

1,A light microscope uses focused light and lenses to magnify a specimen. In this way, a light microscope is much like a telescope, except that instead of being very large and very far away, it is very small and very close to the specimen. Light microscopes send light through a path that first focuses the light into a point, then passes that light through a sample, which creates an image. That image then passes through one or more lenses to magnify it until it reaches the user's eye or camera. Because light needs to pass through the sample, it must be very thin. Most cells (bacterial or otherwise) are both small and transparent, so light can easily pass through them. Light microscopes can come in several types. Simple microscope use a single lens to magnify an object and cannot reach high magnification. Compound light microscope use two sets of lenses - an objective and an eyepiece - to produce images. Monocular microscopes have one eyepiece, while binocular microscopes have two eyepieces and reduce eye strain.

2a,A Centrifuge is a piece of equipment that puts an object in rotation around a central axis (spins it in a circle), applying a force perpendicular to the axis of rotation. The force can be very strong. The centrifuge works using the sedimentation principle. Centrifugal acceleration causes denser substances and particles to move outward in the radial direction. At the same time, objects that are less dense are displaced toward the center. In a laboratory centrifuge that uses sample tubes, the radial acceleration causes denser particles to settle to the bottom of the tube, while low-density substances rise to the top. There are three types of centrifuge designed for different applications. Industrial scale centrifuges are commonly used in manufacturing for processes such as processing to sediment suspended solids or to separate immiscible liquids. A cream separator is the cream separator found in dairies. Very high speed centrifuges are able to provide very high accelerations can separate fine particles down to the nanoscale, and molecules of different masses. Large centrifuges are used to simulate microgravity or acceleration environments (for example, high G training for astronauts). Medium-sized centrifuges are used in washing machines and at some times used to draw water out of fabrics. Gas centrifuge are used for isotope separation to enrich nuclear fuel for fissile isotopes.

***PRINCIPLE;**The centrifuge works using the sedimentation principle, where centrifugal acceleration causes denser substances and particles to move outward in the radial direction. At the same time, objects that are less dense are displaced toward the center. In a laboratory centrifuge that uses sample tubes, the radial acceleration causes denser particles to settle to the bottom of the tube, while low-density substances rise to the top.

***Brand;**

- LABORATORY CENTRIFUGE / MEDICAL / BENCHTOP / HIGH-PERFORMANCE
ROTOFIX 32 A
- BLOOD BANK CENTRIFUGE / FOR BIOLOGY
/ MEDICAL / LABORATORY
EXCELSA® I 2206

EBA 270

***Care and maintenance;**

- Always place the centrifuge on a flat surface first.
- Always unplug the power cord before cleaning.
- Emergency phone numbers and procedures should be posted and kept up to date
- Wear disposable gloves when cleaning the centrifuge
- Follow your facility's safety procedures when cleaning and disinfecting the centrifuge
- Plug in centrifuge only when completely dry.
- Clean the centrifuge daily, or at least weekly.
- Remove the rotor and any sample or container holders.

2b,An automatic tissue processor is a device that prepares tissue samples for sectioning and microscopic examination in the diagnostic laboratory. This automatic tissue processor combines proven technology and modern design, for automated animal and human tissue processing. There are twelve cylinders in this device, nine glass cylinders and three wax cylinders which are twelve processing stages. Barrier probe automatic control program operation and intelligent temperature control system make the operation more convenient. Supports multiple languages .

***PRINCIPLE;**The tissue basket oscillates up and down in each station at three-second intervals to ensure thorough and even mixing of the reagents and optimum tissue infiltration. Infiltration time is separately programmable for each station. Up to nine programs may be run with immediate or delayed starting times. When it's time for tissue to be transferred to the next beaker or jar, the cover of the machine is raised up, and the lifting mechanism carefully removes the tissue basket and gently transfers it to the next beaker. When the infiltration time for any

particular station is exceeded a warning message will display, indicating the station number and excess time. Controls are arranged by functionality with an LCD to indicate operational parameters. Reagent container lids have seals to minimize operator exposure to hazardous fumes. Tissue basket immediately immerses in a station in the

event of power loss to protect samples from drying out. When power is restored, program will resume. In the event of long-term power failure, wax is liquified. Capacity of tissue basket is 80 cassettes. Vacuum configurations hasten infiltration, allowing pressure to be applied to any station in either manual or automatic operation. Fume control configurations extract fumes with a fan and pass them through an internal carbon filter.

For added efficiency, these models feature a two-part containment shield over the reagent container platform.

BRAND;

●AUTOMATIC SAMPLE PREPARATION SYSTEM / FOR HISTOLOGY / TISSUE PROCESSOR BENCHTOP MTP

●AUTOMATIC SAMPLE PREPARATION SYSTEM / FOR HISTOLOGY / TISSUE PROCESSOR EMBEDDING MPS_P1

● AUTOMATIC SAMPLE PREPARATION SYSTEM / FOR HISTOLOGY / TISSUE / PARAFFIN EMBEDDING MPS_P2

CARE AND MAINTENANCE;

- caution when handling reagents
- Use of proper cleaning reagents to clean the tissue processor
- servicing the tissue processor at least once a year
- Donot Smoke drink or eat in areas where specimen are handled
- PPE should be worn
- cleaning of of the tissue processor after use
- Patient specimen should be handled as biohazards.

2c, Microtome is a mechanical instrument used to cut biological specimens into very thin segments for microscopic examination.

Biological specimens can be embedded and presented in many ways for sectioning. But more often, these specimens are embedded in paraffin wax blocks and the commonest way of sectioning these specimens is achieved by the microtome. The earliest form of the microtome enabled free hand sectioning of fresh or fixed material using a sharp razor. Modern microtomes are precision instruments designed to cut uniformly thin sections of a variety of materials for detailed microscopic examination. Central to the production of good sections is the microtome knife. Microtomy virtually begins and ends with a sharp, blemish-free cutting edge. The introduction of disposable blades has made easier the production of good quality, thin sections, but they are often unsatisfactory for sectioning harder tissues, especially bone. A sharp knife edge free from imperfections is essential for the production of good sections. Since many types of microtomes are commercially available in the market, choosing the right microtome is essential for producing the best result as required. A classification is proposed that unifies and organizes the various microtomes based on the mode of operation.

Types of microtome ;•

- Rotary Microtome.
- Freezing Microtome.

- Rotary Senior Microtome.
- Cryostat Microtome.
- Wood Microtome.
- Sliding Microtome.

Principle ; Microtome is a sectioning instrument that allows the cutting of extremely thin slices of a material known as section. Microtome are used in microscopy , allowing for the preparation of sample for observation under transmitted light or electrons radiation .

Brands;

- ROTARY MICROTOME / SEMI-AUTOMATIC CUT 5062
- ROTARY MICROTOME / AUTOMATIC CUT 6062
- ROTARY MICROTOME / AUTOMATIC / PROGRAMMABLE / WITH KEYBOARD

Care and maintenance;

- Donot leave the microtome unattended with an exposed knife/blade in position
- Donot carry knife / blade unless secure in the Packet provided
- Always clean the microtome after use
- Use appropriate cleaning reagent when cleaning the microtome
- Make sure the surrounding area is clean and free from sharp objects
- Clean the section waste tray with a dry brush

DIAGRAM ILLUSTRATING THE PHYSICS OF LIGHT MICROSCOPE

