



SNS COLLEGE OF TECHNOLOGY

Coimbatore – 641 029

An Autonomous Institution



DEPARTMENT OF CIVIL ENGINEERING

ENVIRONMENTAL ENGINEERING

II YEAR / IV SEMESTER

UNIT 1 : SOURCES, QUALITY AND DEMAND OF WATER

Topic 6 :Physical Test



UNIT 1 : SOURCES, QUALITY AND DEMAND OF WATER



1. Importance and necessity of water supply Engineering – Sources of water – Suitability of water –Choice of source
2. Types of demand – Computation of quantity of water
3. Fluctuation in demand –Factors affecting demand
4. Population forecast
5. Population forecast - Methods
6. Impurities in water– Collection of water sample
7. **Physical test**
8. Chemical test
9. Biological test and Standards of quality of water



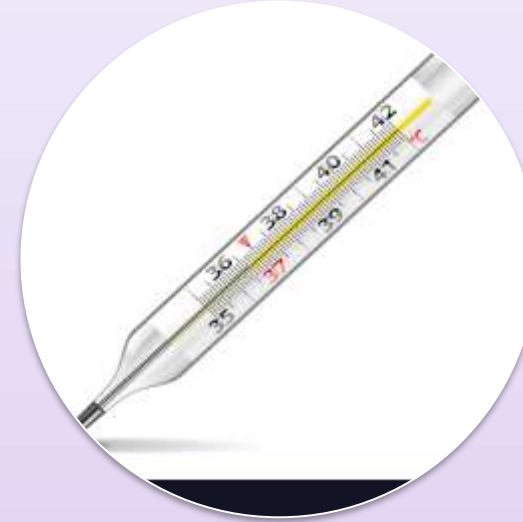
Physical test of water



Colour test



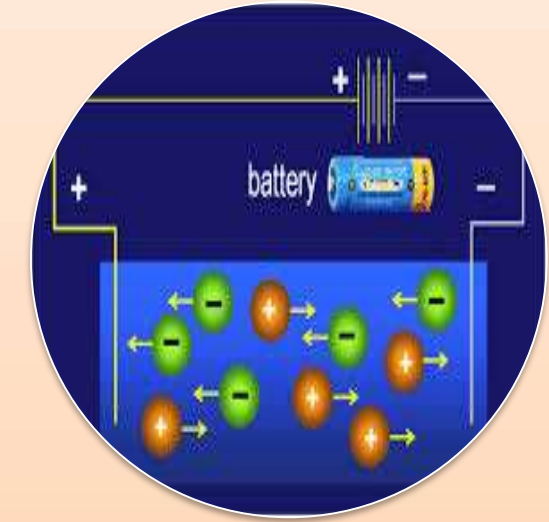
**Taste and
odour test**



**Temperature
test**



**Turbidity
test**



**Specific
Conductivity
of water**





Colour test



Green color- copper leaching

Red color – Rust from iron pipes

Brown color – Organic compounds like tannin





Colour Test



Colour of water can be measured against various standards scales or tubes(Nessler) such as

- Hazen or Platinic chloride scale
- Burgess scale or cobalt scale

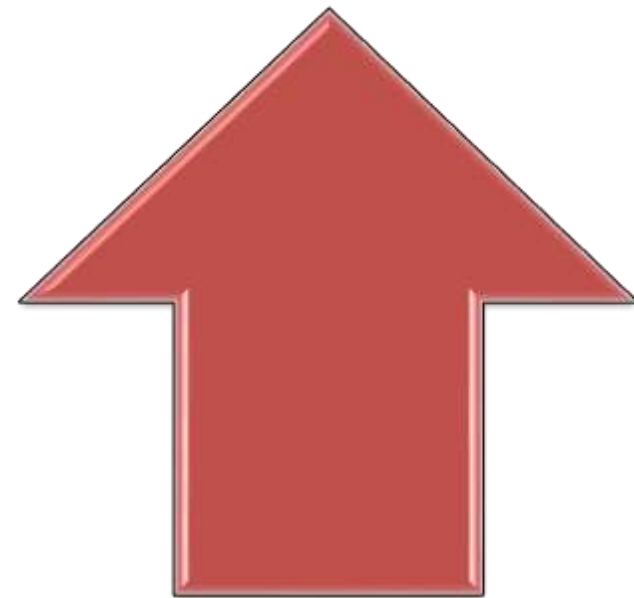
Colour of water is measured by Tintometer

The standard unit of colour is that produced by one milligram of platinum cobalt in one litre of distilled water.

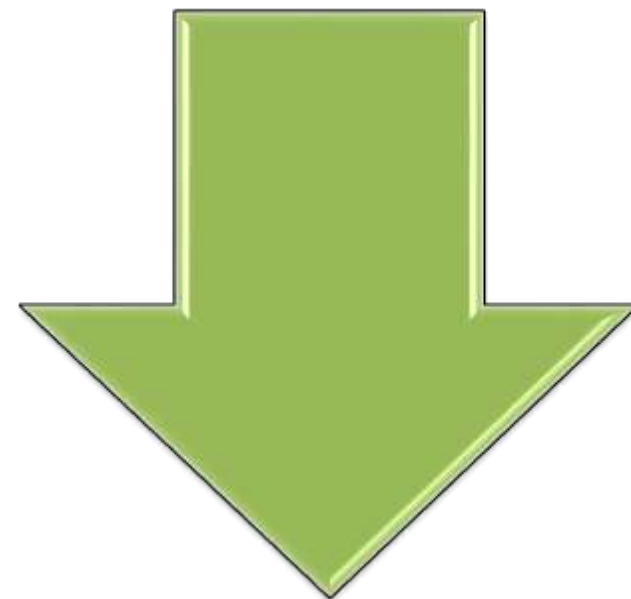




Acceptable limit of water(Cobalt unit)



**Maximum limit –
Not greater than 20**



**Preferable Limit –
Less than 10**



Colour of water

**Apparent color-
color of the whole
water sample
(dissolved +
suspended solids)**



**True Color- color
measured after
filtering the
suspended solids**



Taste and Odour



Strong chlorine taste

- Disinfection with chlorine

Metallic taste

- High mineral – Iron & Manganese

Rotten egg odour

- Decaying organic deposits underground washed along with water flow.

Musty smells

- Organic matter or even pesticides

Salty taste

- High levels of sodium, potassium and magnesium



Measurement of odour and taste



ODOUR

Thresh hold odour
number.(TON)

THRESHOLD NUMBER SHOULD NOT BE MORE THAN 3



Measurement of odour and taste

Sample Volume Diluted to 200 mL	Threshold Odor Number (TON)	Sample Volume Diluted to 200 mL	Threshold Odor Number (TON)
200	1	8.3	24
100	2	5.7	35
70	3	4	50
50	4	2.8	70
35	6	2	100
25	8	1.4	140
17	12	1	200

Threshold Odor Numbers- How They Are Determined

$$\text{TON} = (A + B) / A$$

A - Volume of Sample with odor

B - Volume of Pure Water with no odor Added

If A was a 100 ml sample and 100 ml of water had to be added to not detect the odor - the TON would be 2.

$$\text{TON} = (100 + 100) / 100 = 2$$



Measurement of odour and taste

- No perceptible odour.

0

- Very faint odour, detectable only to trained observer.

1

- Faint odour, detectable to average person only if he is told.

2

- Distinct odour, readily detectable by most people.

3

- Very distinct odour.

4

- Strong and intense odour.

5

- Extremely strong odour.

6



Temperature

The temperature of water depends on the depth from which it is drawn.

The desirable temperature of potable water is 10°C

Temperature of 25°C is considered to be objectionable.

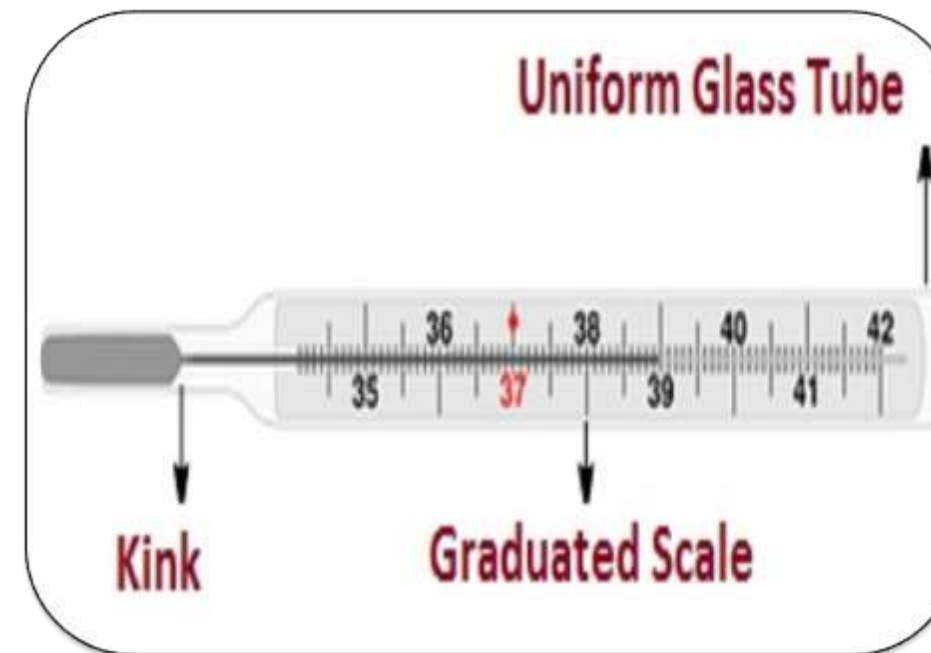
Determination of the saturation values of solids and gases



Measurement of Temperature



Thermometer



Broken Capillary
thermometer



Thermocouple



Turbidity



Haziness of fluid due to particulates invisible to naked eyes.

AESTHETIC ISSUES

- Reduce light penetration into deeper depths.
- Affects growth of aquatic organisms.

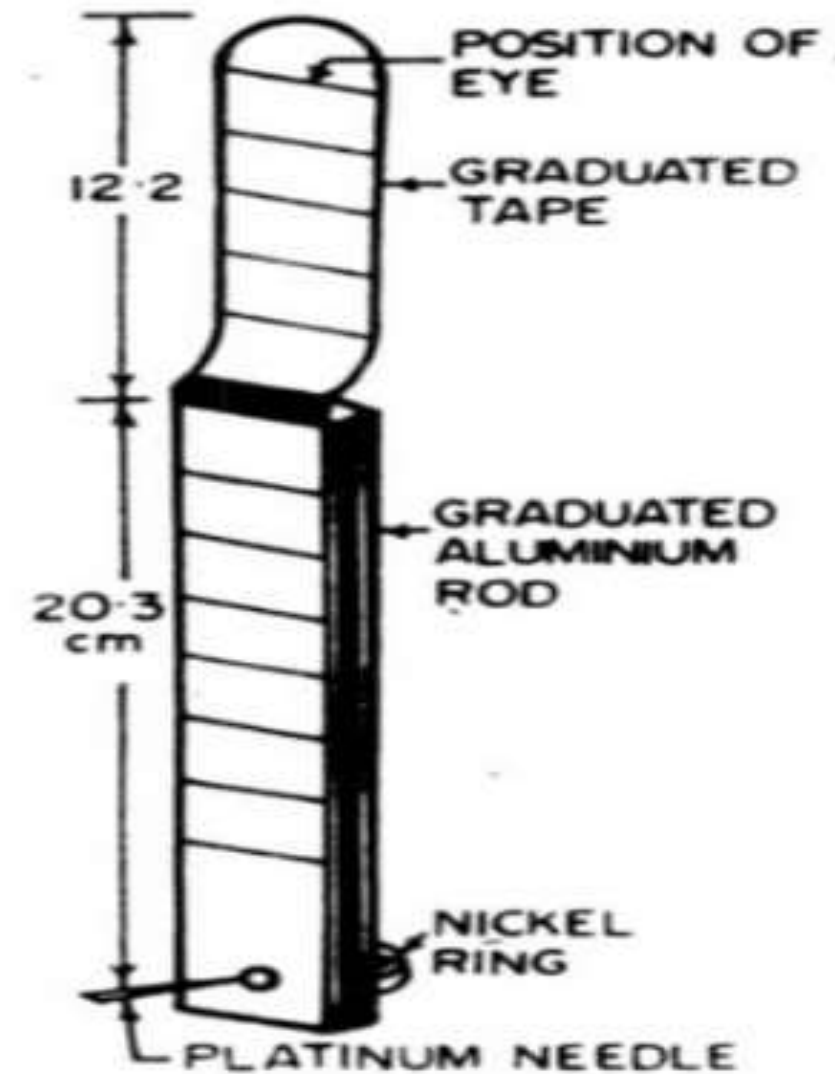
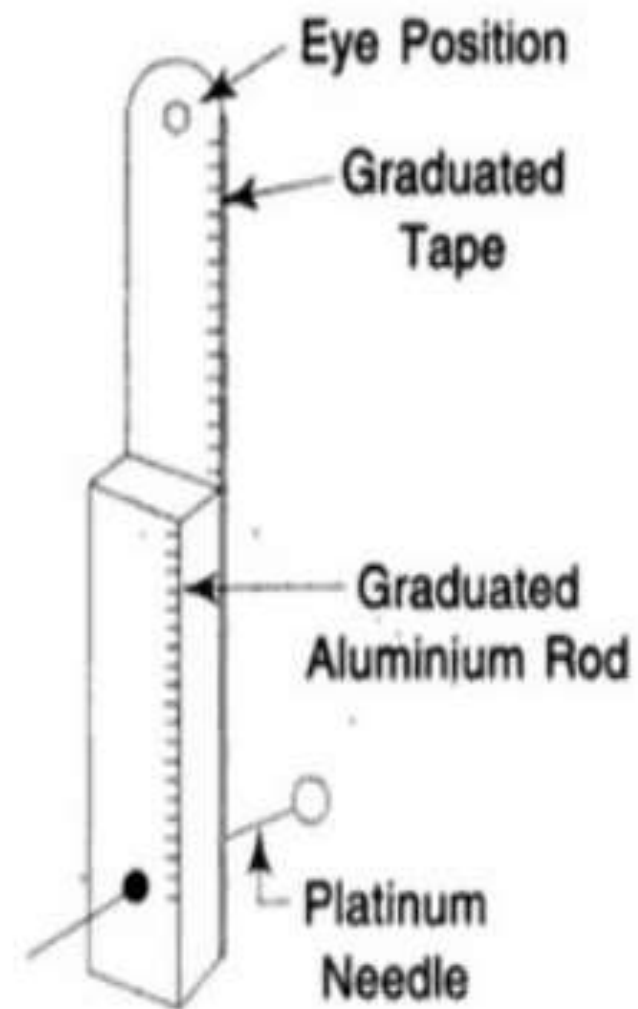
CAUSE

- Phytoplanktons, sediments through storm water runoff, quarrying, mining.



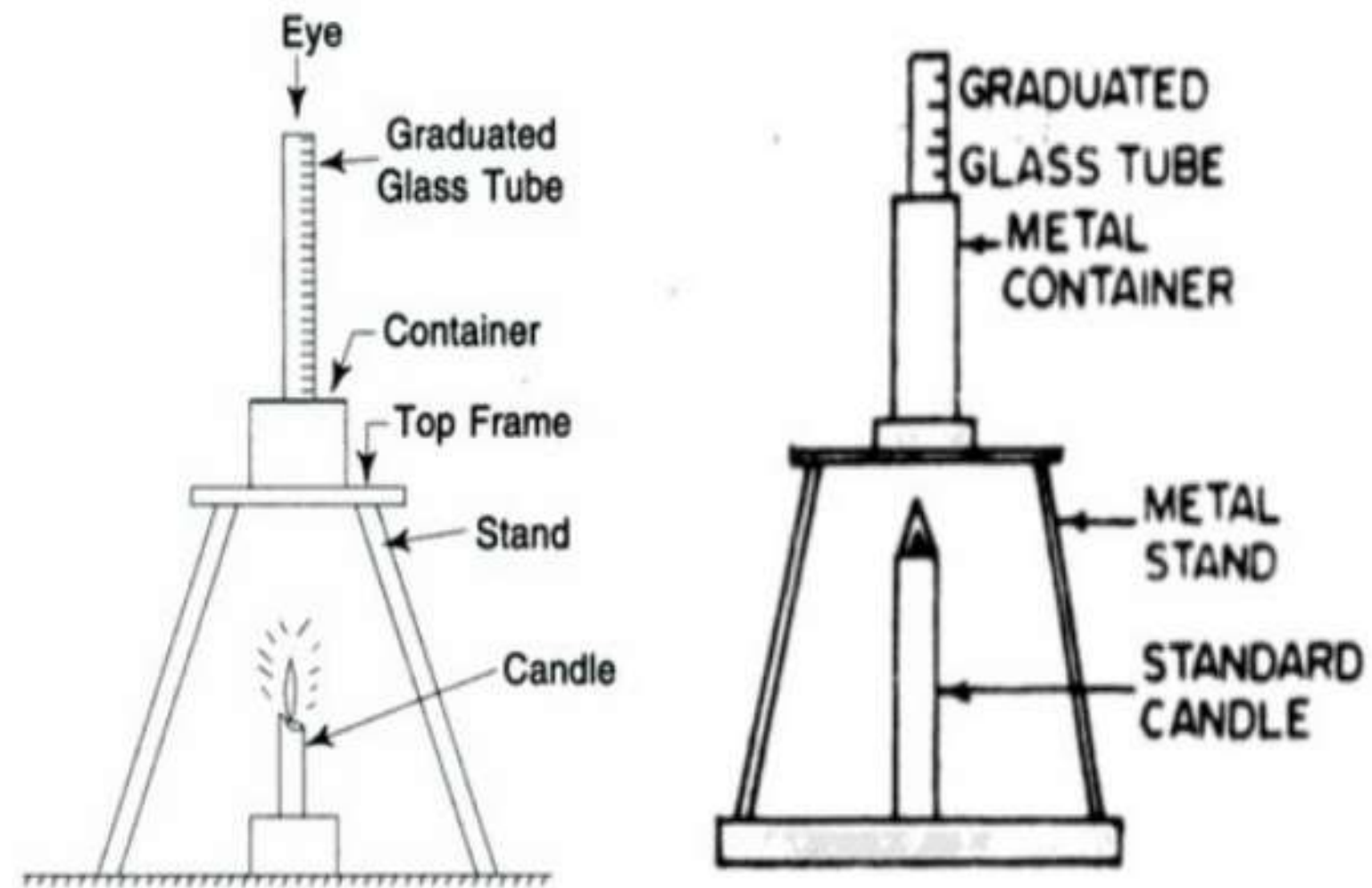
Turbidity Rod

Turbidity Rod





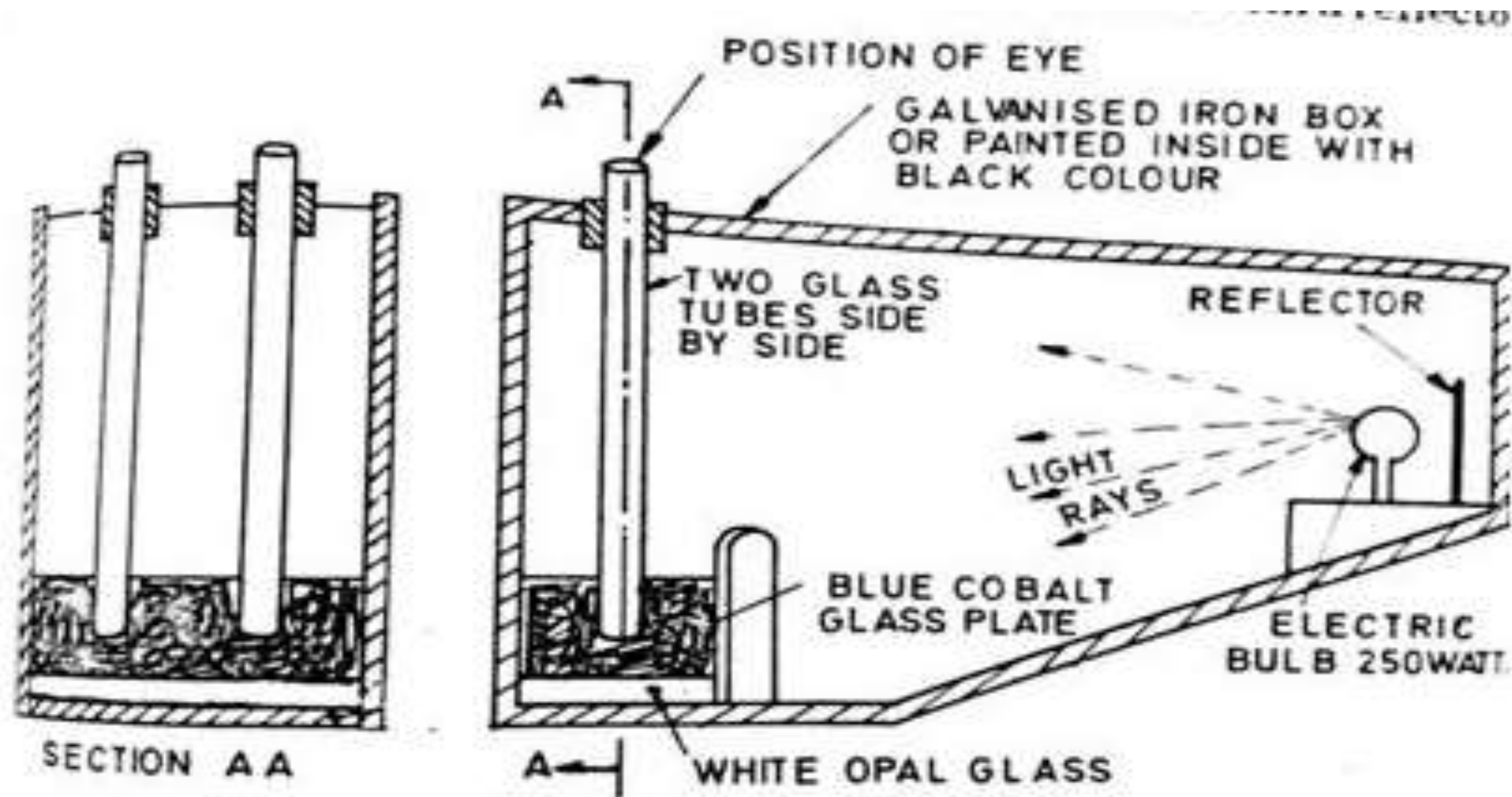
Turbidimeters



Jackson's Turbidimeter

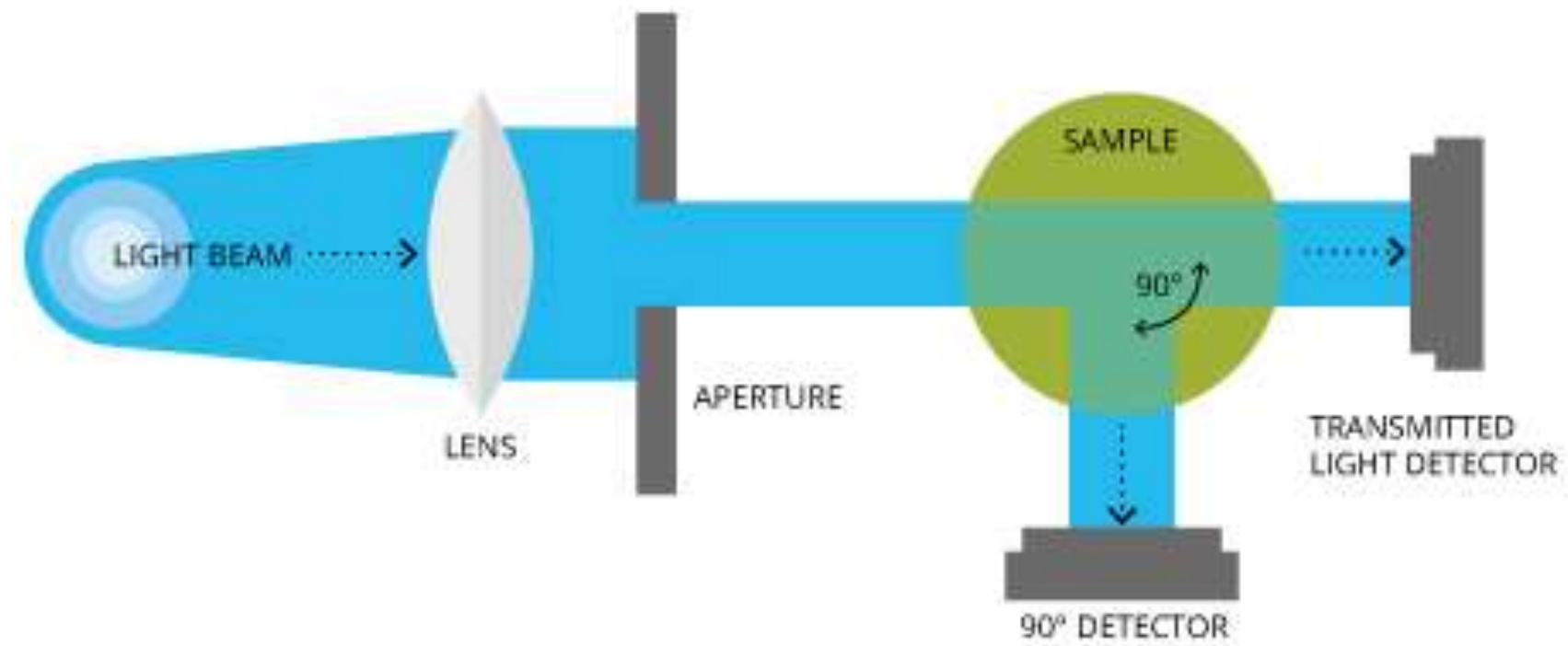


Baylis Turbidimeter





Nephelometer

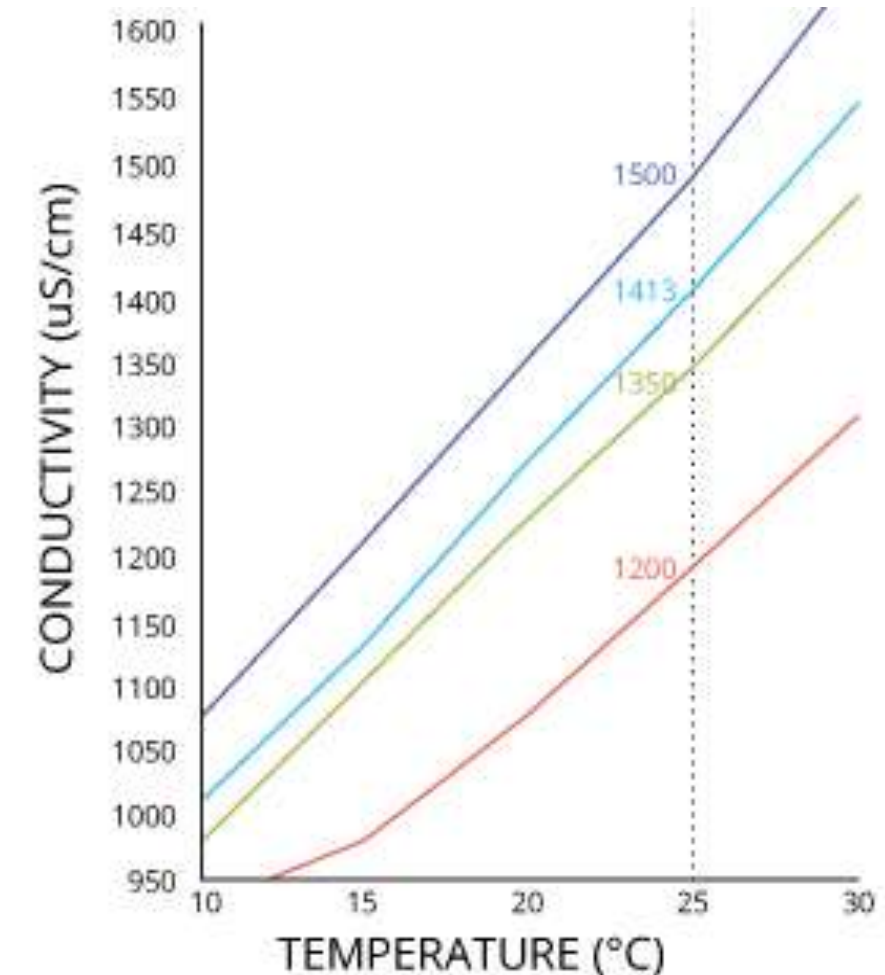




Specific Conductivity of water



- Conductivity is a measure of water's capability to pass electrical flow.
- This ability is directly related to the concentration of ions in the water.
- These conductive ions come from dissolved salts and inorganic materials such as alkalis, chlorides, sulfides and carbonate compounds.
- Compounds that dissolve into ions are also known as electrolytes.
- The more ions that are present, the higher the conductivity of water.





Assessment



What is the permissible limit of colour?



Thank You