7th - Wastewater Management -I

What is Wastewater: Water is elixir of life. It is used for everyday activities like washing, flushing of toilets, bathing etc. All these activities make water dirty. This dirty water is called wastewater or sewage.

Water, Our Lifeline: Water is needed by all forms of life. Clean water is a basic need of human beings. Unfortunately clean water is not available to the large segment of human populations. The water is unfit for human consumption, becomes the source of many water-borne diseases which ultimately lead to loss of human life. It is estimated that one billion human beings do not get safe drinking water. So, realising the urgency we celebrate 22nd March as World Water Day to bring awareness amongst people for safe water, fit for human consumption. Thus, water is cleaned by removing pollutants before it enters a water body or is reused. This process of wastewater treatment is commonly known as sewage treatment which takes place in several steps discussed later.

Sewage: It is wastewater released by homes, industries agricultural fields and other human activities. It also includes rainwater that has run down the street during a storm or heavy rain and it is a liquid waste. Most of its water has dissolved and suspended impurities called contaminants.

Composition of Sewage: The following components make the sewage:

1. The organic impurities present in sewage are human faeces, animal wastes (like animal dung), urea (as urine), oil, fruits and vegetable wastes, pesticides, herbicides, etc.
2. The inorganic impurities present in sewage are nitrates, phosphates and metals.
3. The nutrients present in sewage are nitrogen and phosphorus.
4. The bacteria present in sewage include those bacteria which cause water-borne diseases such as cholera and typhoid.
5. The other microbes present in sewage are Protozoa which cause a water-borne disease called dysentery

Sources of waste water: Water that has been used and has become dirty is called wastewater. It is generated as a result of numerous human activities.

1.Agriculture wastewater generated from farms contains harmful pesticides, biocides, animal wastes, etc.

2.Construction of buildings large amount of wastewater is generated from construction of buildings.

3.Industries wastewater generated from paint and dye industries contain harmful chemicals such as lead, chromium, etc. the discharge chromium, etc. the discharge of liquid wastes into a river or the sea is called effluent.

4.Hospitals, hotels, offices wastewater from hospitals contain disease- causing germs.

5.Domestic activities the wastewater generated from our houses contains detergents, food wastes, human faces, plastics, paper, metal objects, etc.

6.Mining wastewater is also generated as a result of mining operations.

All the wastewater that is released from various sources contains suspended impurities. This wastewater, containing suspended impurities, is called sewage, these impurities are called contaminants.

Eutrophication: An excessive growth or 'blooms of algae in lakes rich in nutrients such as phosphates are called eutrophication. Humans add excessive amounts of plant nutrients (primarily phosphorus, nitrogen, and carbon) to streams and lakes in various ways. Runoff from agricultural fields and urban lawns, and untreated domestic sewage discharged into lakes are major sources of these nutrients. These nutrients speed up the algal blooms which, in turn, lead to oxygen depletion. As a result of this, many fish, birds, and other animals die and the water begins to stink

Where does domestic wastewater go? Each time we wash something or flush our toilets, water containing paper, cloth, soap, detergent, oil, grease, food scrap, faeces etc, and goes down the drain. This water accumulates and forms sewage. In large cities, this is known as municipal wastewater.

Water Freshens Up: An Eventful Journey: In a house (a public building) generally, there are two sets of pipes, i.e. one set of pipes brings clean drinking water into the house and the

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other set of pipes takes away wastewater (sewage) from houses. For proper sanitation a well maintained sewage system is required.

Sewerage System: The pipes which carry away wastewàter or sewage from houses and other buildings are burned under the ground. An underground pipe which carries away dirty drainage water and waste• matter is called sewer. The provision of drainage at a place by laying sewers under the ground is called sewerage. Actually sewerage is an underground network of inter connected pipes called sewers that carries the sewage from the place where it is produced to the sewage treatment plants, where it is processed.

Manholes: A manhole is a covered vertical, hole in the ground, pavement or road, above the underground sewer pipeline through which a worker can go down upto the sewer pipes for inspection, cleaning, etc. Manholes are provided every 50-60 m distance in the main sewer pipeline. Manholes are also provided at the junction of two or more sewers and at, points where there is a change in the direction of sewer line.

Why sewage should be treated: We know that the amount of freshwater is declining day by day. The demand of water has increased due to steep rise in the population. Due to this, extreme scarcity of water occurs and many people in our country do not even get sufficient drinking water. In villages, sometimes villagers have to collect water from long distances to fulfill their needs. They spend several hours in a day, just to collect a small quantity of water. Many people draw out underground water by digging bore wells. Due to continuous use, underground water is also not easily available. One has to dig deep bore wells to reach the water table. This is because the groundwater is not sufficiently replenished with rainwater because of the excessive construction of roads, buildings and pavements. Therefore, there is a need to make wastewater or sewage fit for reuse. It must be cleaned thoroughly so that it can be reused. The purification of dirty wastewater is carried out in **sewage or wastewater treatment plant**.

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