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SUBJECT : WASTE WATER ENGINEERING

SUBMITTED TO : ENGR.NADEEM ULLAH

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SEMESTER : SENIOR

ASSIGNMENT : 01

Iqra National University

Department of Civil Engineering

Course Title: Waste water Engineering

Course Code: CE-421

Assignment # 1

Semester

: 8th

Note: You have 6 days hours to upload your assignment to SIC after which you will not be able to upload. Your responses should be brief and specific. Assignment should be written in your own words and be in MS Word or PDF format. Clearly mention your registration number (ID). Please feel free to contact me in case of any clarification required.

Q1. What is Wastewater Engineering? Briefly describe its applications in safeguarding the environment?

Q2. Briefly describe the relationship of wastewater generation with water supply of a locality?

Q3. What is the importance of wastewater characterization?

Q4. Enlist physical, chemical and biological characteristics of wastewater?

Q5. What are the advantages and disadvantages of combine and separate sewerage system? Which sewerage system will you recommend for a new proposed township Support your answer with justification?

WASTE WATER ENGINEERING

Q1. What is Wastewater Engineering? Briefly describe its applications in safeguarding the environment?

ANS: It is also known as Sanitary Engineering or Public health Engineering. It is the application of Engineering methods for facilitating human beings in the shape of improving sanitation of human communities primarily by providing them safe potable water and in addition by providing the removal and disposal of human waste. The extremely broad term sanitation includes the management of wastewater, human excreta, solid waste and stormwater. The term sewerage refers to the physical infrastructure required to transport and treat wastewater.

APPLICATIONS:

- 1: Wastewater is simply water that has been used. It usually contains various pollutants, depending on what it was used for.
- 2: Wastewater is treated to remove pollutants (contaminants). Wastewater treatment is a process to improve and purify the water, removing some or all of the contaminants, making it fit for reuse or discharge back to the environment.
- 3: Discharge may be to surface water, such as rivers or the ocean, or to groundwater that lies beneath the land surface of the earth. Properly treating wastewater assures that acceptable overall water quality is maintained.
- 4: In many parts of the world, including in the United States, health problems and diseases have often been caused by discharging untreated or inadequately treated wastewater. Such discharges are called water pollution, and result in the spreading of disease, fish kills, and destruction of other forms of aquatic life. The pollution of water has a serious impact on

all living creatures, and can negatively affect the use of water for drinking, household needs, recreation, fishing, transportation, and commerce.

Q2. Briefly describe the relationship of wastewater generation with water supply of a locality?

Ans: In a given situation where waste water flow is not available than waste water flow rate estimate has to be developed from water consumption records.

As we have studied that about 60 to 85% of the per capita consumption of total supplied water becomes waste water.

So for understanding, it is clear that generation of waste water is dependent on Water supply of a system. So that if there is increase in water supply then there will be increase in the quantity of waste water.

And on the other way application of appropriate percentages to record from meters which are installed by concerned departments for check and balance of the house. It can also be used for obtaining a Estimate of Waste Water flow rate.

Q3. What is the importance of wastewater characterization?

ANS: The Characterization of Waste water provides wide variety of information regarding the type and concentration of contamination present in it.

With Characterization of waste water we determine the nature of contaminants which are Physical, Chemical and Biological. Chemical contaminants are due to Chemical Impurities. And after that design the Waste Water treatment plant according to the Nature of Contaminants.

Q4. Enlist physical, chemical and biological characteristics of wastewater?

ANS: Following are the Characterization of Waste Water.

1: Physical Characteristics

2: Chemical Characteristics

3: Biological Characteristics

1: Physical Characteristics:

Following are the some of the Physical Characteristics.

a: Colour:

Domestic and industrial wastes, natural decay of organic materials.

b: Odor:

Decomposing wastewater, industrial wastes.

c: Solids:

Domestic water supply, domestic and industrial wastes, soil erosion, inflow infiltration.

d: Temperature:

Domestic and industrial wastes.

2: Chemical Characteristics:

a: Organic Carbohydrates:

Domestic, commercial, and industrial wastes.

b: Fats, oils, and grease:

Domestic, commercial, and industrial wastes.

c: Priority pollutants:

Domestic, commercial, and industrial wastes.

3: Biological Characteristics:

A: Biological Oxygen Demand (BOD)

B: Microbial Population i.e. Bacteria, Pathogens.

C: Oxygen required for Nitrification.

Q5. What are the advantages and disadvantages of combine and separate sewerage system? Which sewerage system will you recommend for a new proposed township Support your answer with justification?

ANS: Following are the advantages and disadvantages of combine and separate sewerage system:

ADVANTAGES OF COMBINE SEWERAGE SYSTEM:

- 1: Cleaning of Combined Sewer is Easy because of larger diameter.
- 2: Reasonable maintenance cost Strength of sewage is reduced due to dilution of sewage by storm water.
- 3: This system requires only one set of sewer making it economical.
- 4: The pollutants trapped in the rainwater can be treated before being released into the environment.

DISADVANTAGES OF COMBINE SEWERAGE SYSTEM:

- 1: A minimum velocity must be maintained to prevent the deposition of solids in the sewer.
- 2: Difficult and costly to extend as a community changes and grows.

3: Leakages pose a risk of wastewater exfiltration and groundwater infiltration and are difficult to identify.

4: Requires expert design, construction and maintenance.

ADVANTAGES OF SEPARATE SEWERAGE SYSTEM:

1: As Sewage flows in separate pipe, hence the quantity to be treated at sewage treatment plant is small, resulting in economy of treatment.

2: This system may be less costly as only sanitary sewage is transported in close conduit and storm can be collected and conveyed through open drains.

3: When pumping is required during disposal, this system is economical due to less flow.

DISADVANTAGES OF SEPARATE SEWERAGE SYSTEM:

1: Self Cleansing velocity may not developed at certain locations at sewers and flushing of sewers may be required.

2: This system requires laying two set of pipe, which may be difficult in congested area.

3: This system will require maintenance of two set of pipelines and hence maintenance cost is low.

RECOMMENDATION OF SEWERGE SYSTEM:

I Will Suggest Combined Sewerage system because both Domestic sewage and Storm Water are carried in a single sewer. And on the other hand cleaning of combined sewer is easy because of its large size. And their construction cost is less. So I recommend Combined Sewerage System for the Proposed Township.

