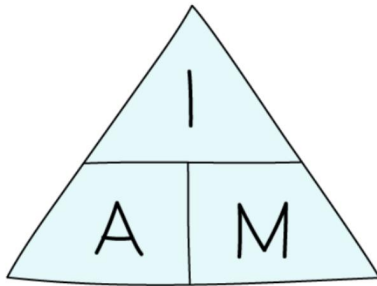


## Model Answers: Hard

Q1

The correct answer is **B** because you will be using the magnification equation to calculate your answer:



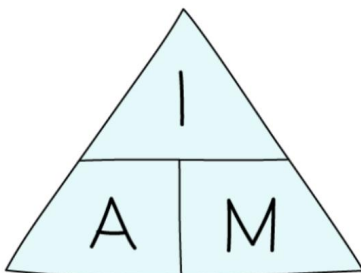
WHERE: I = IMAGE/DRAWING SIZE  
A = ACTUAL SIZE OF IMAGE  
M = MAGNIFICATION

- Whenever you carry out a magnification calculation, you need to make sure that your image measurement and actual measurement have the same unit (either  $\mu\text{m}$  or  $\text{mm}$ ).
- To convert  $\text{mm}$  into  $\mu\text{m}$  you need to multiply the figure by 1000.
- Magnification =  $\frac{\text{image size}}{\text{actual size}}$
- Magnification =  $\frac{83000}{450} = 184.4$

Q2

The correct answer is **D** because:

- To calculate the actual size of an image you need to use the equation:



WHERE: I = IMAGE/DRAWING SIZE  
A = ACTUAL SIZE OF IMAGE  
M = MAGNIFICATION

- $A = \frac{\text{image size}}{\text{magnification}}$
- $A = \frac{43}{2500} = 0.0172 \text{ mm}$
- To convert mm into  $\mu\text{m}$ , multiply the figure in mm by 1000.
- So,  $0.0172 \times 1000 = 17.2 \mu\text{m}$

Q3

The correct answer is **A** because mitochondria are usually slightly smaller than chloroplasts. Mitochondria have a highly folded internal membrane, whereas chloroplasts look like they contain stacks of pancakes (sometimes!).

Q4

The correct answer is **C** because:

- **X** is a chloroplast which contains chlorophyll, absorbing light for photosynthesis.
- **Z** is the nucleus where genetic information (in the form of chromosomes made from DNA) is stored.
- **Y** is the vacuole, storing a solution of salts and sugars.

To distinguish between chloroplasts and mitochondria, you should look at the inner membranes. The inner membrane of the mitochondrion is highly folded inwards, whereas chloroplasts have a more regular internal structure with stacks of membranes called thylakoids - shown as boxes in the sketch above.

Q5

The correct answer is **D** because:

- The primary function of xylem vessels is to transport water from the roots to the leaves. The movement of water is driven by the transpiration stream.
- Xylem also provides support to the plant as the cell walls of the vessels are strengthened with a polymer called lignin.