Answer on Question #71154, Physics / Optics

When we take an image from optical microscope suppose using 5x magnification of objective lens and eyepiece lens of 10x magnification, the image shows scale bar of micrometer. how does it gives value of 500 micrometer? Like when i use 10x objective lens, scale bar shows value of 200 micrometer

Solution:

Magnification of the image:

$k = \frac{H}{h}$ (1), where k is the magnification, H is the size of image, h is the actual size of object

In most micrographs, most measurements are expressed in micrometers.

Of (1) $\Rightarrow h = \frac{H}{k}$ (2)

Given: $k = 5 \times 10 = 50$, H=500 micrometers

Of (2) $\Rightarrow h = \frac{500 \text{ micrometers}}{50} = 10 \text{ micrometers}$

Given: $k = 10 \times 10 = 100$, H=200 micrometers

Of (2) $\Rightarrow h = \frac{200 \text{ micrometers}}{100} = 2 \text{ micrometers}$

Answer:

The actual sizes of object are

10 micrometers

2 micrometers