

**Microbiology 2730**  
**Study Guide #1**  
**Winter Semester 2008**  
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## **LABORATORY SECTION**

### **INTRODUCTION: THE COMPOUND MICROSCOPE**

**Textbook reference for this set of questions is chapter 3**  
**Also see, the introductory materials of the microscope exercise in your laboratory manual**

1. In discussing light microscopes, it was noted that 2 basic forms exist, the simple and compound microscope. Describe the major difference between them. What type of microscope is employed in this laboratory?
2. What is the formula for the calculation of total magnification capacity of a microscope?
3. Using the above formula, fill in the following table.

**Ocular magnification**  
**Total Magnification**

**Objective magnification**

5X	15X	
10X		200X
	30X	300X

4. What are the 2 major factors, which control the resolving power of a microscope? What is the relationship between these factors in the determination of resolving power (State the formula utilized for the determination of resolving power)?
5. As the resolving power of a microscope improves or get better, what in general happens to the clarity of the image?
6. Which is the “better” resolving power, 0.80um (micrometer) or 0.60um? How does a micrometer (um) relate to a millimeter and a meter?

7. The highest power objective of your microscope utilizes a substance known as immersion oil for proper operation. What major effect does this oil have on the operation of the microscope?
8. If the optical system of a microscope has a resolving power of 1 micrometer, objects that are 1 micrometer or greater apart, will appear as \_\_\_\_, while those closer than 1 micrometer will appear as \_\_\_\_.
9. You were introduced to the concept of depth of field in relation to the various objectives of your microscope. If your microscope were to have a depth of field of 1 millimeter when the scanning power objective was being utilized, what would this tell you about your microscope?
10. What happens to the depth of field of the optical system of your microscope as you change objectives moving from the scanning objective to the oil immersion objective?
11. A student can focus his specimen sharply when using 40X, 100X and 400X level of magnification. The student complains that when he switches from 400X level of magnification to 1000X, he can not seem to find his specimen. What is the most likely explanation for this difficulty?

## LECTURE SECTION

**The textbook reference for this set of questions is Chapter 1**

1. You were introduced to a very brief history of the development of the science of microbiology. This history centered on the work of Leeuwenhoek, Pasteur, and Koch.
  - a. A. Leeuwenhoek.
    1. What major contribution has this individual made to microbiology that got him included in my history?
    2. Why did he make his observations?
    3. What (now world famous) scientific society did he communicate his observations to?

## b. L. Pasteur

1. This, famous Frenchman, now always associated with microbiology, was actually trained as a \_\_\_\_ (type of scientist)
2. You were introduced to 3 (of many) areas of Pasteur's scientific inquiries. One of those centered on the request of one of his fellow Frenchmen, a certain, Mr. Bigo.
  - a. This gentleman made is living by producing one material?
  - b. Why did he come to see Pasteur?
  - c. What was Pasteur's solution to his problem?
  - d. I used this work to illustrate Pasteur's role in establishing what today one would call \_\_\_\_ microbiology?
3. Pasteur's wide-ranging studies of microbes resulted in a now famous, 1864 presentation at the Sorbonne, in Paris.
  - a. This presentation involved Pasteur's view on what topic?
  - b. What was Pasteur's view on this issue?
  - c. You should be able to describe (a sketch will do) the now famous piece of glassware that Pasteur used in these studies.
  - d. You should be able to explain how the above piece of equipment "worked".
  - e. Of what general value to the field of medicine was this work?
  - f. Of what general value to the field of Biology (The study of life) was this work?
4. My last comments on Pasteur dealt with some experimental work that he undertook in 1865 as the request of one of his former teachers, Mr. Dumas.
  - a. What problem resulted in Pasteur getting a visit from Dumas?
  - b. This problem results in the death of what kind of animal?
  - c. What was Pasteur's conclusion concerning the nature of the causative agent of this illness?
  - d. Pasteur's work in this area was cited because of its role in providing significant support of what is usually called the \_\_\_\_ Theory of Disease.