Roy Pelletier

Test Your Knowledge of Various Water Treatment Topics

1. What is one problem associated with aerating water?
   A. Increase in pH.
   B. Reduction in hydrogen.
   C. Reduction in carbon dioxide.
   D. Possible contamination through the atmosphere.

2. In what units is the presence of suspended and colloidal matter that imparts a cloudy appearance to the water expressed?
   A. Specific ultraviolet absorbance (SUVA) units
   B. Threshold odor number (TON) units
   C. Turbidity units
   D. Conductivity units

3. Tastes and odors such as grassy, septic, musty, and earthy are all related to what water quality related issue?
   A. Algae
   B. Manganese
   C. Mineral content in the presence of a disinfectant
   D. Corrosion in metallic pipes

4. What is the health effect associated with water that has excessive color?
   A. Gastrointestinal distress
   B. Methemoglobinemia
   C. Dysentery
   D. There are no health effects.

5. When conducting titration with most chemicals, where is the meniscus (level) determined?
   A. Top of the curve.
   B. Bottom of the curve.
   C. Middle of the curve.
   D. Either the top or bottom; it does not alter test results.

6. What is the maximum filtration rate in a typical pressure filter?
   A. 2 to 3 gpm/sq ft
   B. 4 to 5 gpm/ sq ft
   C. 5 to 10 gpm/ sq ft
   D. 10 to 100 gpm/sq ft

7. What type of filter media is used to remove tastes and odors?
   A. Granular activated carbon
   B. Clay brick
   C. Garnet
   D. Alum

8. What condition may occur when unusually low pressures develop in a high-service pump?
   A. Cavitation
   B. Backflow
   C. Backpressure
   D. Backsiphonage

9. How should a sample be preserved when sampling for iron?
   A. Acidified with nitric acid.
   B. Cooled to 4°C.
   C. Add preservative to fix pH above 8.0.
   D. Iron samples do not require preservatives because it is a metal.

10. What is the purpose of a desiccator in a laboratory?
    A. Dispensing reagent volumes.
    B. Calibrating scale weights to known values.
    C. Remove toxic gases from a flame hood.
    D. Remove moisture from lab samples.

Answers on page 54

LOOKING FOR ANSWERS?
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SEND US YOUR QUESTIONS

Readers are welcome to submit questions or exercises on water or wastewater treatment plant operations for publication in Certification Boulevard. Send your question (with the answer) or your exercise (with the solution) by email to roy.pelletier@cityoforlando.net, or by mail to:

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Certification Boulevard Answer Key

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1. **D) Possible contamination through the atmosphere.**
   Contamination of water through aeration is an associated problem. The other choices listed are all benefits of aeration. The increase in pH assists in iron removal by converting ferrous ion to ferric hydroxid,e and the reduction in hydrogen and carbon dioxide have added benefits such as reducing chemical dosages like chlorine for disinfection.

2. **C) Turbidity units**
   Turbidity is a measure of the amount of light reflected by suspended particles, though it is not a measure of the concentration of solids because white particles reflect more light than dark particles. Often expressed as nephelometric turbidity units (NTUs,) water having turbidities greater than 5 NTUs is clearly visible with the naked eye.

3. **A) Algae**
   Tastes and odors that have an earthy or grassy smell are generally related to algae. When an algae bloom (rapid and massive increase in algae) occurs, the population eventually dies off and the decaying organic material imparts tastes and odors. Additionally, the decaying algae may create an oxygen demand and lower oxygen levels to a point where anaerobic conditions are created.

4. **D) There are no health effects.**
   There are no direct health effects associated with color. Color due to iron or manganese may cause red water or black staining, but neither have health effects. Sometimes color may be an indicator of other pollutants or contaminates in the water that could cause sickness or disease.

5. **B) Bottom of the curve.**
   Most chemicals are water-based and the bottom of the curve of the liquids surface should be used when determining chemical level. There are some exceptions, such as mercury, whose meniscus will actually curve in the opposite direction and form a slight rise in the liquids surface.

6. **A) 2 to 3 gpm/sq ft**
   A pressure filter is completely enclosed in a vessel and the water is forced through the media under pressure. Maximum filtration rates are typically 2 to 3 gpm/sq ft (gal per min per sq ft). Exceeding these filtration rates may force solids through the media and result in increased turbidity levels in the finished water.

7. **A) Granular activated carbon**
   Granular activated carbon, made from heating carbon such as wood, has high adsorptive properties that allow it to remove tastes and odors from drinking water. The adsorptive properties of activated carbon do not last indefinitely and the spent carbon must be regenerated or replaced.

8. **A) Cavitation**
   Cavitation occurs when pressures drop inside a high-service pump that is in operation. This drop in pressure causes gas pockets to form in the water, which then collapse, causing severe damage to the pump's interior. This can occur when a pump is trying to deliver more water than it was designed for, commonly called "pumping off the curve."

9. **A) Acidified with nitric acid.**
   Iron samples should be acidified with nitric acid to reduce the pH to <2. This ensures that the iron stays insoluble and does not form a scale buildup on the container wall,s resulting in an erroneously low iron result.

10. **D) Remove moisture from lab samples.**
    The desiccator is an apparatus for absorbing the moisture present in a substance. Typically, the substance is placed in an enclosed box, which contains a desiccant (drying agent) that removes humidity (water) from the atmosphere.

Thank you to Scott Ruland, chief operator with the City of Deltona, for providing these questions and answers.