



L&BROTORY INSTUMENT&TION &ND TECHNIQUES

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LECTURE ONE INTRODUCTION & TYPE OF MICROSCOPE

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Laboratory Instrument is any implement, tool, or utensil used for laboratory test. An instrument is a device that measures a physical quantity, such as flow, concentration, temperature, level, distance, angle, or pressure. Instruments may be as simple as direct reading hand-held thermometers or as complex as multi-variable process analyzers. Medical instrument is a device used to diagnose or treat diseases. A tool or device used for a particular purpose; especially: a tool or device designed to do careful and exact work. A device that measures something.

Laboratory equipment, the measuring tools used in a scientific laboratory, often electronic in nature. Laboratory equipment refers to the various tools and equipment used by scientists working in a laboratory. Laboratory equipment is generally used to either perform an experiment or to take measurements and gather data. Larger or more sophisticated equipment is generally called a scientific instrument. Both laboratory equipment and scientific instruments are increasingly being designed and shared using open hardware principles.The classical equipment includes tools such as Bunsen burners and microscopes as well as specialty equipment such as operant conditioning chambers, spectrophotometers and calorimeters.

Laboratory techniques are the sum of procedures used on pure and applied sciences in order to conduct an experiment, all of them follow scientific method; while some of them involves the use of complex laboratory equipment from laboratory glassware to electrical devices others require such specific or expensive supplies. **Microscopes:** is an important device that produces a magnified image of objects too small to be seen with the naked eye .The microscope is widely used in medicine and biology

Types of microscope :

1-Light microscope : The types of light microscope Including

A- Bright - field microscope: It used to view stained

or naturally pigmented specimens .The name "bright field" is derived from the fact that the specimen is dark and contrasted by the surrounding bright view ingfield. Simple light microscopes are sometimes referred to as bright field microscopes

B- Dark - field microscopy: is used to illuminate

unstained samples causing them to appear brightly lit against a dark background. This type of microscope contains a special condenser that scatters light and causes it to reflect off the specimen at an angle. C -Ultraviolet microscope: It has quartz lenses and slides and uses ultraviolet radiation as the illumination. The use of shorter wavelengths than the visible range enables the instrument to resolve smaller objects and to provide greater magnification than the normal optical microscope.

D-Fluorescent microscope : It used to examine material that fluoresces under ultraviolet light. Fluorescence microscopy is based on the principle that fluorescent materials emit visible light when they are irradiated with ultraviolet rays or with violet-blue visible rays.

E - Phase contrast microscope: Transparent microorganisms suspended in a fluid may be difficult and sometimes impossible to see.

One method of making them more visible is to use phase contrast

Phase contrast is useful for examiningUnstained bacteria : cholera vibrios in specimens and cultures

; Amoebae in faecal preparations, Cerebrospinal fluid, lymph gland fluid, Urine sediments

2- Electronic microscope: These types are : A- Scanning electron microscope (SEM): This microscope helps in viewing three-dimensional images of microorganisms and other specimens. Gold and palladium is used to stain the specimens mounted on a scanning electron microscope

- **B-Transmission electron microscope (TEM) :** is used to study cells. Ultrathin slices of microorganisms like viruses are placed on a wire grid, then these cells are stained with gold or palladium and then used to observe under a transmission electron microscope. The electron beam is deflected on the densely coated parts of the cells and the image is observed on dark
- and light background