

1. NAME/ SHAMS UT TAMRAIZ M
2. CLASS/ BS-MLT4TH SEMESTER

3. ID CARD NO/ 14537

4. COURSE TITLE: BIOMEDICAL INSTRUMENTATION (MLT 4TH)
INSTRUCTOR: SAIMA HADI

Q1) write a note on flow cytometry?

What is Flow Cytometry?

Flow Cytometry is a laser-based, biophysical technology that measures cell properties while in a fluid stream. FLOW = Cells in motion

3D CYTO = Cell

METRY = Measure,

Flow cytometry is a technology that is used to analyze the physical and chemical properties of particles in a fluid, as it passes through at least one laser. Cell components are fluorescent labels and then stimulated by lasers for light in different dimensions. A flow-to-optometric analysis is a device that provides data from a sample. Other devices using flow-cytometry include cell-sorting robots that are physically isolated and thus clean up cells of interest based on their visual characteristics. Flow is used in primary research of chemotherapy, clinical practice, and medical trials. Uses for flow cytometry: Cell Count, Cell Sort, determine cell properties and function, detection of microorganism, finding the Biomarker, detecting protein engineering, health diseases such as blood cancer diagnosis.

There are five important components of a flow cytometer: a flow cell, a measuring system, a vaccine, a perversion system, and a computer for signal analysis. The flow cell has a liquid stream (mean fluid), which aligns the cells and passes a file through the light beam for sensing. The measurement system usually uses the measurement of impedance (or conductivity) and optical systems,

Q2) define the following terms,

A) PH meter,

1934 by the American chemist Arnold O. Beckman created the pH meter in to measure the sourness of lemons. And used for the measurement of PH of solution. A simple and speedy device to measure the alkaline and acidic of water like fluid,

B) Vortex mixer,

A vortex mixer is a simple device used in laboratories to mix small glass or vials of liquid, an electric motor consisting of vertically based and a slightly distant center attached to a hand rubber piece. The motor moves the rubber piece as fast as the circular movement.

C) Balance,

Is a device for weight measurement, Balance is used in measuring the lack of an objection and science., in write of the following two like balance the first one is analytical balance and the second one is lab balance. Much health related analytical balances have been designed to measure small scale. Quantitative is usually used in chemical analysis. While the analytical balance can be used for sub-abaft measurement with high accuracy and health related.

Lab balance is the tools required for mass measurement and are based on a variety of formats and uses. The basic lab balance is used for the normal measurement of solid and liquid chemicals.

C) Water still,

It is a device used in the laboratory for water-sand and also called water still used in lab for Purification of water.

D) Deionizer,

Deionization is a chemical process that uses specially prepared ion exchange, which contains hydrogen and hydrogen oxide ions for analysis minerals, the definition of deionizer are It is an instrument used in laboratory for Purification of water, The end...

Q)3 explain autoclave, it's uses and components.

Autoclave,

The terms Autoclave and Steam Sterilizer are essentially synonymous and often used interchangeably. "Autoclave" is used more often in laboratory settings, while "Sterilizer" is more commonly heard in hospitals or pharmaceutical settings. Auto means self and clave means self locking equipment,

Autoclave is a device used for sterilization. The steam digester was the forerunner of laboratory autoclave invented in 1879 by Dr Charles chamber land, developed by Dr Charles Chamber land in 1879. Autoclave is a device used to remove microorganisms (viruses, bacteria, fungi, etc.) and to lay eggs using high-pressure and high-temperature steam sterilization. These devices are also called disinfectant Digest this device was first developed by the doctor in its raw form. Dennis Papin in 1679 and it was named Steam Autoclave as contain is a few written word like heat autoclave, gas autoclave, and ultraviolet autoclave,

Uses,

Sterilization autoclaves are widely used in microbiology, medicine, podiatry, tattooing, body piercing, veterinary science, mycology, dentistry, and the manufacture of artificial products. It depends on the media for sterilization which varies in size and function. Common loads include laboratory glassware, other equipment and waste, surgical instruments and medical waste. A notable growing application of autoclaves is the default treatment and sterilization of waste products, such as pathogenic hospital waste. Machines in this category operate largely on the principles of conventional autoclave, in which they are able to neutralize potentially infectious

agents using pressurized steam and extremely hot water. A new generation of waste converters has the ability to disinfect culture media, rubber materials, gowns, dressings, gloves, etc. without the need for a pressure vessel to achieve the same effect that is especially useful for materials that the hot air cannot withstand the high temperature of the oven. Toklio is also widely used in the treatment of ailments and in the manufacture of rubber almonds. The high temperature and article that ensures autoclaves help ensure that the best possible physical characteristics are repeatedly achievable. The aerospace industry and spare makers (especially for sailboats) have autoclaves over 50 feet (15 meters).

Components,

Autoclaves, or steam sterilizers essentially consist of following parts: I) a cylindrical or rectangular chamber, with capacities ranging from 400 to 800 liters. ii) Water heating system or steam generating system iii) Steam outlet and inlet valves IV) Single or double doors with locking mechanism, v) Thermometer or temperature gauge VI) Pressure gauges the main components of the following written it. Heating Elements 1, Temperature Controller 2. 3. Pressure Sensor4. Chamber Door gasket5. 6. Solenoid valve 7. Water level Sensor Steam generator 8, Vacuum pump
The end...

Q4) explain electrophoresis and its importance?

Electrophoresis,

Electrophoresis is the movement of a fluid or gel-charge particles under the influence of an electric field is known as Electrophoresis, or it involves the separation of components of a sample by differential rate of migration in the presence of electric field. The theory was first suggested by Professor Ferdinand F reuss by experimenting on the migration of the colloidal clay particles, Term means: migration with electricity. Molecules moves with the speed dependent on their charge shape and size and get separated in the presence of an electric field. Contain of the following components such as, Comb to load sample in the gel before solidification, Gel casting assembly. glass plate to hold the gel. Power supply.

Importance, it is important that the support media is electrically neutral.

Electrophoresis is used for separation and isolation of DNA fragments. it is a technique used for separation of substances of different ionic properties .on electric field, DNA fragments are negative charged molecules moves toward anode according to their molecular size through Agros gel. The separated DNA fragments are observed with ethidium bromide solution. The bands of DNA can be seen under UV rays. These bands are cut from gel and purified. The DNA bands we got by gel electrophoresis can be used in constructing recombinant DNA by joining them with cloning vector.

The end...

Q5) what do you know about Beer Lambert law uses and principle.

What is Beer-Lambert Law?

Beer-Lambert law has a modern definition which is a combination of two different laws and stated as for a given material sample path length and concentration of the sample are directly proportional to the absorbance of the light.

What is Lambert Law?

Lambert law states that absorbance and path length are directly proportional and it was stated by Johann Heinrich Lambert.

What is Beer's Law, Beer law states that concentration and absorbance are directly proportional to each other and it was stated by August Beer.

The law was first developed by Pierre Bouguer before 1729.

The Beer Lambert law states that the amount of light absorbed by a fully dissolved solvent is directly proportional to the length of the light path through the concentration and solution of the substance, because the law of beer states this, it means that we can use both emotions to calculate the concentration of a solution, or draw a graph of different concentrations, align them for their correct absorption, and You can use a calorimeter to find the concentration of an unknown solution.

A spectra photometer is a device that measures the light emitted by each unit of radiation per unit time, the light entering the sample solution and the light going out of the sample solution. Both intensities can be expressed as transmission: the ratio of the amount of light entering the emitted light or the percentage of transmittance T. Different substances absorb different wavelengths of light. Therefore, the optimal wavelength of a substance is one of the properties of this material. A completely transparent material will have a = 10 and a 100% transmittance. Similarly, a substance that does not allow radiation of any particular wavelength to pass through it will have 0 = 80% transmittance.

Law Equation

Beer-Lambert law equation is as following:

$$I = I_0 e^{-\mu(x)}$$

Where,

I: intensity

I₀: initial intensity

μ: coefficient of absorption

X: depth in meter.

The end...