

**Paper =**

**Biomedical instrumentation**

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**Q:1 what is microscope? And also explain principal of microscope?**

**Answer=**

**Microscope =**

**Micro=means small**

**Scopes=means to see**

**Microscope is instrument through which small things can be seen larger.**

**OR**

**“microscope is used to magnify a small object several times bigger visible by naked eye.**

**Principal of microscope =**

**There are based on three features**

**(Lenses are arrange in sequence)**

**1) Magnification =**

**Magnification is a principal of microscope to enlarge the image.**

**2) Resolution=**

**Resolution is the second principle of microscope to separate the details of two object /image.**

**3) contrast=**

**Difference in light intensity between image and background intensity to produce the details visible to eye.**

**Q:2 Describe chromatography and also it's phases?**

**Answer=**

**Chroma means "color" graphy means "trace or plot " measure or draw up etc.**

**"the separation of a mixture by passing it in solution or suspension or as a vapor (as in gas chromatography ) through as medium in which the components move in different rates".**

**In 9<sup>th</sup> century Dr Mikhail S. Tsvet invented a system similar to paper chromatography.**

**Phases of chromatography =**

**It consists of two phase.**

**1) Mobile phase      2)stationary phase**

**1) Mobile phase =**

**Solvent molecules which carries the analyte (sample).**

**The mobile phase flow through the stationary phase and carries the components of the mixture with it.**

**2) Stationary phase =**

**The substance on which adsorption of the analyte take place.**

**Typically ,the stationary phase is a porous solid (e. g: glass, silica or alumina,) that is packed into a glass or metal tube or that constitutes the walls of an open- tube capillary.**

**Q:3 write down the application of flame-photo-meter?**

**Answer =**

**Application of flame photo meter=**

**= its determine the concentration of sodium and potassium ions in infusion solution or other.**

**= flame photometry are mostly used for the quantitative estimation of Sodium Potassium and Calcium etc.**

**= In field of forming and agriculture this technique is applied for soil analysis to check the fertilizer requirement.**

**=In food industry the monitoring compliance with sodium and potassium limit in food. In the production of pre-milk ,pre-food and**

pre-powder, the quality can also be controlled and monitored with flame photo meter.

= In cement industry the review of sodium, potassium and calcium content in the construction and cement industry.

=In beverages industry, the soft drink and fruit Juices can be analyzed by using flame photometer.

**Q:4 Explain the components of centrifuge ?**

**Answer =**

**Centrifuge =**

**Centrifuge come from latin word "centrum" which means "center" and "fug" to "escape"**

**"A centrifuge is a device used for separating particles from solution according to their size, shape, speed, density etc".**

**Components of centrifuge =**

**1) Rotor=**

**(Rotor is a head of the centrifuge )**

**2) Drive shaft =**

**The main function of shaft in centrifugal pump is to transmit the input power.**

**3) Motor=**

**Motor provide the power to turn the rotor.**

**4) Hanging buckets =**

**Hanging buckets works to hang the tubes.**

**5) Power switch =**

**We provide electric current to centrifuge.**

**6) Timer=**

**We note time for tube in the centrifuge.**

**7) Tachometer =**

**We can checked the speed by tachometer**

**8) Brake=**

**We can stop the centrifuge.**

**Q:5 write note on water bath?**

**Answer =**

**Water bath=**

**Water bath is a device used in laboratories to incubate sample in water maintained at a constant temperature.**

**The water bath permits the occurrence of a period constant temperature (up-to 100c') for long time period.**

**Available in range of capacity from 2 liters to 28 liters.**

**It also prevent excessive evaporation of the fluid being heated.**

**The water bath has evolved from a simple heated vessel an instrument.**

**Components of water bath=**

**1) Vessel or trough=**

**Vessel or trough are insulated metal.**

(usually made up of Stainless Steel)

2) Electric element =

An electric element to heat the water the water contained in the trough.

3) Propeller or stirrer=

A propeller or stirrer to circulate the water in the trough in order to maintain a uniform temperature throughout the trough.

4) Thermometer =

A thermometer to check the temperature. This may be in-built or placed separately in the trough.

5) Thermostat =

A thermostat to maintain the temperature at a constant level.

Uses of water bath =

=A water bath provide indirect heat.

= used for warming blood bag blood.

Used for incubation of test such as, PT, APTT, and coombs test.

Q:6 Explain the types of centrifuge?

Answer =

Types of centrifuge =

There are many types of centrifuge such as,

=Small bench centrifuge (low speed)

=Large capacity refrigerated centrifugal

**=ultra capacity (preparative ultra centrifuge**

**(used for separating particles according to densities)**

**=Analytical centrifuge ( very high speed spinning used in molecular biology)**

**Rotor base types of centrifuge =**

**1) swinging bucket rotor=**

**= vertical position at the rest.**

**= During acceleration of rotor swingout horizontal.**

**2) Fixed angle rotor =**

**= The body of rotor set at fixed angle.**

**Fixed angle rotor between 14 and 40 to vertical.**

**3) Vertical tube rotor =**

**= the tubes are aligned vertically in the body rotors at all time parallel position.**