Magnification

Biology calculations | AQA Combined Science 8464 and AQA GCSE Biology 8461 | 12 questions, 37 marks

GCSE science calculations

Scan for the solutions

Equations for this topic (cover this box to practise recalling them)

- magnification = $\frac{\text{size of image}}{\text{size of real object}}$ learn this one

Name: _____ **Date:** _____ **Score:** _____ **/ 37**

1 Lena looks at a cheek cell with a light microscope and draws it. In her drawing the cell is 36 mm wide.

The real width of the cell is 0.06 mm.

Calculate the magnification of her drawing.

(2 marks)

Answer _____

2 A photograph in a revision guide shows a single onion skin cell. The cell is 45 mm long in the photograph.

The real cell is 0.15 mm long.

Calculate the magnification of the photograph.

(2 marks)

Answer _____

3 Dev mounts some pollen from a grass flower on a glass slide that is 76 mm long. He draws one pollen grain.

- The pollen grain in his drawing is 40 mm wide.
- The real pollen grain is 0.025 mm wide.

Calculate the magnification of his drawing.

(2 marks)

Answer _____

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4 A hospital lab technician photographs a red blood cell. In the photograph the cell is 30 mm across.

The real cell is 7.5 µm across.

Calculate the magnification of the photograph.

(3 marks)

Answer _____

5 An electron micrograph shows a bacterium that is 18 mm long on the printed image.

The real bacterium is 3 µm long.

Calculate the magnification of the micrograph.

(3 marks)

Answer _____

6 A virus particle has a real diameter of 120 nm. In an electron micrograph the particle is 48 mm across.

1 mm = 1000 µm and 1 µm = 1000 nm.

Calculate the magnification of the micrograph. Give your answer in standard form.

(3 marks)

Answer _____

7 A mitochondrion is 27 mm long in an electron micrograph. The magnification of the micrograph is ×9000.

Calculate the real length of the mitochondrion in µm.

(3 marks)

Answer _____

8 A chloroplast in a moss leaf cell is 5 µm long. Chen is drawing it at a magnification of ×1500.

Calculate how long the chloroplast should be in his drawing, in mm.

(3 marks)

Answer _____

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9 A ribosome appears 20 mm wide in an electron micrograph. The magnification is ×800 000.

Calculate the real width of the ribosome in mm. Give your answer in standard form.

(3 marks)

Answer _____

10 A micrograph of a leaf has a scale bar labelled 20 µm. On the printed micrograph the scale bar is 40 mm long.

a. Calculate the magnification of the micrograph.

b. A guard cell on the same micrograph is 64 mm long. Calculate the real length of the guard cell in µm.

Show your working.

(4 marks)

Answer _____

11 Tomasz draws a root hair cell. His drawing is 90 mm long. The real cell is 0.15 mm long.

He writes: magnification = 0.15 ÷ 90 = 0.0017

a. Calculate the correct magnification of his drawing.

b. The nucleus in his drawing is 12 mm long. Calculate the real length of the nucleus in µm.

Show your working.

(4 marks)

Answer _____

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12 In an electron micrograph of a liver cell, a mitochondrion is 37 mm long. The magnification is ×24 000.

a. Calculate the real length of the mitochondrion in metres. Give your answer in standard form to 2 significant figures.

b. A bacterium is 3.2 μm long. Calculate how many times longer the bacterium is than the mitochondrion. Give your answer to 2 significant figures.

Show your working.

(5 marks)

Answer _____

End of questions | Total 37 marks

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