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**Paper:- lab Instrumentation**

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**Ans no 1:**-

**PH Meter:**-

**Def.**

It is a device which is used for the meaurement of PH of solution.

Through PH meter we can measure the acidity and alkalinity of fluid.

**2.Vortex Mixer:**-

**Def.**

The device with the help of which we can mix small virals of liquid in laboratories.

**3.Blance:**-

**Def.**

The balance is weighing scale is a device for the measrement of mass of an object.

The weight of substance between 0.01 to 500mg.

**4.WaterStill:-**

**Def.**

Water still is a device which is used for the purification of water.

It work on principle of Distillation.

**5.Deionize:**-

**Def.**

This is an instrument which is used for the purification of water by a chemical process called ion exchange resins.

It work on principle deionization.

**Ans no 2:-**

**Electrophoresis:-**

The term electrophoresis is mean migration with the electricity.

Def:- Electrophoresis is the study of movement of charge particles i.e DNA,RNA protien under the influence electric field is called electrophoresis.

* **History:-**

The theory about electrophoresis was given by the prof.Fredinand by doing experiment on the movement or migration of clay particles.

* **Principles:-**

The speed of molecule depends upon the charge shape and size of molecule.it should keep in mind that all charges molecule having charge so, the positive charge molecule move toward cathode and vice versa(anode).

**Component:**

Here we will only discuss the basic material used in the separation of protein,RNA and DNA.

Some major component are given below.

* Gel casting assembly
* Electrophoresis tank
* Power supply
* Glass plate to hold the gel

Comb to load sample in the gel before solidification.

**Importance of electrophoresis:-**

* Use in DNA finger printing
* Also used in DNA patemity testing
* Also useful in criminalogy or forensic study .
* It is very useful in molecular biology
* Also commennly used in DNA sequencing.
* Purification and analysis of vaccine.

**Ans 3. Flowcytometry:-**

Def.the technique which is used for measurement of physical structure and chemical properties of a cell.

**Explanation:**  in this machine machine a fluid system is present (saline reagents ( from which a single cell can pass at a time.then laser light is passed which is detected by machine and tell us about physical and chemical properties of cell . through this machine we can study blood sample from bone marrow and lymph node.

**Principles of flowcytometry:**-it work on hydrodynamic focusing principles.

**Component of flowcytometry:-**

**1.the flow system.**

It is also called fluidic speed .these fluid make the sample diluted which can pass easily from laser.

**2.optical system:**-also called light sensing system.in this system scattered are fixed which involved in scattering of coming light.

**A.farwrd scattered**

**B side scattered**

**3.electronic system.**the light which is emit from optical system will convert and will give values in digital form and tell us about number of cells.

**Application of flowcytometry:**

1.it tell us about cell surface marker (Hiv cell, cytokine)

2.tell us about structure and about demage DNA.

3.about numbers of DNA

4.tell us about pigments cells

5.tell us about enzymatic activity inside our body

6.it is multiparamitic that’s why we uses

7.. useful to know about chemical and physical properties of cell.

**Ans 4. Calorimetry:-** the most common analytical technique used in biochemical estimation in clinical laboratories.

A substance to be estimated calorimetrically must be coloured forming chromogen through addition of reagents.

**Calorimetry principles:-** when a monochromatic light is passed from color solution some particular wave length of light is absorb which is related to color intensity.

The amount of light aborbed or transmitted according to beer and lambert law.

**Beer law:**

When the monchromatic light is passed through a color solution amount of light transmitted decrease with increase in concentration of color substance.

**Lambert law:-**

This law state that the amount of light is decrease exponentially with increase of path length (diameter)

Of the or thickness of color solution through which light is passed.

**Application/use of beer . lambert law:-**

**1.**it is mostly and widely used for estimation of bio chemical sample like plasma,serum , cerebrospinal fluid and urine.

**2.it** is useful to the quantative estimation of serum components also glucose, protein and other various compounds.

**3.**also used in food and textiles industry.

**Ans no 5. autoclave (sterilizer):-**

**Def**.this is pressurized device which is designed to heat the aqous solution above to the boiling point at normal atmospheric pressure to achieve the sterilization process.

**History:**

This instrument was for the first time developed by Dr.denis papin in it’s crude form and was called steam digester .the steam digester was fore runner of labortory auto clave invented in 1899 by Dr .Charles while working with loius paster .

Auto\_self

Clavis\_ self locking device.

**Components :**-there are some components which are given below.

**1.chamber.**

This is the part of autoclave in which items to be sterilized.

**2.control pannel.**

Thispart **is** involved in controling of auto claving process.

**3.Air pump .**

system.Air pump is involving in the removel of air in chamber and also create a vacume.

**4.pressure gauge.**

This is gauge on which pressure is showen .

**5.pressure knob.**

It is involved in the discharge of pressure ,desired time and temperature.

**6.saftey handle.**

It is the most important part which is attached to safety lid used for safety.

**Principles:-**

We know that when vapour pressure is equal to the pressure of surrounding of atmosphere .the temperature at sea level is 100 degree centigrade .when water is boiled with in close vessel at Increases the pressure

The boiling point of temperature is increased of steam produced.

This principle is employed in the sterilizing material by steam at temperature higher then 100 centigrade and this process is called autoclaving.

**Importance ) uses of autoclave:-**

* To sterilized material for culture.
* It is also used to sterilize dentil instrument and surgical instrument
* Plastic tube and pipette tips.
* Solution and water
* Also used in biohadrous waste
* Animals food and bedding.

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