



**Subject Name: ENVIRONMENTAL-ENGINEERING**

**Prepared by (Faculty (s) Name):Dr.C.S.C Devadass**

**Year and Sem, Department:III / I**

**Unit-I**

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – types of water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards: sources of water - Comparison from quality and quantity and other considerations – intakes – infiltration galleries

**Important points / Definitions: (Minimum 15 to 20 points covering complete topics in that unit)**

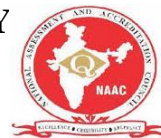
- 1. layouts of distribution network:** The distribution pipes are generally laid below the road pavements, and as such their layouts generally follow the layouts of roads. There are, in general, four different types of pipe networks; any one of which either singly or in combinations, can be used for a particular place. Grid, Ring, Radial and Dead End System.
- 2. health environment:** Public health has always been a major factor influencing the ways how water supply has been solved by societies. The source of water supply was chosen according to its odorless water e.g. from springs or wells was preferred.
- 3. Sample space:** Water treatment is the process that improves the quality of water to make it more acceptable for a specific end- use. The end use may be drinking, industrial water supply, irrigation, river flow maintenance, water recreation or many other uses, including being safely returned to the environment. Water treatment removes contaminants and undesirable components.
- 4. Water treatment process:** Water treatment is any process that quality of water to make it more acceptable for a specific end-use.
- 5. hydrological cycle and water quality:** It maintains a balance between evaporation, precipitation, the transport of water vapor in the atmosphere from the sea to the land and run-off from land to sea. About two-thirds of the Earth's surface is covered with water.
- 6. suspended solids:** Suspended solids refers to small solid particles which remain in suspension in colloid or due to the motion of the water, suspended solids can removed by the sedimentation because of their comparatively large size. It is used as one indicator of water quality.
- 7. Turbidity:** Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to the naked eye. Turbidity is a key test of water quality
- 8. Infiltration gallery:** Infiltration galleries may be used to collect water from the aquifer underlying a river. Water from an infiltration gallery has the advantage of bank filtration to reduce the water treatment requirements for a surface withdrawal. An infiltration gallery may also be the best way to withdraw water from a thin aquifer or lens of fresh water overlying saline water.



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9. **Confined aquifer:** A confined aquifer is an aquifer below the land surface that is saturated with water. Layers of impermeable material are both above and below the aquifer.
10. **unconfined aquifer:** Unconfined aquifer is an aquifer whose upper water surface is at atmospheric pressure, and thus is able to rise and fall space associated with a real number
11. **storage capacity** Storage capacity refers to how much disk space one or more storage devices provides. It measures how much data a computer system may contain. For an example, a computer with a 500GB hard drive has a storage capacity
12. **favorable event:** Drinking water quality standards describes the quality parameters set for drinking water. Despite the truth that every human on this planet needs drinking water to survive and that water may contain many harmful constituents, there are no universally recognized and accepted international standards for drinking water.

## Short Questions

1	Discuss the various parameters for deciding the design period of components in water supply projects?	<b>MAY-2018</b>
2	Enumerate the various methods for population forecast. On which Factors increase in population depends?	<b>DEC-2018</b>
3	What is Design period in water supply projects? Describe the life span for various components	<b>MAY-2017</b>
4	Explain the following: (i) Storage capacity of reservoir (ii) Fire demand?	<b>DEC-2016</b>
5	Classify the demands of a city or town. Describe briefly the water demand?	<b>DEC-2014</b>
6	Discuss Water meters of displacement type and velocity type?	<b>MAY-2015</b>
7	Explain Arithmetical increase method of population and geometrical increase Method of population?	<b>MAY-2016</b>
8	Write a note on drinking water quality standards in India?	<b>DEC-2018</b>
9	State the importance of treating water for public supply?	<b>MAY-2015</b>
10	Write short note on the maintenance of purity of waters?	<b>DEC-2017</b>

## Long Questions

1	Write short note on the maintenance of purity of waters?	<b>May-2015</b>
2	Write short note on, (a) MPN (b) Sampling of water?	<b>May -2015</b>
3	Describe the different microorganisms commonly found in water?	<b>Dec-2015</b>
4	Explain "Fluctuation in water demand"?	<b>Dec-2015</b>
5	Write a note on drinking water quality standards in India?	<b>May-2016</b>
6	Write an account on the common water-borne diseases?	<b>May-2016</b>
7	Explain in brief various factors affecting the rate of demand?	<b>Dec-2016</b>
8	State the importance of treating water for public supply?	<b>Dec-2016</b>
9	What is B.coli index? How is it determined? (or) Write short note on B-coli index?	<b>May-2017</b>
10	Discuss two standard tests which are employed to examine water bacteriologically?	<b>May-2017</b>



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## Fill in the Blanks / Choose the Best:

1. What is the process by which water enters the small pore spaces between particles in soil or rocks  
A) Transpiration B) Infiltration C) Precipitation D) Sublimation [ ]
2. The boundary between the saturated zone and the unsaturated zone is called the [ ]  
A) Water table B) Aquifer C) Aquiclude D) Porosity
3. Which of the following can contaminate an aquifer [ ]  
A) Landfills B) Agricultural regions C) Gas stations D) All of these
4. Sedimentation is a physical process used in wastewater treatment to [ ]  
A) Remove particles that are less dense than water  
B) Remove particles that are more dense than water  
C) Remove the pertinacious material from the water  
D) None of the above
5. In water treatment procedures, the purpose of coagulation and flocculation is to [ ]  
A) Disinfect the water supply B) Remove suspended particles  
C) Soften the water D) Remove taste and odor problems
6. The water carriage sewage system removes [ ]  
A) Domestic sewage B) Industrial sewage C) Storm sewage D) All of these
7. The settling velocity of a particle in a sedimentation tank depends on [ ]  
A) Depth of tank B) Surface area of tank  
C) Both depth and surface area of tank D) None of the above
8. Water supply system includes [ ]  
A) Construction of dams B) Digging a well for water  
C) Entire arrangement from source to distribution D) Construction of canals
9. The chemical commonly used to increase the speed of sedimentation of sewage is ----- [ ]  
A) Sulphuric acid B) Copper sulphate C) Lime D) Sodium permanganate
10. Ground water is usually free from [ ]  
A) Suspended impurities B) Dissolved impurities C) Microbes D) None of the above

## Fill in the Blanks

11. The ultimate source of water is----- and -----
12. Water will be led to the ----- after passing through the clarifier.
13. ----- are settling tanks built with mechanical means for continuous removal of solids being deposited by sedimentation.
14. The pathogens can be killed by -----
15. Presence of bacteria in potable water causes -----



**Unit-II**

**Important points / Definitions:**

- Water treatment is any process that improves the quality of water to make it more acceptable for a specific end- use.
- The natural process in which material is carried to the bottom of a body of water and forms a solid layer.
- The gravitational parameter is the ratio of the terminal velocity of the particles in still flow to the characteristic velocity of the fluid.
- Surface loading is one of the most important factors affecting
- the effectiveness of the sedimentation process. The surface loading rate is used to determine if the sedimentation tanks and clarifiers are under or over loaded.
- Jar testing is a pilot-scale test of the treatment chemicals used in a particular water plant. It simulates coagulation or flocculation process in a water treatment plant and helps operators determine if they are using the right amount of treatment chemicals, and, thus, improves the plant's performance.
- Rapid sand filter or rapid gravity filter is a type of filter used in water purification and is commonly used in municipal drinking water facilities as part of a multiple-stage treatment system
- Multimedia filter is used to reduce the level of SDI (Silt
- Density Index), TSS in the incoming feed water. Suspended solids consist of small particles such as silt, clay, grit, organic matter, algae and other microorganisms.
- Chlorine demand is the difference between the amount of chlorine added to water or wastewater and the amount of residual chlorine remaining after a given contact time. Chlorine demand may change with dosage, time, temperature, pH, and nature and amount of the impurities in the water.
- It is defined as the sequential flow of procedures, system sand activities which are designed and linked to facilitate and monitor the movement of goods and services from the source to the consumer.
- The Hardy Cross method is an iterative method for determining the flow in pipe network systems where the inputs and outputs are known, but the flow inside the network is unknown

**Short Questions**

1	Draw the layout of water treatment plant, indicate the various process used?	May-2016
2	What are the requirements of good water meters?	May-2016
3	What are the objectives of water treatment process?	Dec -2016
4	Explain the Fill and draw type settling tank?	Dec-2016
5	Explain the Continuous flow type settling tank?	May-2017
6	In an ideal settling tank, 16% of 30 mm diameter particles are removed having specific gravity of 1.20. Temperature at the time of removal in 200 C. What will be the size of the particles for which the tank is actually designed? Assume the specific gravity of these particles same as that of 30 mm diameter particles?	May2017
7	List the factors which affect the dosage of coagulants and explain the procedure to determine the optimum dose of coagulant by Jar test apparatus?	Dec-2018
8	Explain the Fill and draw type settling tank?	May-2018
9	Mention the chemical reactions when the following are used as coagulants :  (a) Sodium aluminate (b) Ferrous sulphate and lime (c) Magnesium carbonate?	Dec-2018
10	Write short notes on Coagulation?	May-2015



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### Long Questions

1	Discuss in detail the usual coagulants which are employed for the treatment of water?	May -2018
2	Differentiate between discrete particles and flocculent particles of sedimentation?	Dec-2016
3	Explain various types of sedimentation tanks based on shapes with neat sketches?	May-2018
4	Explain the aspects which influence design and performance of sedimentation tanks ?	Dec-2015
5	Explain the principle of sedimentation and derive the equation for uniform settling velocity in terms of specific gravity of a particle?	Dec-2017
6	What are the features of fill and draw settling tanks.	May-2017
7	Explain in detail alum or Aluminium Sulphate and sodium aluminate	Dec-2015
8	Mention the chemical reactions when sodium aluminate and ferrous sulphate and lime are used as coagulants.	May-2015
9	Write the determinations of optimum dose of coagulant by jar-test Apparatus	Dec-2018
10	Draw a neat sketch of conical plug solution feeding device.	May-2016

### Fill in the Blanks / Choose the Best:

- If the total hardness of water is greater than its total alkalinity, the carbonate hardness will be equal to \_\_\_\_\_.
- The maximum discharge of a tube-well is about \_\_\_\_\_.
- The amount of residual chlorine left in public water supply for safety against pathogenic bacteria is about \_\_\_\_\_.
- The length of rectangular sedimentation tank should not be more than \_\_\_\_\_ where B is the width of the tank \_\_\_\_\_.
- Air binding phenomena in rapid sand filters occur due to \_\_\_\_\_.
- Orthotolidine test is used for determination of \_\_\_\_\_.
- On standard silica scale, the turbidity in drinking water should be limited to \_\_\_\_\_.
- The self-cleansing velocity for all sewers in India is usually \_\_\_\_\_.
- Sewage treatment units are normally designed for \_\_\_\_\_.
- The effective size of sand particles used in slow sand filters is \_\_\_\_\_.
- The disease Cholera, Typhoid and Jaundice are due to pollution of -----
- The devices which are installed for drawing water from the sources are called-----
- Standard EDTA solution is used to determine the -----
- In distribution pipes drain valves are provided at -----
- The means of access for inspection and cleaning of sewer line is known as -----

### Unit-III

#### Important points / Definitions:

➤ The water carriage system is the modern method of conveyance of sewage. In this system, water is used as a medium for conveying the sewage to the treatment plant and final disposal.

➤ The relationship between only two variables is known as simple correlation. Sewage (or domestic wastewater or municipal wastewater) is a type of wastewater that is produced by a community of people. It is characterized by volume or rate of flow, physical condition, chemical and toxic constituents, and its bacteriological status.

Storm water, also spelled storm

- water, is water that originates during precipitation events
- and snow/ice melts. Storm water can soak into the soil (infiltrate), be held on the surface and evaporate, or runoff and end up in nearby streams, rivers, or other water bodies. The relationship between more than two variables is known as multiple correlation

➤ Biochemical Oxygen Demand

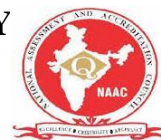
or Biological Oxygen Demand is a measurement of the amount of dissolved oxygen (DO) that is used by



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aerobic microorganisms.

- Biochemical Oxygen Demand or Biological Oxygen Demand is a measurement of the amount of dissolved oxygen (DO) that is used by aerobic microorganisms.
- A catch basin is an inlet to the storm drain system that typically includes a grate or curb inlet where storm water enters the catch basin and a sump to capture sediment, debris and associated pollutants.
- Tank holding a supply of water or sewage for periodically flushing out a sewer.

The horizontal drain in a

- basement that receives the waste discharge from stacks and extends a few feet outside the foundation. called also building drain Sanitary process piping and fittings (also known as hygienic piping or high purity piping) is used almost exclusively in the food, beverage and personal care industries.
- This plumbing system, two pipes are installed. W.Cs and urinals are connected to vertical soil pipe baths, kitchens, basins etc. are connected to another separate vertical waste pipe
- In this plumbing system, two pipes are installed. W.Cs and urinals are connected to vertical soil pipe baths; kitchens, basins etc. are connected to another separate vertical waste pipe

### Short questions

1	With the help of neat sketch describe the construction and working of slow sand filters?	May-2016
2	What is the most accurate method of determining hardness of a water sample?	May-2016
3	Explain rapid sand filter a neat sketch?	May-2017
4	Explain pressure filter with a neat sketch and mention its advantages and disadvantages?	Dec-2018
5	Write short notes on Dual media filters?	May-2015
6	Write short notes on Mixed media filters?	Dec-2014
7	Compare and contrast between slow sand filter and rapid gravity filters?	Dec-2016
8	Distinguish between the pressure filters and toughing filters?	May-2018
9	Distinguish between the High velocity wash and low velocity wash?	May-2017
10	Design five slow sand filter beds from the following data for the waterworks of a town population 75,000, per capita demand =135 litres/day /capita.	Dec-2015

### Long questions

1	Describe the various method of dechlorination?	Dec-2018
2	Explain about method of chlorination?	May-2016
3	Write short notes on the following, (a) Pre-chlorination and double chlorination (b) Chlorine demand (c) Chlorine compounds?	May-2015
4	(a) How does jar test carries out? What are the points to be noted in this test? (b) State the procedure of starch –iodide test?	Dec-2015
5	What do you understand by filtration? Explain theory of filtration?	Dec-2015
6	Discuss any four methods of disinfection of water?	May-2017
7	Design a rapid sand filter unit for 4.5 MLD with all its principal components?	Dec-2015
8	What do you understand by filtration? Explain theory of filtration?	Dec-2015
9	Discuss slow sand filters and explain	May-2017
10	Discuss any four methods of disinfection of water?	May-2014

### Fill in the blanks/ choose the best:

1. At what concentration (in ppm), is nitrogen present in the atmosphere?  
a) 780,840  
b) 390,420



- c) 78,084  
d) 900,000
2. In the lower layers of atmosphere, what range of wavelengths of light is predominant?  
a) Less than 100 nm  
b) Greater than 300 nm  
c) Between 100-300 nm  
d) All wavelengths are equally present
3. What does the ratio of the mass of water vapour to mass of air indicate?  
a) Absolute humidity  
b) Specific humidity  
c) Relative humidity  
d) Approximate humidity
4. What is the region of mild and irregular wind in the equatorial region known as?  
a) Trade winds  
b) Westerlies  
c) Doldrums  
d) Easterlies
5. "Roaring forties" is the term used to describe which of the following winds?  
a) East-to-west air winds in the southern hemisphere  
b) West-to east air winds in the northern hemisphere  
c) East-to-west air winds in the northern hemisphere  
d) West-to-east air winds in the southern hemisphere
6. Match the following:
- |    |                  |                                   |
|----|------------------|-----------------------------------|
| A. | Hurricane        | Indian Ocean and South Pacific    |
| B. | Typhoon          | .Low level air circulation        |
| C. | Cyclone          | Northeastern Pacific and Atlantic |
| D. | Tropical Cyclone | Northwestern Pacific              |
7. Which of the following statements is true?  
a) Troposphere is equally thick across different parts of the world  
b) Troposphere contains the ozone layer  
c) Troposphere is thinner at the equator than at the poles  
d) Troposphere is thicker at the equator than at the poles
8. Which of the following indicates the correct order of the principal layers of the earth's atmosphere from top to bottom?  
a) Troposphere – Stratosphere – Mesosphere – Thermosphere – Exosphere  
b) Thermosphere – Stratosphere – Troposphere – Mesosphere – Exosphere  
c) Exosphere – Thermosphere – Mesosphere – Stratosphere – Troposphere  
d) Exosphere – Mesosphere – Thermosphere – Stratosphere – Troposphere
9. Which layer of the atmosphere is responsible for aurora formation?  
a) Ozone layer  
b) Stratosphere  
c) Exosphere  
d) Ionosphere
10. Which of the following mentioned layers is NOT a homosphere?  
a) Exosphere  
b) Troposphere  
c) Ionosphere  
d) Mesosphere
11. The planetary boundary layer belongs to which of the following atmospheric layers?  
a) Exosphere  
b) Ionosphere  
c) Stratosphere  
d) None of the mentioned
12. What is the atmospheric pressure at sea level?  
a) 101325 Pa  
b) 14.696 psi  
c) 760 Torr  
d) All of the mentioned



13. By international convention, which line marks the outermost boundary of the Earth's atmosphere?
  - a) Space line
  - b) Boundary line
  - c) Karman line
  - d) Astronaut line
14. What would have been the average temperature of Earth without greenhouse gases?
  - a) 0°C
  - b) -7°C
  - c) -9°C
  - d) -19°C
15. How much of the sun's radiation energy is absorbed by the greenhouse gases to warm the planet?
  - a) 75PW
  - b) 1750GW
  - c) 1500MW
  - d) 150TW

#### UNIT-IV

##### Important points / Definitions:

- It is any process that improves the quality of water to make it more acceptable for a specific end-use.
- Grit chambers are long narrow tanks that are designed to slow down the flow so that solids such as sand, coffee grounds and eggshells will settle out of the water.
- A skimming tank is a chamber so arranged that the floating matter like oil, fat, grease etc., rise and remain on the surface of the waste water (Sewage) until removed, while the liquid flows out continuously under partitions or baffles
- A sedimentation tank allows suspended particles to settle out of water or wastewater as it flows slowly through the tank, thereby providing some degree of purification. A layer of accumulated solids, called sludge, forms at the bottom of the tank and is periodically removed
- This plumbing system, two pipes are installed. W.Cs and urinals are connected to vertical soil pipe baths, kitchens, basins etc. are connected to another separate vertical waste pipe.
- The natural process in which material is carried to the bottom of a body of water and forms a solid layer
- Grit chambers are long narrow tanks that are designed to slow down the flow so that solids such as sand, coffee grounds and eggshells will settle out of the water.
- In this plumbing system, two pipes are installed. W.Cs and urinals are connected to vertical soil pipe baths; kitchens, basins etc. are connected to another separate vertical waste pipe
- The horizontal drain in a basement that receives the waste discharge from stacks and extends a few feet outside the foundation called also building drain
- Sanitary process piping and fittings (also known as hygienic piping or high purity piping) is used almost exclusively in the food.
- A confined aquifer is an aquifer below the land surface that is saturated with water. Layers of impermeable material are both above and below the aquifer
- When the wastewater or effluents is discharged into natural body of water, the receiving waters gets polluted due to the waste products, present in the sewage effluent is self-purification
- Primary treatment consists temporarily holding the sewage in a quiescent basin where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface

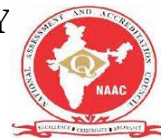




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### Short questions

1	Explain the method of sewage collection	May-2015
2	Explain about aquifers and list out their relative merits and demerits.	Dec-2017
3	Define the terms sewage and sewerage?	Dec-2016
4	Compare conservancy and water carriage system of sanitation?	May-2016
5	Differentiate between separate and combined systems of sewerage suitable to a town. List their merits and demerits?	May-2017
6	Write down advantages and disadvantages of combined systems of sewage?	Dec-2015
7	Define the terms, (i) Sullage (ii) BOD (iii) Sewage (iv) Aerobic Bacteria (v) Time of Concentration?	Dec-2014
8	State the factors on which the storm water flow of an area depends?	May-2014
9	Explain the term concentration and its significance in design of storm sewers?	May -2014
10	Explain the different principles that should be considered while designing a house drainage system?	Dec-2014

### Long questions

1	What is the foundation of storm water regulator in sewerage systems? Draw a neat sketch of "leaping weir storm regulator.	May-2017
2	What is the foundation of storm water regulator in sewerage systems? Draw a neat sketch of "leaping weir storm regulator.	May-2017
3	(a) Explain BOD and derive the expression for it? (b) Explain COD and derive the expression for it?	Dec-2017
4	Draw a neat diagram of circular pipes Sewer Section and Explain.	Dec-2017
5	Explain the classification of traps?	Dec-2016
6	What are the different parameters that are considered in the Sewer design?	May-2016
7	What are the different sewers sections explain with neat diagrams?	May-2016
8	Explain the following with neat sketches, (a) Manholes (b) Inverted siphon (c) Catch Basin?	Dec-2016
9	Write short notes on the various materials used in sewer construction?	May-2015
10	Distinguish between the loss of head and negative head?	May-2018

### Fill in the blanks/ choose the best:

- What is the emissivity of the Earth's surface?
  - 0.457
  - 0.578
  - 0.135
  - 1.42
- In which layer of the ionosphere does the International Space Station orbit?
  - D
  - E
  - F
  - G
- Which type of clouds is the found in the highest altitude of the Earth's atmosphere?
  - Noctilucent
  - Cirrostratus
  - Stratus
  - Cirrus
- What is the significance of the ionosphere?
  - Aviation movements



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- b) High frequency radio transmission  
c) Regulates weather  
d) All of the mentioned
5. What does the term “overcast” define?  
a) Phenomenon of indirect radiation exposure due to scattering  
b) Weather when cloud cover is equal to 8 oktas  
c) Both the mentioned  
d) None of the mentioned
6. The hourly variation factor is usually taken as  
a) 1.5      b) 1.8      c) 2.0      d) 2.7
7. If the average daily consumption of a city is  $100000 \text{ m}^3$ , the maximum daily consumption on peak hourly demand will be  
a)  $100000 \text{ m}^3$       b)  $150000 \text{ m}^3$       c)  $180000 \text{ m}^3$       d)  $270000 \text{ m}^3$
8. Chlorine demand of water is equal to  
a. applied chlorine      b) residual chlorine  
c) sum of applied and residual chlorine      d) difference of applied and residual chlorine
9. In water treatment, rapid gravity filters are adopted to remove  
a. dissolved organic substances      b) dissolved solids and dissolved gases  
c) floating solids and dissolved inorganic solids      d) bacteria and colloidal solids
10. The velocity of flow of water in a sedimentation tank is about  
a. 5 to 10 cm/sec      b) 15 to 30 cm/sec      c) 15 to 30 cm/m      d) 15 to 30 cm/h
11. Scour valves are provided  
a. at street corners to control the flow of water  
b. at every depression and dead ends to drain out the waste water that may collect there  
c. at the foot of rising main along the slope to prevent back running of water  
d. at every summit of rising mains
12. The rate of Alteration of pressure filters is  
a. less than that of slow sand filters  
b. in between the filtration rates of slow and rapid sand filters  
c. greater than that of rapid sand filters  
d. equal to that of slow sand filters

## UNIT-V

### **Important points / Definitions:**

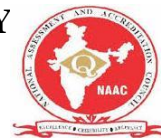
- Oxidation ponds, also called lagoons or stabilization ponds, are large, they are designed to treat wastewater through the interaction of sunlight, bacteria, and algal.
- Sewage sludge treatment describes the processes used to manage and dispose of sewage sludge produced during sewage treatment. Sludge is mostly water with lesser amounts of solid material removed from liquid sewage.
- Soak pit, also known as a soak away or leach pit, is a covered, porous-walled chamber that allows water to slowly soak into the ground.
- Sewage farms use sewage for irrigation and fertilizing agricultural land. The practice is common in warm, arid climates where irrigation is valuable while sources of fresh water.
- The residue that accumulates in sewage treatment plants is called sludge. Sewage sludge is the solid, semisolid, or slurry residual material that is produced as a by-product of wastewater treatment processes.
- Sludge digestion is a biological process in which organic solids are decomposed into stable substances. Digestion reduces the total mass of solids, destroys pathogens, and makes it easier to dewater or dry the sludge.
- Sewage farms use sewage for irrigation and fertilizing agricultural land. The practice is common in



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warm, arid climates where irrigation is valuable while sources of fresh water are scarce.

- The self-purification process of water bodies or processes involving biological, chemical and physical processes working simultaneously on biological pollutants.
- Biochemical Oxygen Demand is the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time period.
- Water treatment is any process that improves the quality of water to make it more acceptable for a specific end- use. The end use may be drinking, industrial water supply, irrigation, river flow maintenance.
- Scour valves are located at low points or between valve sections of the pipeline. Their function is to allow periodic flushing of the lines to remove sediment and to allow the line to be drained for maintenance and repair work.
- The purpose of distribution system is to deliver water to consumer with appropriate quality, quantity and pressure. Distribution system is used to describe collectively the facilities used to supply water from its source to the point of usage.
- The water carriage system is the modern method of conveyance of sewage. In this system, water is used as a medium for water.
- The study of test of significance is the deviation between the observed sample statistic and the hypothetical parameter value is significant and the deviations between two sample statistics are significant.
- Unconfined aquifer is an aquifer whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall space associated with a real number

## Short Questions:

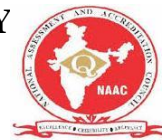
1	Write treatment measures of a drainage line?	<b>May-2015</b>
2	Discuss about laying and testing of pipe lines.	<b>Dec -2017</b>
3	Write short notes on (a) Screens (b) Grit chambers (c) Sedimentation tanks	<b>Dec-2018</b>
4	Design a circular sedimentation tank to treat 1 MLD of domestic waste water treatment plant. Make suitable assumptions?	<b>Dec-2018</b>
5	Design a primary sedimentation for treating 1 MLD of waste water. Make suitable assumptions?	<b>May-2019</b>
6	List out methods for removal of dissolved inorganic impurities from waste water?	<b>May-2016</b>
7	Explain the activated sludge process with a flow diagram?	<b>Dec-2017</b>
8	Give advantage and disadvantages of ASP?	<b>May-2018</b>
9	Differentiate between activated sludge process and trickling filter?	<b>Dec-2015</b>
10	Explain the trickling filter process with a flow diagram?	<b>Dec-2018</b>



# SAMSKRUTI COLLEGE OF ENGINEERING & TECHNOLOGY

(Approved by AICTE, New Delhi & Affiliated to JNTUH.)

**Kondapur(V), Ghatkesar(M), Medchal(Dist)**



## Long Questions:

1	Write an account an effluent treatment?	<b>May-2016</b>
2	Compare process design consideration in aerated lagoons and oxidation ditches?	<b>May-2018</b>
3	Write an account on floating surface Aerator	<b>Dec-2018</b>
4	Design a horizontal flow type grit chamber for a proposed sewage treatment plant expected to treat 60,000 m <sup>3</sup> /day respectively. The flow through velocity is to be controlled by a proportional weir?	<b>Dec-2018</b>
5	Explain the operational problems of trickling filter and their remedies?	<b>Dec-2017</b>
6	Write down the summary of reactions during Anaerobic Treatment	<b>May-2015</b>
7	List out the methods for removal of dissolved inorganic impurities from waste water.	<b>May-2016</b>
8	Explain the activated sludge process with a flow diagram	<b>Dec-2017</b>
9	Explain the operational problems of trickling filter and their remedies.	<b>Dec-2016</b>
10	Give the advantages and disadvantages of ASP	<b>May-2015</b>

## Fill in the blanks/ choose the best:

1. If the total hardness of water is greater than its total alkalinity, the carbonate hardness will be equal to\_\_\_\_\_.
2. The maximum discharge of a tube-well is about\_\_\_\_\_.
3. The amount of residual chlorine left in public water supply for safety against pathogenic bacteria is about\_\_\_\_\_.
4. The length of rectangular sedimentation tank should not be more than\_\_\_\_\_where B is the width of the tank\_\_\_\_\_.
5. Air binding phenomena in rapid sand filters occur due to\_\_\_\_\_.
6. Orthotolidine test is used for determination of\_\_\_\_\_.
7. On standard silica scale, the turbidity in drinking water should be limited to\_\_\_\_\_.
8. The self-cleansing velocity for all sewers in India is usually\_\_\_\_\_.
9. Sewage treatment units are normally designed for\_\_\_\_\_.
10. The effective size of sand particles used in slow sand filters is\_\_\_\_\_.