



PRACTICAL I

ENERGY AND ENVIRONMENT ENGINEERING



PRACTICAL 1

■ INTRODUCTION TO ENVIRONMENTAL ENGINEERING LAB

Importance Of Environment Lab In Civil Engineering

Do and Dont's in lab

Water Quality Parameters

PRACTICAL 1

■ IMPORTANCE OF ENVIRONMENTAL ENGINEERING LAB IN CIVIL ENGINEERING

- 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.

PRACTICAL 1

- ❑ Do and don'ts in lab

Environmental Engineering Laboratory

General Guidelines for Safety Practices



**Safety is as simple as
ABC...Always Be Careful**

**AN EXPERIMENT DONE WELL IS...
AN EXPERIMENT DONE SAFELY.**

PRACTICAL 1

☐ Do and don'ts in lab

1. Think Safety First.
2. Know Emergency Responses.
3. Know What You are Working With.
4. Use the Smallest Possible Amount.
5. Follow all Safety Protocols/Procedures .
6. Report Dangerous Situation immediately.
7. Store & Handle Hazardous Material Safely.
8. Do not panic.
9. If you Don't Know... **ASK!**

A
CASUAL
attitude
Toward
SAFETY
=
CASUALTY

PRACTICAL 1

- ❑ Do and don'ts in lab

Chemistry Laboratory Safety Rules **Better Safe than Sorry**

Dress Appropriately

Identify the Safety Equipment

Don't Taste or Sniff Chemicals

**Read the Chemical Safety
Information**

Do Not Pipette By Mouth - Ever

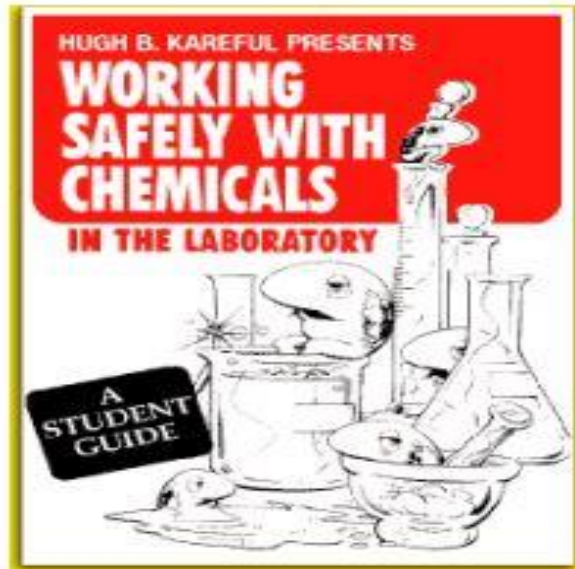
**Don't Casually Dispose of
Chemicals Down the Drain**

Tomorrow - Your reward for working safely today

PRACTICAL 1

- ❑ Do and don't's in lab

HANDLING CHEMICALS



All chemicals in the laboratory are to be considered dangerous.

Avoid handling chemicals with BARE HANDS.

When making an observation, keep at least 1 foot away from the specimen.

Do not taste, or smell any chemicals.

Check the label on all chemical bottles twice before removing any of the contents.

Take only as much chemical as you need.

Never return unused chemicals to their original container.

Never remove label of any chemical bottle.

At work, at play, let safety lead the way

PRACTICAL 1

- ❑ Do and don'ts in lab

HANDLING GLASSWARE AND EQUIPMENT



Care in handling glassware
and electricity

Never handle broken glass with your bare hands. Use a brush and dustpan to clean up broken glass.

Place broken glass in the designated glass disposal container.

Examine glassware before each use. Never use chipped, cracked, or dirty glassware.

If you do not understand how to use a piece of equipment, ASK THE TEACHER FOR HELP!

Do not immerse hot glassware in cold water. The glassware may shatter.

PRACTICAL 1

- ❑ Do and don'ts in lab

HEATING SUBSTANCES



Heated glassware remain very hot for a long time. They should be set aside in a designated place to cool, and picked up with caution.

Use tongs or heat protective gloves if necessary.

Never look into a container that is being heated.

Do not place hot apparatus directly on the laboratory desk. Always use an insulated pad.

Allow plenty of time for hot apparatus to cool before touching it.

PRACTICAL 1

❑ Do and don'ts in lab

CLOTHING



Any time chemicals, heat, or glassware are used, students will wear safety goggles. **NO EXCEPTIONS TO THIS RULE!**

Contact lenses may be not be worn in the laboratory.

Dress properly during a laboratory activity. Long hair, dangling jewelry, and loose or baggy clothing are a hazard in the laboratory. Long hair must be tied back, and dangling jewelry and baggy clothing must be secured. Shoes must completely cover the foot. No sandals allowed on lab days.

A lab coat or smock should be worn during laboratory experiments.

PRACTICAL 1

☐ Water Quality Parameters

Drinking Water Quality

Waste Water Quality Parameters

Drinking water quality parameters

Physical parameters

Chemical parameters

Biological parameters

Waste Water Quality Parameters

Physical parameters

Chemical parameters

Biological parameters


Physical characteristics

Physical characteristics includes the determination of

- Colour
- Odour
- Turbidity
- Electrical conductivity
- Total solids



PHYSICAL CHARACTERISTICS



COLOUR

Colour of water

Apparent colour created by suspended substances and true colour is created by dissolved particle that can indicate industrial, agricultural, or natural pollution.

Colour disc kit reads apparent colour created by substances that can indicate industrial, agricultural, or natural pollution.

Colour is measured in platinum cobalt scale in Platinum Cobalt Unit or PCU.

And also in true colour unit (TCU)



Hach color test comparator

ELECTRICAL CONDUCTIVITY

- Conductivity (or specific conductance is a measure of its ability to conduct electricity. The SI unit of conductivity is Siemens per meter (S/m).
- Due to the presence of ions present in the water.
- Electrical conductivity meter is used to measure conductivity.
- Conductivity is measured at a particular temperature.
- **Typical drinking water in the range of 5–50 mS/m.**



Features

Micro controller based

Readout: 2 Line 16 Character LCD

Data storage : Calibration & Data Stored in Memory

Printer interface for 80 Column D.M. Printer

TURBIDITY

- ❖ Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particulates.
- ❖ Turbidity is measured by using
 - ❖ Turbidity rod
 - ❖ Jakson turbidimeter
 - ❖ Nephelometer/Turbidimeter
- ❖ Turbidity is measured in
 - a. JTU : Jakson turbidi Units
 - b. NTU : Neplometer turbidity units
- ❖ Drinking water standards for turbidity upto 10 NTU as per IS 10500 (2013)



TURBIDIMETER

TOTAL SOLIDS

- The term solids refers to the solid matter, suspended and dissolved, in water.
- It is the residue left in the vessel after the evaporation of liquid content at defined temperature.
- Total solid consists of suspended solids and dissolved solids and they consist of non volatile and volatile solids
- Drinking water standards for total dissolved solids is less than or equal to 500mg/L



TOTAL SOLIDS

Apparatus Required



**Drying
Oven**



Dish Tongs



Analytical Balance



Dessicator



Pipette



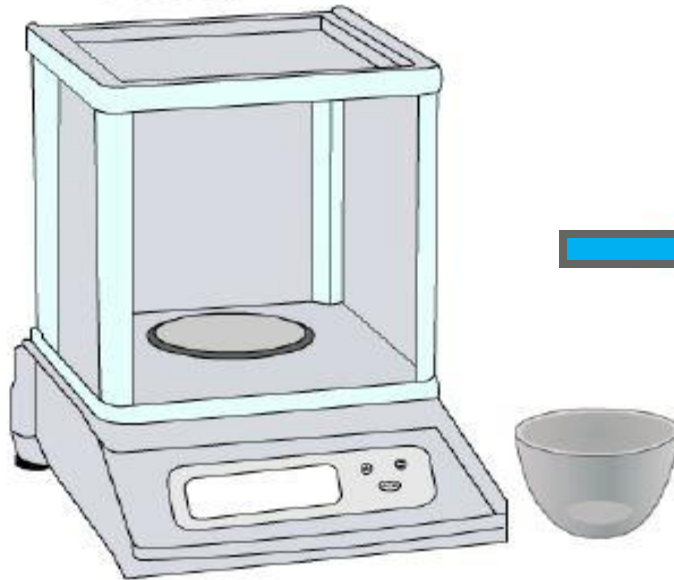
Crucible



**Wash
Bottle**

TOTAL SOLIDS

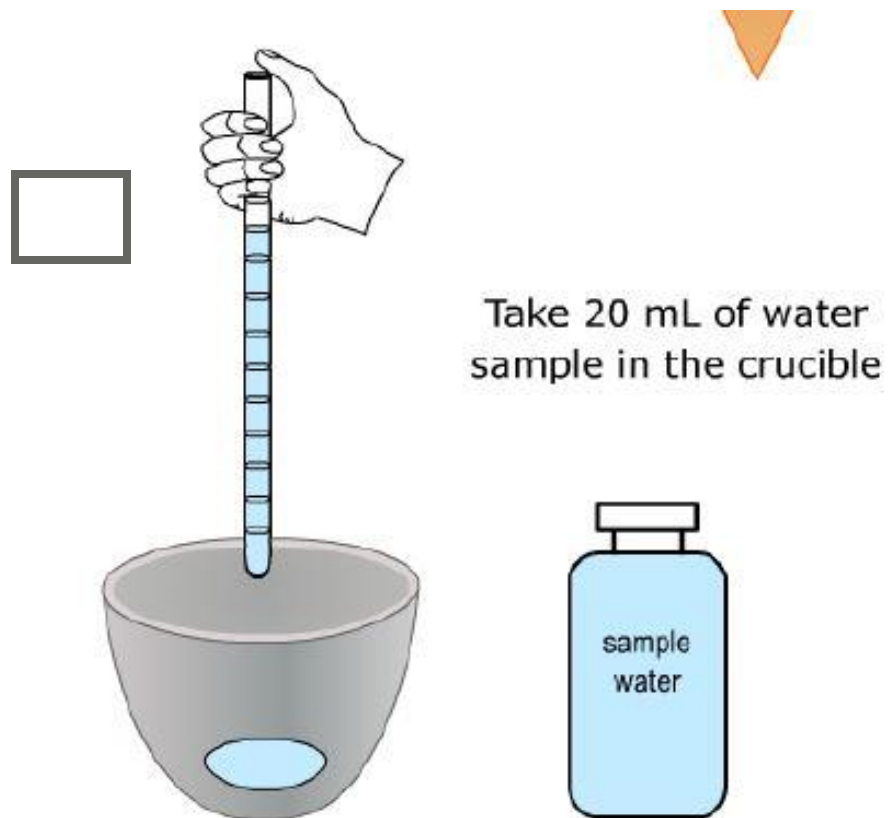
Switch on the balance
(Atleast 30 min before
the test)



Notedown the initial
dry weight of the crucible



TOTAL SOLIDS



Place the crucible
inside the oven at 103°C



4



After drying in the oven cool to room temperature in dessicator

5



Note down the final dry weight of the crucible



DRINKING WATER QUALITY PARAMETERS

Determination of Chemical characteristics includes

- ☐ pH
- ☐ Alkalinity
- ☐ Acidity
- ☐ Hardness
- ☐ Chlorine
- ☐ Residual chlorine
- ☐ Sulphate
- ☐ Dissolved oxygen
- ☐ Bio chemical oxygen demand (BOD)
- ☐ Chemical oxygen demand (COD)