



MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Drinking Water and Environmental Health Division

**DRINKING WATER OPERATOR CERTIFICATION
COMPLETE TREATMENT (F-LEVEL) PRACTICE EXAM**

1. What acid is generally used in the determination of raw water alkalinity?
 - A. Hypochlorous acid
 - B. Tartaric acid
 - C. Sulfuric acid
 - D. Hydrochloric acid

2. You want to dilute a standard 0.1N sulfuric acid to 1 L of 0.01N. How much of the 0.1N acid do you need to use?
 - A. 50 ml
 - B. 100 ml
 - C. 150 ml
 - D. 200 ml

3. The chemical formula for aluminum hydroxide is _____
 - A. $\text{Al}_2(\text{SiO}_3)_3$.
 - B. $\text{Al}(\text{OH})_3$.
 - C. $\text{Fe}_2(\text{SO}_4)_3$.
 - D. H_2O_2 .

4. Calculate the percent of Sulfur in $\text{Fe}_2(\text{SO}_4)_3$.
 - A. 12%
 - B. 24%
 - C. 35%
 - D. 47%

5. Chlorine and ammonia combine to form _____
 - A. iron oxychloride.
 - B. polyphosphates.
 - C. trichlorosilane.
 - D. chloramines.

6. A chlorinator is set to feed 240 lbs of 12.5% sodium hypochlorite solution in 24 hours to a flow of 750,000 gallons per day (GPD). Find the chlorine dose in mg/L.
- A. 0.85 mg/L
 - B. 1.8 mg/L
 - C. 3.2 mg/L
 - D. 4.8 mg/L
7. Alum is used in the treatment of drinking water for _____
- A. coagulation.
 - B. iron removal in aerators.
 - C. corrosion control.
 - D. chlorination.
8. A water treatment plant treats an average daily flow of 400,000 GPD. The desired polymer dosage for coagulation is 2 mg/L. How many pounds of polymer will be used in 60 days?
- A. 6.672 lbs
 - B. 100 lbs
 - C. 200 lbs
 - D. 400 lbs
9. What acts as a corrosion inhibitor by forming a protective film in the water system?
- A. Alum
 - B. Phosphates
 - C. Calcium hypochlorite
 - D. Fluoride
10. A(n) _____ is defined as a connection or arrangement of piping or appurtenances through which a backflow could occur.
- A. Cross Connection Control Program
 - B. cross connection
 - C. air gap
 - D. submerged inlet

11. Trihalomethanes are formed through the reaction of _____ with certain organic compounds in the water.

- A. arsenic
- B. iron
- C. chlorine
- D. phosphates

12. What is a critical component of a water system's overall security plan?

- A. A capital improvement plan.
- B. A water rates study.
- C. A valve turning program.
- D. An emergency response plan.

13. Backwashing is the reversal of flow back through the filter media to _____

- A. aid in the disinfection process.
- B. aid in the fluoridation process.
- C. increase contact time.
- D. remove entrapped solids.

14. A filter has sand surface dimensions of 32 ft by 32 ft. How many gallons of water are filtered in one day at a rate of 4 gpm/ft²?

- A. 5.898 Million Gallons per Day (MGD)
- B. 240 MGD
- C. 1024 MGD
- D. 5760 MGD

15. All fluoridation chemicals are _____ at high levels.

- A. toxic
- B. good for the human body
- C. useful for disinfection
- D. prevent corrosion

16. A water supply produces 4 MGD of finished water and reports using 400 lbs of hydrofluorosilicic acid each day. Assume hydrofluorosilicic acid is 23% pure and contains 79.1% fluoride ion. What is the concentration in mg/L of fluoride ion?
- A. 1.0 mg/L
 - B. 2.2 mg/L
 - C. 2.7 mg/L
 - D. 4.4 mg/L
17. What is defined as mass per unit volume?
- A. Avogadro's number
 - B. Specific gravity
 - C. Molecular weight
 - D. Density
18. A water treatment plant has a design flow of 5 MGD. The sedimentation basin is 10 feet deep, 50 feet wide, and 150 feet long. What is the approximate volume of the tank?
- A. 75,000 Gallons
 - B. 125,000 Gallons
 - C. 561,000 Gallons
 - D. 600,000 Gallons
19. A basic principle of gas chromatography is _____
- A. flow of water vapor.
 - B. vaporization of sample into gaseous components.
 - C. water electrolysis.
 - D. measures water vaporization rate.
20. A burette is used to measure _____
- A. volume.
 - B. length.
 - C. specific gravity.
 - D. laminar flow.

21. For a subpart H supply using membrane filtration, the turbidity level of representative samples of a supply's filtered water shall at no time exceed _____

- A. 0.3 NTU.
- B. 0.6 NTU.
- C. 1 NTU.
- D. 4 NTU.

22. Total coliform positive results when using the Colilert method are indicated when _____

- A. the media is black in color.
- B. the media is red in color.
- C. the media is yellow in color.
- D. the media is pink in color.

23. What does the chemical formula, ClO_2 , represent?

- A. Chlorine dioxide
- B. Carbon monoxide
- C. Chlorine oxide
- D. Calcium hypochlorite

24. The final polishing to remove turbidity particulates or floc that were too small to settle is called what?

- A. Chlorination
- B. Filtration
- C. Coagulation
- D. Fluoridation

25. A 475,000-gallon tank is filled during a pumping test in 16 hours. What is the pumping rate?

- A. 208 gpm
- B. 391 gpm
- C. 495 gpm
- D. 710 gpm

26. Any Type I water supply which applies chemical treatment is required to submit an operation report _____

- A. every month.
- B. every two months.
- C. every three months.
- D. every six months.

27. The worker Right to Know Law addresses an employer's responsibility to provide _____

- A. an employee work manual.
- B. the location of all bathrooms.
- C. a 401K plan.
- D. Safety Data Sheets (SDS).

28. The Lead and Copper Rule requires that samples be collected from _____

- A. pump stations.
- B. storage tanks.
- C. consumer taps.
- D. raw water taps.

29. What is the minimum retention period of records for the chemical analyses (excluding lead and copper results)?

- A. 2 years
- B. 5 years
- C. 10 years
- D. 15 years

30. Lime is used in the treatment of drinking water _____

- A. to disinfect water.
- B. to control THMs.
- C. as a titrant indicator.
- D. for the precipitation of carbonate hardness.

31. In a particular softening process, it takes 75 mg/L of soda ash to remove noncarbonate hardness. If the soda ash is 80% pure, how much product is needed?
- A. 15 mg/L
 - B. 60 mg/L
 - C. 94 mg/L
 - D. 375 mg/L
32. At a water treatment plant, it is recommended that all valves should be _____ annually.
- A. labeled
 - B. replaced
 - C. operated
 - D. washed
33. Which of the following water treatment processes is used for taste and odor control in drinking water?
- A. Fluoridation
 - B. Alum addition
 - C. Carbon adsorption
 - D. Sedimentation
34. A water storage tank 50 ft x 70 ft x 80 ft is full of water. If the water is being pumped out of the tank at a rate of 250 gpm, how long will it take to empty the tank?
- A. 6 hours
 - B. 19 hours
 - C. 140 hours
 - D. 8378 hours
35. How many pounds per day of liquid alum are used if the flow rate is 12.7 MGD and the dosage is 8.25 mg/L of alum? The dry alum percent equivalent is 48%.
- A. 8.25 lbs of liquid alum per day.
 - B. 106 lbs of liquid alum per day.
 - C. 874 lbs of liquid alum per day.
 - D. 1820 lbs of liquid alum per day.

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