unit-I

Laminar air flow:.

what is Bioinstrumentation:.

→ It is device used to measure evaluate and treat biological systems.

→ used to monitor physiological characters of human or animal.

Example:.

* Centrifuges, electrophoresis, chromatography, colorimetry, photometry.

* PH meter, Incubator, water bath, shaker, Laminar air flow etc.

Laminar air flow:.

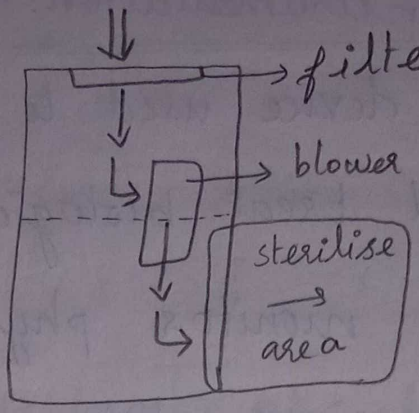
→ It is a basic and Necessary equipments to our microbiology Lab.

→ Otherwise called Bio safety cabinet

→ Designed to prevent contamination of waters, biological samples, any sensitive materials.

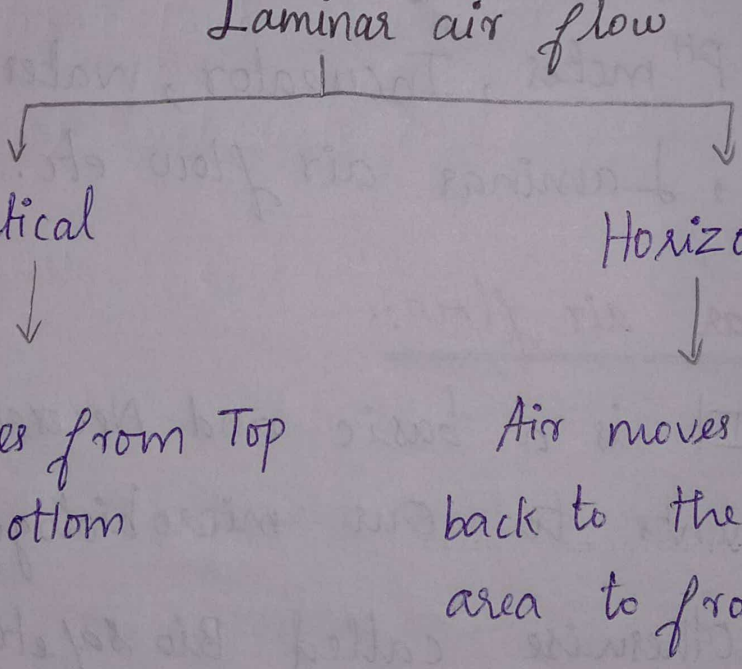
→ Air is drawn through a HEPA filter.

→ HEPA - Means: High Efficiency Particulate absorbing.



Types:-

→ The Laminar air flow is they are 2 types.



Uses:-

→ where clean air environment is required for smaller items.

Example:- medical, Pharmaceutical, electronic

and Industrial sectors.

How they are Made :-

→ Made of stainless steel with no gaps or joints.

→ prevents the build up of bacteria from working Zone.

→ Also known as clean benches. because working area is a throughly cleaned by the filteration process.

Why Laminar air flow :-

→ provides particle free Environment by air filteration system.

→ uni - directional air system.

→ provide clean air Environment for Laboratory.

Bacterial Incubator :-

Principle :-

→ Incubator is maintains optimal Temperature.

→ humidity, CO_2, O_2 content of inside atmosphere.

→ essential for cell biology, microbiology, molecular is used to culture both eukaryote and bacterial cells.

Uses:-
(what)

→ It is used to storage of bacterial culture at 37°c. They are fitting heating Temperature only.

Types:-

They are 3 types.

i) poultry incubator – keep egg

ii) infant incubator.

iii) Bacteriological incubator.

→ Infant incubator used the hospitals.

cleaning:-

→ check incubator once or week discard unused cultures.

→ clean the incubator one or two times / month.

If you incubate bacteria too long what will happens?.

→ The cells use the available

nutrients excrete toxic metabolites (or) entire population will die.

→ That only culture must be periodically transferred (or) subcultured, (or) new media.

Incubator parts :-

Container, Heater, Thermostat, Humidity control, Thermometer, hygrometer.

8.20

Buffer :-

home salt → NaCl → aqueous solution → weak acid and base

→ A Buffer solution is an aqueous solution.

→ Consisting of a mixture of a mixture of a weak acid and its conjugate base.

→ used to keeping a pH of a nearly Constant value in a variety of chemical applications.

Example: Acidic buffer solution are commonly made from a weak acid.

i) one of its salts often a sodium salt.

ii) mixture of ethanoic acid sodium ethanoate in solution.

→ by neutralizing (நடுநிலைப்படுத்துதல்) any added acid (H+ ions) (or) base (OH- ions) to maintain moderate PH making them a weaker acid or base.

→ Human blood contains buffer that allows it to maintain its PH of 7.35 to ensure normal functioning of cells.

→ if the blood PH reduce below 7.35 means the cells will not function properly.

→ Our body system will fail.

Molar :-

→ unit of concentration molarity.

→ which is equal to the no of moles/liter of a solution.

Chemistry :-

→ Molar Concentration of a solute in a solution.

→ Molar concentration has the units mol/L.

Molar concentration, M:

formula:

$$\text{Molarity, } M. = \frac{\#\text{ mole of solute}}{1 \text{ litre of solution}}$$

(or)

$$\#\text{ moles} = \text{Volume (Liters)} \times \text{Molarity} \left(\frac{\text{moles}}{\text{liter}}\right)$$

formula:

$$M = \frac{n}{v}$$

M = molar concentration
n = moles of solute
v = liters of solution.

One molar solution means:?

A 1 molar solution is a solution in which 1 mole of a compound is dissolves in a total volume of 1 litre.

Example: The molecular weight of NaCl is 58.44, so one gram molecular weight (=1 mole) is 58.44g.

Normal solution:-

Normality is another way to quantify solution concentration. It is similar to molarity but uses the gram equivalent weight of a solute in its expression of solute amount in a liter (L) of solution, rather than the gram molecular weight. Expressed in molarity.

→ A 1N solution contains 1 gram equivalent weight of solute / liter of solution.

Example:-

→ 1 M (Molar) hydrogen chloride give is 1M of hydrogen ions and 1M of chloride ions in to the solution.

→ 1 M solution hydrogen ion is = to one equivalent of hydrogen ions.

PH meter:-

Normal PH → 7 ↑ more no → acid

→ A PH meter is an instrument used to measure acidity or alkalinity of a solution.

→ Also known as P^H meter.

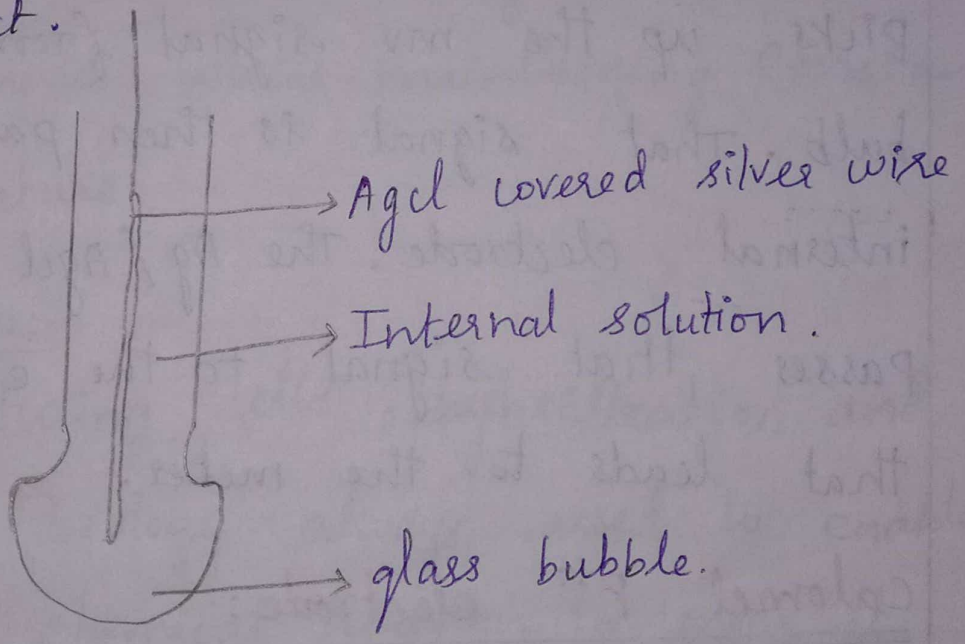
→ As PH is the unit of measure that describes the degree of acidity or alkalinity.

→ It is measured on a scale of 0 to 14.

→ Invented by Arnold O Beckman

P^H electrodes :-

→ P^H electrodes has a glass bulb or bubble that was filled with strong electrolyte and had a Ag / Agcl (silver / silver chloride) half cell inside, with Ag wire as a contact.



Types :-

* double junction electrodes.
* gel-filled electrodes.
* calomel junctions.

* solid state electrodes
* ion selective electrodes.
* epoxy body electrodes.

Principle:

→ electrode immersed in the test solution the glass bulb senses the hydrogen ions as a millivolts (mv) due to positive change of hydrogen ions.

Calomel PH electrode:

→ the electrolyte or internal solution picks up the mv signal from the glass bulb. That signal is then palled to the internal electrode. The Ag / Agcl wire then passes that signal to the electrode cable that leads to the meter.

calomel PH electrode:

The PH responsive electrode is usually glass and the reference is usually a mercury - mercurous chloride (calomel) electrode, although a silver - silver

chloride electrode is sometimes used. When two electrodes are immersed in a solution, they act as a battery.

Glass electrode of pH meter:-

→ It is a type of ion selective electrode made of a doped glass membrane. That is sensitive to a specific ion.

→ Application - measure pH.

→ sensitive to Hydrogen ion.

Example:

Water bath shaker:-

→ It is used to steadily shake and mix samples while maintaining Constant Temperature.

Application:-

culturing cells, hybridization and molecular biology always, used to enable certain chemical reaction to occur at high Temperature.

Principle:-

The CU50 sensor transfer water Temperature to resistance value, amplifier,

Then Output the control signal, efficiently control the average heating power of electric heating tube and maintain water in Constant Temperature.