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 **Paper Lab instrumentation (MLT)**

 **Semester 6th**

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**Q1. Define the following terms.**

1. PH meter
2. Vortex Mixer
3. Balance
4. Water Still
5. Deionizer

**Ans: INTRODUCTION**

1. **PH METER**
* The PH meter was invented in 1934 by the American Chemist Arnold O. Beckman to measure the sourness of lemons.
* It is a device used for the measurement of PH of solution.
* A simple and speedy device to measure the acidity and alkalinity of a fluid
1. **VORTEX MIXER**
* A vortex mixer, or vortexes, is a simple device used commonly in laboratories to mix small vials of liquid
1. **BALANCE**
* A weighing scale is a device for measuring weight
* Balance measure the mass of an object and are used in science.

**Iv. WATER STILL**

* It is an instrument used in laboratory for purification of water
1. **DEIONZER**
* It is an instrument used in laboratory for purification of water.

**Q2. Describe Electrophoreses and its importance?**

**Ans: ELETROPHORESIS**

* Term means: Migration with electricity.
* Involves the separation of components of a sample by differential rate of migration in the presence of electric filed.
* Theory was first proposed by Prof Ferdinand F reuses by doing experiment on migration of colloidal clay practical

**PRINCIPAL**

* Molecules moves with the speed dependent on their charge shape and size and get separated in the presence of an electric field.

**APPLICATIONS**

1. Separation of proteins DNA ,RNA and other macromolecules
2. Purifications and analysis of vaccine and antibiotics
3. Medical Research
4. Agricultural testing
5. In food industry
6. Used for analysis of terpenoids, steroids and antibiotics.
7. For testing purity of thyroid hormones by zone electrophoresis
8. It is used for diagnosis of various diseases of kidney, liver, and CVs.
9. It is also used for separation of Scopolamine and Ephedrine using buffer at PH **4.2**.
10. Electrophoresis is used also for separation of carbohydrates and vitamins.

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

**Ans: FOLW CYTOMETERY:**

* Flow Cytometery is a technology that is used to analyze physical and chemical characteristics of particles in a fluid as it passes through at least one laser.
* Cell components are fluorescently labeled and then excited by the laser to limit light at varying wavelengths.
* Up to thousands of particles per second can be analyzed as they pass through liquid stream.
* Example of properties measured include particle’s relative granularity, size and fluorescence and scatters incident light laser

**MAIN CONTENTS OF FLOW CYTOMETER**

1. **FLUIDICS**

Purpose of the fluidics system is to transport the particles in stream of fluid laser beam where they are interrogated.

* If cell are formed solid tissues, they required disaggregation before they can be analyzed.
* Although cells from animals, plants, bacteria, yeast or algae are usually measured, other practical such as chromosomes or nuclei can also be examined.
* Some particles such as marine algae are naturally fluorescent, but in general, fluorescent labels are required to tag components of the particles.

**OPTICS SYSTEM**

* Laser which illuminate particles present in stream as they pass through and scatter light from laser.
* Fluorescence, molecules that are on particle emit fluoresce cent which is detected by carefully positioned lenses.
* Light scattered from up to six or more fluorescence is determined for two different angles.

**ELECTRONICS SYSTEM**

Used to change light signals detected into electronic pulses that a computer can process.

* Data ca n then be studied to ascertain information about a large number of cells over a short period
* Information on the heterogeneity and different subsets within cell populations can be identified and measured.
* Some instruments have a sorting feature in electronics system that can be sorted for further analysis.
* Data are usually presented in the foam of single parameter histograms or as plots of correlated parameters, which are referred to as cryptograms.
* Cryptograms may display data in the form of a dot plot, a contour plot, a contour plot or a density plot.

**FIELD OF APPLICATIONS**

* Molecular biology, pathology, immunology.
* (especially in transplantation, hematology , tumor immunology and chemotherapy, prenatal diagnosis, and genetics
* Extensively used in research for detection of DNA damage,

**Q4. What do you known about Beer Lambert Law (uses, principal)?**

**Ans: ‘‘BEER LAMBERTB LAW ’’**

**Lambert’s Law,** When monochromatic radiation is passed through a medium the rate of the decrease. The intensity of the radiation with thickness of the medium is directly proportional to intensity of the incident radiation.

Mathematically it could be expressed as

**-di/db = Kio**

Final equation: It = Io.10-kb

Combine equation no 1st and 2nd

Log (Io)

Beer’s Law:

 When a monochromatic radiation is passed through a transparent medium, rate of decease in the intensity of radiation with the concentration of medium is directly proportional to the intensity of incident light.

Mathematically

* Dio/dc =ki

Final equation: It = Io 10-k11c

Combine equation

 Log (Io/It) = k1k11 b,c

 A= abc

**USES:**

1. Remove the corvettes from the instrument when not in use.
2. Use the correct type of curette in the colorimeter as recommended. by the manufacture.
3. Read the user manual carefully.
4. Bring filter into place before switching on the colorimeter.

**PRINCIPAL:**

1. Colored solutions have the properly of absorbing certain wavelength of light when a monochromatic light is passed through
2. The amount of light absorbed or Transmitted by a colored solution is in accordance with two laws.
3. The difference in color intensity results in the difference in the absorption of light.
4. Involves the quantitative estimation of colors.

**Q5. Explain Autoclave, its uses and component?**

**Ans: DEFINITION**

Autoclave is a pressurized device designed to heart aqueous solutions above their boiling point at normal atmospheric pressure to achieve sterilization.

Auto means self

Calves mean Self locking device

**USES:**

* Surgical instruments
* Plastic sharps containers
* Glassware
* Plastic tubes and pipette tips
* Solution and water
* Animal food and bedding
* Biohazard us waste

**COMPOMENTS**

1. Presence gauge
2. Safety valve
3. Autoclave Lid
4. Handles
5. Autoclave Body
6. Steam Release value
7. Vacuum release valve
8. Outer stand

**End.**