

# INTERSHIP REPORT



A report submitted in partial fulfilled of the requirement for the award of degree of

**BACHELOR OF SCIENCE**

**IN**

**CHEMISTRY**

**BY**

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## *Certificate of Training*

*This is to certify that*

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*From 11<sup>th</sup> to 26<sup>th</sup> September 2023.*



  
**Dr. M. MAYILSAMY**  
Director

## **ACKNOWLEDGEMENT:**

I want to thank my advisers and everyone at the company for their patience and assistance during my on-site training. Thanks to their guidance, I was able to develop my industrial skills and learn about Waste water treatment by uv-spectroscopy analysis these skills will help me to expand my resume and advance my career.

## **ABOUT COMPANY:**

Hiyoshi India Ecological Services Pvt. Ltd. was a result of the 25 years of interactive relationship between Hiyoshi and India through

Talk your way to Japan speech contest, conducted since 1998 to increase environmental awareness among school students in India

Hiyoshi Environmental Awards established in the year 2007 for recognising and felicitating the environmental warriors in India

Hiyoshi University Internship Program since 2007 for students to enhance their career and inspire them to work for the Environment.

ABK AOTS intern training since 1995 to increase environmental awareness among future leaders in the country

Hiyoshi India Ecological Services Private Limited a 100% subsidiary company of Hiyoshi Corporation, Japan was established in the year 2011.

To provide Hiyoshi's 70 years of acquired knowledge in the field of drinking water analysis, wastewater analysis, O&M of STP, solid waste etc. in Chennai.

# **UV SPECTROSCOPY ANALYSIS**

## **INTRODUCTION:**

- ❖ Ultraviolet-visible (UV-vis) spectroscopy is a technique that measures the interaction of light with matter at the electronic level. It is used to obtain the absorbance spectra of a compound in solution or as a solid
- ❖ UV-vis spectroscopy is a type of absorption spectroscopy. Molecules with  $\pi$ -electrons or non-bonding electrons can absorb ultraviolet or visible light energy and be excited to higher anti-bonding molecular orbitals.

## PRINCIPLE:

- ❖ The Principle of UV-Visible Spectroscopy is based on the absorption of ultraviolet light or visible light by chemical compounds, which results in the production of distinct spectra. [Spectroscopy](#) is based on the interaction between light and matter. When the matter absorbs the light, it undergoes excitation and de-excitation, resulting in the production of a spectrum.
- ❖ When matter absorbs ultraviolet radiation, the electrons present in it undergo excitation. This causes them to jump from a ground state (an energy state with a relatively small amount of energy associated with it) to an excited state (an energy state with a relatively large amount of energy associated with it). It is important to note that the difference in the energies of the ground state and the excited state of the electron is always equal to the amount of ultraviolet radiation or visible radiation absorbed by it.



## **INSTRUMENTATION:**

- ❖ Source Of Light
- ❖ Monochromator
- ❖ Sample Solution In Cuvette
- ❖ Photo Detector
- ❖ Readout Device

## **Advantages:**

- ❖ Simple and inexpensive experimentation
- ❖ Most organic molecules absorb UV/Vis light
- ❖ Quantitative beer's law

## **Disadvantages:**

- ❖ Mixtures of molecules can be a problem due to overlap
- ❖ Spectra are not highly specific for particular molecules
- ❖ Expensive instrumentation

## **Application:**

- ❖ Molecular weight determination
- ❖ Quantitative analysis
- ❖ Chemical kinetics
- ❖ Detection of impurities
- ❖ Qualitative analysis
- ❖ Detection of functional groups

## TO DETERMINE THE AMOUNT OF SULPHATE IN WASTEWATER

### PRINCIPLE:

At acidic PH sulphate ( $\text{SO}_4$ ) reacts with  $\text{BaCl}_2$  to form  $\text{BaSO}_4$  as the turbid compound.

- ❖  $\text{SO}_4^{2-} + \text{BaCl}_2 \rightarrow \text{BaSO}_4 \downarrow + 2 \text{Cl}^-$
- ❖ PH is higher at lower temperature
- ❖ PH is lower at higher temperature

### REAGENTS REQUIRED:

- ❖ Buffer solution:  $\text{CH}_3\text{COONa}$ ,  $\text{MgCl}_2$ ,  $\text{KNO}_3$ ,  $\text{CH}_3\text{COOH}$
- ❖ Barium chloride

### Total Dissolved Solids (TDS)

- ❖ Total dissolved solids (TDS) is a measure of the dissolved combined content of all inorganic and organic substances present in a liquid in molecular, ionized, or micro-granular (colloidal sol) suspended form. TDS are often measured in parts per million (ppm). TDS in water can be measured using a digital meter.

### DETRMINATION:

#### TDS can be determined by two methods:

**Gravimetric analysis:** This method is a laboratory method and is time taking but results are accurate. Here, water sample is prepared by filtering water by 1.5 micron filter so as to separate suspended solids from the water.

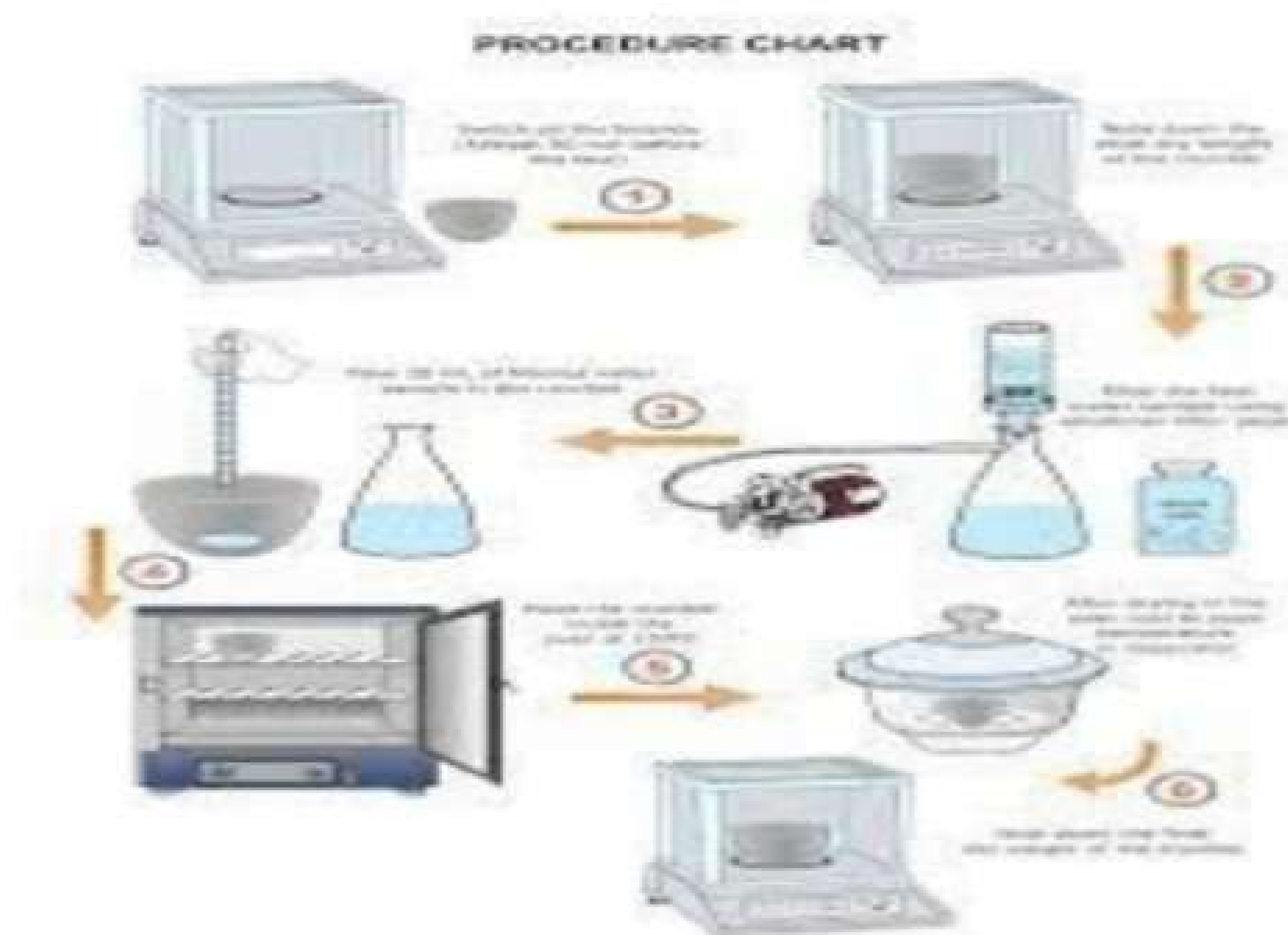
## Procedure:

- ❖ Step1- Take an empty beaker and note down it's weight, say- 20 g.
- ❖ Step2- Put water sample in the beaker and take weight again, say-220 g which, means weight of water=220 g – 20 g=200 g.
- ❖ Step3- Heat the beaker to evaporate water and once all the water is evaporated take the weight of beaker along with the residue, say-21 g which means weight of residue is= 21g – 20 g=1 .

## Formula:

- ❖ The formula for total dissolved solids (TDS) is  $TDS = K_e \times EC$ .

In this formula, TDS is expressed in mg/L and EC is the electrical conductivity in microsiemens per centimeter at 25 °C.



## Conclusion:

- UV-visible spectroscopy is a valid, simple and cost effective method for determining the concentration of absorbing species if applied to pure ESC