Pre-Test

Regulatory Review

1. Which one of the following correctly describes how RTCR protects public health? (Choose only one).
   a. Identifies conditions under which special purpose samples are noncompliant
   b. Dictates the temperature at which samples from seasonal water systems must be shipped, and mandates penalties for noncompliance
   c. Mandates that seasonal systems designate an appropriate MCL for \textit{E. coli} at the beginning of each operating season, prior to serving water to the public
   d. Requires systems to assess their infrastructure and sampling practices when total coliforms exceed prescribed levels

2. Which statement is \textit{not} true about a water system’s responsibilities under the RTCR requirements? (Choose only one).
   a. Reporting/record-keeping guidelines require lab samples to be shipped at 40° Fahrenheit (4.44° C), or below
   b. Monitoring guidelines require systems to develop a sample siting plan that identifies when and where samples will be taken.
   c. Assessment and Corrective Action guidelines require systems to fix sanitary defects found via a Level 1 and/or Level 2 assessment
   d. Violations and Public Notification guidelines require systems to report drinking water violations to their primacy agency within prescribed timeframes

3. After routine monitoring, your system finds one TC+ sample. What is your immediate next step? (Choose only one).
   a. Call the Primacy Agency to inform them where the TC+ sample was found
   b. Submit a completed Level 2 assessment form to the Primacy Agency
   c. Notify the public about potential drinking water quality issues
   d. Take 3 repeat samples within the next 24 hours

4. Your system has found one routine sample to be TC+. In which one of the following cases is a Level 1 Assessment triggered? (Choose only one).
   a. One additional TC+ sample is found during the same sampling period
   b. The TC+ sample that is sent to the lab is shipped below 4.44° C (40° F)
   c. You fail to collect 3 special-purpose samples during the next 48 hours
   d. The MCL for \textit{E. coli} is above the accepted level of compliance
5. Your system has found one routine sample to be TC+. You’ve had no Level 1 assessment triggers in the previous 12-month period. In which one of the following cases would a Level 2 Assessment be triggered for this situation? (Choose only one).
   a. One additional TC+ sample is found during the same sampling period
   b. The TC+ sample that is sent to the lab is shipped below 4.44° C (40° F)
   c. Some repeat samples that are required are not collected
   d. The MCL for E. coli is above the accepted level of compliance

6. Assume that within one sampling period, a TC+ routine sample from your system is found to be E. coli-positive. Which one of the following is true in this situation? (Choose only one).
   a. You must report the results to officials in your state’s drinking water primacy agency within 48 hours
   b. The E. coli-positive result has triggered a Level 1 Assessment for your system
   c. The E. coli-positive result has triggered a Level 2 Assessment for your system
   d. You must notify the public within 10 days of your E. coli-positive result

7. The maximum residual disinfectant level (MRDL) for chlorine or chloramines is ____ mg/L.
   a. 1.0
   b. 5.0
   c. 0.0
   d. 4.0

8. ____% of all waterborne disease originates from distribution system issues.
   a. 10
   b. 20
   c. 30
   d. 50

**Disinfection Overview**

9. Which types of disinfection provides protection in the distribution system?
   a. Chlorine and Ozone
   b. Chloramines and UV
   c. Chlorine and Chloramines
   d. Ozone and UV

10. Chlorine levels __________ over time in the distribution system.
    a. stay the same
    b. increase
    c. decay
    d. double
11. What is the multi-barrier principle (sometimes called “multi-barrier approach”)?
   a. A combination of various procedures, processes and tools that collectively prevent or reduce drinking water contamination from source to tap
   b. The water purification system in a self-contained device that is used by people without access to potable water supplies
   c. A water safety plan promoted by the World Health Organization as the most effective way to maintain a safe supply of drinking water for the public
   d. A drinking water standard that is maintained and regulated by the Environmental Protection Agency

**Coliform Sample Collection**

12. All of the following are correct sample collection steps except:
   a. Refrigerate or ice the samples
   b. Assemble Sampling Supplies
   c. Open cold water tap and immediately collect sample
   d. Adjust flow to about the width of a pencil

13. The purpose of a sample siting plan is to:
   a. Publish metrics regarding pathogen levels in the municipality’s public water system
   b. Identify conditions that require public notification of excessive chlorine residuals
   c. Ensure that collected samples are representative of a system’s water quality
   d. Facilitate communication between the public water system and private citizens

14. Why is it important for public water systems to test for total coliforms?
   a. Total coliform detection is a warning sign that the public water system may be vulnerable to fecal contamination
   b. To provide information on the yearly risk assessments that public water systems must submit to the Primacy Agency
   c. To determine whether use of a Colilert® Test would provide more accurate readings over time
   d. Coliform detection is an important step in determining whether the public water system should improve their chain-of-custody procedures

**Distribution System Infrastructure**

15. All of the following are solutions to dead ends in a distribution system, except:
   a. Pipe Loops
   b. Flushing program
   c. Flushing valves
   d. Increasing chlorine residual
16. Opening and closing of valves can impact water quality in which one of the following ways:
   a. Affect water flow and release slugs of biofilm or metal in the water
   b. Unintentionally increase the microorganisms in the water
   c. Prevent contamination via cross-connections
   d. Water stratification with high temperatures that encourage microorganism growth

17. Which one of the following can improve the quality of water in storage?
   a. Limiting the number and type of baffles
   b. Hydraulic modeling
   c. Configuration of inlet/outlet locations
   d. Height of the storage tank

18. Which one of the following accurately describes a cross-connection where a backflow event could occur?
   a. A dishwasher connected to an airgap installed on the sink
   b. A garden hose attached to an outside faucet on one end, with the other end in the swimming pool
   c. Vertical clearance between a faucet and the flood-level rim of the sink
   d. An irrigation system that uses water from a potable source, and has a backflow device installed

Distribution Water Quality

19. Chlorine is most effective between pH ____ and ____?
   a. 1.5 – 3.5
   b. 3.5 – 5.5
   c. 5.5 – 7.5
   d. 7.5 – 9.5

20. If customers complain their water tastes or smells like a rotten egg, __________ is likely the cause.
    a. Hydrogen sulfide
    b. Di- and trichloramines
    c. algae
    d. excess chlorine

21. Rapid decay of chlorine may indicate ____________________________?
    a. Hydraulic modeling needs to be performed
    b. A distribution system problem that should be investigated
    c. Lead and copper issues in your distribution system
    d. Your system’s pH level is neither acidic nor basic
22. Heterotrophic Plate Count:
   a. Indicates the types of organisms present in your system
   b. Is a general indicator of your system’s health
   c. Has not been found useful for water quality management purposes
   d. Provides you with helpful information about the source of system pathogens

Flushing
23. There are______ steps to an effective flushing program.
   a. Three
   b. Four
   c. Five
   d. Six

24. What should you do to minimize customer complaints about your utility’s flushing operations?
   a. Never perform unidirectional flushing at night
   b. Notify the public prior to any flushing event
   c. Flush from end of distribution system to source, minimizing residential impact
   d. Submit a flushing plan to your municipality and obtain approval

25. Why is a flushing program important, even though customers may complain and perceive it as a waste of their water and tax dollars?
   a. Flushing helps to eliminate non-potable water from the system; without regular flushing operations, utility customers would be at greater risk for health problems
   b. You should not flush if there are many customer complaints; instead, you should consider abandoning the program
   c. Regular flushing maintains overall health of pipes, valves, and other distribution system infrastructure
   d. So that your system can determine where continuous blow-offs can be used to address the source of water quality issues

26. Which one of the following answers lists the four steps utilities should take to develop a flushing program?
   a. Answer (a):
      i. Determining the appropriateness of flushing as part of your utility’s maintenance program
      ii. Planning and management of the flushing program
      iii. Implementation of the flushing program, and collection of program data
      iv. Evaluating and revising the flushing program
   b. Answer (b):
      i. Assessing potential for community cooperation with program objectives
      ii. Determining whether to use conventional or unidirectional flushing
      iii. Using hydraulic modeling to determine the plan and sequence of flushing
      iv. Evaluating the potential for non-revenue water loss
c. Answer (c):
   i. Submitting the program plan to the primacy agency for approval
   ii. Analyzing the potential for water hammer events
   iii. Contacting media representatives to inform them of the program and obtain public comment
   iv. Determining local issues unique to your area that would negatively impact your flushing program

d. Answer (d):
   i. Identifying the location of cross-connections in your system
   ii. Mapping traffic patterns and possible safety concerns
   iii. Establishing a pilot flushing program to estimate water used
   iv. Identifying where to partially open hydrant valves to avoid water quality impacts

Main Breaks and Cross Connections

27. The first 3 steps when disinfecting new pipe are:
   1. Flush the line to remove particulates
   2. Chlorinate
   3. Flush to remove chlorinated water

Which one of the following is the 4th step in this process?
   a. Notify the state
   b. Flush again
   c. Refill and test for coliform
   d. Wait 24 hours before resuming service

28. Which of the following is an example of a reactive response to water quality challenges such as main breaks and cross connections?
   a. Systematic flushing of the system
   b. Prioritizing mains that need replacement
   c. Including main break repair costs in the Capital Improvement Plan
   d. Implementing cross-connection control devices
29. Which of the following is an example of a cross-connection that could endanger public health?
   a. A 5 mg/L residual that remains 24 hrs after chlorination
   b. A garden hose with one end connected to an outside water spigot, and the other end in your swimming pool
   c. An air gap that is twice the diameter of the water supply outlet but not less than one inch, at minimum
   d. An atmospheric vacuum breaker (AVB) assembly that consists of a polyethylene float

Source Water Protection:

30. What is a source water assessment program?
   a. An annual water quality assessment/rating of utilities’ source water protection efforts
   b. A program that addresses a public water system’s capability to protect drinking water sources from contamination
   c. A program that prescribes treatment techniques for source water contaminants
   d. A program that determines and advises on recreational uses of surface water lakes

31. Which of the following is not the responsibility of a state source water assessment program?
   a. Identifying land areas that provide water to each public drinking water source in the state
   b. Inventorying existing and potential sources of contamination in delineated areas
   c. Remediating contaminants in domestic wells serving single households
   d. Determining each drinking water system’s susceptibility to contamination

32. Who is required to have a source water assessment program?
   a. Large municipalities
   b. Mobile home parks
   c. Well users
   d. All of the above

33. Why should these assessments be reviewed?
   a. To determine if there are any changes
   b. To document a new drinking water source
   c. To reevaluate likelihood of contamination
   d. All of the above

34. Which of the following are potential threats to a community’s source water? (choose any that apply)
   a. Road salting activities
   b. Septic systems
   c. Stormwater runoff
   d. Agricultural activities
35. Obtaining total coliform samples from taps with household point-of-use devices is:
   a. Never acceptable
   b. Always acceptable
   c. Acceptable if you remove the device
   d. Acceptable if you flush the tap first

36. You should never rinse out the total coliform sample collection bottle prior to collection because:
   a. This is not true; you should always rinse out the TC sample collection bottle at least 2-3 times prior to collection
   b. It increases the likelihood that the DPD agent will adhere to the inside of the bottle and will therefore not mix well with the sample
   c. The bottle contains a dechlorination agent, and rinsing will yield false results
   d. The Colorimeter will be unable to measure the results and will return a zero reading

37. After placing a free chlorine residual sample in the Colorimeter, how long should you wait between the time you press the Measure button, and taking the measurement?
   a. 4-5 minutes
   b. 3-6 minutes
   c. 2-3 minutes
   d. 1 minute

38. After placing a total chlorine residual sample in the Colorimeter, how long should you wait between the time you press the Measure button, and taking the measurement?
   a. 4-5 minutes
   b. 3-6 minutes
   c. 2-3 minutes
   d. 1 minute

39. Why should you wipe chlorine residual sample vials with a Chem-wipe or lint-free cloth prior to placing in a Colorimeter?
   a. You must ensure that no dechlorination agent adheres to the outside of the vial
   b. It is important to eliminate fingerprints, scratches, bubbles or anything that could interfere with results
   c. Thoroughly cleaning the vial enables you to better line it up in the Colorimeter
   d. To ensure that the vial is at room temperature prior to placing in the Colorimeter
40. Lining up chlorine residual sample vials in a consistent manner in the Colorimeter serves what purpose?
   a. It is not necessary to line up the chlorine residual sample vials consistently
   b. It is a helpful strategy to use so that you don’t forget to zero the Colorimeter
   c. It facilitates a better mixture between the DPD reagent and the sample
   d. It helps to ensure that results are more repeatable and precise

41. Chlorine residual mapping:
   a. Is reactive rather than proactive, and wastes valuable system resources
   b. Helps discover patterns and locations where there may be real/potential water quality problems
   c. Should never be done when there has been a main break with depressurization
   d. Is not a useful method to determine whether public health protection may be compromised

42. A contour map is:
   a. The end-product of a chlorine residual mapping exercise
   b. A map obtained from the U.S. Weather Service that shows weather patterns
   c. A type of map that applies only to wastewater systems
   d. A map developed by professional surveyors that is useful but not necessarily to scale