



19CH101- ENGINEERING CHEMISTRY

Unit-1 WATER AND ITS TREATMENT

WATER QUALITY PARAMETERS

Physical characteristics:

1. Colour: caused by metallic substances like salt of Fe, Mn, algae, weeds etc. The standard unit of colour is that which is produced by one milligram of platinum cobalt dissolved in one litre of distilled water. For public supplies, the colour number on cobalt scale should not exceed 20 and should be preferably less than 10. Colour determined by an instrument is known as **tintometer**.
2. Turbidity: due to colloidal suspension, finely divided matters. The turbidity is measured by a turbidity rod or by a turbidity meter with optical observations and is expressed as the amount of suspended matter in mg/l or parts per million (ppm). For water, ppm and mg/l are approximately equal. The standard unit is that which is produced by one milligram of finely divided silica (fuller's earth) in one litre of distilled water.
3. Taste: it is interlinked directly with odour.
4. Odour: due to presence of living organism, decaying vegetation.

Chemical characteristics:

1. Total Solids and Suspended Solids

Total solids (suspended solids + dissolved solids) can be obtained by evaporating a sample of water and weighing the dry residue left on the filter paper. The suspended solid can be found by filtering the water sample. Total permissible amount of solids in water is generally limited to 500 ppm.

2. pH value of Water

$$\begin{aligned} \text{pH} &= -\log [\text{H}^+] \\ &= \log [1/\text{H}^+] \end{aligned}$$

If H^+ concentration increases, pH decreases and then it will be acidic. If H^+ concentration decreases,

pH increases and then it will be alkaline.



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$pH + pOH = 14$ if the pH of water is more than 7, it will be alkaline and if it is less than 7, it will be acidic.

The alkalinity is caused by the presence of bicarbonate of calcium and magnesium or by the carbonates of hydroxides of sodium, potassium, calcium and magnesium. Some, but not all of the compounds that cause alkalinity also cause hardness.

pH Measurement: The pH value of water can be measured quickly and automatically with the help of a **Potentiometer**. The pH can also be measured by indicators as given below:

Permissible pH value for public supplies may range of 6.6 to 8.4.

- considered soft and above 200 ppm are considered hard and in between is considered as moderately hard.
- Underground waters are generally harder than surface waters.
- The prescribed hardness limit for public supplies range between 75 to 115 ppm.