



## **19CH101- ENGINEERING CHEMISTRY**

### **Unit-1 WATER AND ITS TREATMENT**

#### **1. Dissolved Oxygen:**

The amount of oxygen dissolved in a given quantity of water at a particular pressure & temperature. Oxygen gas is generally absorbed by water from the atmosphere but it being consumed by unstable organic matter for their oxidation. Hence, if the oxygen present in water is found to be less than its saturation level, it indicates presence of organic matter and consequently making the waters suspicious.

#### **Significance of DO:**

1. It supports fish & other aquatic life in river water.
2. Determines whether the biological change is brought about by aerobic or anaerobic micro-organisms.
3. Controls river pollution.
4. Minimum level of DO-4 mg/lit , to support the aquatic life in good condition.

#### **2. Biological Oxygen Demand**

The amount of oxygen required for the biological decomposition of organic matter present in the water. The extent of organic matter present in water sample can be estimated by supplying oxygen to this sample and finding the oxygen consumed by the organic matter present in water. This oxygen demand is known as Biological oxygen demand (BOD). It is not practically possible to determine ultimate oxygen demand. Hence, BOD of water during the first five days at 20<sup>0</sup>C is generally taken as the standard demand.  $BOD_5 = BOD \text{ of } 5 \text{ days} = \text{Loss of oxygen in mg/l} \times \text{dilution factor}$ . The BOD of safe drinking water must be nil.

#### **Significance of BOD:**

1. The amount of organic matter present in the river water.
2. Complete oxidation occurs in indefinite period, the reaction period is taken as 5 days at 20°C. The rate of oxidation and demand depends on the amount & type of organic matter present in river water.



### 3. Chemical Oxygen Demand

The amount of oxygen required for chemical oxidation of organic matter using some oxidizing agent like potassium dichromate & potassium permanganate.

#### Significance of COD:

1. It is carried out to determine the amount of pollution in river water.
2. Rapid process & take only 3 hours.

### 4. Metal and other chemical substances in water:

Iron – 0.3ppm, excess of these cause discolouration of clothes.

Manganese – 0.05ppm

Copper – 1.3ppm

Sulphate – 250 ppm

Fluoride – 1.5 ppm, excess of this effects human lungs and other respiratory organs.

Fluoride concentration of less than 0.8 – 1.0 ppm causes dental cavity (tooth decay). If fluoride concentration is greater than 1.5ppm, causing spotting and discolouration of teeth (a disease called fluorosis).