MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Drinking Water and Environmental Health Division

DRINKING WATER OPERATOR CERTIFICATION
LIMITED TREATMENT (D-LEVEL) PRACTICE EXAM

1. What type of physical barriers can be placed in ductile iron pipes to reduce corrosion control?

   A. Phosphates
   B. Mortar lining
   C. Scale layer
   D. Biofilm

2. Which of the following is used as a corrosion inhibitor?

   A. Orthophosphates
   B. Calcium hypochlorite
   C. Ferric chloride
   D. Sodium hypochlorite

3. What type of backflow preventer is typically found on laboratory sinks?

   A. Double check valve assembly
   B. RPZ
   C. Pressure vacuum breaker
   D. Atmospheric vacuum breaker

4. Which of the following is considered a combined chlorine?

   A. Sodium hypochlorite
   B. Calcium hypochlorite
   C. Gaseous chlorine
   D. Chloramines

5. What color is gas chlorine?

   A. Yellow
   B. Magenta
   C. Colorless
   D. Gray

6. A water system treats 4.1 MGD and wishes to maintain a chlorine residual of 0.7 ppm. How many gallons of 11.5% available chlorine will they need to feed per day? Assume it weighs 10.2 lbs/gal.

   A. 208.17 Gallons
   B. 20.41 Gallons
   C. 34.19 Gallons
   D. 18.21 Gallons

7. A water treatment plant produces 1125 gpm. The raw water has a demand of 0.45 ppm, and the system wishes to maintain a residual of 1.1 ppm of chlorine. How many gallons of 5.25% available chlorine will be required per day to do this? Assume bleach weighs 8.8 lbs/gal.

   A. 45.33 Gallons
   B. 13.16 Gallons
   C. 32.16 Gallons
   D. 40.65 Gallons

8. What is the most common fluoridating chemical for drinking water?

   A. Sodium fluorosilicate
   B. Hydrofluorosilicic acid
   C. Sodium fluoride
   D. Trifluoromethane

9. How many pounds of 25% hydrofluorosilicic acid (19.8% available fluoride) will be required to apply 1.0 ppm of fluoride in 1 million gallons (1 MG) of water if the natural fluoride concentration is 0.3 mg/l?

   A. 29.49 lbs
   B. 54.76 lbs
   C. 49.11 lbs
   D. 23.52 lbs

10. What are the mains causes of hardness?

    A. Calcium and magnesium
    B. Iron and manganese
    C. Sodium and potassium
    D. Chlorine and fluoride

11. A water plant produces 1.2 MGD and their raw water has 11.2 grains per gallon of hardness. If all hardness is removed, how many pounds are removed in 7 days?

    A. 119.84 lbs
    B. 1199.36 lbs
    C. 12047.66 lbs
    D. 13432.51 lbs

12. How many gallons of water can be treated through a softener with 275,000-grain capacity before regeneration if the raw water has a hardness of 18.7 grains per gallon and the finished water has a hardness of 7.2 grains per gallon?

    A. 10618 gallons
    B. 14706 gallons
    C. 23913 gallons
    D. 38194 gallons

13. A high service pump from the plant is used to fill an elevated storage tank that is 145 ft tall. If the suction lift on the pump is 25 ft, what is the total head that is needed to fill the tank?

    A. 25 ft
    B. 120 ft
    C. 145 ft
    D. 170 ft

14. What is the type of device is used for inspecting well casings?

    A. Airline
    B. Colorimeter
    C. Borehole camera
    D. Turbidimeter

15. Polyphosphates can be used for sequestering iron up to what levels?

    A. 0.00 ppm – 1.00 ppm
    B. 1.00 ppm – 10.00 ppm
    C. 0.00 ppm – 20.00 ppm
    D. Polyphosphates are not used to sequester (or remove) iron.

16. A water system has a raw water concentration of 1.8 ppm of iron and a finished water concentration of 0.3 ppm as iron. If the plant produces 3300 gpm of finished water, how many pounds of iron will be removed in 72 hours?

    A. 71.34 lbs
    B. 178.35 lbs
    C. 214.02 lbs
    D. 249.68 lbs

17. What are the presumptive positive results for membrane filter technique?

    A. Media turns yellow
    B. Formation of gas bubbles
    C. Fluorescents under a black light
    D. Formation of colonies with metallic sheen

18. Which of these membrane filters has the highest operating pressure?

    A. Nanofiltration
    B. Ultrafiltration
    C. Microfiltration
    D. Reverse osmosis

19. During sampling, why do operators test for total coliform?

    A. They are parasitic organisms that can cause harm.
    B. They are considered pathogenic viruses.
    C. They are generally hardier bacteria and serve as indicator organisms.
    D. They pose no potential health risk when they are present.

20. If phosphates are used for corrosion control, where should the injection of chlorine occur?

    A. After the filters
    B. Same location
    C. Downstream
    D. Upstream

21. A well producing 925 gpm has an iron concentration of 1.4 ppm. If using phosphate to remove iron, 4.0 ppm of phosphate must be used to remove 1 ppm of iron. How many pounds of phosphate will be needed daily to remove all the iron?

    A. 15.55 lbs
    B. 44.44 lbs
    C. 55.72 lbs
    D. 62.21 lbs

22. Who should speak to the press during a public emergency?

    A. Every utility worker
    B. Supervisor
    C. Designated person
    D. City Manager

23. What is the purpose of a lantern ring?

    A. To allow outside materials into the packing gland.
    B. Alignment of the pump shaft.
    C. To allow proper lubrication of the packing gland and keep stuff out.
    D. Serve as a support to the pump shaft.

24. Convert 5750 gpm to MGD.

    A. 0.138 MGD
    B. 0.345 MGD
    C. 0.358 MGD
    D. 8.28 MGD

25. If the brake horsepower (BHP) for a pump is 11.65 while producing 310 gpm and has a total dynamic head of 105 ft, what is the pump efficiency?

    A. 71% efficient
    B. 8% efficient
    C. 90% efficient
    D. Not enough information is given.

26. What is the record retention for bacteriological samples results?

A. 1 year
B. 3 years
C. 5 years
D. 10 years

27. What is the maximum hold time for a bacteriological sample?

A. 12 hours
B. 24 hours
C. 30 hours
D. 48 hours

28. If a system takes 60 routine bacteriological samples, how many positive total coliform samples trigger a Level 1 assessment?

A. 1
B. 2
C. 3
D. 4

29. Any public system that applies chemical treatment is required to do what?

A. Submit Monthly Operational Reports (MORs).
B. Submit only a pumpage report.
C. Submit only a CCR.
D. Have a certified laboratory.

30. A customer is complaining of seeing black discharge from their tap with a swampy smell. What is most likely the cause of this?

A. Iron
B. Manganese
C. Fluoride
D. Chlorine

31. A well has come back into service and it is noticed there is red slime coming out of the discharge. What could this indicate?

    A. Coliform bacteria
    B. *E. coli* contamination
    C. High levels of chlorine
    D. Iron bacteria

32. What is the minimum isolation distance of a municipal well from a major source of contamination?

    A. 50 feet
    B. 75 feet
    C. 200 feet
    D. 2000 feet

33. Which of the following is considered a major source of contamination?

    A. Office building
    B. A landfill
    C. School
    D. Furniture factory

34. The pump in your main well house has been replaced. The well driller dumps 11 lbs of calcium hypochlorite down the well for disinfection. What is the initial dosage of chlorine? Assume calcium hypochlorite is 65% available chlorine. Well diameter is 18 in, well depth is 975 ft, and the static water level is 150 ft below the top of the casing.

    A. 65 ppm
    B. 78.57 ppm
    C. 120.88 ppm
    D. 446.88 ppm

35. What is the proper incubation temperature when using an approved bacteriological testing method for bacteriological samples in drinking water?

    A. 25º Celsius ± 0.5
    B. 35º Celsius ± 0.5
    C. 37º Celsius ± 0.5
    D. 44.5º Celsius ± 0.5