

SUBJECT: STRUCTURE

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ANS (1): WASTEWATER ENGINEERING:

This is a branch of environmental engineering, which is also known as public health engineering.

Wastewater engineering deals with the engineering methods to improve and solve the issues relate to treatment and reuse of water hence improving sanitation of human communities and providing supply of safe portable water.

APPLICATIONS:

- As there are various seasons of watershed so for uses of water the water is stored and then provided for various purposes.
- To prevent transfer of infectious diseases to both human and plants water is treated in plants and then supplied
- Water distribution systems are designed to provide water for various things like domestic use , fire suppression and irrigation purposes
- Treatment of water that is released from the industries save the marine life
- Treatment of water and then releasing it to the rivers or sea keeps clean the water cycle

ANS (2): RELATIONSHIP OF WASTEWATER GENERATION WITH WATER SUPPLY OF A LOCALITY:

- The wastewater management is related to localities in two ways, first the water supply and second managing the sewerage system which is discussed below
- As global pure water sources are reducing day by day and clean water is required for drinking, so wastewater treatments are important for water supply
- As rainwater is polluted due to industrial smokes due to which the ground water storages also get polluted, so wastewater treatment plants use processes to treat that water and provide to the localities for different uses
- As ground water is scarce so water waste engineering processes collect precipitation water in catchment areas and then provide it for use after treatment
- Wastewater engineering not only supplies water but also helps save wasting water by developing quality sewerage systems.
- Wastewater management supplies unique pipelines to the water supply systems like service pipe, distributing pipe, supply main etc.

ANS (3): THE IMPORTANCE OF WASTEWATER CHARACTERIZATION:

- Wastewater is characterized on basis of three levels which are physical, chemical and biological
- First of all, wastewater characterization is important to determine which method to use to treat the water
- Also, there are several good and bad both things in wastewater which are to be separated so for that characterization is important
- In physical characteristics we need to determine the solids that which solids are suspended or settled etc.
- In biological characteristics there are different type of bacteria which has several importance for example in bacteria
 - Pseudomonas removes nitrate
 - Deliveroo destroys pathogens
 - Acinetobacter removes phosphate
 - Also, fungi decompose organic matter
 - Algae is used in ponds
 - And viruses are very dangerous, so they are to be removed
- Chemically characterization is also important because:
 - Chlorides show the strength of the sewage
 - The detection of fats and oils is important because they affect treatment and are to be removed
 - Sulphates and sulphides affect concrete pipes that's why they are detected and removed
 - The characterization is important to balance the DO in the water so that marine life don't die.
- **Hence wastewater characterization is important to identify all these things**

ANS (4): PHYSICAL, CHEMICAL AND BIOLOGICAL CHARACTERISTICS OF WASTEWATER

PHYSICAL CHARACTERISTICS:

- **SOLIDS**
 - (i) Settleable solids
 - (ii) Total solids
 - (iii) Total suspended solids
 - (iv) Total dissolved solids
 - (v) Volatile and fixed solids
- **Odor**
- **Temperature**
- **Density**
- **Specific gravity**

- Turbidity
- Color

CHEMICAL CHARACTERISTICS:

- Ph value
- Organic matter
 - Proteins
 - Carbohydrates
- Nitrogen contents
 - Nitrites
 - Organic nitrogen
 - Nitrates
- Chloride contents
- Fats, oils and greases
- Toxics
- Sulphates, sulphides
- Dissolved oxygen

BIOLOGICAL CHARACTERISTICS

- Beccaria
 - Pseudomonas
 - Bdellovibrio
 - Acinetobacter
 - Nitrobacter
 - Coliform bacteria
- Fungi
- Algae
- Protozoa
- Viruses

ANS (5): COMBINED SEWERAGE SYSTEM:

It is a type of sewerage system in which the storm water and sanitary sewage is carried in single pipeline or sewer

ADVANTAGES

- With less space ie very narrow streets this system is efficient
- The blocking of these sewers is very rare because they are large

- The domestic sewage is very concentrated so by mixing with storm sewage it becomes diluted and hence its strength is reduced
- The cost is less because the pipe is single, so maintenance cost is also less as well as construction

DISADVANTAGES

- The storm can make the sewer overflow which will cause problems
- The treatment plant must take a lot of load due to both type of sewage, storm as well as domestic
- As the sewer is big the initial construction is very uneconomical
- The price of disposing whole sewage is very high

SAPERATE SEWAGE SYSTEM:

_____ A type of sewage system in which the storm sewage and sanitary sewage both has separate sewers

ADVANTAGES:

- Less space is occupied by the sewers because they are separate, so the size is small
- There is option for storm water weather to discharge it to stream or recycle it
- The air flow in the sewer is easy because they are separate
- The treatment plant has less load to treat

DISADVANTAGES

- They are small so they can get blocked
- The cleaning and maintenance are uneconomical and difficult
- initial construction is uneconomical

SYSTEM FOR NEW PRPOSED TOWN:

For a new proposed township, we will propose the separate sewerage system because

- in the new town the roads are not narrow so two separate sewers can easily be installed
- as there will be many people in town so a single sewerage system will apply load on treatment plant due to both domestic and storm sewerage water
- if storm is increased there will be no overflow as the sewers are separate, so the hygiene problem won't arise for the town people

- incase the sewage is to be disposed off so that is very difficult in case of combined system

THE END