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PAPER BIOMEDICAL LAB INSTRUMENTATION

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**QUESTION 1**

1. ***PH meter*** was discovered by american chemist arnold o, in 1934 A PH meter is an electronic instrument used for the measuer PH acidity and alkalinof a liquid. A typical PH meter consist of special measure probes connected to an electronic meter that measure the PH reading.
2. **A vortex mixer**,, is a device used commonly in laboratories to mix small vials of liquid. It consists of an electric motor  with the drive shaft oriented vertically and attached to a cupped rubber piece mounted slightly off-center the muter drives the rubber piece at the top an circular motion and thus has results
3. ***Balance*** Balance is a process to designing or modify , a machine in

which is unbalance forces is minimum

* Balancing is the process of attempt to improve the maass distribution of body so that rotate in its bearing without unbalance centrifugal forces
* Water still:-it ia a an instrument were used in laboratory for furification of water .
* The main function of distillation is a process of separate the component. and cheek the weight.

1. Water still:

* Water still is an instrument used in laboratory for the purification of the water.
* Water still work by first heating water until it turn into steam then collecting the steam in tubes or on a glass plate and finally condensing the stem into new purified water droplet that can be collected in a clean.

1. ***Deionizer***

* Deionizer ia an instrument to purify water which is essentional free ionic contaminate is required in this type of water produced by deionizer.
* Deionizer is a process by which mineral ions in water are removed and the equipment is known is deionizer.

**Question no 2**

**Electrophoresis:**

**Meaning:**

* The meaning of electrophoresis the ‘migration with electricity”

OR

* So it’s also meaning the migration of charged particle under the influence of electricity.

**Definition**

* It’s a technique commonly used in the lab to separate charge molecule, like DNA according to size also called gel electrophoresis is used to separate DNA,RNA and particle.

(OR)

* Electrophoresis is the study of movement of charge particle in an electric field (DNA, RNA, and particle).

**History**

* Electrophoresis was proposed for first time in 1807 by prof.ferdinal observed clay particle dispersed in water to migrate an applying electric field (current)
* So the named electrophoresis was given by DR Michaels almost 100 year.

**Important:**

* The gel electrophoresis use for the separation and isolation of DNA fragment
* It is a technique the separated of substance of different ionic properties.
* Its also used in paternity tasting.
* Its also used in DNA fingerprinting.
* Its also used in forensic study mean in criminology.
* Its also commonly useful in genetic and also the study of molecular biology.
* The gel electrophoresis commonly used in DNA sequencing.
* Purification and analysis of vaccine.

**Component:**

* The following component is.
* Buffer container
* Class plate to hold the gel
* Comb to load sample.
* Gel casting.

**Answer no Question 3**

**Flow cytometry**

* Flow cytrometry is a method used to determine physical and chemical characteristic of a population of cell or other particle
* In this techniques cell or particle is injected into the flow cytometry instrument.
* Cell are usually labeled with fluorescent markers so the light is absorbed and then emitted in a band of wavelength
* Thousand of cell can be examine and the data gathered are prossed by a computer
* Computer of flow cytometry include flow cell measuring system detector amplification system and computer for analysis of the signal

**Limitation.**

* The quality of the particle labeling is affected by the viability of particle
* Heterogeneous population contains fragile subpopulation which is damaged during cell labeling that lead to wrong analysis.

**Advantage of flow cytometry:**

* So the flow cytometry is a fast techniques
* The advantage of flow cytometry provides cell by cell fluorescence study.
* Flow cytometry allows Analysis at chromosome level

**Answer no question 4**

**Beer lambert law:**

* Beer –lambert law state that the quantity of light absorbed by a substance dissolved in transmitting solvent directly proportional to the concentration of the substance and the path length of the light through the solution.

**Uses of beer-lambert low:**

* Its used for detection of bilirubin in blood sample
* Uses for the analysis of mixture of substance by spectrophotometry
* Use for measure of absorbance of unknown sample.
* Use for the measurement of absorbance of standard solution
* It use for the detection of iron in industrial steam.

**Principle**

* UV –visible spectroscopy measure the response of a sample to ultra violet and visible range of electromagnetic radiation
* Molecule have either n,π,Ჾ, electron .theses absorbed UV radiation and undergoes transition from ground state to excited state.
* the autoclaved in the laboratory the most agreeable and commonly used method is to use steam at 121oC for 15 to 30 minutes depending upon the particular material to be sterilized .

***Q5 Autoclave***  
An **autoclave** is a instrument that uses steam under pressure to kill harmful bacteria, fungi viruses , etc and spores on items that are placed inside a pressure vessel. The items are heated to an appropriate sterilization temperature for a given amount of time. The standard temperature of autoclave is 121C.

* Autoclave it is a instrument was first discovered by Dr Denis pippin and named as steam digester. The steam digester was forerunner of lab autoclave discover in 1879 by Dr Charles chamber land,

Similar to pressure cooker.

A normal pressure , at water boils 100c but pressure inside a closed vessel increase, the temperature at which water boils also increased.

* ***Uses:-***
* autoclave are used in surgical ward to clean instrument ,
* Used in plastic container
* Are used in microbiology
* Plastic tubes and pipette tips
* Glassware

**Principle of autoclave** ;-

* Heating element
* Temperature controller
* Pressure sensor
* Chamber
* Door gasket
* Solenoid valve
* Water sensor level