

Experiment - 4

Object :- To study about the working principle of electronic balance.

Introduction :- A balance (also called a weighing scale) is used to measure weight or mass. Earlier the two - pan chemical balance was used for weight measurements in the laboratory. It is robust, precise and permits the measurement of weight upto the fourth decimal place. With the passage of time, single pan electronic balances have become affordable and precise. Consequently they are now replacing the two - pan balance in most laboratory work. Now precise electronic balances which can determine the weight correctly upto 0.00001 g are available.

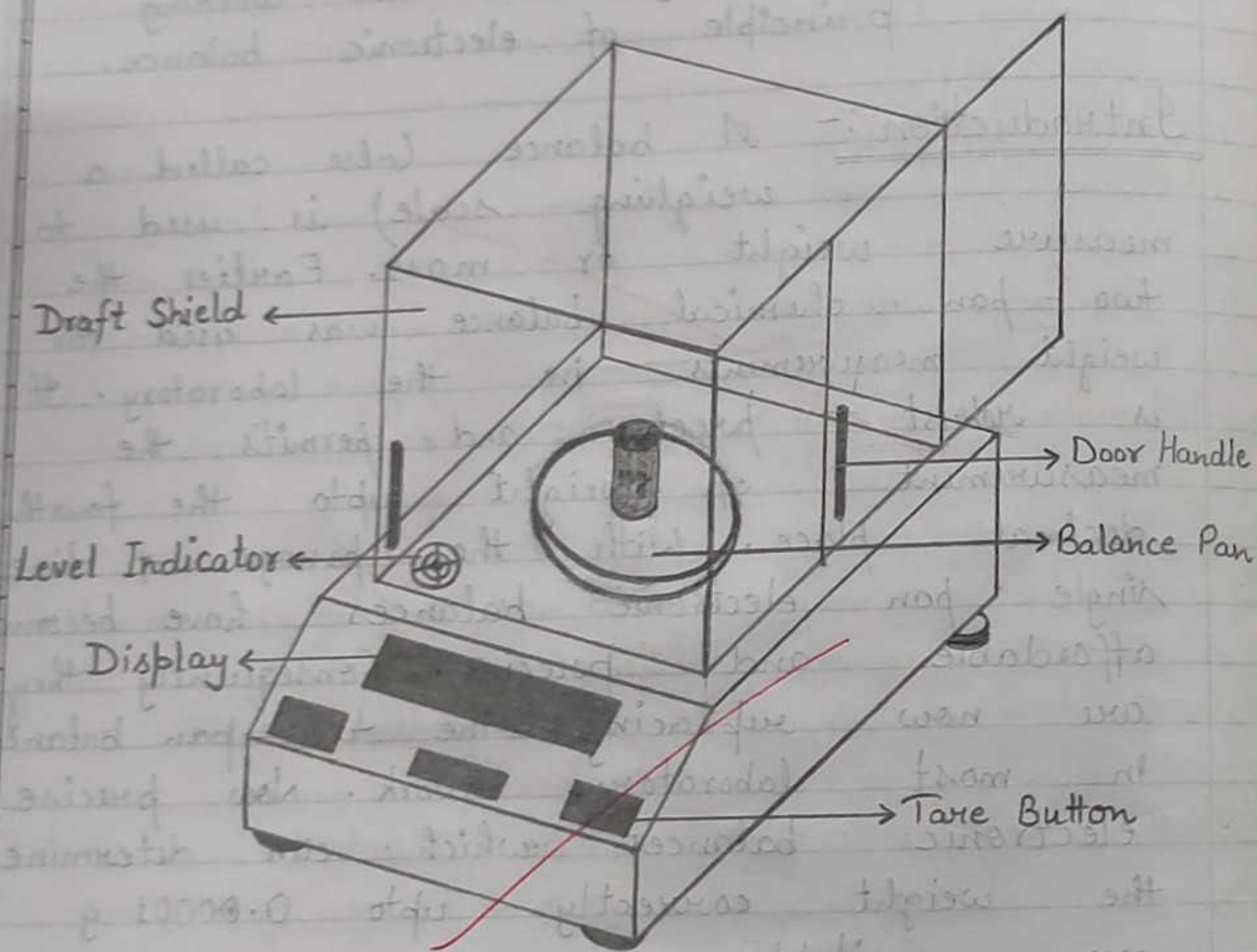
Principle :- Electronic balances have a single pan on which the substance to be weighed is kept. The balance measures the downward force acting on the pan of the balance. Most

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balances have an electromagnet. When the sample is placed in the pan, a downward force acts on the pan. This force is counteracted by an electromagnetic force. The amount of electric current needed to counteract the downward force due to the sample is determined and is used to compute the mass of the sample.

Using an Electronic Balance :-

1. The balance is switched on.
2. The draft shield is opened, a piece of paper is placed on the pan of the balance and the draft shield is closed.
3. The display shows the weight of the piece of paper.
4. The tare button is pressed. Pressing the tare button causes the balance to adjust and the balance now reports the weight of the paper as zero.
5. The draft shield is opened and the



sample to be weighed is placed on the paper.

6. The draft shield is closed. After sometime, the reading on the display stabilises.

7. The stable reading is noted and the sample with the paper is removed from the balance.

Precautions :-

1. Use a fresh piece of paper for weighing every time.

2. Do not place the sample directly on the pan of the balance.

3. Do not spill liquids on the balance.

4. Keep the draft shield closed when weighing samples.

5. Samples being weighed should be at room temp.

6. The electronic balance is a sensitive scientific

equipment. Do not place weights beyond the weighing capacity of the balance on the pan. It may damage the balance permanently.

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Object :- To study the use of glass and micro pipettes.

Use of Glass Pipette

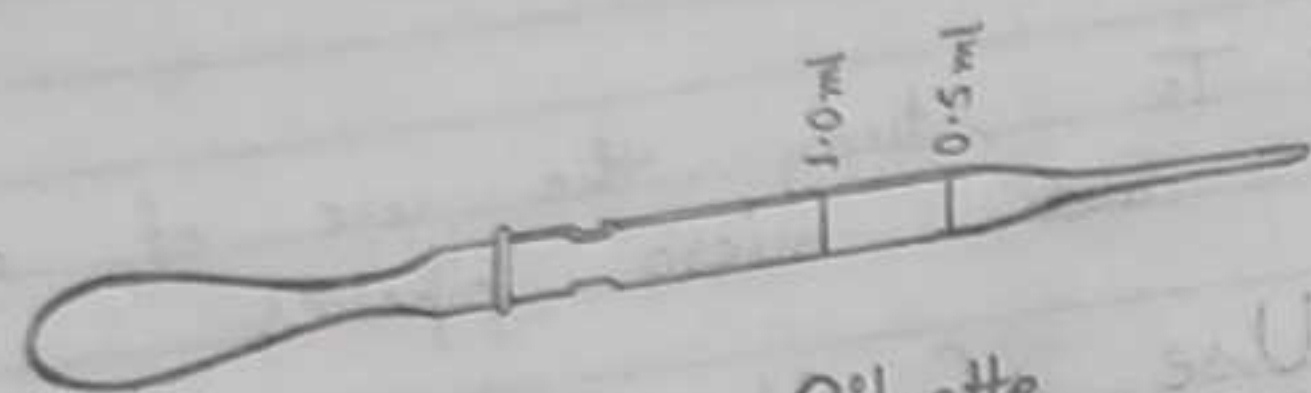
Introduction :- "Louis Pasteur" invented the first glass pipettes in the 1840s. The pipette helps in transfer of liquids while minimising the risk of contamination. Today pipettes are indispensable instruments in laboratories.

Types of Glass Pipettes :-

(a) Pasteur pipette :- These pipettes are used to transfer small volumes of liquids. They are generally not graduated or calibrated.

(b) Graduated pipette :- These pipettes have a series of graduations similar to those on a burette or a measuring cylinder. They can be used to

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Pasteur Pipette



Volumetric Pipette



Graduated Pipette

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transfer variable volumes of liquid by controlling the suction applied to the pipette.

(c) Volumetric pipette:- This type of pipette is also called a bulb pipette. It has a swollen bulb like portion with a single graduation mark e.g., 10 ml, 20 ml etc. It is used to transfer a precise but fixed volume of liquid.

Using a Glass Pipette:-

1. Select an appropriate volume, clean pipette according to your need.
2. Place the pipette into the reagent to be transferred. Rinse the pipette with the liquid a few times.
3. Draw the liquid into the pipette upto the desired mark. Oral sucking is strongly discouraged. Use a rubber bulb attached to the pipette.
4. Place your finger on top of the pipette.

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5. Bring the pipette to the flask to which liquid has to be transferred.
6. Remove the finger to transfer the liquid. Touch the tip of the pipette to the side of the container to remove any drop that may be sticking to the tip of the pipette.
7. A small amount of the liquid remains in the pipette. The pipette is calibrated to retain this volume of liquid. Do not blow this liquid out.

Precautions :-

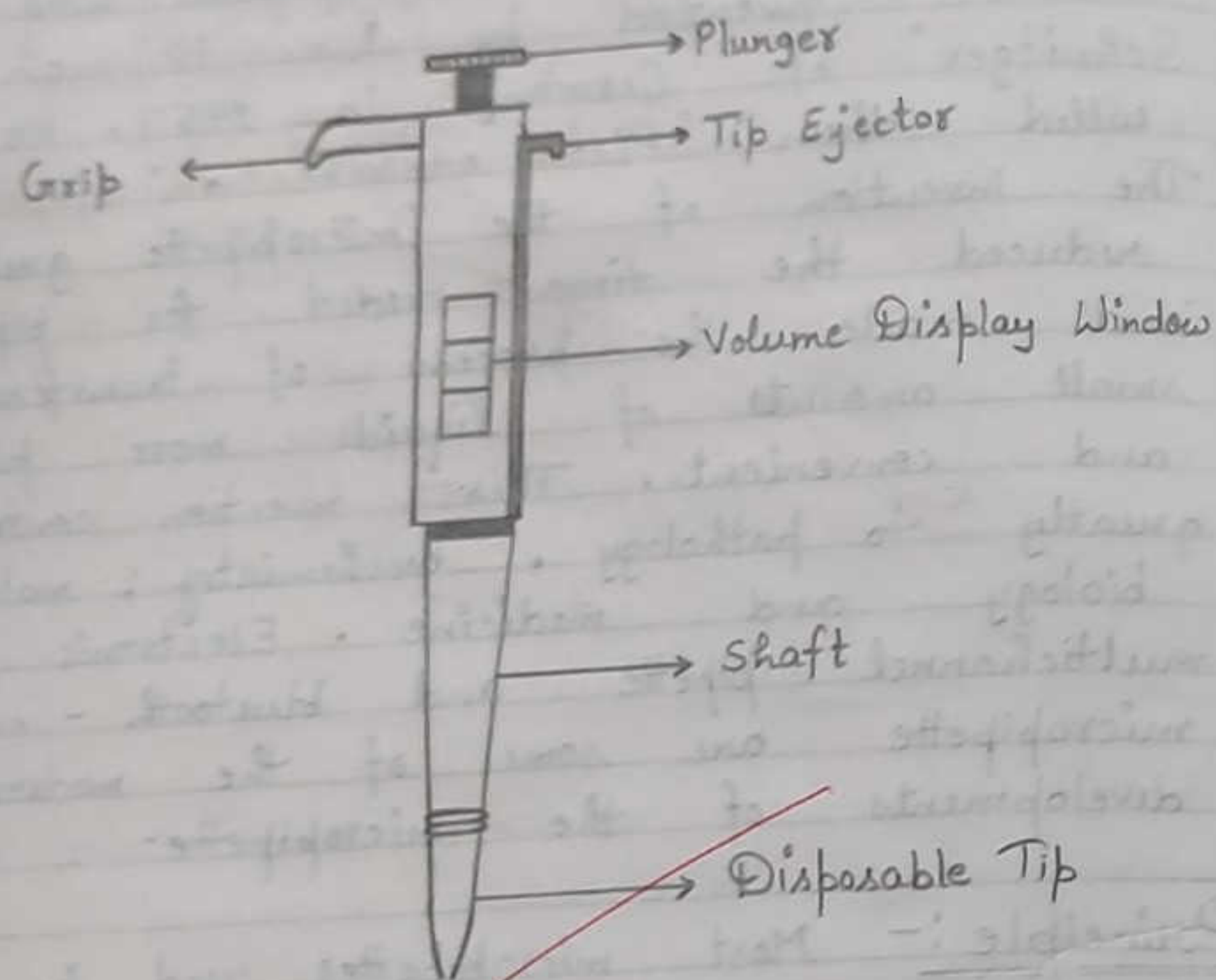
1. Never pipette corrosive and toxic substances by mouth.
2. Pipetting by mouth is considered an unsafe practice and is strongly discouraged.

Use of Micropipette

Introduction:- The first micropipette was invented by "Dr. Heinrich Schnitger" of Germany in 1957. He called them "Piston stroke micropipette". The invention of the micropipette greatly reduced the time needed for pipetting and made the process of transferring small amounts of liquids more precise and convenient. This invention contributed greatly to pathology, biochemistry, molecular biology and medicine. Electronic pipette, multichannel pipette and bluetooth-enabled micropipette are some of the modern developments of the micropipette.

Principle:- Most micropipettes used in lab work on the principle of air displacement. In this type of micropipette, the plunger is attached to a piston. The piston is in contact with an air packet. Moving the plunger results in the movement of the air packet. Pushing the plunger down, expels some air from the shaft. Allowing the plunger to

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Micropipette

move upwards creates a small vacuum in the pipette shaft and pulls the air in the pipette tip upwards. As a result, the liquid to be transferred is sucked into the disposable pipette tip.

Using a Micropipette :-

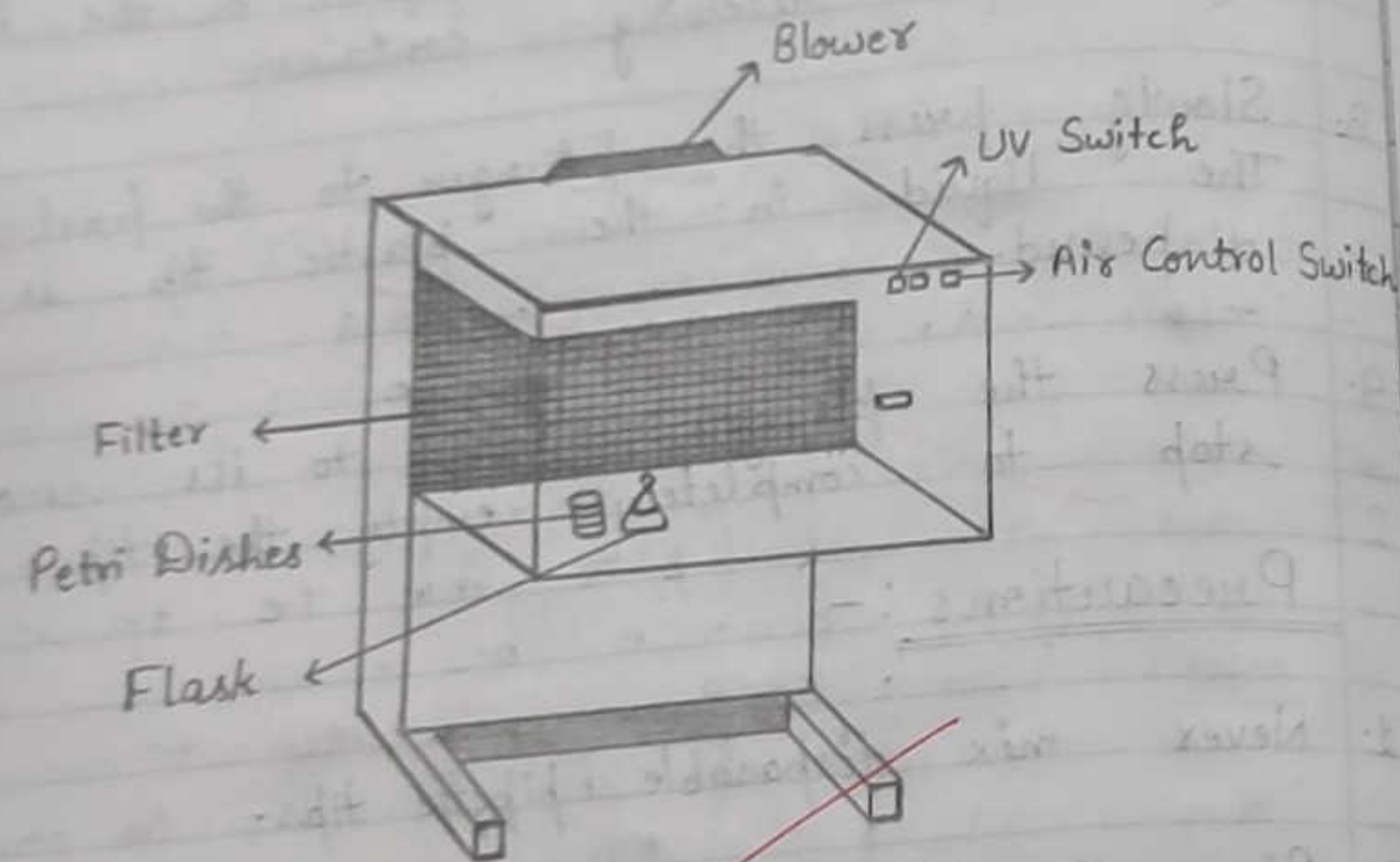
1. Rotate the volume adjustment knob to obtain the desired volume on the volume display window.
2. Press the micropipette into the top of a disposable plastic tip.
3. Press the plunger downwards to its first stop.
4. Immerse the plunger vertically into the liquid.
5. Slowly release the plunger while the tip is immersed in the liquid. The liquid will be aspirated into the tip. The volume of the liquid aspirated into the tip is equal to that displayed on the volume display window.

6. Move the pipette to the container into which the liquid is to be dispensed.
7. Place the tip of the pipette on the inner wall of receiving container.
8. Slowly press the plunger to the first stop. The liquid in the plastic tip is dispensed.
9. Press the plunger further to its second stop to completely empty the tip.

Precautions :-

1. Never mix disposable pipette tips.
2. Rinse the tip 2-3 times before pipetting.
3. Do not turn pipette upside down.
4. Use and store micropipettes carefully to prevent its contamination with chemicals.
5. When using a micropipette, the elbow should be as close to the body as possible.

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Laminar Flow Cabinet

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Experiment - 6

Object :- To study about the working principle of Laminar Flow.

Introduction :- The laminar flow hood (also called the laminar flow cabinet) is an enclosed workspace designed to prevent contamination of samples. In a laminar flow cabinet, the air is drawn through filters and is blown towards the user (the term laminar flow refers to streamlined flow of a fluid). This unidirectional air flow ensures that the sample is not contaminated by the user. The cabinet has a UV lamp to sterilize the working surface before usage.

Principle :- Air is sucked in through the pre filter and HEPA filter. The filters trap dust, spores and microbes. Clean air blows towards the user. The constant, unidirectional air pressure ensures that the sample inside the cabinet is protected from dust and spores in the air and the

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Using a Laminar Flow :-

1. Wipe the working surface with 70% alcohol to sterilize it and to remove any dust, spores etc.
2. Close the plastic (plexiglass) shield of the cabinet.
3. Switch on the UV light for 15 minutes to sterilise the surface of the working surface.
4. Switch off the UV light.
5. Switch on the fluorescent light and the air flow.
6. After 5-10 minutes, open the front transparent shield and begin work in the cabinet.

Precautions :-

1. Sterilize the laminar flow cabinet with UV light before and after the experiment.

2. Do not use UV light and airflow simultaneously.
3. Keep the front cover closed when the UV light is on. Do not work in the cabinet when the UV light is on.
4. Remember that the laminar flow cabinet protects the sample from contamination from the user but it does not protect the user from the sample.