

# NEHA Potable Water Practice Exam (Sample)

## Study Guide



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## **Questions**

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- 1. What does the term "waterborne disease" refer to?**
  - A. Illness caused by air pollution**
  - B. Illness caused by pathogens in contaminated water**
  - C. Illness resulting from agricultural runoff**
  - D. Illness associated with drinking bottled water**
- 2. Which of the following is NOT a common form of water contamination?**
  - A. Bacteria**
  - B. Viruses**
  - C. Chlorine**
  - D. Protozoa**
- 3. What health risk is associated with high levels of nitrates in drinking water?**
  - A. Increased risk of kidney stones**
  - B. Methemoglobinemia, also known as "blue baby syndrome"**
  - C. Higher likelihood of gastrointestinal diseases**
  - D. Chronic fatigue syndrome**
- 4. Which factors can influence the presence of pathogens in potable water sources?**
  - A. Temperature control and urbanization**
  - B. Climate conditions and land use practices**
  - C. Pond cleaning and chemical treatment**
  - D. Plastic pollution and ultrafiltration**
- 5. Which of the following best describes the process of sedimentation in water treatment?**
  - A. The process of adding chemicals to water**
  - B. The settling of particles to the bottom of a container**
  - C. The evaporation of excess water**
  - D. The cooling of water before treatment**

- 6. Which of the following is the LEAST effective method for cadmium removal from drinking water?**
- A. Activated carbon**
  - B. Iron coagulation**
  - C. Lime softening**
  - D. Ion exchange**
- 7. What is the purpose of flotation in water treatment?**
- A. To enhance the flavor of the water**
  - B. To remove dissolved gases**
  - C. To gather solids and improve surface removal**
  - D. To sterilize the water effectively**
- 8. Water treatment incorporates, modifies, or supplements which aspects of natural processes?**
- A. Wasting, evaporation, and filtration**
  - B. Coagulation, sedimentation, and filtration**
  - C. Purification, drying, and cooling**
  - D. Chlorination, warming, and cooling**
- 9. What does the term "potable water" refer to?**
- A. Water that is suitable for agricultural use**
  - B. Water that is safe for human consumption and meets health standards**
  - C. Water that is aesthetically pleasing**
  - D. Water that is treated for industrial processes**
- 10. What is the role of Environmental Health Specialists with respect to potable water?**
- A. To conduct research on marine ecosystems**
  - B. To monitor water quality, enforce regulations, and educate the public**
  - C. To develop new water treatment technologies and innovations**
  - D. To oversee water sport activities in public areas**

## **Answers**

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1. B
2. C
3. B
4. B
5. B
6. A
7. C
8. B
9. B
10. B

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## **Explanations**

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**1. What does the term "waterborne disease" refer to?**

- A. Illness caused by air pollution**
- B. Illness caused by pathogens in contaminated water**
- C. Illness resulting from agricultural runoff**
- D. Illness associated with drinking bottled water**

The term "waterborne disease" specifically refers to illnesses that are transmitted through the ingestion of water contaminated with pathogenic microorganisms. These pathogens can include bacteria, viruses, and parasites that enter water supplies due to various factors such as poor sanitation, inadequate water treatment, or direct contamination from human or animal waste. For instance, diseases such as cholera, gastrointestinal infections, and dysentery are primarily linked to contaminated drinking water sources. Recognizing the source and nature of these diseases underscores the importance of safe drinking water and proper sanitation practices to protect public health. The other options describe conditions not classified as waterborne diseases, as they pertain to non-waterborne issues or different pathways through which substances can cause illness. For example, air pollution leads to respiratory issues rather than waterborne illnesses, and agricultural runoff may have different contaminants affecting water quality without being classified as a disease itself. Bottled water involvement relates to packaging and storage issues, rather than the inherent risks associated with waterborne diseases.

**2. Which of the following is NOT a common form of water contamination?**

- A. Bacteria**
- B. Viruses**
- C. Chlorine**
- D. Protozoa**

Chlorine is not a common form of water contamination. In fact, it is widely used as a disinfectant in water treatment processes to eliminate harmful microorganisms such as bacteria, viruses, and protozoa, which are all common forms of water contamination. The presence of bacteria, viruses, and protozoa in water can lead to serious health risks, as these pathogens can cause various waterborne diseases. Chlorine, therefore, serves as a protective measure rather than a contaminant. Its role in water treatment is crucial for ensuring the safety and potability of drinking water, making it an essential component in maintaining public health standards. In contrast, the other options represent various microorganisms that can contaminate water sources and pose a threat to human health.

**3. What health risk is associated with high levels of nitrates in drinking water?**

- A. Increased risk of kidney stones**
- B. Methemoglobinemia, also known as "blue baby syndrome"**
- C. Higher likelihood of gastrointestinal diseases**
- D. Chronic fatigue syndrome**

High levels of nitrates in drinking water are linked to a serious health condition known as methemoglobinemia, commonly referred to as "blue baby syndrome." This condition arises primarily in infants under six months of age, who are particularly susceptible to nitrates due to their developing digestive systems. When nitrates are ingested, they can be converted into nitrites in the body, which then interfere with the ability of blood to carry oxygen. This results in a reduced level of oxygen in the blood, leading to a bluish coloration of the skin, particularly visible in the lips and extremities. This health risk is especially critical for vulnerable populations, such as infants, because it can lead to symptoms like shortness of breath and increased heart rates, and in severe cases, it can be life-threatening if not treated promptly. As infants are more likely to be affected by the presence of nitrates in drinking water, awareness and monitoring of nitrate levels in water sources intended for infant consumption is crucial for public health safety. While other health concerns may be associated with contaminants in drinking water, they do not have the same direct and severe connection to high nitrate levels as methemoglobinemia does. Thus, the association of high nitrate concentrations in drinking water with

**4. Which factors can influence the presence of pathogens in potable water sources?**

- A. Temperature control and urbanization**
- B. Climate conditions and land use practices**
- C. Pond cleaning and chemical treatment**
- D. Plastic pollution and ultrafiltration**

The presence of pathogens in potable water sources is significantly influenced by climate conditions and land use practices. Climate conditions, such as rainfall patterns, temperature fluctuations, and extreme weather events, can affect the levels of waterborne pathogens. For instance, heavy rainfall can lead to surface runoff, which may carry pathogens from animal waste and septic systems into water supplies. Warmer temperatures can also enhance the growth and survival of certain pathogens. Land use practices, including agricultural activities, deforestation, and urban development, can further contribute to the contamination of water sources. For example, the use of fertilizers and pesticides in agriculture can lead to runoff that introduces harmful microorganisms into water systems, while urbanization can increase impervious surfaces, leading to higher runoff and potential pathogen transport. Understanding these factors helps in developing strategies for water quality management and ensuring safe drinking water.

**5. Which of the following best describes the process of sedimentation in water treatment?**

- A. The process of adding chemicals to water**
- B. The settling of particles to the bottom of a container**
- C. The evaporation of excess water**
- D. The cooling of water before treatment**

Sedimentation is a key process in water treatment that involves the gravitational settling of suspended particles to the bottom of a container, typically a sedimentation tank or basin. When raw water is collected, it often contains various impurities such as silt, clay, and organic matter. The purpose of sedimentation is to allow these particles to settle out from the water by utilizing gravity, which helps to improve the water quality before further treatment processes occur. During sedimentation, the water is held still for a period of time, allowing heavier particles to sink to the bottom. This results in a clearer, more purified water layer on top, which can then be further treated through processes such as filtration or disinfection. By effectively removing suspended solids, sedimentation reduces the load on subsequent treatment steps and helps ensure the production of safe drinking water. The other options do not accurately reflect the process of sedimentation. Adding chemicals to water is part of coagulation or flocculation, whereas evaporation pertains to the removal of excess water as vapor, and cooling water involves lowering its temperature, neither of which describe the settling of particles.

**6. Which of the following is the LEAST effective method for cadmium removal from drinking water?**

- A. Activated carbon**
- B. Iron coagulation**
- C. Lime softening**
- D. Ion exchange**

Activated carbon is the least effective method for cadmium removal from drinking water because it primarily functions through adsorption, which is more suitable for organic compounds and some micro-pollutants, rather than for heavy metals. While activated carbon can remove certain contaminants, its capacity to effectively bind and remove cadmium specifically is limited when compared to other treatment methods. In contrast, iron coagulation utilizes the principle of chemical precipitation, where iron ions react with cadmium to form insoluble compounds that can be removed from the water. Lime softening works by increasing the pH, precipitating heavy metals along with hardness, and promoting their removal. Ion exchange, on the other hand, involves the exchange of cadmium ions with less harmful ions, effectively removing cadmium from water with high efficiency. Thus, when evaluating the various methods based on their efficacy in removing cadmium specifically from drinking water, activated carbon is indeed the least effective approach.

**7. What is the purpose of flotation in water treatment?**

- A. To enhance the flavor of the water
- B. To remove dissolved gases
- C. To gather solids and improve surface removal**
- D. To sterilize the water effectively

Flotation in water treatment plays a crucial role in enhancing the removal of solids from water. This process involves the introduction of small air bubbles into the water, which attach to suspended particles. As these bubbles cling to the solids, they rise to the surface, forming a froth or scum that can be easily removed. This mechanism is particularly effective for separating fine particles that may otherwise remain suspended in the water. It improves the efficiency of solid removal beyond traditional sedimentation methods, allowing for clearer water and better overall treatment performance. This process is typically utilized in various water treatment facilities, especially in the removal of organic matter and other particulates, making it significant in ensuring water meets safety and quality standards prior to distribution or further treatment.

**8. Water treatment incorporates, modifies, or supplements which aspects of natural processes?**

- A. Wasting, evaporation, and filtration
- B. Coagulation, sedimentation, and filtration**
- C. Purification, drying, and cooling
- D. Chlorination, warming, and cooling

Water treatment processes are designed to improve the quality of water to make it safe for consumption and other uses. The correct answer highlights essential steps in the water treatment process that align closely with natural processes aimed at removing impurities and harmful contaminants. Coagulation involves the addition of chemicals to water that allow small particles to clump together into larger aggregates, or flocs, which can then be more easily removed from the water. This process mimics natural sedimentation, where particles settle out of the water column over time due to gravity. Sedimentation is the next phase, where the floc formed during coagulation settles to the bottom of the treatment tank, effectively removing a significant amount of suspended solids. In natural water bodies, this process occurs as sediments settle out of the flowing water. Filtration follows sedimentation and is a crucial step for further purification. During filtration, the remaining particles and impurities in the water pass through various filter media, which trap contaminants. This mimics natural filtration processes found in groundwater aquifers or when water flows through soil. Taken together, these processes—coagulation, sedimentation, and filtration—mirror the natural purification mechanisms of water systems while enhancing their efficiency through controlled treatment practices.

**9. What does the term "potable water" refer to?**

- A. Water that is suitable for agricultural use
- B. Water that is safe for human consumption and meets health standards**
- C. Water that is aesthetically pleasing
- D. Water that is treated for industrial processes

The term "potable water" specifically refers to water that is safe for human consumption and meets established health standards. This definition emphasizes the importance of water being free from harmful contaminants and pathogens, making it suitable for drinking and food preparation. Potable water must meet specific regulatory guidelines that help ensure safety for public health. These guidelines typically include limits on various contaminants, including microbial pathogens, chemicals, and physical impurities. The focus on safety for human consumption distinguishes potable water from other types of water that might be used for different purposes, such as agricultural, aesthetic, or industrial uses. In contrast, water used for agricultural purposes may not meet the same stringent health standards as potable water, as it can contain fertilizers and pesticides that are not safe for direct human consumption. Aesthetically pleasing water could refer to water that looks clear and clean but does not necessarily meet health criteria, while water treated for industrial processes might involve chemicals or treatments unsuitable for human consumption.

**10. What is the role of Environmental Health Specialists with respect to potable water?**

- A. To conduct research on marine ecosystems
- B. To monitor water quality, enforce regulations, and educate the public**
- C. To develop new water treatment technologies and innovations
- D. To oversee water sport activities in public areas

The role of Environmental Health Specialists in relation to potable water encompasses critical responsibilities that ensure public health and safety. They are primarily tasked with monitoring water quality to ensure it meets safety standards outlined by regulatory bodies. This includes conducting tests for contaminants and pathogens, evaluating the effectiveness of water treatment processes, and identifying sources of pollution. In addition to monitoring, these specialists enforce regulations that govern water quality and safety. This involves ensuring compliance with local, state, and federal laws designed to protect public health. They may also take action in cases where water quality does not meet established health standards, working with water utilities and other stakeholders to rectify any issues. Another essential aspect of their role is public education. Environmental Health Specialists provide information about safe drinking water practices, the importance of maintaining water quality, and what individuals can do to protect their water supply. This community outreach is critical for fostering public awareness and encouraging best practices related to water use and safety. The other options, while related to environmental health, do not specifically encompass the core responsibilities associated with potable water. For instance, researching marine ecosystems, developing water treatment technology, or overseeing water sports activities do not directly align with the monitoring, regulation enforcement, and public education that are fundamental to maintaining the safety and quality of potable water.