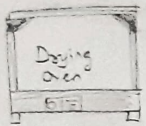
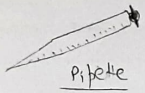


Analytical Balance



Pipette

Wash Bottle

Crucible

Desiccator

Dish Tongs

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Experiment-7

Aim:- To determine the pH & total solids of the given sample of sewage.

(A) To determine total solids of the given sample of sewage:-

Introduction:- The term "solids" is generally used when referring to any material suspended or dissolved in water or wastewater that can be physically isolated either through filteration or through evaporating. Solids can be classified as either filterable or non filterable. Filterable solids may either be settleable or non settleable. Solid can also classified as organic or non-organic. Total solids is the term applied to the material residue left in the vessel after evaporation of a sample & its subsequent drying in an oven at a defined temperature. Measurement of solids can be made in different water sample (industrial, domestic, drinking water) & its defined as residue upon evaporation of free water.

Thus, Total solids are nothing but summation of total dissolved solids & total suspended solids.

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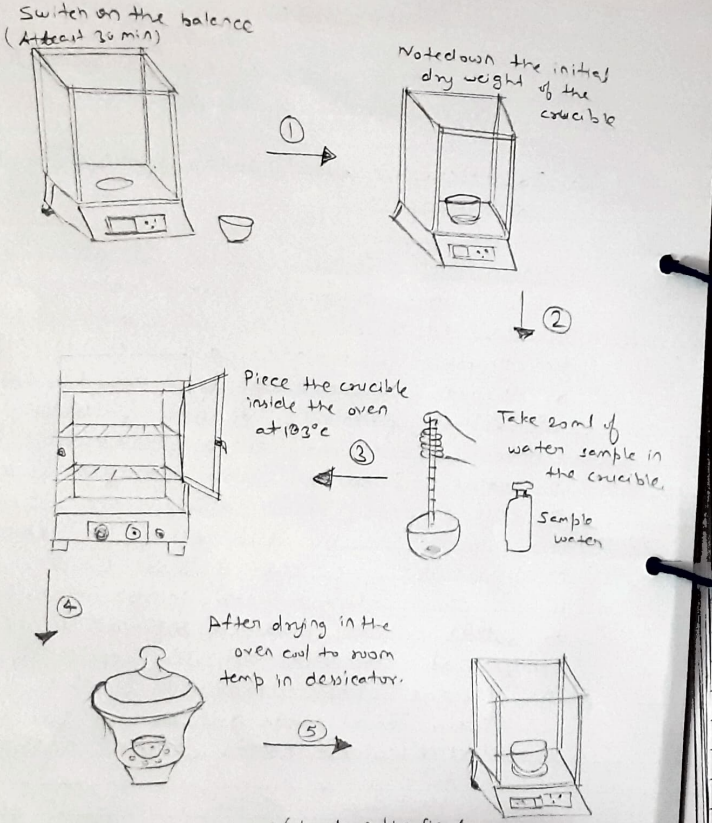

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~~Material Required~~

Principle:- The sample is evaporated in a weighed dish on a steam bath & is dried to a constant mass in an oven either at 103°C - 105°C or 179-181°C. Total solids / residue is calculated from increase in mass.

Material Required:-

Apparatus Required:-

(i) Crucible
(ii) Oven
(iii) Desiccators
(iv) Analytical Balace
(v) Dish Tongs
(vi) Magnetic Stirrer
(vii) Wash Bottle.

Sample Handling And Preservation:-

- Preservation of sample is not practical, Because biological activity will continue after a sample has been taken, changes may occur during handling & storage.
- Both the characteristics & the amount of solids may change.
- To reduce this change in samples taken for solids determination, keep all samples at 4°C.
- Do not allows samples to freeze.
- Analysis should begin as soon as possible.

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Procedure :-

- To measure total solids, take a clean procelain dish which has been washed & dried in a hot air oven at 105°C for one hour.
- Now weigh the empty evaporating dish in analytical balance. Let's denote the weight measured as (WJ)
- Now we should have to decide what should be the volume of sample to be taken for analysis
- Volume may be estimated either from values of specific conductance or general thumb role.
- In general, select a sample volume that will yeild residue between 2.5 & 200 mg after drying.
- Using pipette transfer 75 ml of unfiltered sample in the porcelain dish.
- Switch on the oven & allowed to reach 105°C check & regulate oven & furnace temp. frequently to maintain the desired temp. range.
- Dry the sample to get constant mass. Drying for long duration usually 1 to 2 hrs is done to eliminate necessity of cheeking for constant mass.
- Cool the container in a desiccator. Desiccators are designed to provide an enviornment of

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standard dryness. This is maintained by the desiccant found inside. Don't leave the lid off for prolonged ~~moisture from~~ periods or the desiccant will soon be exhausted.

- Keep desiccator cover greased with the appropriate type of lubricant in order to seal the desiccator & prevent moisture from entering the desiccator as the test glassware cools.
- We should weigh the dish as soon as it has cooled to avoid absorption of moisture due to its hygroscopic nature.
- Samples need to be measured accurately, weighed carefully, & dried & cooled completely
- Note the weight with residue as (W_2)

Observation tables

Description	Weight (g)

(B) To determine the pH of the given sample of Sewage :-

Methodology :- Using pH paper, pH indicator & pH meter.

Apparatus :- Digital pH meter.

Reagents Used :- Turbidity free distilled water

Theory :- pH is a negative logarithm of the reciprocal of the hydrogen ion concentration. The pH scale is used to express the degree of the acidity or alkalinity with the middle value (pH) corresponds to the exact neutrality at 25°C The pH value represents the the instantaneous hydrogen ion activity ie., electrode system which is the most accurate method and free of interference. The pH paper is specially prepared one which will show the variation in pH with different color changes. Thus this method is suitable firmly rough estimation.

Procedure :-

1. Using pH meter :-

a) Follow the manufacture operating instructions.
b) Calibrate the instrument with buffered solution.

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solution (known pH solution pH 4 to 7.)

(c) Dip the electrodes in the unknown water sample and note down the instrument reading which will give the direct pH value of the unknown sample.

2. Using pH indicator (Universal pH indicator of pH 4 to 11)

(a) Follow the instructions given in the indicator bottle.

(b) Pipette out 10ml of given water sample into a small test tube.

(c) To this add 0.2 ml of universal pH indicator solution & mix well.

(d) Compare the color developed with the color chart & note-down the pH values.

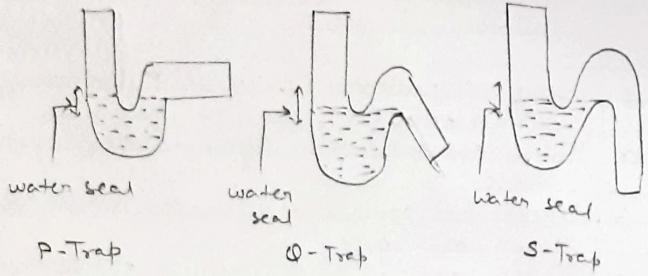
This method is also an approximate method of estimation of pH ranging to 4 to 11

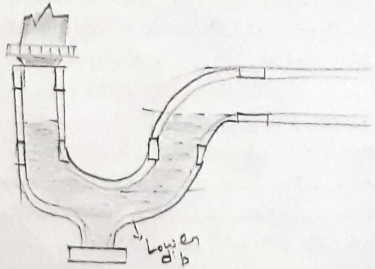
3. pH paper (pH 0 to 10)

(a) Dip the pH paper in the given water sample.

(b) Compare the color developed with that of water given in the wrapper of the pH paper booklet.

(c) Note down the pH of sample along with it





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Experiment-8

Object:- To study different types of Sanitary fitting.

1. **Trap:-** Trap may be defined as a fitting placed at the ends of the soil pipes or the sullage pipe. to prevent the passes of foul gases from the pipes to the outside. Depending upon their the shapes, the traps may be:-
   - (i) P-trap
   - (ii) Q-trap
   - (iii) S-trap
   - (iv) Intercepting trap
   - (v) Nahani trap.

Out of the above three types of traps are shown here. A trap essentially consists of a U-tube. Which retains water, acting as a seal between foul gases inside the pipes & the outside atmosphere. They are largely used for bathrooms, sinks & lavatories. In all such needs, they are made with enlarged mouth, so that the waste pipe may be thoroughly flushed out.

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Aim:- To learn about Sanitary fitting.

Theory:- Places where fitting are needed.

(i) Wash Basins
(ii) Sinks
(iii) Bath tubes
(iv) Water closets
(v) Urinals.

Two-pipe system:- The waste stack recieved the discharge ablutionary fitments & conveyed this to the ground level where it was delivered above the water seal in a tapped gully connected to the drainage system.

The soil stack receives the discharge from soil appliances & delivered it direct to the under ground drainage system. The waste & soil water did not combine until they reached the below ground drainage system.

The fully-ventilated one pipe system:- Vest stack connected to the discharge stack near to the bend to remove compressed air at this point.

Single stack system- Reduces the cost of Soil & waste system.

The slopes of the branch pipes one. Sink & bath; to 19 mm/m basin 20-120 mm/m; we 18 mm/m vertical stack at 200 mm below the centre of the we branch connection.

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One pipe system:

Soil pipe - A soil pipe is a pipe through which human excreta flow.

Water pipe - It is a pipe which carries only the liquid waste it door not carry human excetra.

Vent Pipe It is a pipe which is provided for the purpose of the ventilation system. A vent is open at top & bottom. To facilitate exit of foul gases. It is carried at least one meter higher than the roof level.

Rain water pipe:- It is a pipe which carries only the rain water.

Anti Siphon age pipe - It is pipe which is installed in the house drainage to preserve the water seal of traps.

Traps A trap is depressed or bends fitting that, when provided in a drainage system, always remains full of water. This maintains water seal. It presents the passage of foul air or gas through it, through it allows the sewage or waste water to flow through it. The depth of water seal is the vertical distance between the crown to dip of a trap. The depth of water seal represents its strength or effectiveness greater the depth of

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water seal more effective is the trap. The depth of water seal varies from 25mm to 75mm

Viva Question

Q1 What are the difference between sink & washbasin?
Ans The sinks are mostly used in kitchen & pantries while wash basins are used in toilets & wash rooms.

Q2 What is trap in sanitation?
Ans A trap is a device which is used to prevent sewer gases from entering in buildings.

Q3. What is water steal in traps?
Ans A small amount of water contained in the trap of a drain to prevent the passage of foul smells.

Q4 Which traps is used for water closet?
Ans P-trap is used with an Indian water-closet. This trap also has a water seal & prevents entry of foul gases to the house.

Q5 What is water closet?
Ans The water closet (WC) is a ceramic sanitary ware product which is used as a toilet

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