Microscope Calculations –Assignment

1. A microscope has an eyepiece lens with a power of 5X. The objective lens being used has a power of 10X.

Total magnification = Eyepiece x Objective
5 x 10 = 50x

2. A microscope has an eyepiece lens with a power of 15X. The objective lens being used has a power of 40X

Total magnification = 600x

3. A microscope has an eyepiece lens with a power of 10X. The objective lens being used has a power of 10X.

Total magnification = 100 x

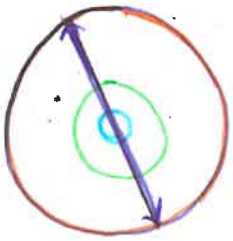
4. Sue observes a clear plastic, millimeter ruler under low power of her microscope. She sees three divisions of the ruler. What would be the field diameter of Sue's microscope on low power? (in micrometers ('µm') 1 mm = 1000 µm

5. Convert each of the following to micrometers (µm).

a) 3.5mm → 3500 µm
b) 4.0mm → 4000 µm
c) 1.5 cm → 15000 µm
d) 0.5 cm → 5000 µm

6. The following information is for a microscope which has an eyepiece lens (ocular lens) with a power of 10X:

Objective Lens	Power	Field Diameter
low	4X	3500 µm
medium	10X	?
high	40X	?



Using the information provided above, calculate the field diameter for medium and high power.

Medium F. of V. $\frac{\text{LP Mag}}{\text{MP Mag}} \times \frac{\text{L.P. Field of View}}{1} = \frac{4}{10} \times \frac{3500}{1}$

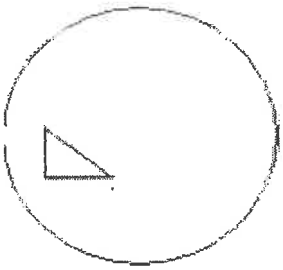
$= \frac{14000}{10}$

$= 1400\ \mu m$

High F. of V. $\frac{\text{L.P. Mag}}{\text{H.P. Mag}} \times \frac{\text{L.P. Field of View}}{1} = 350\ \mu m$

8. The diagrams below represent what can be seen through an imaginary microscope. You have been given information along with the diagrams. Using the information provided, calculate the size of the objects viewed.

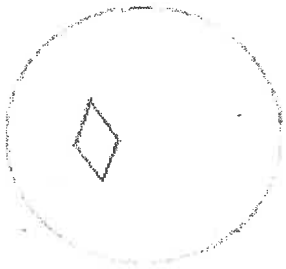
a) This triangicium is being viewed under medium power.
low power objective = 4X
medium power objective = 10X
high power objective = 40X
eyepiece = 5X
low power FOV = 4.2 mm = 4200um



a) Calculate Size of Medium F. of V.
$\frac{\text{L.P. Mag}}{\text{M.P. Mag}} \times \frac{\text{L.P. Field of View}}{1} = \frac{4}{10} \times \frac{4200}{1} = \frac{16800}{10}$
$= 1680\text{um}$

b) Calculate Size of Object (Longest Way)
$\text{Size} = \frac{\text{F of V}}{\#\text{across}}$
If you think 3 fit → $\frac{1680\text{um}}{3}$
$= 560\text{um}$
If you think 4 fit → $\frac{1680\text{um}}{4}$
← Anything Between → $= 420\text{um}$

b) This diamondogram is being viewed under high power.
low power objective = 5X
medium power objective = 40X
high power objective = 100X
eyepiece = 10X
low power FOV = 3.5mm



Size = 58.3um ↔ 43.8um