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Wastewater Engineering (CE-421)

Section C

Midterm Exam Submission

Question 1:

What is wastewater engineering? briefly describe its application in safeguarding the environment?

Answer:

Definition:

Wastewater engineering or sanitary engineering also known as public health engineering, basically it is the application of engineering methods to improve sanitation of human communities, primarily by providing the removal and disposal of human waste treatment and reuse application for various purposes.

Applications:

1. Basically, it is directly related to improving environment and by disposing of treated wastewater and thus reducing the risk of ground and water contamination and safeguarding aquatic life.
2. Wastewater engineering deals with the management of wastewater and its treatment to reuse it for various purposes.

3. The recovery of sewage is very much effective by means of saving water resources and promoting the reuse of water resources. It also helps to reduce the pollution of sewage and protect the environment.
4. Primary objective of wastewater engineering is to provide a good sanitary environmental condition in a city.

Question 2:

Briefly describe the relationship of wastewater generation with water supply of a locality.

Answer:

The relationship of wastewater generation with water supply of a locality is that:

- In situations where wastewater flow rate data is limited or unavailable then wastewater flow rate estimates is to be developed from water consumption records and other information.
- About 60-85% of supplied water per capita becomes wastewater.
- Simply as we know wastewater generation is dependent on supplied water and has a direct relation with water as the supplied water increases the wastewater will become more.

Question 3:

What is the importance of wastewater characterization?

Answer:

The characterization of wastewater provides a wide variety of information regarding the type and concentration of contaminants present. In the characterization of

wastewater, we determine the nature of contaminant (physical, biological, chemical) and then design wastewater treatment plant according to the nature of contaminants.

Question 4:

Enlist physical chemical and biological characteristics of wastewater?

Answer:

Physical Characteristics:

1. Solids.
2. Odour.
3. Temperature.
4. Density.
5. Specific gravity.
6. Turbidity.
7. Colour.

Chemical Characteristics:

1. Chemical oxygen demand (COD).
2. Total organic carbon (TOD).
3. Nitrogen.
4. Phosphorus chlorides.
5. PH.
6. Heavy metals.
7. Trace elements.
8. Priority pollutants.

Biological Characteristics:

1. Biological oxygen demand (BOD)
2. Oxygen required for nitrification.
3. Microbial population (bacteria pathogens)

Question 5:

What are the advantages and disadvantages of combine and separate sewerage system?

Which sewerage will you recommend for a new proposed township Support your answer with justification?

Answer:

Advantages of Combined Sewerage System:

1. The cleaning of sewers is easy as they are large.
2. There maintenance cost is less.
3. The stormwater reduces the strength of sewage by dilution.
4. The self-cleaning velocity is easily achieved.
5. This system requires only one set of sewers; thus, it becomes economical.

Disadvantages of Combined Sewerage System:

1. The load on the treatment plant becomes high.
2. The stormwater is unnecessarily polluted.
3. The sewers are large in diameter.
4. This system proves to be uneconomical when pumping is required for the lifting of sewage.

5. During a heavy storm, the combined sewer may be overflowed which may create trouble for the people.

Advantages of Separate Sewerage System:

1. The load on treatment plant is less as only sewage is carried to the plant.
2. The size of sewer is small, thus economical.
3. Due to more pumping the system proves to be more economical.
4. Natural/storm water is not unnecessarily polluted by sewage.

Disadvantages of separate Sewerage System:

1. Cleaning of sewer is difficult due to their small size.
2. The self-cleansing velocity is not easily obtained.
3. They may be choked in dry season by garbage.
4. Sewer sewers are provided below storm sewer which causes greater depth and pumping at wastewater treatment plant.

Justification:

I will suggest combined sewerage system because both domestic sewage and storm water is carried in a single sewer, so construction cost is less, and sewerage are of larger in size so they are easy to clean.