Grade : VII

Chapter 18. Wastewater Story

Basic concepts – A Flow Chart

Wastewater

Rich in lather, mixed with oil, black-brown water that goes down the drains from sinks, showers, toilets, laundries is called wastewater

Sewage

- It is wastewater which is released from homes, industries, hospitals, offices and other users.
- It is a liquid waste containing suspended impurities (contaminants).

Sewage disposal

- Sewer pipelines transport wastewater form buildings to horizontal mains (sewerage).
- Mains connect to wastewater treatment plants .

Better Housekeeping Practices

- Cooking oil and fats should not be thrown down the drain, but in dustbins.
- Chemicals like paints, solvents, insecticides, motor oil, Medicines should not be thrown down the drain.
- Used tea leaves, solid food remains, soft toys, cotton sanitary towels etc. should be thrown in dustbins.

Sewage Treatment

- Aeration: Air is bubbled through the wastewater while it is continuously stirred.
- Filtration: Aerated water passes through a medium gravel.
- Chlorination: To the filtered water chlorine is added and mixed until water is clear.

Wastewater Treatment plant (WWTP)

Wastewater passes through screens to remove large objects.

↓

It goes to a grit and sand removal tank at low speed.

↓

Water is allowed to settle in large tank.

↓

Floating solids are removed with skimmer.
Settled solids (sludge) are removed with scraper.

↓

Cleared water is called clarified water.

↓

Water is then decomposed by anaerobic bacteria in a tank and air is passed.

↓

Microbes settled at bottom as activated sludge and water from top is removed.

Know the Terms

- **Waste water** : It is the used dirty water which may be black-brown, rich in lather, mixed with a discharged from sinks, showers, toilets, laundries etc.
- **Clean water** : Water that is fit for use and safe for drinking is known s clean water.
- **Cleaning of water** : It is a process of removing pollutants from water before it is released into a water body or is reused.
- **Sewage treatment** : It refers to the process of rendering the dirty water from households and industries. The treated water is released to water bodies, such as streams and rivers. This water can be used again for supplying drinking water, irrigation of crops and for aquaculture.
- Sewage is a waste water discharged from industries, hospitals, offices, homes and rainwater that washed off roads and rooftops. Sewage is a liquid waste that may contain organic impurities (such as urine, faeces), inorganic impurities, nutrients (e.g., phosphates), diseases causing bacteria and other microbes.
- **Sewers** : A network of big and small pipes that carries waste water (sewage) is called sewers, forming the sewerage. Sewers carry sewage from the point of being produced to the point of diposal-treatment plant.
- **Contaminants** :The dissolved and suspended impurities present in water are called contaminants.
- **WWTP** : It stands for Waste Water Treatment Plant. Here by physical, chemical and biological processes contaminants of waste water are removed.
- **Sludge** : Waste water solids like faeces, which settle down at the bottom of a large tank and are removed with a scraper are called sludge.
- **Clarified water** : Water which is cleared from the floatable substances like oil and grease by a skimmer is called clarified water.

- **Anaerobic Bacteria** : Bacteria which can grow and multiply in absence of free oxygen are called anaerobic bacteria.
- **Biogas** : Bacteria which can grow and multiply in absence of free oxygen are called anaerobic bacteria.

Objective Type Questions

(1 Mark each)

I. Multiple choice questions

1. Which is the quality of water waste?

a. Dirty look
b. Foul smell
c. bad taste
d. All of these

2. Which is used in vermi processing toilets?

a. Cockroach
b. Earthworms
c. Both of these
d. None of these

3. World water day is celebrated.

a. 22 march
b. 22 April
c. 22 march
d. 23 september

4. Chemical used to disinfect water is ;

a. chlorine
b. Nitrogen
c. Methane
d. Phosphate

5. The full form of WWTP is

a. World wide transport programme
b. Waste water treatment plant
c. World worker' s Talent programme
d. None of these

6. Which of the following in waste water?

a. water trickling form a damaged tap
b. water coming out of a shower
c. Water flowing in a river
d. Water coming out of a laundry

7. Sewage is mainly a

a. liquid waste
b. Solid waste
c. gaseous waste
d. Mixture of solid and gas

8. Which of the following is/are products of wastewater treatment?

a. Biogas
b. Sludge
c. Both biogas and sludge
d. Aerator

9. Open drain system is a breeding place for which of the following:

a. Files
b. Mosquitoes
c. Organisms which cause diseases

10. Water polluted by various human activities causes a number of water borne diseases. Which of the following is not a water borne disease?

a. cholera
b. Typhoid
c. Asthma
d. Dysentery

11. Pick from the following one chemical used to disinfect water.

a. chlorine
b. washing soda
c. Silica
d. Coal

12. The system of a network of pipes used for taking away wastewater from homes or pupil buildings to the treatment plant is known as:

a. sewers
b. Sewerage
c. Transport
d. Treatment plant

13. Which of the following is a par t of inorganic impurities of the sewage?

a. pesticides
b. Urea
c. phosphates
d. Vegetable waste

14. In a filtration plant water is filtered using layers of ;

a. Sand and clay
b. Clay and fine gravel
c. Sand and fine gravel
d. Sand , fine gravel medium gravel

15. Which of the following is not a source of waste water?

a. Sewers
b. Homes
c. Industries
d. Hospitals

1. d	2. b	3. a	4. a	5. b	6. d	7. a	8. c
9. d	10. c	11. a	12. b	13. c	14. d	15. a	

I. Fill in the blanks

A very _____ number of our people defecate in the open . it may cause _____ pollution and soil pollution. Both the surface water and _____ water get polluted, _____ water is the source

for wells, tubewells and_____. Thus it becomes the most common route for _____ borne diseases like _____, dysentery etc.

Large	Water	Ground	Ground	Hand pumps	Water	cholera

II. Fill in the blanks

(i) Water is the basic constituent of all .....

(ii) Water exist in..... states

(iii) Water boils at.....

(iv) Sewage is a liquid waster which causes ..... and.....pollution

(v) Wastewater is treated in ..... treatment plant.

i) living beings	ii) three	iii) 100^0C	iv) water, soil	v) wastewater/sewage

I. Match the following.

I. Column A	Column B
a. Bar screen	i. Transport system of
b. Paint and solvent	ii. Disinfect water
c. Anaerobic bacteria	iii. Used in vermin toilet
d. Sewerage	iv. Do not allow free flow of O_2
e. Earthworm	v. Remove large objects
f. Dried sludge	vi. Harden and block the pipe
g. Cooking oil and fats	vii. Decompose sludge
h. Ozone	Viii. Used as manure

a. V	b. iv	c. vii	d. i	e. iii	f. viii	g. vi	h. ii

II. Column A	Column B
a. Inorganic impurities	i. Phosphorus and nitrogen
b. Organic impurities	ii. Nitrates and phosphate
c. Nutrients	iii. cholera and tryphoid
d. Bacteria	iv. Pesticides and herbicides

I. True or False

a. Sewage is solid waste which causes water pollution and soil pollution.

b. Used water is waste water.

c. Wastewater could be reused.

d. Where underground sewerage systems and refuse disposal systems are not available, the high cost on-site sanitation system can be adopted.

a. False (Sewage is a liquid waste which cause water pollination and soil pollution) b. True
c. True
d. False (where underground sewerage systems and refuse disposal systems are not available, the low cost on-site sanitation system can be adopted.

II. True or False

(i) Water is a basic constituent of all living organisms

(ii) Waste water cannot be reused

(iii) Chemicals like chlorine and ozone are used to disinfect water

(iv) Wastewater is treated in vermin processing plant

(v) We should not defecate in open because untreated human excreta is a health hazard.

(i) True	(ii) False	(iii) True	iv) False	v) True

Quiz Time

1. What is the colour of wastewater?

2. What do you mean by clean water

3. Write the full form of WWTP

4. Should the used water be wasted?

5. Write any three sources of water

6. Is natural water always pure or not?

7. Which period is know as International decade for action on "Water for life"?

8. Write caption for the logo

9. Write the names of two water borne diseases

10. How much water in treatment plant is activated sludge?

11. Write the name of the toilets in which human excreta is treated by earthworms.

1. Black brown

2. The water that is fit and safe for drinking is clean water

3. Wastewater Treatment Plant

4. No. it should be cleaned

5. i) Well ii) river iii) Oceans

6. It is not always pure

7. 2005 to 2015

8. Water for life 2005 - 2015

9. i)Cholera ii) Polio

10. 97%

11. Vermi-processing toilet

NCERT Corner

Intext Questions

Table Contaminant survey

S.No.	Type of sewage	Print of origin	Substances which contaminate	Any other remark
1.	Sewage water	Kitchen	Vegetable pills	Not so polluted
2.	Foul waste	Toilets	Excreta	Very polluted
3.	Trade waste	Industrial and	Chemicals	Extremely

		commercial organisations		polluted

Activity

1. What changes did your observe in the appearance of the liquid after aeration?

Liquid becomes cleaner

2. Did aeration change the odour?

No.

3. What is removed by the sand filter?

Mud, dirt

4. Did chlorine remove the colour?

No

5. Did chlorine have an odour? Was it worse than that the waste water?

Chlorine has odour. But it is now worse than that of the waste water.

Textbook Questions

1. Fill in the blanks.

a) Cleaning of water is the process of removing _____.

b) Wastewater released by houses is called _____.

c) Dried _____ is used as manure.

d) Drains get blocked by _____ and _____.

a) pollutants b) sewage c) dung d) plastic, sludge

2. Water is sewage? Explain why it is harmful to discharge untreated sewage into rivers or seas?

Sewage is the wastewater released by homes industries, hospitals, offices and other users. It also includes rainwater that has run down the street during a storm or heavy rain. The water that washes off roads and rooftops carries injurious substances with it. Sewage is a liquid waste. Most of it is water. Which has dissolved and has suspended impurities known as contaminants.

That is why it is harmful to discharge untreated sewage into rivers or seas.

3. Why should oils and fats be not released in the drain? Explain.

Oil does not mix with water. Being lighter, oil floats on water. This checks mixing of water and air. This brings down oxygen supply for aquatic plants and animals.

4. Describe the steps involved in getting clarified water from wastewater.

In the sewage treatment the waste water enters a treatment plant. Large solid materials are first removed from it by passes the water through screens or vertical bars. The waste water then passes through a grinder, where leaves and other organic materials are reduced in size for efficient treatment and removal.

The water is then passed through setting tanks known as frit chambers, where solids such as sand, slit and gravel are removed.

After this, the waste water passes into a sedimentation tank, in which organic materials settle down and are drawn for disposal. This organic matter is then converted to methane, carbon dioxide and a humus-like material by a process called digestion.

The waste water is then treated biologically to reduce the organic material that remains in it. The treated water may then be used or discharged into a water body.

5. What is sludge? Explain how it is treated?

The waste water passes into a sedimentation tank, in which organic materials settle down and are drawn for disposal. This organic matter is then converted to methane, carbon dioxide and a humus like material by a process called digestion. This digested sludge is placed on sand beds for air drying. Dried sludge can be used as a fertilizer.

6. Untreated human excreta is a health hazard Explain.

Untreated human excreta is a health hazard. It may cause water pollution and soil pollution. Both the surface water and groundwater are polluted. Groundwater is a source of water for wells, tubewells, springs and many rivers. Thus it happens to be the most common route for eater borne diseases. They include cholera, typhoid, polio, meningitis and dysentery.

7. Name two chemicals used to disinfect water.

Ozone, chlorine

8. Explain the function of bar screens in a wastewater treatment plant.

Wastewater is passed through bar screens. Large objects like rags, sticks, cans, plastic packets and napkins are removed.

9. Explain the relationship between sanitation and disease.

Domestic sewage contains harmful micro organisms that can cause disease such as jaundice, cholera and typhoid.

Thus proper sanitation is must to avoid some of the deadliest diseases.

10. Outline your role as an active citizen in relation to sanitation.

We all have a part to play in keeping our environment clean and healthy. We must shoulder our responsibility in maintaining the water sources in a healthy state. Adopting good sanitation practices should be our way of life. As an agent of change, our individual initiative will make much difference. We can set an example to others with our energy ideas and optimism. Much can be done if people work together. There is great power in collective action.

11. Here us a crossword puzzle: Good luck!

Across

3. Liquid waste products

4. Solid waste extracted in sewage treatment

6. A word related to hygiene.

8. Waste matter discharged from human body

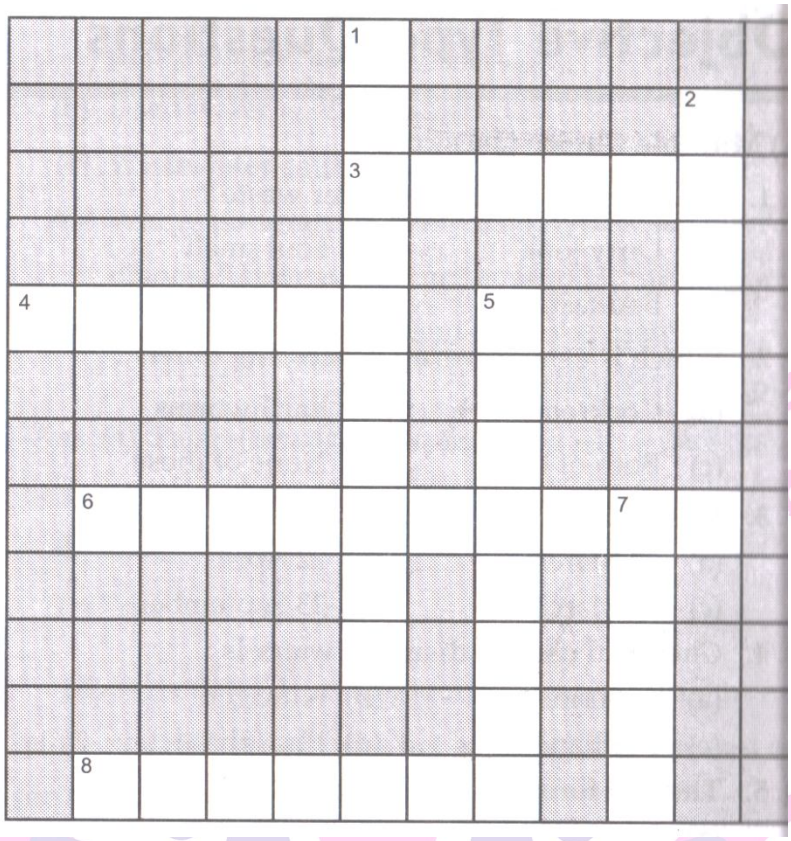
Down

1. Used water

2. A pipe carrying sewage

3. Micro-organisms which cause cholera

7. A chemical do disinfect water.



Ans.

					1 w						
					a					2 s	
					s	e	w	a	g	e	
					t					w	
4 s	l	u	d	g	e		5 b			e	
					w		a			r	
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	6 s	a	n	i	t	a	t	i	7 o	n	
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	8 e	x	c	r	e	t	a		e		

12. Study the following statements about ozone:

a) It is essential for breathing of living organisms.

b) It is used for disinfect water.

c) It absorbs ultraviolet rays.

d) Its proportion in air is bout 3%.

Which is these statements are correct?

(i) (a) (b) and (c) **(ii) (b) and (c)**

(iii) (a) and (d) **(iv) All four**

Answer: (ii)

I. Very Short Answer Type Questions.

1. What is wastewater?

The water after using for various purposed becomes dirty. This dirty water is called wastewater.

2. Should the used water be wasted or not?

The used waste should not be wasted but it should be cleaned

3. What are pollutants?

The harmful and toxic substances which contaminate waste, air and soil etc. Are called pollutions.

4. Name tow gases used to disinfectant of water

i) Chlorine gas ii) Ozone gas

5. Which day is celebrated as world water day?

22 March

6. Which period is considered as International Decade for action on "Water for life"?

2005 to 2015

7. Write three sources of water

i)Oceans ii)Rivers iii) Wells

8. Is the water of all sources safe for drinking?

No, the water of all sources is not safe for drinking,

9. What is sewage?

The wastewater released from homes, industries, hospitals, offices and other uses is called sewage.

10. Does chlorine have any odour?

Yes, chlorine has an odour.

11. What are sewers?

Sewers are the pipes acting as a transport system that carries sewage from point to origin to the point of disposal.

12. Natural water is always pure. Why or why not?

All types of water except rainwater contain salts dissolved in it. These salts make the water impure. So natural water is not pure always.

13. Why is the bleaching powder mixed in water.

Bleaching powder is mixed in water to make it safe for drinking because it kills the harmful germs present in water.

14. What do you mean by chlorination?

The process of adding bleaching powder to water to make water safe for drinking is called chlorination.

15. Write the full form of WWTP

Waste Water Treatment Plant

16. What are the organic impurities present in sewage?

Human faces, animal wastes, oil urea, pesticides, herbicides fruits and vegetables are the organic impurities in water.

17. Write the examples of onsite sewage disposal systems

Septic tanks, chemical toilets and composing pits etc.,

18. What is sludge?

The solids like faces which settle at the bottom of treatment tank and are removed with a scraper are called sludge.

19. What is the role of effluent treatment plants in cities?

The effluent treatment plants filter out undissolved materials from water.

20. What is meant by sanitation?

The process of disposal of sewage and garbage from houses is called sanitation.

21. Arrange the following steps of purification of water in the correct order; adding alum, treatment with chlorine, sieving.

Adding alum, sieving treatment with chlorine.

22. Write the common name of the process of cleaning of wastewater

Sewage treatment

23. Name the toilets in which human excreta is treated by earthworm

Vermi-processing toilet.

24. Write the steps involved in the treatment of polluted water

i) Aeration ii) Filtration iii) Chlorination

25. How much water is activated in sludge?

About 97%

26. What is the use of dried sludge?

Dried sludge is used as manure, thus returning organic matter and nutrients to the soil.

27. Write some water borne diseases

Cholera, typhoid , polio, meningitis, hepatitis and dysentery.

28. How can we improve the sanitation?

To improve sanitation, low cost onsite sewage disposal systems must be encouraged.

29. What is the colour of waste water?

Black Brown

30. Should we waste used water?

No, used waste should not be wasted. It can be treated and reused.

31. What do you understand by cleaning of water?

The process of removing pollutants and impurities is called cleaning of water.

32. What is composition of sewage?

Sewage contains suspend solids organic and inorganic materials, bacteria and other microorganisms.

II. Very Short Answer Type Questions.

1. Give the term used for water which is black- brown, oily and rich is lather

Sewage.

2. What is meant by clean water?

Water which is fit for drinking, bathing and cooking is known clean water.

3. What is a chemical toilet?

A toilet using chemicals to deodorize of the waste instead of storing in a hole or passing it into a sewage treatment plant.

4. Why the speed of incoming waste water is decreased when it goes into grit and sand removed tank?

The speed of waste water I slowed down in order to allow sand grit and pebble to settle down.

5. What term is used for solids like faeces which settle at the bottom of sewage treatment tank?

Sludge.

6. What is the function of skimmer in a water treatment plant?

Skimmer removes floatable solids like oil and greases.

7. Which gas is released during treatment of sludge?

Biogas is released during treatment of sludge it is used as source of energy.

8. Why clarified water is aerated during sewage treatment?

Clarified water is aerated in order to allow the aerobic bacteria to grow and digest the remaining organic waste.

9. How can we make water clean?

We can clean water by removing pollutants.

10. Contaminated water is a potential health hazard. Name any two diseases that could be caused by consumption of contaminated water.

Janudice and cholera.

12. Why are open drains a concern?

It is so because they create unsanitary and unhygienic conditions.

13. Animal waste, oil and urea are some of the organic impurities present in sewage. Name two more organic impurities present in sewage.

Pesticides, herbicides, fruits and vegetable wastes (Any two) .

14. Name two inorganic impurities present in sewage.

Nitrates, phosphates, Metals (any Two)

15. How are open drains harmful for human health?

In the unhygienic conditions of open drains, flies, mosquitoes and other insects breed and spread a number of diseases.

III. Very Short Answer Type Questions.

1. Why are open drains a concern?

It is so because they create unsanitary and unhygienic conditions.

2. How are open drains harmful for human health?

In the unhygienic conditions of open drains, files, mosquitoes, and other insects breed and spread a number of diseases.

3. Why should we not throw used tea leaves into sink?

Used tea leaves may choke the drain-pipe of the sink.

4. Name two inorganic impurities present in sewage.

Nitrates, phosphates, metals.

5. Animals waste, oil and urea are some of the organic impurities present in sewage, Name two more organic impurities present in sewage.

Pesticides, herbicides, fruit and vegetables wastes.

I. Short Answer Type Questions.

1. Name two alternative arrangements for sewage disposal where there is no sewerage system.

(a) Septic tanks (b) Composting pits

2. A mixture (x) in water contains suspended solids, organic impurities, inorganic impurities (a) nutrients (b) disease causing bacteria and other microbes. Give names for (x) (a) and (b).

(x) –Sewage

(a)-Nitrates, Phosphates and metals

(b)-Phosphorus and nitrogen

3. What is sewage? Explain why it is harmful to discharge untreated sewage into rivers or seas.

Sewage is the wastewater containing both liquid and solid wastes produced by human activities from homes, industries, hospitals, offices, etc.

Sewage contains various contaminants including disease-causing bacteria and other microbes. If untreated sewage is discharged into rivers or seas, then the water in the rivers or

seas would also get contaminated. If this contaminated water is used for drinking, then it can cause diseases such as cholera, typhoid, dysentery, etc. Which may lead to death. That is why it is harmful to discharge untreated sewage unto rivers or seas.

4. Why should oils and fats be not released in the drain? Explain.

Oils and fats harden and block the sewage pipes. In an open drain also, fact block porosity of soil which affects its water filtering efficiency. That is why oils and fats should not be released in the drain.

5. Describe the steps involved in getting clarified water from wastewater.

The steps involved in getting clarified water from wastewater are:

(a) Aerator is used to bubble air through the wastewater. A mechanical stirrer or a mixer can also be used in place of the aerator. This helps in reducing bad odour of the wastewater.

(b) Then, the water is filtered through the layers of sand, fine grave, and medium gravel. Filtration makes the wastewater clean from various types of pollutants. The water is filtered continuously until it becomes clear.

(c) Then any disinfectant such as chlorine tablet is added to the filtrate and stirred to obtain completely clear water.

6. What is sludge? Explain how it is treated.

Semi-solids such as faces that settle down during wastewater treatment are called sludge. This sludge is removed using a scraper and then transferred to a tank where it is decomposed by anaerobic bacteria to produce biogas. This biogas is used as a low-cost fuel for heating, cooking, etc. It is also used to produce electricity.

7. Untreated human excreta is a health hazard. Explain.

Untreated human excretions are a health hazard. It cause pollution of soil and water including the underground water. Thus, it contaminates the sources of water from which people collect water for drinking and household purposes. When this contaminated water is used for drinking, it can cause disease such as cholera, typhoid, hepatitis, dysentery, etc., which may even lead to death.

8. Explain the function of bar screens in a wastewater treatment plant.

In a wastewater treatment plant, bar screen removes large solid objects from water. The wastewater is allowed to pass through bar screen so that large solid objects such as rags, napkins, sticks, cans, plastic bags, polythene, etc. Present in wastewater can be removed.

9. What is 'onsite sewage disposal system?

It is an alternate arrangement for sewage disposal to improve sanitation in places where there is no sewage system like in rural areas or in isolated buildings.

10. What is a vermin processing toilet?

It is a design of toilet in which human excreta is treated by earthworms to be converted into vermin cakes which are good for the soil. It is a novel, low water-use toilet for safe processing of human waste.

11. Why is clarified water passed through aeration tanks?

In aeration tanks clarified water is acted upon by aerobic bacteria which remove the suspended solids and dissolved substances. Leaving fairly pure water.

12. How is biogas formed?

The excreta of animals and humans is collected in a separate tank in a biogas plant. Here it is acted upon by the anaerobic bacteria which produce biogas in the process.

II. Short Answer Type Questions.

1. How can we control the water pollution?

We can control water pollution by following measures:

i) By avoiding disposal of industrial and household wastes into river water

ii) By avoiding washing of clothes, cleaning utensils and bathing with soap near the source of water

iii) By covering the mouth of well so that dust, leaves etc. May not fall into it.

2. What do you mean by cleaning of water?

Cleaning of water is a process of removing pollutants from water before it enters water body or is reused. This process of wastewater treatment is commonly known sewage treatment. It takes place in several stages.

3. What is potable water ? Write its characteristics.

The water which is fit for drinking by human being is called potable water

Characteristics.

i) It is transparent

ii) It is odourless and colourless

iii) It is harmless or free from disease causing bacteria.

4. List the various sources of water pollution.

i) Domestic wastes

ii) Agricultural wastes

iii) Fertilizers, insecticides and pesticides.

iv) Industrial wastes

v) Discharge of sewage

5. What are the substances which make water unfit for drinking which we get from local supply?

The local water is hard due to the presence of calcium and magnesium chlorides, sulphates and bicarbonates. It also contains dust particles and micro-organisms which make waste polluted. Therefore, such type of waste is not suitable to drink and use. Such type water is not suitable to drink and use. Such water must be treated before use.

6. What is wastewater? What should we do to wastewater?

Rich in lather, mixed with oil, black brown water that goes down the drains from sinks, showers, toilets, laundries is dirty. It is called wastewater. This used water should not be wasted. We , must clean it up by removing pollutants.

7. What do you mean by sewerage?

It is a network of big and small pipes called sewers. It is like a transport system that carries sewage from the point of being produced to the point of disposal.

Manholes are located every 50 m to 60 m in the sewerage at the junction of two or more sewers and at point where there is a change in the direction.

8. What should we do being an active citizen to utilize wastewater?

i) We should minimise the quantity and type of wasters produced.

ii) We may approach the Municipality of Gram Panchayat for enlightenment of community.

iii) Open drains should be covered

iv) You should request neighbourhood to be more considerate about other's health while performing sanitary practices.

9. How can contaminants be controlled?

We can control water from contamination by following ways:

i) We should not dispose waster into water.

ii) Avoid washing, cleaning and bathing with soap near source of water.

10. What are on site sewage?

The septic tanks, chemical toilets and composting pits are called on site sewage, they have low cost.

Onsite sewage disposal system are being encouraged. Septic tanks are suitable for places where there is no sewage system. Some organisations offer hygienic onsite human waste disposal technology. These toilets do not require scavenging.

III. Short Answer Type Questions- I

1. What are the harmful effect of releasing untreated sewage in water bodies?

Untreated excreta contaminates water. It encourages algae bloom in water bodies. The water of such water bodies become unfit for drinking and other house hold purposes. Such water is also cause of a large number of water borne diseases such as typhoid, cholera, hepatitis and polio, etc.

2. Name two water disinfectants used during treatment of waste water.

The two water disinfectants used during treatment of waste water. Are chlorine and ozone.

3. Why chemicals, solvents and insecticides should not be thrown down the drain?

Chemicals like paints, solvents and insecticide should not be thrown down the drain as they may kill microbes that help to purify water.

4. Why you are advised not to throw soft toys, used tea leaves, cotton and sanitary towels into drains?

Such waste choke the drains. They do not allow free flow of oxygen. This hampers the degradation process.

5. Give four examples of diseases caused by drinking contaminated water.

Contaminated water is a source of many water borne diseases which include : cholera , typhoid, polio, meningitis, hepatitis and dysentery.

6. What are contamination sewage? Give examples.

The dissolved and suspended impurities present in sewages are known as contaminations. These contaminates are organic and inorganic impurities, nutrients saprophytic and disease causing bacteria and other microbes?

7. Mention two factors which are causing scarcity of fresh water.

i. Increase in population.

ii. Pollution.

iii. Industrial growth

8. Describe the steps involved in getting clarified water from wastewater.

Following steps are involved in the purification of water.

i. Firstly all the physical impurities like stones, plastic bags, cans etc., are to be removed. It is done by passing the water through bar screens.

ii. Then water is taken to grit and sand removal tank where impurities are removed by sedimentation.

iii. Solid impurities and feaces etc., are collected from bottom of water. These impurities collected are called sludge.

iv. Clarfied water is cleaned of other impurities by aeroator, All disease causing bacteria are removed by chlorination.

9. Explain the function of the following in waste water treatment plant:

a. Bar screen, b. water clarifier.

Function of Bar screen : it helps in removing solid waste like facets, sand, grit and pebbles form waste water and floatable solids like oils and grease to make it clear.

10. Think and suggest some ways to minimize waste and pollutant at their source, taking your home as an example.

i. Do not throw used tea leaves, solid food remains etc. in the drain. Throw them in the dustbin

ii. Chemicals like medicines, paints, insecticides etc. should not be thrown in the drain, as they increase the pollution load of the sewage.

11. A man travelling in a train threw an empty packet of food on the platform. Do you think this is a proper waste disposal method. Elaborate.

No, one must always put the waste in a nearby dustbin or carry it until a proper place to dispose it of is found. Waste, not properly disposed may go into the drains and choke them. It also makes public dirty and unhygienic.

12. Why should we not throw?

a. Use should we not throw?

b. cooking oil and fats down the drain?

a. Used tea leaves may choke the drain-pipe of the sink.

b. Cooking oil and fats can harden and block the pipes.

III. Short Answer Type Questions-II

1. How can we control water pollution ?

We can control pollution by following measures:

i. By avoiding disposal of industrial and household wastes into river water.

ii. By avoiding washing of clothes, cleaning utensils and bathing with soap near the source of water.

iii. By covering the mouth of well so that dust, leaves etc., may not fall into it.

2. What do you mean by water cleaning?

Cleaning of water is a process of removing pollutants form water before it enters a water body or is reused. this process of waste water. Treatment is commonly Known as sewage treatment. It takes place in several stages.

3. What is potable water? Write its characteristics ?

The water which is fit for drinking by human beings is called portable water.

Characteristics:

i. it is transparent

ii. it is odourless and colourless

4. List the various sources of water pollutions.

i. Domestic wastes

ii. Agricultural Wastes

iii. Fertilizers

iv. Insecticides and pesticides

v. Industrial wastes

vi. Discharge of sewage.

5. How a vermin composting toilet works?

It is a design of a toilet in which humans excreta is treated by earthworms. It is a novel, low water-use toilet for safe processing of human waste. The operation of the toilet is very simple and hygienic. In these toilet excreta is completely converted to vermin cakes – a resource much heeded for soil.

6. What are the various alternative arrangements for sewage disposal other than WWTP?

Various alternative arrangements for sewage disposal other than WWTP are septic tanks, chemical toilet and composting pits, septic tanks are suitable for places there is no sewage system, such as hospitals, isolated buildings or cluster of 4-5 houses. In other methods, the excreta flow through covered drains into a biogas plant, the biogas thus produced is used as a source of energy.

7. The terms sewage, sewers and sewerage are interlinked with each other. Can you explain. How?

i. Sewage – mixture of wastewater coming out of homes and other places.

ii. Sewers – pipes which carry sewage.

iii. Sewerage – network of sewage carrying pipes.

8. Three statements are provided here which define the terms.

a. Sludge b. sewage and c. wastewater. pick out the correct definition for each of these terms.

a. The settled solids that are removed in wastewater treatment with a screaper.

b. Water form kitchen used for washing dishes.

c. Wastewater released from homes, industries, hospitals and other public buildings.

a. Sludge, b. Wastewater c. Sewage.

9. A mixture (X) inwater contains suspended solids, organic impurities, inorganic impurities (a) nutrients. (b) disease causing bacteria and other microbes. Give names for (x) , (a) and (b)?

(x) sewage

a. nitrates, phosphates and metal

b. phosphorus and nitrogen

10. What are the different types of inorganic and organic impurities generally present in sewage?

i. inorganic impurities – nitrates, phosphates and metals.

ii. Organic impurities – fruit and vegetable wastes, oil, urea, human faceces, animals pestricides and herbicides.

I. Long Answer Type Questions

1, Describe various house- keeping practices for efficient working of sewage system.

i. left overfood contain lot of oil and fat, it should not be thrown down the drain. They choke the pipe when they become harden. These waste when thrown in open drains block the oil pores thereby decreasing its effectiveness to filter water, such wastes should be thrown in dustbin only.

ii. solid wastes such as used tea leaves, plastic bags. Soft toys, cotton and sanitary towels should not be thrown in drains. Such wastes block he drain. They reduce free flow of oxygen and thus slow down the process of degradation.

iii. Chemical products like medicines, motor oil, paint, machine oil and insecticide should also be not thrown down the drain. These substances kill water purifying organisms and hamper degradation.

3. What are the various organic, in organic and disease causing components of sewage?

Organic impurities : Human faeces, Animals wstes, oil, urea (Urine), pesticides, Pesticides, herbicides.

Inorganic impurities: Nitrates, phosphates, metals.

Disease causing microbes : microbes which cause typhoid, cholera, polio, dysentery.

4. Given below is jumbled sequence of the processes involved in a wastewater treatment plant. Arrange them in their correct sequence.

a. Sludge is scraped out and skimmer removes the floating grease.

b. water is made to settle in a large tank with a slope in the middle.

c. Large objects like plastic bags are removed by passing wastewater through bar screens.

II. Long Answer Type Questions

1. Describe the uses of water

Uses of water

i) Water is used for drinking, washing clothes and cleaning utensils at home.

ii) Most of the industries use water for their working.

iii) Water is used for irrigation purposes

iv) Water is used to run some flour mills

v) Water is used as coolant

2. What do you mean by water pollution?

The presence of some biological, inorganic or physical substances which degrade the quality of water and makes it harmful is called water pollution.

The substance which cause pollution are called pollutants. They many be inorganic, physical, organic or biological in nature.

Major pollutants of water are :

i) Sewage from household

ii) Wastes from industries

iii) Dissolve salts

iv)Suspended materials like dust, clay etc.

v) Fertilizers

vi) Insecticides and pesticides

3. Explain the various processes that take place at the water treatment plant with the help of an activity.

i) Collect the sewage and dirty water in a tank, Shake it well and let the mixture standing the sun for two days. Pour it into another utensil.

ii) Use an aerator and allow several hours for aeration. Leave the aerator attached overnight. When aeration is complete pour it into another utensil.

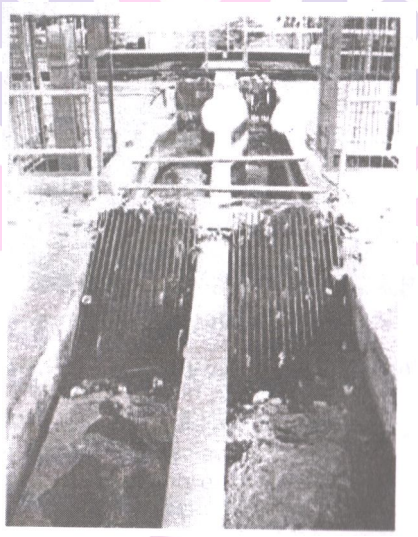
iii) Filter the sample with the help of filter paper, sand fine gravel and finally medium gravel.

iv) Add chlorine tablets of bleaching powder in the filtered water. This process is called chlorination.

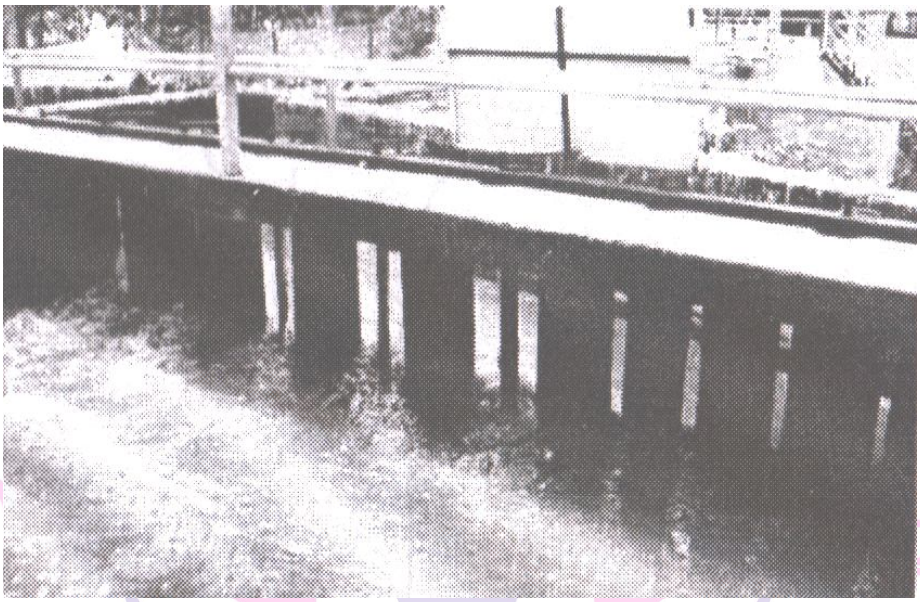
4. Explain the process of the treatment of water at wastewater treatment plant (WWTP) to get clarified water and aeration.

Treatment of water involves physical, chemical and biological processes.

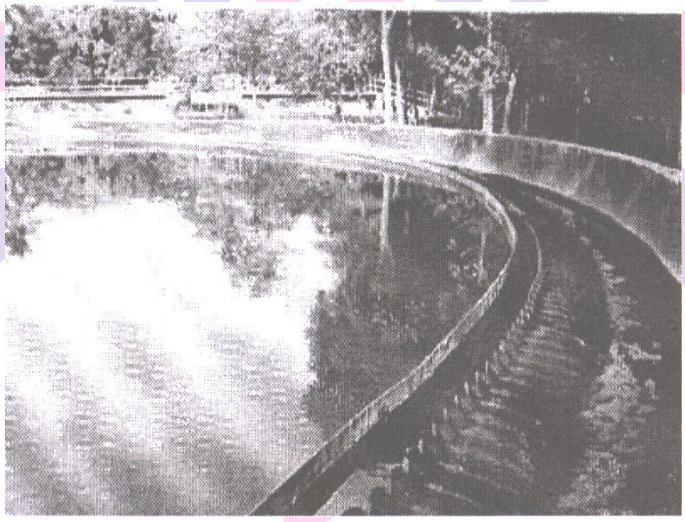
i) Wastewater is passed through bar screens which is used to remove rags, sticks, can, plastic packets, napkins etc.



ii) Water then goes to a grit and sand removal tank. The speed of waste water is decreased to allow sand, grit and pebbles to settle down.



iii) The water is then allowed to settle in a large tank sloped towards the middle. Solids like faeces settle at the bottom and are removed with a scraper.



iv) The sludge is transferred to a separate tank where it is decomposed by the anaerobic bacteria. Biogas produced in this process can be used as fuel or can be used to produce electricity.

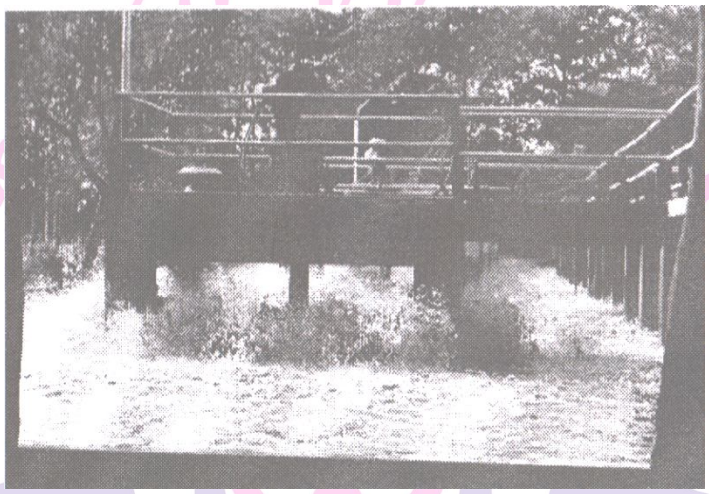
And is pumped into clarified water to help aerobic bacteria to grow, which consume human wastes, food wastes, soaps and other unwanted matter will remaining in clarified water.

After several hours the suspended microbes settle at the bottom of the tank as activated sludge. The water is then removed from the top.

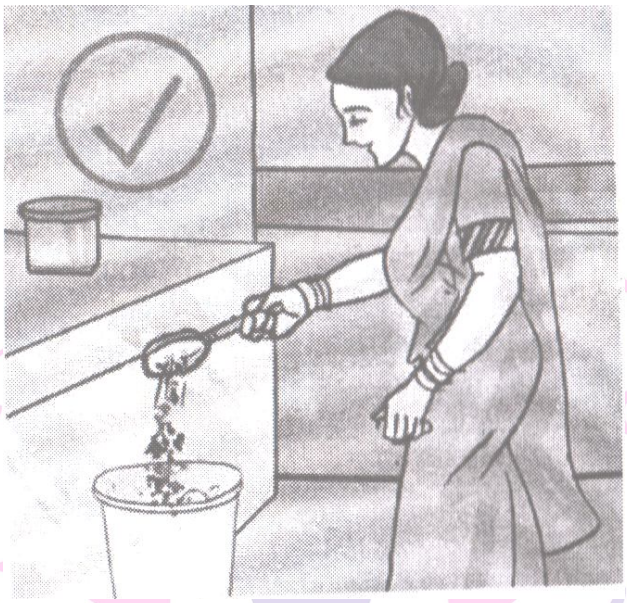
The activated sludge in about 97% water. Water is removed by sand drying beds or machines. Dried sludge is used as manure. The treated water has a very low level of organic

materials and suspended matter. It is discharged into a sea , a river or into the ground. Nature cleans it up further.

Sometimes it may be necessary to disinfect water by mixing chemicals like chlorine and ozone before releasing it in to the distribution system.



5. Explain some housekeeping practices to minimise waste at their source.



i) Cooking oil and fats should not be thrown down the drain. They can harden and block the pipes. Throw oil and fats in the dustbin

ii) Chemicals like paints, solvents insecticides , motor oil, medicines may kill microbes that help purify water. So do not throw them down the drains

iii) Used tea leaves, solid food remains, soft toys, cotton sanitary towels etc., should also be thrown in the dustbin. These wasters choke the drains. They do not allow free flow of oxygen. This hampers the degradation process.

III. Long Answer Type Questions

1. What are the different types of inorganic and organic impurities generally present in sewage?

Waste water is composed primarily of natural organic substance, which are by-products of human, animal and plant processes. The primary elements in domestic wastewater are nitrogen, phosphorous, ammonia and carbon, these elements are released with the growth of bacteria in standing water. The bacteria consume the oxygen present in water and as a result, living organisms in the water start to die.

We know that sewage is a complex mixture containing suspended solids, organic and inorganic impurities, nutrients, saprotrophic and disease causing bacteria and other microbes.

Organic impurities	Human faeces, animal waste, oil, urea (Urine)
Inorganic impurities	Nitrates, phosphates, metals
Nutrients	Phosphorus and nitrogen
Bacteria	Such as which cause cholera and typhoid
Other microbes	Such as which cause dysentery

2. Explain the relationship between sanitation and disease.

Sanitation and disease are related to each other as lack of sanitation can cause diseases. In our country, a large number of people even today to not have sewerage facilities and thus defecate in open fields, railway tracks, etc. The untreated human excreta thus pollute soil and water sources including the underground water. When this contaminated water is used for drinking, it can cause diseases such as cholera, typhoid, hepatitis, dysentery, etc. Which may even lead to death.

Therefore, lack of sanitation resulting in drinking of contaminated water can cause health problems.

3. Outline your role as an active citizen in relation to sanitation

A citizen has many responsibilities regarding sanitation. Among other things, an active citizen should do the following with regard to maintaining proper sanitation.

a) Ensure that his surrounding (both inside and outside home) are clean.

b) Ensure that the sewerage system in his house is properly managed.

c) If he notices some leakage or other problem in the sewerage system, he should report

I. High Order Thinking Skills (HOT) Question.

1. What in a river is cleaned naturally. Do you agree? Think and explain

Yes, river water is cleaned naturally by a process that is similar to wastewater treatment plant. A s muddy water when flows through grass or weeds on its way to a stream , mud and solid particles get filtered out. At the bottom of a lake or stream, micro organism bring chemical changes in the water. The natural filtration process removes pollution from the groundwater throughout the process making it clean and fit for drinking.

II. High Order Thinking Skills (HOT) Question.

1. What are storm drains?

Storm drains or storm sewers are large pipes that transport storm water run-off from streets to natural water bodies, to avoid street flooding.

Value Based Questions

1. Souvik goes to his aunt's home which is an advanced semi-town in the state of Madhya Pradesh. One day his cousin brother Rounak takes him to its neighbour village to have a visit. But this village has much more population thought it is not considered as truly advanced village. Souvik comes across many things like school, hospital, bank etc. but he comes to know that recently one intestinal disorder attacks the villagers and many of them are admitted in hospital as they are serious. Souvik goes deep into the matter and observes that due to scarcity of proper sanitary system people are compelled to defecate in the open area, same pond water is used for bathing, washing utensils and for other domestic works. He understands the actual fact behind it and writes one application to the municipality. Read the above passage carefully and answer the following questions

i. What might be the reason of intestinal disorder form which people of the village are suffering?

ii. Who is the authority in such a village to install a better sewage practice?

iii. Give some alternative arrangement for sewage disposal.

iv. Which value is shown by Sauvik and which value is not shown by villagers?

i. Most intestinal disorders are water-borne like typhoid, cholera, hepatitis etc. these are caused by in taking of contaminated surface/ ground water ,which get polluted due to different human activities.

ii. Municipal / Gram Panchayat.

iii. a. Onsite sewage disposal systems, e.g., septic tanks, chemical toilets, composting pits.

b. Some organizations offer hygienic on-site human scavenging. Excreta from the toilet seats flow through covered drains into a biogas plant.

iv. Social awareness, conscious citizen who want to adopt good sanitation practice in our remote villages.

Villagers do not take any initiative to lead a healthy life. So, value of awareness is not promoted by them.

2. How would you improve sanitation conditions of an area?

We can improve sanitation conditions of follows:

i. We should take care of personal and environmental sanitation.

ii. Low cast on – sit sewage disposal systems like septic tanks, chemical tanks, etc. should be built where there is no sewage system.

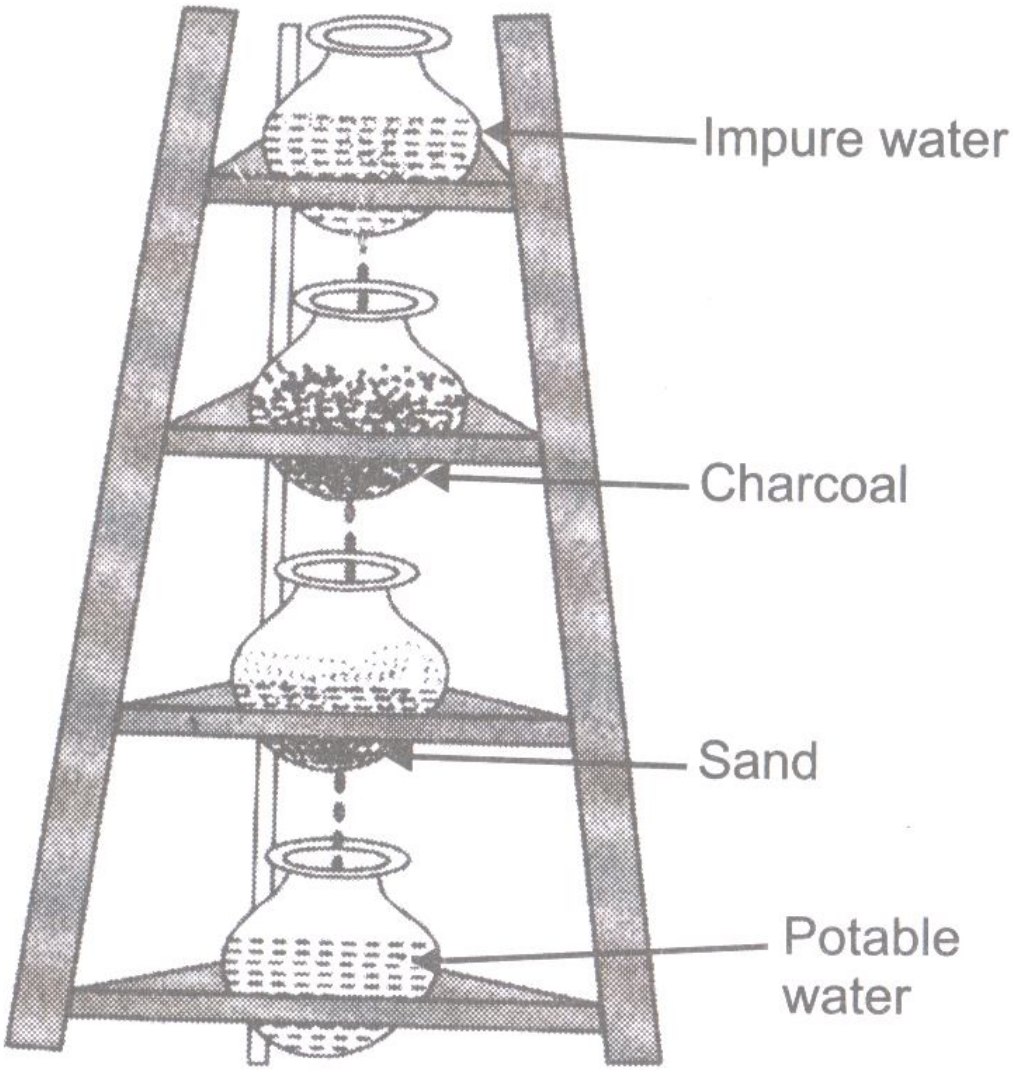
iii. People should be made aware of the benefits of sanitation.

iv. We should keep our surroundings clean.

v. We should help the municipal corporation or gram panchayat to cover all the open drains and remove the unhygienic as well as disease causing substances thrown in open.

Skill Based Questions

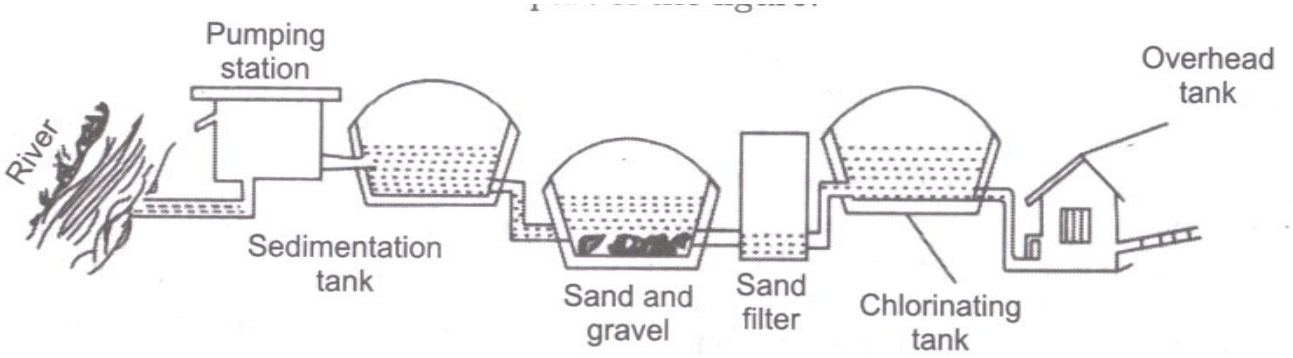
1. Draw a diagram to show a method to obtain portable water at rural areas.



2. Observe the following figures and answer the following questions:

i) What does this figure show?

ii) What are the functions of each part of the figure?



i) This figure shows the supply of drinking water from source to houses

ii) a) River : It is the source of water

b) Pumping station : Pump the water to collect it in reservoir.

c) Sedimentation tank : Suspended impurities are settled at the bottom of tank,

d) Sand and gravel and sand filter : Remove the dirt from the water

e) Chlorinating tank : Chlorine is mixed n water to disinfect the water and to kill the germs.

f) Over head tank: Purified water is stored in their tank for supply to the household for drinking.

3. Draw a diagram to show the filtration process