

POTABLE WATER

Answer all the questions below then check your answers.

1. What is potable water?

2. Fill in the gap to complete the sentence below:

An _____ is a layer of rock or sediment that can hold and transmit water underground.

3. Which of the following is a method used for disinfecting water?

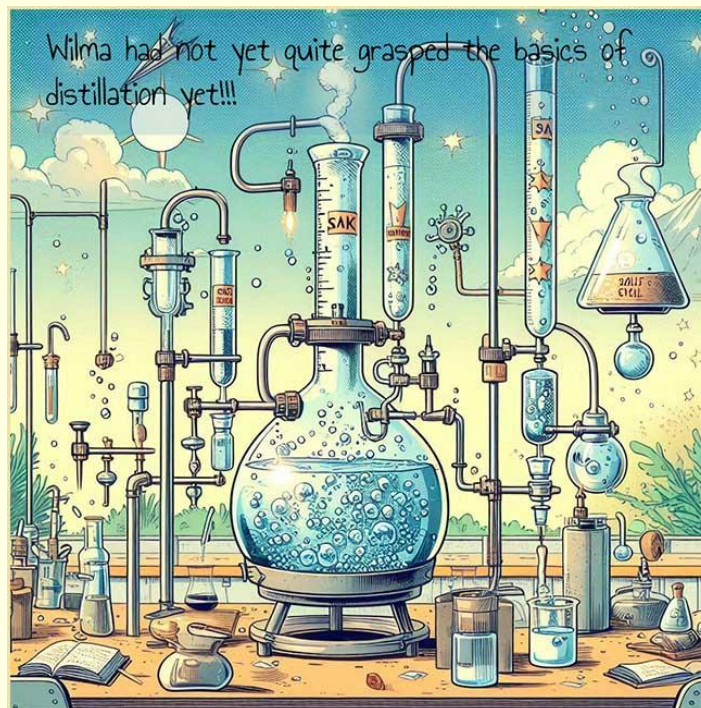
a) Coagulation b) Filtration c) Chlorination d) Sedimentation

4. Describe what happens during the screening process at a water treatment plant.

5. Explain what an aquifer is and its importance in the water cycle.

6. What are the main steps involved in water treatment at a water works? List and briefly describe each step.

7. What is desalination, and why is it used?



8. Explain how distillation is used to obtain potable water from seawater.

9. Describe how reverse osmosis is used in the desalination process.

10. Compare and contrast the three methods of disinfection used in water treatment: chlorine, ozone, and UV radiation. Discuss the advantages and disadvantages of each method.

11. Explain the process of coagulation and sedimentation in water treatment, and why these steps are essential.



12. Fill in the gap to complete the sentences below:

a. During the _____ step at the water works, chemicals are added to water to form flocs, which then settle during the _____ process.

b. _____ is a method of removing salt from seawater by heating it up under reduced pressure to make it drinkable.

13. Which method of desalination uses a semi-permeable membrane to filter out salt?

a) Distillation b) Coagulation c) Reverse osmosis d) Filtration

b. What is the primary purpose of sedimentation in water treatment?

a) To kill bacteria

b) To remove large debris

c) To allow particles to settle out

d) To add chlorine

Answers

1. What is potable water?

Answer: Potable water is water that is safe to drink.

2. Fill in the gap to complete the sentence below:

An _____ is a layer of rock or sediment that can hold and transmit water underground.

Answer: aquifer

3. Which of the following is a method used for disinfecting water?

a) Coagulation b) Filtration c) Chlorination d) Sedimentation

Answer: c) Chlorination

4. Describe what happens during the screening process at a water treatment plant.

Answer: During screening, large debris such as sticks, leaves, and rubbish are removed from the water by passing it through metal screens. The mesh in the metal screen gets finer which enables smaller and smaller pieces of debris to be removed.

5. Explain what an aquifer is and its importance in the water cycle.

Answer: An aquifer is an underground layer of water-bearing rock or sediment. It is important because it stores groundwater, which can be a source of fresh water for wells and springs.

6. What are the main steps involved in water treatment at a water works? List and briefly describe each step.

Answer:

Screening: Removes large particles and debris from the water.

Coagulation: Chemicals are added to cause small particles to clump together.

Sedimentation: Clumped particles settle at the bottom of a tank.

Filtration: Water passes through sand, gravel, or other filters to remove remaining particles.

Disinfection: Chlorine, ozone, or UV light is used to kill harmful microorganisms.

7. What is desalination, and why is it used?

Answer: Desalination is the process of removing salt from seawater to produce fresh water. It is used in areas where fresh water is scarce, such as arid regions or islands.

8. Explain how distillation is used to obtain potable water from seawater.

Answer: Distillation involves heating seawater to produce steam. The steam, which does not contain salt, is then cooled and condensed back into liquid water, which is now free of salt and safe to drink. This process effectively separates the salt and other impurities from the water.

9. Describe how reverse osmosis is used in the desalination process.

Answer: In reverse osmosis, seawater is forced through a semi-permeable membrane under high pressure. The membrane allows water molecules to pass through but blocks salt and other impurities. The result is fresh water on one side of the membrane and concentrated brine on the other.

10. Compare and contrast the three methods of disinfection used in water treatment: chlorine, ozone, and UV radiation. Discuss the advantages and disadvantages of each method.

Answer:

Chlorine:

Advantages: Effective at killing and inactivating bacteria and viruses, provides residual protection (continues to disinfect as water travels through pipes).

Disadvantages: Can produce harmful by-products when it reacts with organic matter in water.

Ozone:

Advantages: Stronger oxidant than chlorine, effective at killing/inactivating bacteria, viruses, and protozoa, does not produce harmful by-products.

Disadvantages: More expensive than chlorine, no residual protection (disinfection does not continue after water leaves the treatment plant).

UV Radiation:

Advantages: Effective at inactivating bacteria, viruses, and protozoa, no chemical residues or harmful by-products.

Disadvantages: No residual protection, effectiveness can be reduced by cloudy water, and requires electricity to operate.

11. Explain the process of coagulation and sedimentation in water treatment, and why these steps are essential.

Answer: Coagulation involves adding chemicals (coagulants) to water that cause fine particles to clump together into larger particles, or flocs. During sedimentation, these flocs settle at the bottom of a tank due to gravity. These steps are essential because they remove a significant amount of suspended particles and reduce turbidity (cloudiness), which improves the effectiveness of subsequent filtration and disinfection processes.

