paramecium* in the image is 6 cm. The magnification is ×400.

Which calculation will give the correct actual length of the *Paramecium*, in mm?

A $\frac{6 \times 10}{400}$ **B** $\frac{6 \times 1000}{400}$ **C** $\frac{400 \times 10}{6}$ **D** $\frac{400}{6 \times 1000}$

Magnification and size of specimens Click for more variations

6 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?

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

Magnification and size of specimens Click for more variations

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



The actual length of the chloroplast is 5 μm.

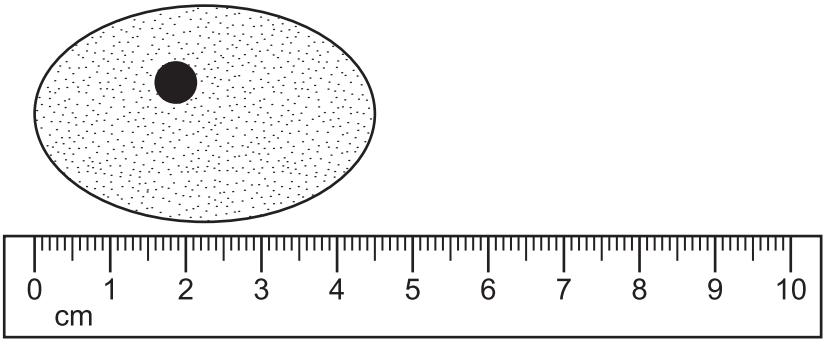
What is the magnification of the image?

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

Magnification and size of specimens Click for more variations

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8 The diagram shows a cell at ×1500 magnification.



What is the actual size of the cell?

A 0.003 mm **B** 0.03 mm **C** 33 mm **D** 333 mm

Magnification and size of specimens Click for more variations

9 Four students used a microscope to view some onion plant cells. Each student drew one of the cells.

Each student calculated the actual length of the cell and the magnification of their drawing.

Which student produced the longest drawing of a cell?

	actual length of onion plant cell / mm	magnification of drawing
A	0.120	×150
B	0.125	×300
C	0.150	×225
D	0.200	×175

Magnification and size of specimens Click for more variations

10 The table shows the magnifications and image lengths of three specimens when seen with a light microscope.

specimen	magnification	image length / mm
X	×50	0.20
Y	×150	0.50
Z	×250	0.40

What is the order of increasing actual lengths of the specimens, from smallest to largest?

A X → Y → Z **B** X → Z → Y **C** Y → X → Z **D** Z → Y → X

Magnification and size of specimens Click for more variations

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