DEPARTMENT OF CHEMICAL ENGINEERING

University of Engineering & Technology, Lahore

Instrumental Analysis Lab

Introduction

This lab consists of number of sophisticated instruments that can be used for the qualitative and quantitative analysis of different types of chemicals. The purpose of this lab is to provide sufficient training to students in developing and understanding the principles of instrumentation and their application for the analysis of compounds and their formulated products. This lab will help the students to integrate a fundamental understanding of the physics' principles of instrumentation for atomic, molecular, and mass spectrometry, magnetic resonance spectrometry, chromatography and other methods of separation, electro-analytical methods, and thermal methods for chemical analysis. In this lab students can apply theory and operational principles of analytical instruments including electronic components and the results can be very helpful in the areas of research and development.

List of Equipment

1. Atomic Absorption Spectrophotometer
2. Gas Chromatograph
3. High-Performance Liquid Chromatograph (HPLC)
4. UV Spectrophotometer

Details of Equipment

Atomic Absorption Spectrophotometer

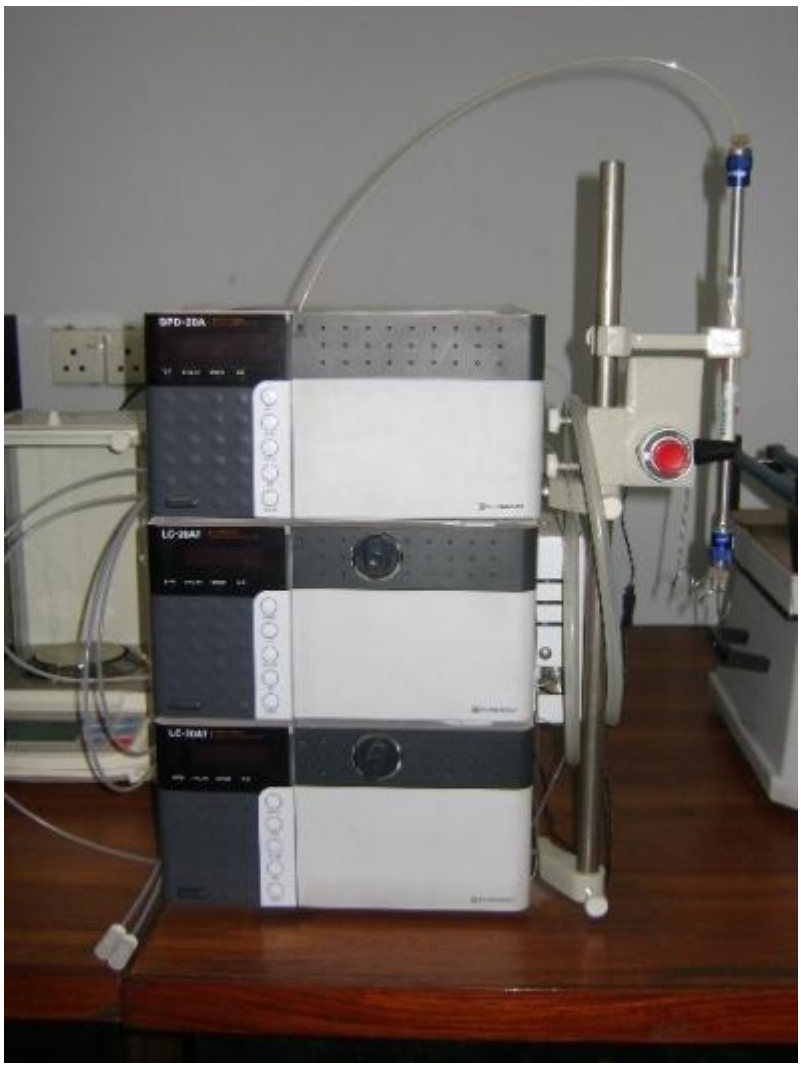
Atomic absorption spectrophotometry provides accurate quantitative analyses for metals in water, sediments, soils or rocks. Samples are analyzed in solution form, so solid samples must be leached or dissolved prior to analysis. It is a microprocessor-controlled double-beam spectrophotometer with a graphite furnace attachment for flameless analysis. Both acetylene and nitrous oxide fuel mixtures can be use to allow for the analysis of a wide range of elements.

Gas Chromatograph

A gas chromatograph is a chemical analysis instrument for separating chemicals in a complex sample. A gas chromatograph uses a flow-through narrow tube known as the column, through which different chemical constituents of a sample pass in a gas stream (carrier gas, mobile phase) at different rates depending on their various chemical and physical properties and their interaction with a specific column filling, called the stationary phase. As the chemicals exit the end of the column, they are detected and identified electronically.

High-Performance Liquid Chromatograph (HPLC)

High-performance liquid chromatography (or High-pressure liquid chromatography, HPLC) is a form of column chromatography used frequently in biochemistry and analytical chemistry to separate, identify, and quantify compounds. HPLC utilizes a column that holds chromatographic packing material (stationary phase), a pump that moves the mobile phase through the column, and a detector that shows the retention times of the molecules.



UV Spectrophotometer

Many chemical species absorb light in either the visible or ultraviolet region of the electromagnetic spectrum. This absorption is caused by the changing electron energy levels in the molecule and is therefore characteristic of the molecular structure. This equipment is particularly useful for performing rapid quantitative concentration measurements of organic species in solution.