Public Health Sanitarian Practice Test (Sample)

Study Guide

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Questions

1. What does titration primarily determine in a solution?

A. The temperature of the solution

B. The acidity level of the solution

C. The normality of an acid solution

D. The density of the solution

2. Which of the following is NOT used as a rodenticide?

A. Methoxychlor

B. Bromadiolone

C. Warfarin

D. Cholecalciferol

3. What do you call a can that contains spoiled food but appears normal on the outside?

A. Flat sour

B. Sharp sour

C. Swollen can

D. Bulging can

4. The effectiveness of DDT insecticide as a residual spray is due to it being a:

A. Systemic poison

B. Contact poison

C. Repellent

D. Ingestion poison

5. If the concentration of a salt solution is given as 0.7243 grams per liter, how can it also be expressed?

A. 72.43 grams per liter

B. 7.243 X 10 -2 grams per liter

C. 72.43 X 10 -2 grams per liter

D. 0.07243 grams per liter

6. Atoms' nuclei are primarily made up of which particles?

- **A. Electrons and protons**
- **B. Positrons and electrons**
- **C. Neutrons and protons**
- **D. Quarks and leptons**

7. Which of the following diseases is considered to be infectious?

- **A. Syphilis**
- **B. Amoebic dysentery**
- **C. Psittacosis**
- **D. Endemic typhus**

8. The immunity acquired as a result of an injection of tetanus antitoxin is termed _____ immunity.

- **A. Natural immunity**
- **B. Artificially acquired active**
- **C. Artificially acquired passive**
- **D. Innate immunity**

9. What type of immunity does a person gain through natural infection?

- **A. Active natural**
- **B. Passive artificial**
- **C. Passive natural**
- **D. Active artificial**

10. Which of the following diseases is caused by a virus?

- **A. Psittacosis**
- **B. Encephalitis**
- **C. Amoebic dysentery**
- **D. Plague**

Answers

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

Explanations

1. What does titration primarily determine in a solution?

A. The temperature of the solution

B. The acidity level of the solution

C. The normality of an acid solution

D. The density of the solution

Titration is a quantitative analytical technique commonly used in chemistry to determine the concentration of a specific substance in a solution. In the context of the question, titration primarily determines the normality of an acid solution. Normality is a measure of concentration that indicates how many equivalents of a substance are present in a liter of solution. In titration, an acid and a base are reacted in a controlled manner until the reaction reaches completion, typically identified by an endpoint indicated by a color change or a pH measurement. By knowing the volume of the titrant (the solution of known concentration) used to react with the analyte (the solution of unknown concentration), one can calculate the normality of the acid solution. This is especially important in various applications such as determining the strength of acids in food safety or evaluating the efficacy of cleaning agents. Titration does not measure the temperature of the solution, the density of the solution, or directly indicate the acidity level, although acidity can be inferred from the normality of an acid solution. Therefore, the determination of normality in an acid solution aligns best with the primary purpose of titration in analytical chemistry.

2. Which of the following is NOT used as a rodenticide?

A. Methoxychlor

B. Bromadiolone

C. Warfarin

D. Cholecalciferol

Methoxychlor is a synthetic organochlorine compound primarily used as an insecticide, particularly against mosquito populations, and it does not function as a rodenticide. This distinguishes it from the other options listed, which are specifically designed or utilized to target rodent populations. Bromadiolone, warfarin, and cholecalciferol are all compounds that can be employed as rodenticides. Bromadiolone is an anticoagulant that causes internal bleeding in rodents; warfarin functions similarly by disrupting the blood-clotting process; and cholecalciferol, or vitamin D3, can lead to severe hypercalcemia and subsequent death in rodents. Thus, identifying methoxychlor as the only choice that is not used as a rodenticide is accurate based on its specific pest control application.

3. What do you call a can that contains spoiled food but appears normal on the outside?

A. Flat sour

B. Sharp sour

C. Swollen can

D. Bulging can

The term that is most appropriate for a can that contains spoiled food while appearing normal on the outside is "flat sour." This condition is specifically associated with the spoilage of canned food due to the growth of microorganisms, typically certain bacteria, that produce acids without generating gas. Consequently, the can maintains its normal shape without swelling or bulging, hence the term "flat." This situation often occurs when the food inside has undergone an anaerobic fermentation process but does not lead to the gas buildup that would cause the can to be visualized as swollen or bulging. Recognizing flat sour is vital for food safety because it indicates spoilage that might not be externally visible, thereby emphasizing the importance of not only relying on the physical appearance of canned goods but also understanding their potential microbiological safety risks. In contrast, "sharp sour" typically refers to a noticeable sour taste caused by bacterial action, which is distinct from the condition of the can itself. "Swollen can" and "bulging can" both describe physical deformities in the can that indicate gas production, which implies different spoilage mechanisms often associated with pathogenic spoilage and is fundamentally different from the flat sour condition.

4. The effectiveness of DDT insecticide as a residual spray is due to it being a:

A. Systemic poison

B. Contact poison

C. Repellent

D. Ingestion poison

The effectiveness of DDT insecticide as a residual spray is primarily attributed to its nature as a contact poison. Contact poisons work by adhering to the surface where they are applied and impacting insects through direct contact. DDT's design allows it to remain on surfaces for extended periods, meaning it continues to kill pests that come into contact with treated areas long after the initial application. This characteristic is crucial for managing insect populations effectively, particularly in situations where insects may not ingest the poison directly but may encounter it on surfaces such as walls, floors, and vegetation. In contrast, systemic poisons are absorbed by the insect and may not be effective as a residual spray, as they require ingestion rather than contact. Repellents function to deter insects rather than eliminate them, which does not align with the goal of a residual insecticide like DDT. Ingestion poisons depend on insects consuming the chemical, which also doesn't apply to the intended use of DDT as a surface treatment. Thus, DDT works best as a contact poison, making it effective in long-term pest control strategies.

5. If the concentration of a salt solution is given as 0.7243 grams per liter, how can it also be expressed?

A. 72.43 grams per liter

B. 7.243 X 10 -2 grams per liter

C. 72.43 X 10 -2 grams per liter

D. 0.07243 grams per liter

To express 0.7243 grams per liter in scientific notation, you want to convert the number into a format that includes a coefficient between 1 and 10 multiplied by a power of ten. In this case, 0.7243 can be rewritten as 7.243, which is now between 1 and 10. To adjust for this change in scale, you need to recognize that moving the decimal place one position to the right (from 0.7243 to 7.243) reduces the power of ten by one. Hence, moving the decimal one place to the right gives you: $0.7243 = 7.243 \times 10^{-1}$ However, if we want it in the format where the power of ten is expressed as an exponent of 2, we could consider multiplying the coefficient by 10 squared while appropriately adjusting the exponent. This leads us to: $7.243 \times 10^{-1} = 72.43 \times 10^{-2}$ This showcases how 0.7243 grams per liter can be represented as 72.43 X 10^-2 grams per liter, confirming the correctness of this choice as

6. Atoms' nuclei are primarily made up of which particles?

A. Electrons and protons

B. Positrons and electrons

C. Neutrons and protons

D. Quarks and leptons

Atoms' nuclei are primarily composed of neutrons and protons. Protons carry a positive electrical charge, while neutrons are electrically neutral. Together, they make up the bulk of an atom's mass and define the identity of the element, as the number of protons determines the atomic number. Neutrons add stability to the nucleus by mitigating the repulsive forces between the positively charged protons. Other particles mentioned in the choices, like electrons, are not found in the nucleus itself; they orbit around the nucleus and contribute to atomic structure but have a negligible mass compared to protons and neutrons. Positrons are the antimatter counterparts of electrons and do not play a role in the structure of atomic nuclei. Quarks and leptons are fundamental particles, but quarks are what compose protons and neutrons rather than being a description of the nucleus itself. Thus, the correct focus on neutrons and protons highlights the essential components that make up the nucleus of an atom.

7. Which of the following diseases is considered to be infectious?

A. Syphilis

B. Amoebic dysentery

C. Psittacosis

D. Endemic typhus

The correct answer is Psittacosis, a disease caused by the bacterium Chlamydia psittaci, which is typically associated with birds, particularly parrots. This disease is classified as infectious because it can be transmitted from infected birds to humans through inhalation of dried secretions or respiratory droplets, making it a zoonotic disease. Understanding the infectious nature of Psittacosis highlights the importance of controlling and monitoring potential animal vectors to prevent outbreaks in humans. This disease exemplifies how certain pathogens can cross species barriers, affecting not only animal populations but also human health. The other options, while they are diseases that can cause significant health issues, vary in their modes of transmission. Syphilis is a sexually transmitted infection, while amoebic dysentery results from ingesting contaminated water or food containing the parasite Entamoeba histolytica. Endemic typhus, caused by the Rickettsia bacteria, is transmitted through flea bites, which differentiates it from the manner in which Psittacosis spreads. Each of these diseases relates to different transmission pathways, but the infectious characteristic of Psittacosis is particularly noteworthy due to its zoonotic aspect.

8. The immunity acquired as a result of an injection of tetanus antitoxin is termed _____ immunity.

A. Natural immunity

B. Artificially acquired active

C. Artificially acquired passive

D. Innate immunity

The immunity acquired through an injection of tetanus antitoxin is classified as artificially acquired passive immunity. This type of immunity occurs when antibodies are transferred to an individual from another source, in this case, through the administration of the antitoxin. Tetanus antitoxin contains pre-formed antibodies that provide immediate protection against the tetanus toxin, but it does not stimulate the recipient's immune system to produce its own antibodies in the long term. This is what distinguishes passive immunity from active immunity; in active immunity, the body develops its own immune response to an infection or through vaccination, leading to long-lasting protection. In contrast, natural immunity refers to the immunity developed through natural exposures to pathogens, which involves the body's own immune cells generating a response. Artificially acquired active immunity involves vaccination, where a weakened or inactivated pathogen is introduced to stimulate antibody production. Innate immunity, on the other hand, is the body's initial, non-specific defense mechanism and does not involve antibodies at all. Therefore, because the tetanus antitoxin provides immediate protection through the transfer of pre-formed antibodies rather than through direct stimulation of the immune system, it is correctly classified as artificially acquired passive immunity.

9. What type of immunity does a person gain through natural infection?

A. Active natural

B. Passive artificial

C. Passive natural

D. Active artificial

When a person gains immunity through natural infection, they develop what's known as active natural immunity. This type of immunity occurs when the body is exposed to a pathogen, such as a virus or bacteria, and the immune system responds by producing its own antibodies and memory cells. When infected, the immune system activates B cells to produce specific antibodies against the pathogen. Additionally, T cells help identify and eliminate infected cells. This process not only clears the infection but also provides long-lasting protection, as the immune system "remembers" the pathogen for future encounters. This means that if the individual is exposed to the same pathogen again, their immune response will be faster and more robust due to the pre-existing memory cells. In contrast, passive immunity, such as passive natural immunity, occurs when antibodies are transferred from one individual to another, as seen when a mother passes antibodies to her infant through breast milk. Active artificial immunity involves vaccination, where the immune system is exposed to a harmless form of the pathogen or its components to develop immunity without causing disease. Therefore, the correct characterization of immunity gained through natural infection reflects the concept of active natural immunity.

10. Which of the following diseases is caused by a virus?

A. Psittacosis

B. Encephalitis

C. Amoebic dysentery

D. Plague

Encephalitis is caused by a virus, specifically various strains, including the herpes simplex virus, West Nile virus, and others. This disease involves inflammation of the brain, which can lead to severe neurological symptoms and complications. The role of viruses in causing encephalitis is well-documented, as they can invade the central nervous system and induce an immune response that results in swelling and damage. In contrast, psittacosis is caused by the bacterium Chlamydia psittaci, which is typically transmitted from infected birds to humans. Amoebic dysentery is caused by the parasite Entamoeba histolytica, leading to gastrointestinal issues. Plague is an infectious disease caused by the bacterium Yersinia pestis, transmitted through fleas or contact with infected animals. Understanding the distinctions among these diseases is crucial in public health, as the management, treatment, and prevention strategies vary significantly between viral and bacterial or parasitic infections.