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**Date 22nd June 2020**

Q1) Find the following

1. PH Meter
2. Vortex Mixer
3. Balance
4. Water still
5. De-ionizer

**Answer:**

1. **PH METER**

**HISTORY: -**

PH Meter was first use by American chemist Arnold\_o\_Backman to measure the PH of lemon.

**PH METER: -**

 it is a device used for the measurement of a Ph Solution to check the solution acidity or basicity.

* Output devices like galvanometer in which the values are mentioned to check the solution acidity or basidty. It is also used commercially and laboratory.
* Its also used in laboratory to identify the labourtries chemical PH. Like water beverages, washing powder PH.

it is a device used for the measurement of a Ph Solution to check the solution acidity or basicity.

**EXAMPLE**

Urine/RE

1. **VORTEX MIXER: -**

Vortex mixer is a simple device used in labourtries for mixing of any solution, reagent, or liquid.

**COMPONENTS**

* Power Supply
* Electric Motor
* Drive Shaft
* Cupped rubber pieces

**PRINCIPLE:**

As the motor runs the rubber piece oscillate rapidly in a circular motion. When a test tube or other appropriate container is pressed into the rubber cap. The motion is transmitted to liquid inside and vortex is created.

* Two type of Vortex Mixer
* Continuously vortex mixer
* When down pressure is applied its start

**USES**

Use to mix different regent or samples.

1. **BALANCE: -**

A weighting scale is a device used in labourtries for Measuring weight.

**ANALYTICAL BALANCE: -**

 Analytical balance is found throughout labourtries mostly used to weight substance and sample between 00.1 to 500 milligrams.

1. **WATER STILL:**

A labourtries instrument used for the purification of water and it is also called distillers. Its works first heating water until it run into steam. The collecting the steam in tubes or a glass plate and purified water droplets that can be collecting a clean vessel.

1. **DE-IONIZER:**

De-ionizer is a Labourtries instrument used for the purification of water.

**PRINCIPLE:**

Its works on Principle of De-ionization. It is a chemical process their uses specially manufactured ion Exchange reign’s which exchange hydrogen and hydroxide ion for dissolved minerals and then recombine to from water. Water has had almost all its minerals and anion. Such as chloride and sulphate.

**Q2) Describe Electrophoresis and Importance?**

**Answer:**

**HISTORY:**

Electrophoresis was proposed by first time in 1807 by Professor Ferdinand observed the clay particles dispersed water to migrate on applying electric field and the named Electrophoresis was coined by Doctor Micharelis almost 100 years.

**ELECTROPHORESIS:**

It is a technique commonly used in lab to separate charged molecule. Like DNA according to size.

OR

Electrophoresis is the study of movement of charged particles in an electric field. Like (DNA, RNA, Proteins) with the help of electricity.

**PRINCIPLE**

Molecules moves with the speed depends on their charge, Shapes and size and get separated in the presence of electric field. All molecule posies certain amount of positive or negative charge so when electric current is applied positively charged molecules moves towards cathode a=while negative charged molecules moves to anode.

**IMPORTANCE ELECTROPHORESIS**

* It is used in DNA finger Printing.
* Also used in paternity testing.
* In Forensic study (criminology).
* Mostly use full in genetics and molecular biology study
* DNA sequencing
* Purification and analysis of vaccine

**Q3) Write a note on Flow cytometry?**

**Answer:**

Flow cytometry is a technology used to analysis chemical and physical characteristics of a particles in fluid as is pass through at least on laser.

Up to thousand particles can be analysis

Parts of Flow cytometry

**FLUIDICS**

* The purpose of fluidics is to transport particles in stem to lesser beam
* The design of flow chamber allows the sample core to focus on the center sheath

**OPTICS SYSTEM**

* This system includes collection system and excitation system
* The optical system a focused laser which scatter light and emit that is filtered and collected

**ELECTRONIC SYSTEM**

* This is used convert signals from detector into digital signals so then can be read by computer.

**USES**

* Used in laboratory for malignancy
* Used in transplantation (MHC) Hematology
* Apoptosis and Necrosis can be detected by Flow cytometry

**Q4) what do you know about beer’s and lambert law (Uses, Principles)?**

**Answer:**

 **BEER’S LAW**

 This law state that when a monochromic light passes through a colored solution amount of light transmitted decreases exponentially with increase in concentration of colored substance.

Concentration and absorption are directly proportional to each other.

**LAMBERT’S LAW**

The amount of light transmitted decrease exponentiation with increase in diameter of cuvette or

Thickness of color solution through which light passes.

**USES**

* The relation may be used to determine the concentration of a chemical species in a solution using a colorimeter or spectrophotometer.
* The relation is most often used in UV visible absorption spectroscopy.
* Use correct type of cuvette
* Remove the cuvette when not in use

**PRINCIPLES**

The color emitter is based on beer’s lambert’s law according to which the absorption of light transmitted through the medium is directly proportional to the medium concentration

A colorimeter beam of light with a specific wavelength is passed through a solution via a series of lances which navigate the colored light to the measuring device the analysis the colored compared to an exiting standard. A micro processer then calculate the absorbance or percent transmittance if the concentration of the solution is greater more light will be absorb which can be identified by measuring the difference between the amount of light at its origin and that after passing the solution .

**Q5) Explain autoclave its uses and components?**

**Answer:**

**AUTO CLAVE:**

Autoclave is a device used to remove microorganism and spores using high temperature steam sterilization. It is used to clean equipment and make them bacteria-free. This is done by the extreme high pressure and steam to clean this equipment which are placed inside them.

**DEVELOPED:**

This instrument was first developed in its crude form by Dr Denis papain in 1979and named it as a steam digester

**USES OF AUTOCLAVE**

It is useful for media containing water that cannot be sterilized by dry heat. Following are the method of choice for sterilizing:

1. Use as a culture media, Surgical instruments
2. Plastic tubes and pipette tips
3. Autoclavable plastic containers
4. Biohazardous waste
5. Solution and water
6. Glassware

**COMPONENT OF AUTO CLAVE**

The following are the components/parts of the autoclave explain as below:

**CHAMBER**

The first part of the autoclave, where the material is placed for sterilization. They are different in size, from 100L to 3000L and have two chamber that is inner as well as an outer. The outer chamber is known as a ‘jacket’, which is filled with steam to reduce sterilization time.

 **DOOR**

The second part is the door and its purpose are to seal off the outside atmosphere. This allows the material inside the chamber to be sterilized properly.

**WASTEWATER COOLER**

Almost all the autoclaves have a system that cools any wastewater before it enters the drain. This is done as because to avoid damage to the drain piping at the laboratory.