**Name: Mushtaq ullah ID: 15188 Instructor: M.s Saima Hadi subject: Lab instrumentation (INU) Peshawar**

**Q1:**

**Answer:** **PH meter**

* PH meter is a device used for commonly laboratory.
* That measure the concentration of the hydrogen ions (H) in a solution.
* Or measure the acidity and alkaline of a fluid.
* Discover by American chemist Arnold O.Beckman in 1934.
* PH the degree of acidity or alkaline.

**Vortex mixer**

* Is a simple device used commonly laboratories.
* Also called vortexer.
* That use to mix small vial of liquid.
* Which consist of power supply, electric motor,
* Drive shaft, cupped rubber piece.

**Balance**

* Balance is a device used for measuring weight.
* Also called weighing scale.
* Measure the mass of an object.
* Two types of balance.
* Analytical balance
* Lab balance
* Mostly used to weight substances and samples between 0.01 to 500 milligram.

**Water still**

* Is mechanism used for laboratory?
* Commonly used for purification of water.
* Or a level section of a waterway.
* No current visible for the water still.
* **Distillation**: is a process in which to separating the component.
* Which consist of still heat, source of heat, cooling water, still pot, condenser, etc.

**Deionizer**

* Recombine form water.
* Is a mechanism used in commonly laboratory?
* Most used for purification of water.
* Simply means the removal of ions.
* Or to remove ions from deionizer water by ion exchange.
* That exchange of hydrogen and hydroxide ions for dissolved mineral and

**Q: 2 Describe Electrophoresis and its importance.**

**Answer:** **Electrophoresis**

* Is the study of movement of charge particles in the electric field (DNA, RNA PROTEINS?)
* Also called migration with electricity.
* Is the motion of single charge particles under the influence of electricity?
* That separate the component of a sample with the help of electricity.
* Frist time proposed by prof.Ferdinand in 1807.
* The named electrophoresis was coined by Dr.Michaelis almost 100 years.
* Electrophoresis consist of power supply, Gel casting assembly, Glass plate to hold the gel, etc.

**Importance of electrophoresis:**

* Used in DNA fingerprinting.
* Electrophoresis used to separate DNA fragment.
* It is used in paternity testing.
* Criminology (forensic study).
* Useful in Genetic study and molecular biology.
* Thy can help in the analysis of vaccine and antibodies..
* That used for analyzing biomolecules as protein, plasmid, and nucleic acids.
* Proteins electrophoresis is a test that measures specific protein in the blood, (the test separate protein in the blood).
* Separate the proteins in the blood serum into group of similar size, shape, and charge.
* It is specially used for clinical investigation such as
* Separation of glycoprotein
* Hemoglobin from blood.
* Serum analysis
* Albumin (egg protein).
* Myosin (muscle protein)

**Q3: Write a note on Flow Cytometery**?

**ANSWER:** **Flow Cytometery**

* Flow cytometry is a cell analysis technique.
* Used in commonly laboratories.
* Was first discover by Wallace coulter in 1950.
* Developed in 1970.
* Is a technique used to detect and measure physical and chemical characteristic of particles.
* Method for the Qualitative and quantitative measurement of physical properties of cells as it passes through at least one laser.
* Most commonly analyzed metals are.
* Blood.
* Bone marrow aspirate.
* Lymph node check.

**Principle:**

Three main component.

1: Optical system

2: Flow system

3: Electronic system

**Optical System:**

* It is plate form of analysis.
* Made up of laser.
* Light sensing.
* The light secttered from up more than six fluorescence’s is determined for two different angles.
* A fused laser which scatter light and limit that is filtered and collected.
* Forward scatter=volume.
* Side=scatter morthatagy.

**Flow system:**

* Also called Fluidics.
* Thy transport the particles in a fluid to the laser where they are interrogated.
* That contain particles as referred to as the sample core.
* Cell in check

**Electronic System:**

* Signal processing.
* Emitted light in converted to digitized.
* Used to change light signal.
* It is used to change the light signals detected into electronic pulses.
* The data can be studies to ascertion information of cell over a short period of time.
* Data usually presented in the form of single parameter which are refferd to cytogram.

**Application:**

* Cell surface marker (HIV CD4 MARKER, CD MARKER, CUSTER OF DIFFECENTATION)
* Intra cellular mediator (cytokines)
* Used in transplantation (MHC)
* Hematology (malignancy) Reticulocyte count.
* Used for detection of DNA damage.
  + DNA number variation (flow fish)
  + Cell canting
  + Immunophealtyrphy
* Detect auto antibodies.
* Enzymatic intensity.
* Oxidative burst.

**Q4: What do you know beer and lambert law (uses, principle).**

**Answer**: The measurement of color intensity of a coloured solution by photometry is governed by two laws.

1: beer law.

2: lambert law.

It is based on the Beer-lamberts law also known as beers law or the beer-lambert-Bouguer law.

**Beer lambert law:**

* The absorbance of a solution is directly proportionate to the concentration of the solution.
* Simple terms a more concentrated solution adsorbed more light than a more dilute solution does.
* Light passes through a colored solution.
* Light transmitted decreases exopontially with increased in concentration of colored substance.

**Uses:**

* Beer lambert law mostly used in chemistry.
* The concentration of chemical solution.
* Use law state the concentration of a chemical species in a solution using colorimeter and spectrophotometer.

**Principle:**

* The quantity of light adsorbed by a substance dissolved in a fully transmitting solvent.
* For any particular wavelength.

**Q5: Explain Autoclave, Its uses and components.**

**Answer:**

**Autoclave:**

* Auto means self
* Clave means locking chamber device.
* Autoclave is locking chamber device commonly used in laboratory.
* Is a pressure chamber used for sterilization?
* Also called sterilizer.
* Discover by Dr.Denis papin in 1679.

**Uses:**

1. Sterilize material (heat, stable) for culture.
   * + - Test tube
       - Pipettes
       - Petri dishes
2. Sterilize contaminated disposal.
   * + - Culture plats
       - Syringes
       - Glasscvare
       - Gloves
3. Sterilize in dental instruments/surgical instrument.

**Component:**

**Chamber:**

It’s the place where the items to be sterilized.

**Control panel:**

Control over the autoclave process.

**Air pump system:**

Its remove the air in the chamber.

**Pressure guage:**

The pressure is shown in psi (pound per sequence inches).

**Pressure knob:**

Used to discharge the pressure.

**Safety handle:**

Attached to safety lid.

Used for safety.