

DEPARTMENT OF CHEMICAL ENGINEERING
University of Engineering & Technology, Lahore

ENVIRONMENTAL
ENGINEERING LAB

Lab Incharge

Dr. A.R. Saleemi

Lab Staff

Malik Muhammad Zubair

Introduction

Environmental engineering lab helps in the pollution prevention as air, water and noise testing is done in the lab. As a result of these tests, various remedies can be suggested to reduce the environmental pollution. The purpose of this lab is to make the students aware of the dangerous effects of environmental pollution. With these tests environmental protection agency can keep a check on the hazardous emissions by any industry and can protect health of common man, water toxicity, land spoiling and air pollution. Environmental engineering lab in the chemical engineering department has the following equipments related to the air, water and noise pollution.

List of Equipments

1. Standard test jar apparatus
2. Chemical oxygen demand apparatus
3. Dissolved oxygen meter
4. Reverse osmosis apparatus
5. Biochemical oxygen demand equipment
6. NO_x measuring equipment
7. SO_x measuring equipment
8. CO_x measuring equipment
9. Sound level meter

Details of Equipment

Standard Test Jar Apparatus

It is used to remove the turbidity in the given sample. Turbidity appears due to the presence of suspended material in the sample. Light falling on the sample is scattered due to this matter and because of this scattering, cloudiness appears. This cloudiness is referred to as turbidity. The equipment is provided with the turbidity meter that measures the initial and final turbidity of the samples before and after adding the required dosage of flocculent and coagulant. There is control console with the provision of setting the desired RPM and time.

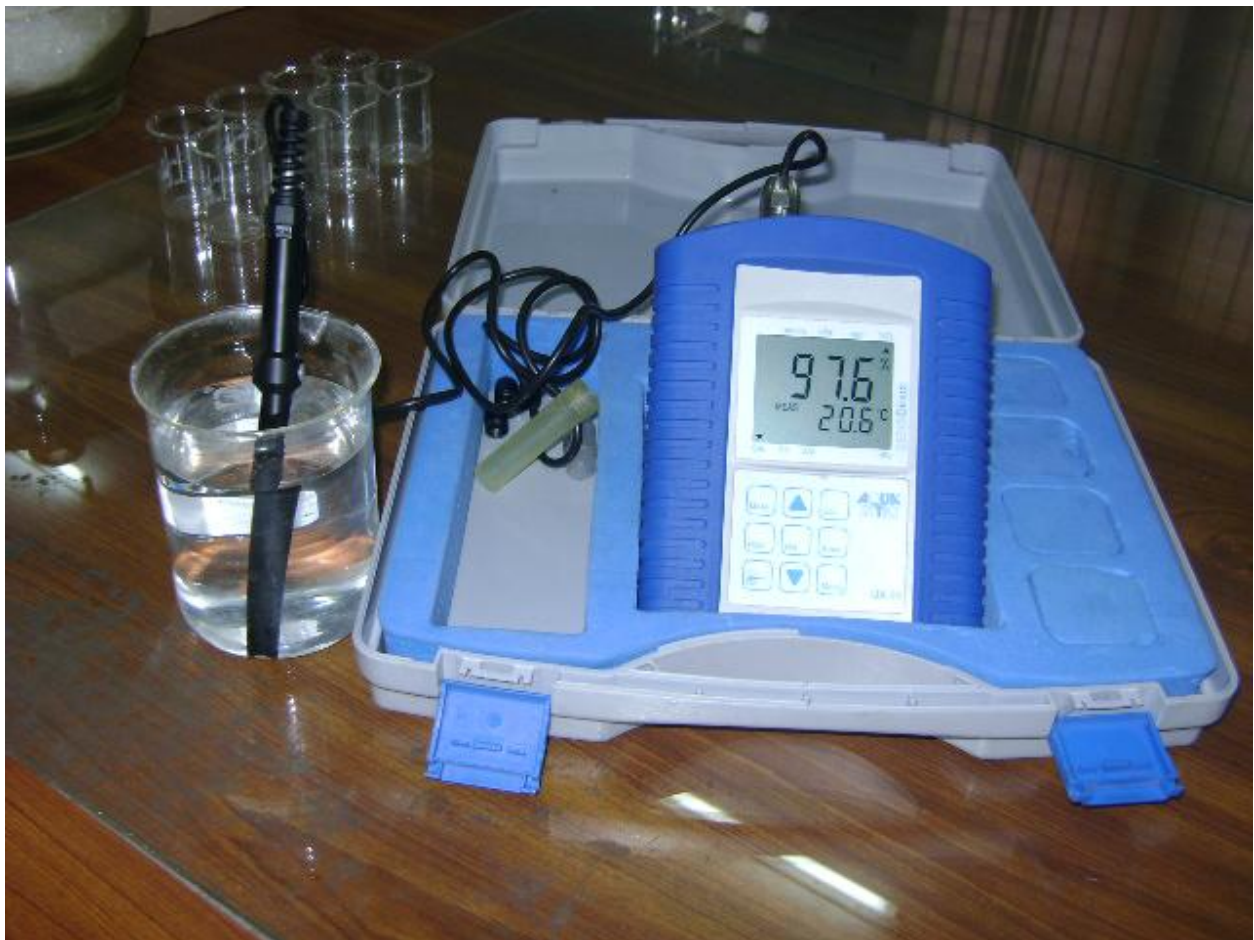


Chemical Oxygen Demand Equipment

Chemical oxygen demand (COD) equipment is used to find the COD of the different samples. COD is the water quality parameter. COD value indicates the amount of oxygen that is required for the chemical oxidation of organic matter present in the sample and indirectly the amount of organic matter. Apparatus consist of a distillation flask, a reflux condenser for entrapping the volatile materials, cylinders for measuring volumes and chemicals.

Dissolved Oxygen Meter

Dissolved oxygen (D.O) meter is used to find the amount of dissolved oxygen in the given sample of water. D.O is the molecular or the gaseous oxygen present in water. It is required for the survival of living beings. D.O concentration is very important to check whether the given water sample is perfect for the given use or not. e.g for living species under water, the water becomes dangerous for their lives, if D.O super-saturation is above 140%. The meter can be calibrated to give the desired readings for the pressure in mmHg, absolute pressure in hPa, %oxygen saturation and oxygen concentration in mg/l.



Reverse Osmosis Equipment

Reverse osmosis equipment is used for the treatment of water. It can reduce the organics, inorganics, bacteria and particles found in contaminated drinking water to tolerable levels at lower energy costs. Reverse (R.O) offers significant advantages. It can accomplish the removal of contaminants to the desired degree of purity. R.O process is the reverse of osmosis that involves the selective movement of water from one side of the membrane to the other. A specific amount of pressure is necessary to separate the contaminants and this depends on the nature of impurities present. R.O equipment is provided with the sediment filter, activated carbon, water softener, R.O membrane, and mercury vapor lamp and conductivity meter.



Biochemical Oxygen Demand Apparatus

Biochemical oxygen demand apparatus is used to determine the amount of oxygen required for the biological oxidation of organic matter present in the sample. Biochemical oxygen demand (B.O.D) is the water quality parameter. B.O.D value indicates the amount of oxygen required for oxidation and indirectly the amount of organic matter present.



NO_x Measuring Unit

It measures the concentration of NO_x present in the given air sample. It works on the principle of chemilluminescence. There is a screen that displays the continuous readings for the concentration of NO, NO₂ and NO_x.



CO_x Measuring Unit

It measures the concentration of CO_x in the air. Non-dispersive photometers are used to determine the CO gas. In this the characteristic frequencies absorbed by CO are made use of in the determination. There are thermal detectors that sense the temperature difference due to the difference in the concentration of CO in sample and the reference gas.



Sound Level Meter

This meter is used to determine the sound intensity at different places. There is a condenser type microphone that is kept at a distance of 1m. A transducer is used to convert the sound energy into the electrical signals and is displayed on the meter in the form of sound or noise intensity.



List of Experiments

1. To find the optimum dosage of flocculent for the removal of turbidity in canal water.
2. To measure the concentration of dissolved oxygen in the given sample using D.O meter.
3. To measure the B.O.D of the sample.
4. To measure the C.O.D of the sample.
5. Treatment of drinking water using Reverse osmosis process.
6. To measure the sound intensity at different places using the sound level meter.
7. To measure the concentration of NO_x in the air sample.
8. To measure the concentration of CO_x in the air sample.
9. To measure the concentration of SO_x in the air sample.