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**Department allied health science Bs (MLT) 6th semester**

**Paper final lab instrumentation**

**Submitted to Mam saima hadi**

**Q1. DEFINE THE FOLLOWING**

1. **PH METER,**

PH mean power of hydrogen or to measure the H ion activity in water based solutions (acidity) or alkalinity.

It is an electric device which is used to find out the acidity and basicity or alkalinity of a solution.

It was discovered by American chemist named Arnold, through which we want to measure the sourness of lemons.

1. **VORTEX MIXER,**

it is also known as vortexer….

It is simple device dedvice of equipment mostly found in different research labs and it is used to mixed the small particles or samples of liquid solution.

This device can also do single test and multiple liquid samples at a time.

1. **BALANCE,**

It is a weighting scale is a device which is used to measureing weights.

It measures the mass of an object and also used in different fields such as

1. **WATER STILL,**

 It is a water heating device in which wateris heated until change into steam. Then collected that steam in tubes or glasses and then finally condense that steam into new purified water droplets and then collected in a new clean vessel.

1. **DEIONIZED,**

As the name indicate that it is a process in which the ions are remove from the water solution ions including minerals, salts, iron, sodium etc

**Q2. ELECTROPHORESIS**

Electrophoresis is a laboratory technique used to separate DNA, RNA, or protein molecules based on their size and electrical charge. An electric current is used to move molecules to be separated through a gel. Pores in the gel work like a sieve, allowing smaller molecules to move faster than larger molecules. The conditions used during electrophoresis can be adjusted to separate molecules in a desired size range.

Electrophoresis is a very broadly used technique which, fundamentally, applies electric current to biological molecules, whether--they're usually DNA, they can be protein or RNA, too...and separates these fragments into pieces which are larger or smaller. It's used in a variety of applications... Everything from forensics for determining the identity of individuals that may have been involved in a crime, by linking their DNA pattern,

**IMPORTANCE OF ELECTROPHORESIS**

1. It is used in DNA fingerprinting.
2. It is also used inpaternity testing.
3. In forensic study (crimionology)
4. Very useful in genetic and in study of molecular biology.
5. Commonly used in DNA sequencing.
6. Purification and analyzing of vaccine.

**Q 3. FLOW CYTOMETERY,**

 It is a technique which is used to detect or analyze the physical and chemical properties or characteristics of different due to excitments.

Hundreds to thousand of particles are analyze as they passed through liquid steam.

**PRINCIPLE**

**The** flow system (fluid); cell in suspension are bought in a single file past.

THE OPTICAL SYSTEM (light sensing); a focused laser which scatter light and emits fluorescence that is filtered and collected.

THE ELECTRICAL SYSTEM (signal processing): Emitted light is converted to digitized of values that are stored in a file for analysis.

**APPLICATIONS:**

* Immunophenotyping of lymphoma and leukemia
* Detection of malignancy in body fluids
* DNA ploudy and cell cycle analysis.
* CD4 and CD8 counting.
* Histocompatibility cross matching .
* Reticulocytes count.
* PNH detection
* HLA-B27 detection
* Bioterrorism
* Parasitology
* Microbiology
* Molecular biology
* Genetics
* Cell kinetics
* Immunofluorescence
* Cell cycle kinetics
* Animal husbandry
* Biological oceanography
* Minimal residual disease
* Apoptosis and gene reporter

**Q4. What do you know about beer lambert law (uses, principle)?**

**“BEER LAMBERT LAW”**

**When monochromatic radiation** is passed through a medium the rate of the decrease the intensity of radiation with thickness of the medium is directly proportional to intensity of the incident radiation.

Mathematically it could be expressed as

Final equation

**Beer’s Law:.**

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

Final equation

Combining equation

**USES,**

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

**PRINCIPLE,**

* **Colored** solution have the property of absorbing certain wavelength of light when a monochromatic light is passed through them.
* The amount of light absorbed or transmitted by a colored solution is in accordance with two law.
* The difference in color intensity result in the difference in the absorption of light.
* Involve the quantative estimation of colors.

**Q5. AUTOCLAVE,**

The Autoclave carries out that exact function of sterilizing materials. It is a machine that uses pressure and steam to reach and maintain a temperature that is too high for any microorganisms or their spores to live.

Microorganisms are what most people commonly refer to as germs.

**USES OF AUTOCLAVE,**

A medical autoclave is a device that uses steam to sterilize equipment and other objects.this means that all bacteria, viruses, fungi and spore are inactivated….

Autoclave are found in many medical setting, laboratories and other places that need to ensure the sterility of an object.

**CRITICAL COMPONENT OF AN AUTOCLAVE**

Chamber, the chamber is the primary component of a steam autoclave, consisting of an inner chamber and outer jacket….

* Controls system….
* Thermostatic trap..
* Safety valve…
* Waste-water cooling mechanism…
* Vacuum system (if applicable)
* Steam generator (if applicable).