

# **Assignment/Quiz:**

**NAME: Subhan ullah**

**ID: 14772**

**SUBJECT: Water supply and waste water management**

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## **Question No: (1)**

What are the different water distribution systems, which one you have observed or suggest for your area if there?

### **Answer:**

**The system of distributing water efficiently to the consumer is known as water distribution system.**

### **PURPOSE OF DISTRIBUTION:**

- The purpose of distribution system is to deliver water to consumer with appropriate quality quantity and pressure.

### **Dead end system:**

It is also known as tree system there is only One main supply pipe, a number of sub-main pipes are taken out from it each sub-main is divided into many branch pipes called lateral, from laterals, the service connections are given to the consumers.

### **Grid iron system:**

This system is an improvement over the dead end system in this system the main, sub-main and branches are enter-connected with each other.

### **Ring system:**

This system is adopted in well –planned cities only in this system, each city is divided into square or circular blocks the water mains are laid around all the four side of the square around the circle and branches, sun-main etc are laid along the inner roads.

### **Radial system:**

This system is just opposite to the ring system and water flows towards outer periphery from one point.

### **System for our Area:**

The best system for our area is **DEAD END SYSTEM:**

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### **Question No: (2)**

What are the physical and biological tests for checking the quality of water?

### **Answer:**

- Water quality testing is an important part of environmental monitoring. When water quality is poor, it affects not only aquatic life but the surrounding ecosystem as well.
- These sections detail all of the parameters that affect the quality of water in the environment.
- These properties can be physical, chemical or biological factors.
- Physical properties of water quality include temperature and turbidity.
- Chemical characteristics involve parameters such as pH and dissolved oxygen. Biological indicators of water quality include algae and phytoplankton.

These parameters are relevant not only to surface water studies of the ocean, lakes and rivers, but to groundwater and industrial processes as well.

### **Physical Test:**

**The physical examination of water includes the following test:**

#### **Temperature:**

The temperature of water is measured by an ordinary thermometer it helps in determining the density, viscosity, vapour pressure and surface tension of water the maximum permissible temperature for domestic supply is 10 degree centigrade to 15 degree.

#### **Color:**

Color in water is primarily a concern of water quality for aesthetic reason. Colored water give the appearance of being unfit to drink, even though the water may be perfectly safe for public use.

#### **Turbidity:**

Turbidity is a measure of the light-transmitting properties of water and is comprised of suspended and colloidal material. It is important for health and aesthetic reasons

#### **Taste and Odour:**

Taste and odour are human perceptions of water quality. Human perception of taste includes sour (hydrochloric acid), salty (sodium chloride), sweet (sucrose) and bitter (caffeine). Relatively simple compounds produce sour and salty tastes. However sweet and bitter tastes are produced by more complex organic compounds. Human detect many more tips of odour than tastes. Organic materials discharged directly to water, such as falling leaves, runoff, etc., are sources of tastes and odour-producing compounds released during biodegradation.

## **Biological Test:**

The biological tests are as follows:

### **Total count of bacteria test:**

By this method, total no of bacteria present in a mili leter of water is counted the total count of bacteria per cubic centimeter for domestic purposes varies from 0 to 100.

### **Bacteria Coli(B-Coli) or Escherichia coli(E-coli) test:**

There are two test for b-coli or e-coli i.e. presumptive test and confirmative test. Now a days a new technique known as membrane filter technique (M.F.T) is used for finding b-coli or e-coli

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## **Question No: (3)**

What are the various methods for water treatment, explain each one in detail?

### **Answer:**

The process of treating water may have slight differences at various locations, based on the plant's technology as well as the type of water that needs to be treated. Nevertheless, the basic principles are the same. The following section talks about the standard processes of water treatment.

### **Coagulation / Flocculation:**

Coagulation is adding liquid aluminum sulfate or alum and/or polymer to raw or untreated water. The resulting mixture causes the dirt particles in the water to coagulate or stick together. Then, the groups of dirt particles attach together,

forming larger particles named flocs that can easily be removed via filtration or settling.

### **Sedimentation:**

When water and flocs undergo the treatment process, they go into sedimentation basins. Here, water moves slowly, making the heavy floc particles settle to the bottom. Floc that accumulates on the bottom is known as sludge. This is carried on to drying lagoons. Direct Filtration does not include the sedimentation step and the floc is just removed by filtration.

### **Filtration:**

In filtration, water passes through a filter, which is made to take away particles from the water. Such filters are composed of gravel and sand or sometimes crushed anthracite. Filtration gathers together impurities that float on water and boosts the effectiveness of disinfection. Filters are regularly cleaned by means of backwashing.

### **Disinfection:**

Before water goes into the distribution system, it is disinfected to get rid of disease-causing bacteria, parasites and viruses. Chlorine is also applied since it is very effective.

### **Sludge Drying:**

Solids that have been gathered and removed from water via sedimentation and filtration are transferred to drying lagoons.

### **Fluoridation**

Fluoridation treats water supplies of communities to adjust the concentration of free fluoride ions to an optimal level so that dental cavities can be reduced. It is compulsory for Hunter Water to perform water fluoridation to conform to the NSW Fluoridation of Public Water Supplies Act 1957.

## pH Correction

To adjust pH levels, lime is combined with filtered water. This, also, stabilizes naturally soft water so corrosion can be minimized in the water distribution system and plumbing of customers.

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### **Question No: (4)**

Explain sewerage appurtenances, what are the different methods of sanitation which one you have observed in your area?

#### **Answer:**

**The different devices required for construction, operation and maintenance for entire sewerage system is known as appurtenance, these are classified as follow:**

#### **Manholes:**

A manhole is defined as the construction made to connect the ground level with the hole or opening made in the sewer line so that a man can easily, conveniently and safely enters through it and carries out the usual maintenance operation.

#### **A manhole essential consists of:**

- (a) A working chamber;
- (b) An access shaft; and
- (c) A strong cover on the top flush with the road level.

The working chamber has such a size, so that necessary examination and cleaning can be done easily.

*The minimum internal sizes of the chambers are as follows:*

(i) For depth of 0.8 m or less – 0.75 × 0.75 m

(ii) For depth between 0.8 m and 2.1 m – 1.2 × 0.9m

(iii) For depth more than 2.1m – Circular chambers of 1.4 m diameter or rectangular chamber of 1.2 × 0.9 m

**Catch basins or pits:**

- A catch basin is a structure in the form of a chamber which is provided along the sewer line to admit clear rain water free from silt, grit, debris, etc. into the combined sewer.
- These are small masonry chambers (75 to 90 cm in diameter and 75 to 90 cm deep) which are constructed below the street inlets to prevent the flow of grit, sand or debris in the sewer lines. When storm water enters these basins, the grit, sand etc. settle in the bed and the storm water free from all these enters the sewers.

**Ventilating Shafts:**

It is shaft provided for the purpose of ventilation of sewers the ventilating shafts are required to prevent the accumulation of dangerous explosive and corrosive gases.

**Flushing Tanks:**

These are used to hold and through water into the sewer for the purpose of cleaning these is usually provided and beginning of the sewers and maybe either hand operated or automatic.

## **Method of Sanitation:**

The sanitation of a town is done by the following two methods:

The waste product of town are collected and carried by these methods to the treatment or disposal works

### **Conservancy Or dry method:**

In the conservancy or dry method, different types of refuse or collected, carried and disposed of separately

### **Water carriage method:**

In the water carriage method, water is used as a medium to convey the sewage to the point treatment or disposal the method is more hygienic, but the initial cost for the construction of the system and the maintenance cost is high there is no smell or nuisance in the water carriage method and the sewers being all underground do not impair the beauty of the place.

### **System for our Area:**

The best system for our area is ***WATER ACRRIDGE SYSTEM.***

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## **QUESTION NO: (5)**

Define the following terms

### **Answer:**

#### **Ex-filtration:**

The leakage of sewage from the sewer into the soil surrounding the water, is called Ex-filtration.



### **Sewage:**

The used water mixed with organic and inorganic solids, fluid wastes from houses, factories, and dry weather flow, is called sewage

### **Infiltration:**

The water which leaks into sewers from the ground, is called Infiltration

### **Dry waste:**

The waste which does not contain any moisture, is known as Dry waste. The garbage rubbish and ashes are the 3 form of Dry waste

### **Storm and combined sewage:**

The quantity of liquid waste which flows in sewers during rainy season is called storm sewage.

A combination of sanitary sewage surface water and storm water with

### **Soft water:**

**Soft water** is surface **water** that contains low concentrations of ions and in particular is low in ions of calcium and magnesium. **Soft water** naturally occurs where rainfall and the drainage basin of rivers are formed of hard, impervious and calcium-poor rocks

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