

Model Answers: Medium

1

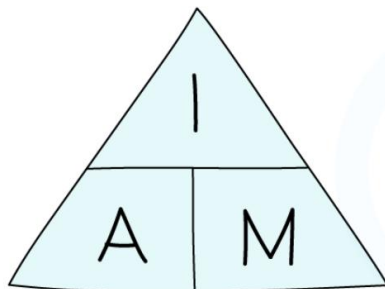
The correct answer is **C** because an electron microscope does not have a resolution as small as 0.05 nm.

All the other statements are correct about a light microscope and an electron microscope.

2

The correct answer is **D** because:

- To calculate magnification the following equation is used:



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

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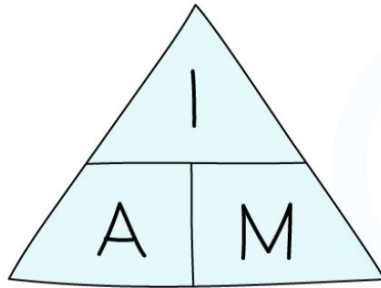


- Rearrange for image size $I = A \times M$
- To convert units from μm to mm, divide 50 000 by 1000, which equals 50
- Put 50 into standard form

3

The correct answer is **C** because:

- The equation for magnification is:



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

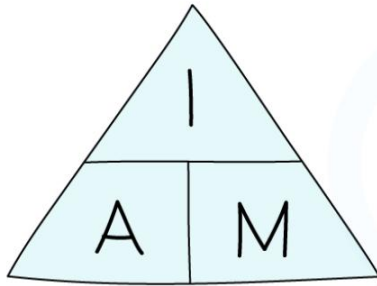
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- Step 1: Interpret information given:
 - Image size = 70 mm diameter
 - Measuring length of scale shows that 14 mm (length of scale bar) is equivalent to 5 μm , so actual diameter is 25 μm because:
 - $70\text{mm}/14\text{mm} = 5, 5 \times 5 \mu\text{m} = 25$
- Step 2: Choose equation arrangement:
 - Rearrange the equation to $M = I/A$
- Step 3: Ensure units I and A are the same:
 - Convert all units to smallest unit given, so $70 \text{ mm} \times 1000 = 70\,000 \mu\text{m}$
- Step 4: Substitute values into equation:
 - $M = 70\,000 / 25$
- Step 5: Determine answer:
 - Magnification is x2800

The correct answer is **B** because:

- The equation for magnification is:



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

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- Step 1: Interpret information given:
 - Image size = 10 mm diameter
 - Magnification is x200
- Step 2: Choose equation arrangement:
 - Rearrange the equation to $A = I/M$
- Step 3: Ensure units I and A are the same:
 - Convert all units to μm as lowest unit used , $10\text{mm} \times 1000 = 10\,000\ \mu\text{m}$
- Step 4: Substitute values into equation:
 - Substitute into equation $A = I/M = 10000 / 200$
- Step 5: Determine answer:
 - Actual size is $50\ \mu\text{m}$

5

The correct answer is **D** because:

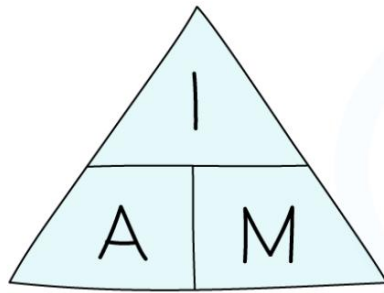
- Once the eyepiece is calibrated at the magnification to be used to observe the cell then the eyepiece graticule is used to measure the diameter of the cell.
- The number of eyepiece graticule units is then multiplied by the calibration.

A & B are incorrect as	the object is to be viewed with a x40 lens, so this is the lens that is needed for calibration.
C is incorrect as	mm to μm are converted by multiplying by 1000 or 10^3

6

The correct answer is **B** because:

- The equation for magnification is:



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

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- Step 1: Interpret information given:
 - Image size = 100 mm diameter
 - Scale shows 2 cm (20 mm) is 5 μm , actual size 25 μm as 100 mm / 20 mm = 5, 5 x 5 μm = 25 μm
- Step 2: Choose equation arrangement:
 - Rearrange the equation to $M = I/A$
- Step 3: Ensure units I and A are the same:
 - Convert all units to μm , so 100 mm x 1000 = 100 000 μm
- Step 4: Substitute values into equation:
 - Substitute into equation $M = 100\ 000 / 25$
- Step 5: Determine answer:
 - Magnification is x4000, in standard form = 4×10^3

7

The correct answer is **A** because:

- Convert all units to μm , so 7000 nm = 7 μm
- Compare the sizes; 35/7 = 5 times smaller than the pancreatic cells

8

The correct answer is **D** because:

- A micrometer (μm) is 1000 times smaller than 1 mm
- Alveoli and white blood cells are microscopic structures that would need to be measured in μm
- A nanometer (nm) is 1000 times smaller than 1 μm
- The width of cell walls would be measured in nm as this is a structure that surrounds a cell

A & B are incorrect as	alveoli are microscopic structures, measuring in mm would not give high enough accuracy.
C is incorrect as	measuring the width of the cell walls in μm would not provide a measurement with a high enough accuracy.

9

The correct answer is **D** because:

- The question states that it is a wet mount
- A wet mount involves suspending the specimen in water or oil
- This is an ideal method for observing living organisms such as aquatic animals

A is incorrect as	methylene blue is added to stain the specimen to provide contrast.
B is incorrect as	a coverslip will be used in most slide preparation techniques, not just a wet mount.
C is incorrect as	the lowest power lens would be used to focus the object regardless of the type of sample preparation used.