Medical laboratory instrument

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L2

Balance

Is essential laboratory instruments that are widely used for determining weight of various substances (powders ,crystals and chemical materials) in the laboratory for used to prepare reagents, stains and culture media , balances are required to weight accurately within the needed range. The balance should be kept clean and located in an area away from heavy traffic, large pieces of electrical equipment and open windows to minimize any vibration as interference that may happen, a slab of marble is placed under the balance.

Types of balance :

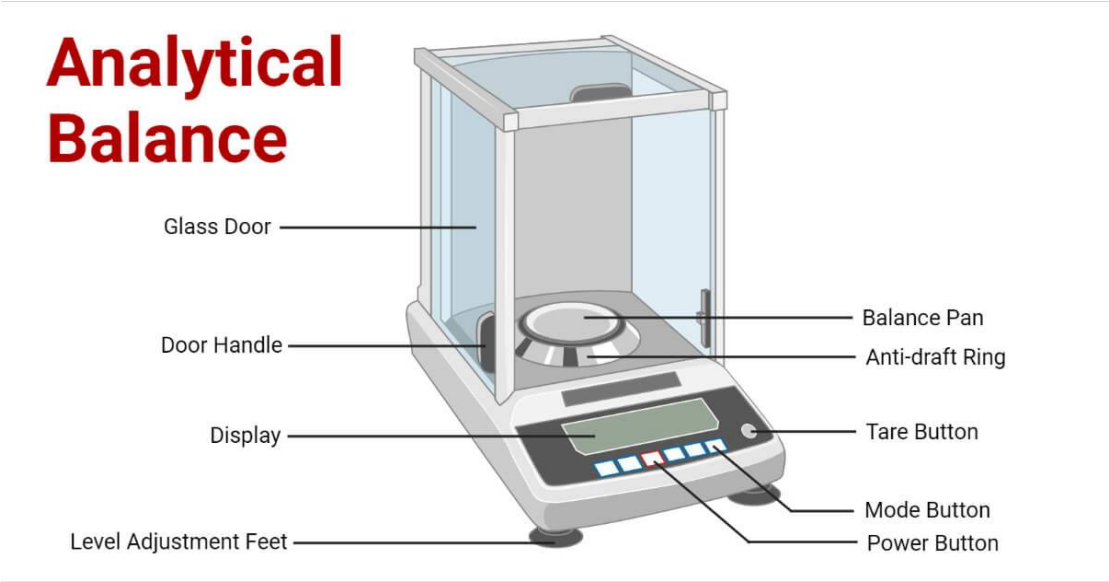
1-Beam Balance: This type of balance uses a comparison technique in the form of a beam from which a weighing pan and scale pan are suspended. The object to be weighed is placed on the measuring pan, and standard weights are added to the scale pan until the beam is in equilibrium.

2-Analytical Balance: It is used to measure mass to a very high degree of precision. The weighing pans are inside see-through enclosure with doors so that dust does not collect and so any air currents in the room do not affect the delicate balance .

These balances are used to:

1.weigh small quantities usually in milligram (mg).

2.When great accuracy is required.



Parts of analytical balance:

1- Balance plate Pan : Flat rigid support on which the specimen is placed.

2-Power button (on/off button)- It is used to activate or deactivate the balance .

3- Zero button . It is used to rebalance the system and bring it back to neutral

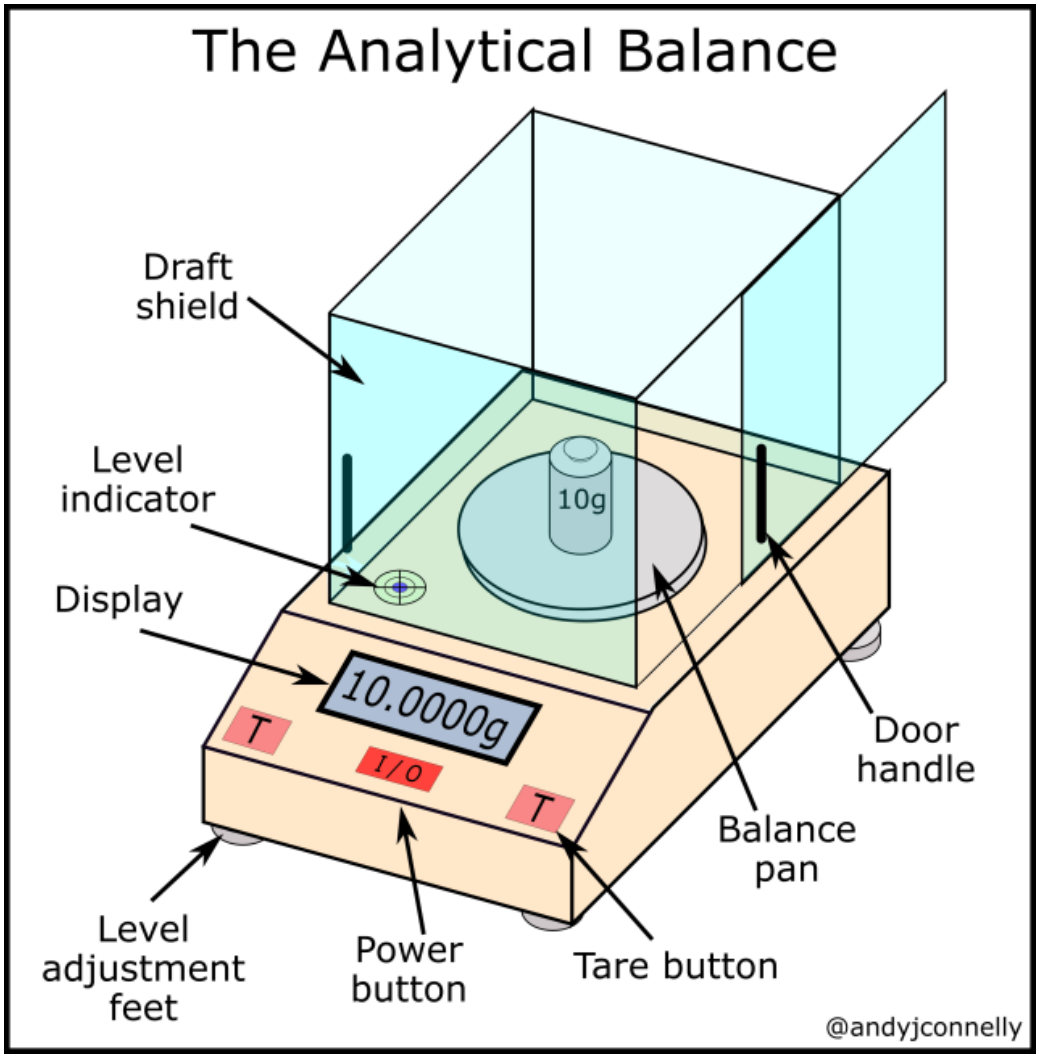
4- Glass doors : Sliding door that provide easy access to the inside of the glass case .

5- Mode button- It is used to configure the measurement conversion system such that the conversion system can be changed as necessary.

6- Draft shields- These are incorporated into the design of analytical balances to offer protection from outside factors such as air flows and dust that could compromise precision.

7- Level adjustment feet- These enable the balance to be brought to the reference position. These are movable legs. The leveling bubble, spirit level, or plumb bob determines the reference position.

8- Display panel- It displays various information such as results, errors, information for function settings, and function in progress.



Types of Analytical Balance :

A- Single-Pan Mechanical Balance: These consist of

-a beam with two knife-edges, one to support the weighing pan and the other acting as a pivot

- fixed counterweight balances the load on the pan .

B-Two-Pan Analytical Balance: These balances consist of a symmetrical beam and three knife-edges. The two terminal knives support the pans and a central knife-edge acts as a pivot about which the beam swings .

C- Electronic Single-Pan Balance: These are top loading balances with the applied load being measured by an electromagnetic force unit or a strain gauged load cell. The mass of the load is proportional to the current needed to balance it. Single-pan electronic balances give a direct reading of the mass . applied

D- Microbalance: This type of analytical balance is capable of measuring samples to at least (1) million parts of a gram. The more sensitive quartz crystal microbalance (QCM) measures mass by measuring the change in frequency of a piezoelectric quartz crystal.

Factors affecting the performance of an analytical balance:

1-Temperature

2-Vibrations

3-Chemical Reaction

4-Air Currents

5-Calibration

6-Fingerprints