

Final Exam
Continuing Education Course #406
Disinfection of Water System Components

1. What is the purpose of surface disinfection?
 - ☐ a. Inactivate microorganisms
 - ☐ b. Improve water quality
 - ☐ c. Confirm pipe integrity
2. What is a wetted surface?
 - ☐ a. Saturated material
 - ☐ b. Surfaces exposed to the elements
 - ☐ c. Interior surfaces in contact with the service water
3. Which standards cover the disinfection of PWS components?
 - ☐ a. WEF 156 to 160
 - ☐ b. AWWA C651, 652, 653 & 654
 - ☐ c. NSF 60 & 61
4. Which is NOT a chlorine chemical used for disinfection?
 - ☐ a. Liquid chlorine (gas)
 - ☐ b. Sodium hypochlorite
 - ☐ c. Chlorine trifluoride
 - ☐ d. Calcium hypochlorite
5. What is the most common concentration for sodium hypochlorite found at WTP's?
 - ☐ a. 5%
 - ☐ b. 12.5%
 - ☐ c. 20%
6. Which is NOT a form of calcium hypochlorite used for disinfection?
 - ☐ a. Bricks
 - ☐ b. Tablets
 - ☐ c. Granules
7. Chemicals used for disinfection should have which approval?
 - ☐ a. NFPA 60
 - ☐ b. NSA 20
 - ☐ c. NSF 60
8. What is the hold time for the tablet/granule method and the continuous method?
 - ☐ a. 6 hours
 - ☐ b. 24 hours
 - ☐ c. 36 hours

9. What is the maximum spacing for sample locations on a long water main?
- ☐ a. 1,200 feet
 - ☐ b. 1,500 feet
 - ☐ c. 2,000 feet
10. For the continuous method and slug method, is flushing the pipe done before or after chlorination?
- ☐ a. Before
 - ☐ b. After
 - ☐ c. Both
11. Which method allows disinfecting multiple pipe segments with the same chlorine solution?
- ☐ a. Slug
 - ☐ b. Continuous
 - ☐ c. Tablet
12. Which is NOT an application for the spray method, per AWWA C651?
- ☐ a. Large transmission mains
 - ☐ b. Short pipe connections
 - ☐ c. Pipe repairs
 - ☐ d. Long water mains
13. What is the approximate concentration of a 1% chlorine solution.
- ☐ a. 1,000 mg/L
 - ☐ b. 10,000 mg/L
 - ☐ c. 100,000 mg/L
14. What can be used to swab a surface with chlorine?
- ☐ a. Sponge
 - ☐ b. Tablet
 - ☐ c. Slug
15. A storage tank should be filled with a chlorine solution to what water level?
- ☐ a. Average water level
 - ☐ b. Maximum water level
 - ☐ c. Overflow level
16. For the 100% fill method, what allows decreasing the hold time to 6 hours?
- ☐ a. Granules added to the tank floor
 - ☐ b. Chlorine added to the inlet pipe during filling
 - ☐ c. Walls and floors sprayed
17. How many bacteriological tests are typically required at each sample location?
- ☐ a. 1
 - ☐ b. 2
 - ☐ c. 3
18. For the spray method on a storage tank, how should the drain pipe be disinfected?
- ☐ a. Fill with a chlorine solution
 - ☐ b. Swab accessible parts of the pipe
 - ☐ c. Spray accessible parts of the pipe

19. For the 5% fill method on a 30-foot tall ground storage tank, to what height should the tank be filled with the initial chlorine solution?

- ☐ a. 1'-0"
- ☐ b. 1'-6"
- ☐ c. 2'-0"

20. Why is it good practice to disinfect all WTP components, even upstream of filters?

- ☐ a. Meet AWWA standards
- ☐ b. Improve performance
- ☐ c. Avoid potential positive fecal coliform results

21. What are the two methods in AWWA C653 for disinfecting a gravity filter?

- ☐ a. Swab & Spray
- ☐ b. Forward & Reverse
- ☐ c. Backwash & Influent

22. What are the three steps for disinfecting a raw water well, per AWWA C654.

- ☐ a. Gravel, Equipment, and Well Casing
- ☐ b. Spray, Fill, and Dechlorinate
- ☐ c. Flush, Chlorinate, and Discharge

23. Which disinfection method allows the shortest hold time?

- ☐ a. Tablet
- ☐ b. 5% Fill
- ☐ c. Spray or Swab

24. Which tank disinfection method requires checking the final chlorine concentration?

- ☐ a. Method 1 - 100% Fill
- ☐ b. Method 2 - Spray
- ☐ c. Method 3 - 5% Fill

25. The AWWA methods for surface disinfection have been confirmed to provide what removal of bacteria and viruses?

- ☐ a. 99.9% (3-log)
- ☐ b. 99.99% (4-log)
- ☐ c. 99.999% (5-log)