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| Name: | Sajid Shahzada |
| ID: | 7685 |
| Section: | C |
| Subject: | Wastewater Engineering |
| Semester: | 8 th |
| Teacher: | Engr. Nadeem Ullah |
| Exam: | Mid term |

Q NO 1:

ANSWER:

Wastewater Engineering or Sanitary engineering, also known as public health engineering, 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.

OR

Wastewater engineering is the branch of environmental engineering in which basic principles of science and engineering are applied to solving the issue associated with treatment and reuse of wastewater.

Applications in safeguarding the environment

1) Ground water protection

Water is scarce source, so we need to protect it. Primary source of wastewater are sewage, industry, agricultural runoff and urban runoff etc. Treatment of wastewater is essential to prevent contamination of drinking water from pollutants.

2) Natural bodies of water

Natural fresh water bodies are polluted everyday by untreated wastewater, which is harmful for both humans and animals.

3) Irrigation purposes

Wastewater can be useful in the irrigation field after proper treatment.

4) Helping the environment

Wastewater engineering reduces deforestation and soil salinity.

Q NO 2:

ANSWER:

Wastewater generation has a direct relation with the water supply of a locality, for instance if the felid measurement of the wastewater flow rates are not possible and actual wastewater data is not available water supply records can often be used as an aid to estimate wastewater flows rates, and the same if we cannot measure the flow of fresh water we can get it through wastewater flow rates.

Q NO 3 :

ANSWER:

There are many physical, chemical, biological importance characteristics and uses of wastewater as given below.

Chemical, physical, and biological characteristics of wastewater:

Wastewater as well as grey water used because it is considered a method of combining water and recycling of nutrients. They increased or improved nutrition for poor households security. Economic, environmental pressure and conservation ethic led recycling of wastewater and their widespread such as irrigation of crops, green spaces, industrial processes, sanitation etc. Also the direct or indirect source of drinking water.

Importance or uses of wastewater:

1. Wastewater are important for different purposes and gaining popularity increased for preserving the fresh water resources.
2. Wastewater used to help in decreased the impact on environment.
3. Wastewater used to determine the quality and management procedure required to ensure safety.
4. WHO in 2006a and many other countries developed skill, standards and guidelines for the safe use of wastewater in agriculture.

Q NO 4:

ANSWER:

There are three main characteristics of Wastewater which are classified below.

- 1:- Physical characteristics
- 2:- Chemical characteristics
- 3:- Biological characteristics

1) Physical Characteristics:

Turbidity, color, Odor, total solids and Temperature are the physical characteristics of wastewater.

2) Chemical characteristics:

Chemical oxygen demand (COD), total organic carbon (TOC), nitrogen, phosphorous, chlorides, sulphates, alkalinity, PH, heavy metals, trace elements, and priority pollutants.

3) Biological characteristics :

Biological oxygen demand (BOD), oxygen required for nitrification, and microbial pollution.

Q NO 5:

ANSWER:

Advantages and Disadvantages of Combined Sewerage System:

Advantages:

- Both domestic sewage and storm water are carried in a single sewer, so construction cost is less.
- The strength of domestic sewage is reduced because of dilution of storm water.
- The sewers are of large size, and therefore the chances of their chocking are rare. It is easy to clean them.
- In towns with narrow streets, this system is preferred.

Disadvantages:

- Initial cost is high because of large dimensions of sewers.
- Because of large size of sewer, their handling and transportation is difficult.
- Due to the inclusion of storm water, the load on the treatment plant increases and ultimately increases treatment costs.
- During heavy rain the sewer may be overflow and may thus create unhygienic conditions.
- If the whole sewage is to be disposed off by pumping it is uneconomical.

Advantages and Disadvantages of Separate Sewerage System:

Advantages:

- Size of sewers is generally less.
- Since the sanitary sewage and storm water flows in a separate pipes, the quantity of sewage to be treated is less.
- As the sewer are smaller in section, they can be easily ventilated.
- Rain water can be discharged in to the streams or can be reused / recycled without any treatment.

Disadvantages:

- Since the sewers are of smaller size, it is difficult to clean them.
- They are likely to get chocked / blocked.
- Initial cost is high, when two separate sets are used.
- Maintenance cost of system is also high.

- For new proposed township we will recommend separate sewerage system.

