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Question no 1 Answer: (1) PH Meter: The PH meter was Invented 1934 by the American chemist Arnold O. Beckman to measure the sources of lemons.

PH Meter electric device which is used to measure Hydrogen- ion activity (acidity or alkalinity) in Solution.

Vortex Mixer: A vortex mixer or vortexer is a simple device used commonly in laboratories to mix small vials of liquid.

Balance: An even distribution of weight enabling someone or something to remain upright and steady. Balance measure the mass of an object and are used in science.

Water still: it is an instrument used in laboratory for purification of water. A part of stream Where no current is visible.

Deionizer: it is an instrument used in laboratory purification of water. Deionization is the process by which both positively charged and negatively charged ions (cations and anions, respectively) are removed from water.

Question no 2 Answer:

Electrophoresis: Electrophoresis is an electrokinetic process which separates charged particles in a fluid using a field of electrical charge. Term means: migration with electricity.

The theory was first proposed by prof Ferdinand F reuss by doing experiment on migration of colloidal clay partials

It is most often used in life sciences to separate protein molecules or DNA and can be achieved through several different. Gel 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 towards anode according to their molecular size through agrose 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.

Important of electrophoresis:

It is used in DNA finger friniting

It is also used in

In forensic study (Criminology)

Very useful in genetic and study misrule biology

Commonly used in DNA sequencing

Purification and analysis of vaccine

Question no 3 Answer :

Flow cytometry: Flow cytometry is a technology that is used to analyse physical and chemical characteristics of particles in a fluid as at passes through at least one laser. In this process, a sample containing cells or particles is suspended in a fluid and injected into the flow cytometry instrument. The sample is focused to ideally flow one cell at a time through a laser beam where the light scattered is characteristic to the cells and their components cells are 1labeled with fluorescent markers so light is absorbed and then emitted in band of wavelengths. Tens of thousand of cells can be quickly examined and the data get are processed by a computer.

Optical-to-electronic coupling system is used to record the way in which particle emits fluorescence and scatters incident light from laser.

Main contents of flow cytometry:

1) **Fluidics:** purpose of fluidics system is to transport the particles in a stream of fluid to laser beam where they are interrogated.
   If cells from solid tissue, they require disaggregation before they can be analyzed
   Although cells from animals, plants, bacteria, yeast, or algae are usually measured, other particles 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 particle.

   ## Question no 4 Answer:

Beer lambert law: This law states that absorbance of a solution is directly proportional to the solution, i.e. **A×C**.

The law was further elaborated by Johann Heinrich Lambert in 1760 and by August Beer in 1852.

Uses: The relation may be used determine the concentration of a chemical species in a solution using a colorimeter or spectrometer. The relation is most often used in UV-visible absorption spectroscopy.

Principle: The absorption of light by a solution of is described by Beer Lambert Law as. A beam of light with a specific wavelength is passed through a solution via a series of lenses, which navigate the colored light to the measuring device. This analyze the color compared to an existing standard. A microprocessor then calculates the absorbance or percent transmittance. If the concentration of solution is greater, more light will be absorbed, which can be identified by measuring the difference between the amount of light at its origin and that after passing the solution.

There is linear relationship between absorbance and concentration of an absorbing species.

$A = a_m \times C \times l$

As= Is the absorbance of solution [Ab].

a_m = The molar extinction (absorption) coefficient.

L= Length of the light path through the solution.

C= concentration of the absorbing substances.

Question no 5 Answer :

Autoclave: Autoclave is a pressure chamber used for the sterilization.

The instrument is also termed as sterilizer.

This instrument was first developed in its crude form by Dr Denis Papin and name it as a steam digester

The steam digester was the forerunner of laboratory autoclave invented in 1879 by Dr Charles Chamberland.

Definition: A strong heated container used for chemical reactions and other processes using high pressures and temperatures e.g. steam sterilization.

Auto = self

Clavis = self locking device

Uses:

Surgical instrument

Plastic sharps container

Glassware

Plastic tubes and pipette tips
Solution and water
Animal food and beeding
Biohazards waste

Components: There are many components of the autoclave which are following

1)Pressure Gauge
Safety valve
Autoclave lid
Handles
Autoclave body
Steam release valve
Vacuum release valve
Outer stand