

Water Exam 1

1. Which of the following elements cause hardness in water?
 - a. sodium and potassium
 - b. calcium and magnesium
 - c. iron and manganese
 - d. turbidity and suspended solids
2. The difference between static level and pumping level in a well is called:
 - a. drawdown.
 - b. cone of depression
 - c. zone of saturation
 - d. radius of influence
3. An illness known as methemoglobinemia (blue baby syndrome) is attributed to:
 - a. excessive hardness in water
 - b. high iodine content
 - c. too much iron in the water
 - d. high nitrate content
4. Drinking water regulations require sampling for bacteriological analysis at the:
 - a. water plant effluent
 - b. clear well
 - c. household water meter
 - d. consumers tap
5. The water table refers to:
 - a. pumping water level in a well
 - b. upper surface of the ground water
 - c. aquifer depth
 - d. water level in the revision
6. In detecting chlorine gas leaks from the disinfection assembly, an ammonia soaked rag will produce:
 - a. a dense white vapor
 - b. toxic fumes
 - c. bubbles to form
 - d. an explosive environment
7. Which of the following increase chlorine demand?
 - a. increase in pH
 - b. increase in temperature
 - c. increase in organic matter
 - d. decrease in volatile solids concentration
8. A chlorine residual of 0.2 mg/l is the same as:
 - a. 0.2 lbs. of chlorine per 1,000,000 lbs. of water
 - b. 0.2 lbs. of chlorine per 1,000,000 gallons of water
 - c. 0.2 gallons of chlorine per 1,000,000 gallons of water
 - d. 0.2 percent chlorine in the water
9. The Total Coliform Rule is based first on
 - a. presence or absence of coliforms in a sample.
 - b. density of coliforms in a sample.
 - c. type of coliforms in a sample
 - d. presence of fecal coliforms in a sample

10. The proper concentration for fluoride in drinking water is determined by:
 - a. average annual air temperature
 - b. average annual water temperature
 - c. average alkalinity
 - d. average pH

11. The maximum contaminant level (MCL) for fluoride in drinking water is:
 - a. 2.0 mg/l
 - b. 3.0 mg/l
 - c. 4.0 mg/l
 - d. 8.0 mg/l

12. If you treat 1.2 MGD at a fluoride dosage of 0.8 mg/l, how many pounds of fluoride would this take?
 - a. 4 lbs.
 - b. 6 lbs.
 - c. 8 lbs.
 - d. 10 lbs.

13. A pH of 7 indicates that the sample is:
 - a. acidic
 - b. basic
 - c. neutral
 - d. alkaline

14. Which of the following conditions would increase turbidity?
 - a. decrease in pH
 - b. increase in alkalinity
 - c. increase in phosphate concentration
 - d. increase in organic matter

15. The MCL for nitrate as N at the point of withdrawal is:
 - a. 1 mg/l
 - b. 10 mg/l
 - c. 30 mg/l
 - d. 45 mg/l

16. The average amount of water used per person per day is:
 - a. 25-30 gpd
 - b. 50-60 gpd
 - c. 75-100 gpd
 - d. 100-150 gpd

17. Disease producing organisms are called:
 - a. parasites
 - b. coliforms
 - c. saprophytes
 - d. pathogens

18. Disinfection involves:
 - a. killing disease producing organisms
 - b. killing all bacteria
 - c. cleaning the water
 - d. slowing down the bacterial action in the water

19. If volatile organic chemicals (VOCs) are detected, sampling must then be conducted
- monthly
 - quarterly
 - every third year
 - annually
20. Three waterborne diseases are:
- mumps, measles and flu.
 - tuberculosis, diphtheria, and chickenpox.
 - typhoid fever, dysentery, and cholera
 - scarlet fever, pneumonia, and colds
21. One milligram per liter (mg/l) is equal to:
- one ml/l
 - one ounce per 1000 gallons
 - one cc. per liter
 - one part per million
22. Your pump ran for 24 hours and pumped 302,400 gallons. The capacity of the pump is:
- 110 gpm
 - 200 gpm
 - 210 gpm
 - 300 gpm
23. Approximately how many gallons would 1000 ft. of 6-in. pipe hold?
- 1236 gal.
 - 1378 gal.
 - 1443 gal.
 - 1468 gal.
24. Under like conditions, how much more water would an 8-inch pipe carry than a 4-inch pipe?
- 2 times
 - 3 times
 - 4 times
 - not enough information given
25. Which of the following is not true about chlorine gas?
- it is 2.5 times heavier than air
 - it is corrosive
 - it is extremely toxic
 - it is flammable
26. What is the chlorine residual in a treated water if the dosage is 2.1 mg/l and has a demand of 0.8 mg/l:
- 0.8 mg/l
 - 1.3 mg/l
 - 2.1 mg/l
 - 2.9 mg/l
27. What is the maximum amount of chlorine gas that can be removed from a 150-lb. cylinder in 24 hrs?
- 26 lbs.
 - 40 lbs.
 - 75 lbs.
 - there is no maximum

28. How many gallons would be contained in a circular tank that is 100 ft. in diameter and 10 ft. deep?
- 587,000 gallons
 - 657,000 gallons
 - 1,340,000 gallons
 - 2,349,000 gallons
29. Chlorine in a dry form is called:
- hypochlorite
 - hypochlorous
 - hydrochlorite
 - hydroxide
30. The rotating part of centrifugal pump is called the:
- rotor
 - impeller
 - propeller
 - incisor
31. Hydrogen sulfide gas:
- is a greenish colored gas
 - smells like dead fish
 - smells like rotten eggs
 - is lighter than air
32. To properly disinfect a water main after new construction, you should:
- apply 50 mg/l chlorine for 24 hours.
 - clean the pipe out with a pig and then disinfect at 10 mg/l for 24 hours
 - use a 10% solution of calcium chloride
 - don't use the main for one week
33. Well screens that are partially blocked with scale deposits can be most easily cleaned by
- pouring a solution of muriatic acid into the well and surging
 - adding a strong chlorine solution to the well
 - pumping water back into the well at the same rate that it is being pumped out
 - dropping charges into the well so that the shock will loosen the scale.
34. Tastes and odors in surface water are most often caused by:
- clays
 - hardness
 - algae
 - coliform bacteria
35. What is the percent accuracy of a water meter registering 9,600 gallons when 10,000 was the actual flow?
- 4 %
 - 54%
 - 96%
 - 104%
36. What effect does temperature have on oxygen solubility?
- As temperature goes up, dissolved oxygen goes up.
 - As temperature goes down, dissolved oxygen goes up.
 - As temperature goes up, dissolved oxygen remains the same
 - Temperature has not effect.

37. In order to rebuild a manhole, it will be necessary to remove the asphalt from a 35-foot diameter circle in a street. The pavement area involved is:
- 208 sq. ft.
 - 241 sq. ft.
 - 962 sq. ft.
 - 1125 sq. ft.
38. If the chlorine demand of water is 2.5 mg/l and you want a residual of 0.5 mg/l, how much chlorine would need to be fed to one million gallons?
- 25 lbs.
 - 30 lbs.
 - 34 lbs.
 - 38 lbs.
39. If you need to feed chlorine at a rate of 2.1 mg/l and you treat 2,300,000 gallons, how many pounds of chlorine should you use?
- 4 lbs.
 - 17 lbs.
 - 35 lbs.
 - 40 lbs.
40. What is the head on a system exerting a static pressure of 62 psi?
- 89 feet
 - 107 feet
 - 143 feet
 - 189 feet
41. Pump motors draw more power starting than during normal operating conditions because:
- check valves have to be pushed open
 - energy is required to get the water moving
 - the motor and pump have to start turning
 - all of the above.
42. Wear rings are installed in a pump to:
- hold the shaft in position
 - keep the impeller in place
 - keep wear concentrated on economically replaceable part
 - wear out the sleeve
43. When using a fire hydrant, the valve:
- should never be opened completely
 - be opened only during the hours of 8 AM to 5 PM
 - be opened to the desired amount of flow
 - be opened all of the way
44. One of the most effective ways to remove hydrogen sulfide from water is by:
- aeration
 - filtration
 - adjusting the pH
 - feeding polyphosphates
45. The primary reason for dry barrel fire hydrants is to:
- allow easy maintenance
 - prevent water hammer
 - keep the hydrant from freezing
 - keep the barrel from rusting

46. The sudden closure of a check valve will result in
- water hammer
 - flow reversal
 - cavitation
 - water aeration
47. A head of 200 feet would equal:
- 46.6 psi
 - 56.6 psi
 - 66.6 psi
 - 86.6 psi
48. Which of the following is an effective way for removing iron from water?
- adding baffles
 - adding sodium chloride
 - aeration and filtration
 - flash mixing
49. Where is the best place to store a self contained breathing apparatus (SCBA)?
- inside a cabinet in the chlorinator room
 - in an unlocked cabinet outside the chlorinator room
 - locked in a cabinet in the office
 - locked in a cabinet just outside the chlorinator room
50. Which of the following procedures is done when preparing to disconnect a chlorine cylinder?
- close the cylinder valve first to allow time for the chlorine to be drawn off
 - loosen the line to the tank and then shut off the valve to the chlorine cylinder
 - shut off the water supply and allow sufficient time for the chlorine to be drawn off
 - turn the chlorinator feed rate valve off then turn the valve on the chlorinator cylinder
51. A 4-inch pipe is running at full capacity at a flow velocity of 5 fps. What is the flow in gpm?
- 31 gpm
 - 75 gpm
 - 190 gpm
 - 238 gpm
52. Discharge from a centrifugal pump:
- increases with an increase in static head
 - decreases with a decrease in static head
 - increase with a decrease in static head
 - is independent of static head
53. A centrifugal pump should not be run empty except momentarily because:
- a serious counter pressure could develop and damage the pump casing.
 - it is a waste of energy to run a pump without water.
 - the excessive end thrust of the shaft would damage the thrust bearing.
 - the parts lubricated by water could be damaged.
54. Pipes of dissimilar metal should not be connected together because of problems due to
- scale formation
 - corrosion
 - water hammer
 - the venturi effect

55. After replacing a repaired pump back into a well, the operator should first:
- put the seal on tight to avoid contamination
 - add chlorine to disinfect the well and surrounding aquifer
 - start the pump to make sure that it will pump water
 - open the valve to let the pressure off the line
56. A water tower has a water pressure of 98 psi at its base. What would be the pressure at a hydrant three blocks away if there is a 65-foot head loss in the pipe?
- 45 psi
 - 65 psi
 - 70 psi
 - 98 psi
57. A well screen must be installed in
- deep wells
 - consolidated materials
 - shallow wells
 - unconsolidated materials
58. A well acidified in order to
- disinfect
 - increase yield
 - remove objectionable gases
 - remove disinfection by-products
59. When collecting a distribution system sample for bacteriological testing, the sample person should allow the water run for how long before collecting the sample?
- 30 seconds
 - 30 minutes
 - one hour
 - as long as necessary to clear service line
60. The hardness of water is expressed in terms of
- fluoride
 - chloride
 - silicon oxide
 - calcium carbonate
61. How can iron bacteria be controlled in a water distribution system?
- by aeration
 - filtration
 - chlorination
 - precipitation
62. The temperature in which water is the most dense?
- 0 C
 - 4 C
 - 32 C
 - 100 C
63. The amount of water that a well will produce for each foot of drawdown is called:
- specific head
 - static yield
 - yield/feet
 - specific capacity

64. If a water supply exceeds the MCL, whose responsibility is it to notify the consumer?
- the testing lab.
 - the supplier.
 - the DOH
 - the USEPA
65. A sanitary well seal is used to:
- seal the clear well
 - seal the top of the well casing
 - seal the water tower
 - seal a break in the distribution system
66. Pumps that work on the basis of inertia or mass moving in a circular motion are called:
- air lift
 - centrifugal
 - diaphragm
 - piston
67. Bacterial pollution moving under ground in fractured basalt
- will be removed in 10 feet
 - will be removed in 100 feet
 - will be removed in less than a mile
 - may never be removed.
68. An atmosphere is considered oxygen deficient when the oxygen level drops below
- 21.5%
 - 20%
 - 19.5%
 - 17%
69. Which of the following is a hazard when handling hydrofluosilicic acid?
- fire
 - explosion
 - corrosion
 - inhalation
70. Water containing high iron is objectionable in a public water supply because:
- excess iron will scale pipes
 - excess iron will stain plumbing fixtures
 - excess iron causes "baby blue" syndrome
 - iron content has no effect on the water supply
71. Which of the following chemical substances is most likely to cause corrosion or deterioration of metal and concrete surfaces?
- carbon dioxide
 - ethanol
 - methane
 - hydrogen sulfide
72. An employee is caught in a room where chlorine gas is leaking. He has no SCBA, he should
- lay down on the floor and quickly crawl out of the room
 - walk out of the room quickly
 - pull shirt over mouth and face and quickly walk out of the room
 - keep mouth closed, head as high as possible, and quickly walk out of the room holding breath.

73. From a sanitary standpoint, the pressure in a distribution system should never be allowed to fall to zero because
- low pressure allows bacteria to multiply
 - ground water may enter and back siphonage may occur
 - the chlorine residual will drop faster
 - the main may collapse
74. Breakpoint chlorination is achieved when
- no chlorine residual is detected
 - the strong chlorine taste at the plant is not found in the distribution system
 - the ammonia level in the water decreases
 - a chlorine dose increase results in an increase of chlorine residual
75. The amount of water in a water bearing formation depends upon
- the depth of the well casing
 - the size of the pump
 - type of well casing
 - the thickness and permeability of the formation
76. Temporary cloudiness in a freshly drawn sample of tap water may be caused by:
- air
 - chlorine
 - hardness
 - silica
77. A yellowish liquid used in disinfection is
- calcium hypochlorite
 - sodium hypochlorite
 - sodium chloride
 - polyphosphate of chlorine
78. Which of the following chemicals will most likely keep iron in suspension?
- chlorine
 - lime
 - polyphosphate
 - potassium permanganate
79. Lead in drinking water can lead to
- stomach and intestinal disorders
 - reduction of white blood count
 - methamoglobinemia
 - impaired mental functioning in children
80. Fluoride is generally added to public water supplies to
- aid in disinfection
 - reduce iron buildup
 - protect the dental health of the young
 - help prevent contamination
81. How many pounds of sodium hypochlorite containing 12% available chlorine by weight would be needed to provide 50 pounds of chlorine?
- 6 lbs.
 - 20 lbs.
 - 200 lbs.
 - 417 lbs.

82. If an initial sample is positive for coliform and a repeat sample is positive for fecal coliform or E. coli, notice to the public must be given by television or radio within
- 24 hours
 - 48 hours
 - 72 hours
 - one week
83. Surging a well to loosen scale deposits on the screen refers to
- turning the pumps on and off as fast as possible to cause a water hammer
 - pumping water in and out of a well
 - sending shock waves through the aquifer to cause a surge of water
 - using a water jet to surge around the well casing.
84. What is the detention time in a circular clarifier with a 50-ft. radius, depth of 10 ft, and a flow of 7,000,000 gpd?
- 0.5 hours
 - 1 hour
 - 2 hours
 - 4 hours
85. The conical depression created by the lowering of the static water level in a well after a period of pumping is called
- drawdown
 - desaturation cone
 - aquifer
 - cone of depression
86. A water supply is found to have a calcium carbonate concentration of 50 mg/l. This water would be considered
- soft water
 - hard water
 - potable water
 - non-potable water
87. The amount of chlorine required to react with the many dissolved and suspended substances found in the water is called:
- organic residual
 - contact time
 - residual chlorine
 - chlorine demand
88. Trihalomethane may be partially removed from water by:
- fluoridation
 - chlorination
 - oxidation
 - ultraviolet radiation
89. Cathodic protection refers to protection against:
- contamination
 - corrosion
 - hardness
 - infiltration

90. Normal surface and ground water have a pH range of:
- 3.0 to 5.0
 - 4.5 to 6.5
 - 6.8 to 8.5
 - 9.0 to 10.5
91. A cross connection is described as a connection between:
- a potable and a non-potable water supply
 - a high pressure system and a low pressure system
 - two different pipe sizes
 - a cross on a water main
92. High fluoride levels in a water system can lead to:
- heart disease
 - tooth decay
 - discoloration of teeth
 - taste and odor complaints
93. A vacuum is formed in the chlorinator by the:
- chlorine cylinder pressure
 - pressure differential through the ejector
 - chlorine feed pump
 - rotameter
94. According to the Lead and Copper Rule, the action for the 90th percentile lead level is:
- 0.005 mg/l
 - 0.015 mg/l
 - 0.030 mg/l
 - 0.050 mg/l
95. A chlorine feed room should be:
- closed with no ventilation
 - open at the top
 - ventilated near the floor
 - ventilated near the ceiling
96. When connecting a chlorine cylinder, you should always replace the:
- lead or fiber washer
 - pressure regulator
 - fusible metal plug
 - valve seats
97. A permit required confined space must be monitored for hazardous atmospheres:
- before entry only
 - before entry and then every 5 minutes
 - before entry and then every 15 minutes
 - continuously
98. The purpose of a rotameter is to:
- create a vacuum
 - maintain a smooth fluid flow
 - meter the flow of fluid
 - reduce pressure

99. If a 3,000,000-gpd flow is to be dosed with 1.2 mg/l, what should the chlorinator feed rate be set at in lbs. of chlorine per day?
- a. 3.0 lbs./day
 - b. 4.5 lbs./day
 - c. 10 lbs./day
 - d. 30 lbs./day
100. Which of the following does not affect the friction loss in a given length of pipe?
- a. hardness of the water
 - b. number of fittings
 - c. roughness of the interior of the pipe
 - d. velocity of the flow

WATER ONE ANSWERS

- | | |
|-----------------------------------|-------|
| 1. B | 51. C |
| 2. A | 52. C |
| 3. D | 53. D |
| 4. D | 54. B |
| 5. B | 55. B |
| 6. A | 56. C |
| 7. C | 57. D |
| 8. A | 58. B |
| 9. A | 59. D |
| 10. A | 60. D |
| 11. C | 61. C |
| 12. C | 62. B |
| 13. C | 63. D |
| 14. D | 64. B |
| 15. B | 65. B |
| 16. D (According to AWWA studies) | 66. B |
| 17. D | 67. D |
| 18. A | 68. C |
| 19. B | 69. C |
| 20. C | 70. B |
| 21. D | 71. D |
| 22. C | 72. D |
| 23. D | 73. B |
| 24. C | 74. D |
| 25. D | 75. D |
| 26. B | 76. A |
| 27. B | 77. B |
| 28. A | 78. C |
| 29. A | 79. D |
| 30. B | 80. C |
| 31. C | 81. D |
| 32. A | 82. A |
| 33. A | 83. B |
| 34. C | 84. C |
| 35. C | 85. D |
| 36. B | 86. A |
| 37. C | 87. D |
| 38. A | 88. C |
| 39. D | 89. B |
| 40. C | 90. C |
| 41. D | 91. A |
| 42. C | 92. C |
| 43. D | 93. B |
| 44. A | 94. B |
| 45. C | 95. C |
| 46. A | 96. A |
| 47. D | 97. D |
| 48. C | 98. C |
| 49. B | 99. D |
| 50. A | 100.A |