MID TERM EXAM

Name:- Aazaz Ahmad

ID No:- 7705

Sec:- B

Dept:- BE (CE)

Subject:- waste water engineering

Teacher:- Engr Nadeem Khan

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Q.1) What is waste water engineering? Briefly describe its application in safeguarding the environment?

Waste water engineering: or Sanitary engineering also known as public health engineering, is the application of engineering methods to ~~impr~~ improve sanitation of human communities, primarily by providing the removal and disposal of human waste, treatment and reuse applicatio for various purposes.

Briefly describe its application in Safeguarding the enviroment

Waste water engineering is directly related to improving enviroment by disposing off treated waste water and thus reducing the risk of ground water contamination and Safeguarding aquatic life.

Waste water engineering is a disciplane which deals with the management of wastewater and its treatment for further use.

Management of wastewater is very important to get end of its harmful effects on environment and biological life. Techniques of wastewater engineering are applied for this purpose. All those techniques for the management

of wastewater and its treatment for useful are and to make it Suitable for the enviroment can be regarded as its application against Safe guarding the enviro ment

Those techniques can be enlisted and ~~digribed~~ discribed breifly as below.

1) Reclamation and utilization of Sewage

The recovery of sewage isan effective means of saving water resources and promoting the reuse of water resources. It is an important measure to reduce the pallution of sewage and protect the enviroment. However and treatment of sewage must be treated with caution, and

(4) expression

Prevent the expansion of water pollution caused by personal promblems and the re-use of non-compliance. In the construction of ecological city. we can make full use of the sewage reclamation project.

Recycling of Solid waste

waste that urban resident form and discharge in production and life. This is an important by-product of urban life and production according to their nature, they can be divided into two categories, recyclable waste and non-recyclable waste. For the former Solid waste that can be recovered we mainly control the total amount of emmions through

recycling, classification and recycling. on the basis, a specral and perfect garbage disposal system should be set up to cooperate with the policies and regulations of the corresponding competent department of the State, by strengthening the publicity of enviromental protection ideas and promoting enviromentel protection methods.

Q.2) (6) Briefly describe the relationship of wastewater generation with water supply of a locality?

Ans) As water supply demand is controlled by its requirement for use by the Societies population. Amount of water requirement greatly depends on its purpose of usage i.e industrial, irrigation, domestic purpose etc

More water supply means will be more wastewater produced. Waste water has a direct relation with water supply amount.

In situation where wastewater flow rate data are limited or unavailable waste water flowrate estimate have to be developed from water consumption records in other information

About 60-85.1. of supplied water per capita becomes waste water

Q.3 What (8) is the importance of wastewater characterization?

Each characteristic of waste water has its own importance indicating different wastewater condition. which has to be dealt during ~~fillering~~ filtering or cleaning operations.

The main importance of waste water characteristics are its effect on treatment method and economy.

The method of treatment depend greatly on types of wastewater and its characteristics. which intern effects its economy.

Importance of wastewater characterization

Temperature:

- Changes in wastewater temperatures effect the settling rates, dissolved oxygen levels, and biological action
- The temperature of wastewater becomes extremely important in certain wastewater unit operations such as sedimentation tanks and recirculating fidters.

Color:

The color of wastewater containing dissolved oxygen (DO) is normally gray. Black-colored waste water usually accompanied b-/ foul odors, containing little or no DO, is said to be septic.

Odor:

Domestic sewage should be have a musty odor. Bubbling gas and/or foul odor may indicate industraid wastes, anaerobic (septic) conditions and operational promblems.

Solids:

waste water is normally 99.9% water and 0.1% solids. If a wastewater sample is evaporated, the solids remaining are total solid.

(1) Dissolved solids pass through a fine mesh filter normal waste water process using selting or flotation are designed to remove solids bot cannot remove dissolved solids.

(2) High TDS indicat the pressure of toxic iminerals

③ Suspended Solids require typical and specified pore size

④ Settleable Solids will settle of water over time.

Importance of Chemical Characteristics

PH

1) PH of less than 7 in waste water may indicate septic condition

2) PH of less than 5 and 10 indicates that industrial wastes exist. which are not compatible with biological waste water operation

2) Dissolved oxygen:-

Non presence of DO indicates presence of an offensive hydrogen Sulphide or ~~then~~ rotten egg order

oxygen demand is important for bacterial growth for metabalism of waste

3) Nutrients:-

They are important for algae growth they are not removed during primary and Secondary treatment

Importance of Biological Characteristic

1) Bacteria:

Bacterial presence in water cause ~~distance~~ disease to homan body. It is important to find bacterial presence because it is dangereous.

2) Viruses and parasites

Similar to ~~back~~. bacterial presence these also are infectious to biological life. Viroses cause hepatitis.

It is important to find out the type of parasites because each has it own effects and removal method.

(14)

Q.4) Enlist physical, chemical and biological characteristics of waste water?

Physical Characteristics of wastewater

1) Odor
2) Temperature
3) Density and specific gravity
4) Turbidity
5) Color

Chemical Characteristics of wasle water

1) pH Valve
2) Organic Matter (OM)
3) Nitrogen Contents
4) Chlorides Contents
5) Fats, oils and Greases
6) Soulphides, Sulphates and Hydrogen gas
7) Toxics
8) Dissolved Oxygen (DO)
9) Chemical oxygen demand

Biological Characteristics of waste water (16)

1) Bacteria pathogens (Microbial population)
2) Fungi
3) Algae
4) Protozoa
5) Viruses
6) pathogenic microorganisms groups-
7) Biological oxygen demand (BOD)

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?

Sol:-

Advantages and disadvantages of Combine and separate sewarage system

Combine Sewarage System:-

Advantages:-

1) Both domestic sewage and storm water are carried in a single sewer, so construction cost is less

2) The strength of domestic sewage is reduced because of dilution of storm water.

3) The sewers are of large size, and therefore the chances of ther chocking are rare. It is easy to clean them.

4) In towns with narrow streets, this system is preferred.

Disadvantages:-

1) Initial cost is high because of large dimensions of sewers.

2) Because of large size of sewer, their ~~hea~~ handling and transportation is difficult.

3) Due to the inclusion of storm water, the load on the treatment plant increases and ultimately increases treatment costs.

4) During heavy rain the sewer may be overflow and may thus create unhygienic conditions

5) If the whole sewage is to be disposed off by pumping it is uneconomical

Separate Sewarage System

Advantages:-

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

Disadvantages:-

1) Since the sewers are of smaller size, it is difficult to clean them.
2) They are likely to get chocked / blocked

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3) Initial cost is high, when two Separate sets are used.

4) Maintenance cost of System is also high

Which sewarage system will you recommended for a new proposed town ship support your answer with justification

Sol:-

I will recommended Separate Sewarage System for a new proposed town ship. Because Separate sewarage Consists in the separate collection of municipal wastewater (blackwater from toilets, greywater and industrial wastewater) and surface run-off (rainwater and stormwater). The Separate collection prevent the overflow of sewer systems and treatment stations during rainy period and the mixing of the relatively little polluted surface run-off which Chemical and microbial pollutants from the municipal waste water. The design of the sewers

and the (semi) ~~centraidi~~ centralised treatment stations thus needs to consider the volume of the waste water only and the surface ran-off and rain water can be reused (eg for land scaping or agriculture)