

EXERCISE # 1**INTRODUCTION TO MICROSCOPE:**

A microscope (from the Greek: *mikrós*, "small" and *skopeîn*, "to look" or "see") is an instrument used to see objects that are too small for the naked eye.

MICROSCOPY:

The science of investigating small objects using such an instrument is called microscopy. Microscopic means invisible to the eye unless aided by a microscope.

MAGNIFICATION:

For calculation of the total magnification when viewing an image with a light microscope, first take the power of the objective lens which is at 4x, 10x or 40x and then multiply it by the power of the eyepiece which is generally 10x. It means, a 10x eyepiece used with a 40x objective lens, will produce a magnification of 400x. Magnification is a measure of increase in diameter of an object.

RESOLUTION:

Resolution means the degree of detail. Resolving Power may be described as the ability to measure the separation of images that are close together. The shorter wavelength ensures increased resolution.

PRINCIPLE OF WORKING:**MAGNIFICATION SYSTEM:**

Stereo microscopes have two major types of magnification systems. One fixed magnification and other zoom magnification. Primary magnification is a part of fixed magnification which is achieved by set of objective lenses with a set degree of magnification. While with Zoom magnification, range of magnification is already set and magnification can be continuously changed within that range. If one wants more magnification of the object, it can be achieved by using auxiliary objectives that increase total magnification by a set factor. By changing the eyepiece, one can increase or decrease total magnification of both fixed and zoom system. In between these two magnifications, there are fixed-focus convex lenses that are arranged so to achieve the fixed magnification. This system is called "Galilean optical system". But the difference to fixed magnification is that if same arrangement of these convex lenses is physically inverted one will get the different magnification. So to get two different magnifications, same set of lenses can be used; two sets of lenses will provide four magnifications and so on. Galilean optical system is a good replacement of expensive zoom magnification system.

ILLUMINATION:

Fiber optic light source with halogen lamps is used to illuminate specimen which gives high light output for a given power input. Many other light stalks are also used for the same specimen, so increasing the illumination yet further.

VIEWING HEADS:

- 1. MONOCULAR**
- 2. BINOCULAR**
- 3. TRINOCULAR**

1. MONOCULAR

The use of only one eyepiece when viewing the specimen. The monocular microscopes are light weight and inexpensive.

2. BINOCULAR

A microscope having two eyepieces. It is most comfortable to use as a common choice.

3. TRINOCULAR

It has a third eyepiece tube that can be used by another person simultaneously or by a CCD camera. The trinocular option is more expensive than monocular or binocular.

CARE AND WISE USE OF MICROSCOPES

1. Ever hold a microscope firmly by the stand, only. Don't catch it by the eyepiece holder.
2. When to unplug the illuminator; hold the plug (not the cable).
3. After completion of lab work, turn the illuminator off.
4. The stage and lenses should be cleaned before putting away the microscope.
5. Always use a good quality lens tissue or a cotton swab (100% natural cotton) to clean an optical surface. Appropriate lens cleaner or distilled water may be used to help remove dried material. Organic solvents will damage the lens coatings.
6. Cover the microscope with a dust cover when it is not in use.
7. Try to focus smoothly and lightly. Increased resistance during focusing shows that you have reached a limit.

QUESTION # 1 Which is the most preferable microscope for daily use?

QUESTION # 2 What is Microscope?

QUESTION # 3 Differentiate between uni, bi and trinocular?