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Random Water Treatment Questions

1. The addition of chlorine until all chlorine demand has been satisfied:
a) Chlorination Curve
b) Breakpoint Chlorination
c) Disinfecting Tendencies
d) Proportional Chlorination

2. Your water treatment plant uses 39.6 lbs. of cationic polymer to treat a flow of 2.71 MGD. What is the polymer dosage?
a) 0.07 ppm
b) 1.75 ppm
c) 14.61 ppm
d) 3.23 ppm

3. A physical link between a potable water supply and one of unknown or questionable quality is
a) a cross connection
b) a Tier 1 violation
c) a Boil Water Advisory
d) a backflow prevention assembly

4. The purpose of stabilization is
a) to prevent floc from rising in the basin
b) to prevent sludge from entering the filters
c) to prevent corrosion or excessive scale from entering the distribution system
d) to prevent excessive turbidity at the top of the filters

5. The effectiveness of chlorine_____ as the pH_____
a) Increase, not effected
b) Decreases, increases
c) Increase, increase
d) Decrease, decrease

6. Core sampling is a viable way to check the condition of your:
a) raw water
b) coagulation process
c) finished water
d) filters

7. The best cross connection device is
a) air gap
b) double check
c) atmospheric vacuum breaker
d) barometric loop

8. Hypochlorite should be kept separate from:
a) Nothing
b) Organic material
c) Water
d) All other chemicals

9. _____ _____ are used to cause particles to become destabilized and begin to clump together.
a) coagulant aids
b) nonsettable solids
c) zeta particles
d) primary coagulants

10. The hydrologic cycle relates to
a) the treatment processes
b) an old Harley
c) movement of water in the environment
d) the moons pull on tidewaters

11. Surface waters are more difficult to clean up or remediate than groundwater.
a) true
b) false

12. Calcium hypochlorite will lose _____of available chlorine per year.
a) 1-2%
b) 3-5%
c) 7-8%
d) 10-12%

13. Drinking water system can reduce THM formation by:
a) Increase the organic material before chlorinating the water.
b) Fluctuate chlorine usage.
c) Move the point of chlorine addition to before sedimentation or filtration.
d) Use alternative disinfection methods.

14. Your treatment facility uses 97 lbs of chlorine a day to disinfect the 4 MGD you treat. Those 97 lbs results in a chlorine concentration of 2.9 ppm. When checking the furthest area of your system you discover that the residual is .6 ppm chlorine. What is your demand?
a) 3.5 mg/l
b) 1.7 ppm
c) 2.3 ppm
d) 3.5 ppm

15. The basin in Wahootchie's water plant measure 60 feet long by 40 feet wide by 8 feet deep. The flow through this plant is 4.1 cuft/sec. What is the detention time?
a) 1 hour 18 minutes
b) 144 minutes
c) 449 minutes
d) 2 hours 24 minutes

16. A laboratory test used to determine the degree of calcium carbonate saturation in water.
a) Manifold Index
b) Ion Index
c) Humic Index
d) Langelier Index

17. A system has a Langelier Saturation Index of -3.6. Treatment is recommended because:
a) The water will precipitate a scale layer of $CaCO_3$
b) The water is chemically balanced
c) The water leans toward being corrosive
d) All of the above

18. The filters in the treatment plant are 40 feet by 20 feet by 7 feet deep. The flow is 1500 gpm. What is the filtration rate?
a) .26 gpm/sq ft
b) 1.9 gpm/sq ft
c) 2.6 gpm/sq ft
d) 3.7 gpm/sq ft

19. A residual in the form of _____ _____ residual chlorine has the highest disinfecting ability.
a) Combined available
b) Total available
c) Minimum available
d) Free available

20. A sanitary survey is used to determine
a) source water characteristics and effectiveness of treatment
b) the hygienic and operational aspects of the plant
c) compliance with the SDWA and other EPA mandates
d) whether the CCR is complete and accurate

21. Chemical which may cause severe burns to skin, eye tissue and mucous membranes:
a) Sodium hydrogen carbonate
b) Sodium bicarbonate
c) Caustic Soda
d) Acetic acid

22. Ortho/Poly blends are made to:
a) Sequester iron and manganese
b) Form film to reduce lead levels
c) Form film to reduce copper levels
d) All of the above

23. In their soluble or reduced state, iron and manganese are
a) alkalinity enhancers
b) colorless
c) negatively charged
d) won't dissolve in water

24. _____ corrosion is the corrosivity of dissimilar metals.
a) saline
b) hydroxyl
c) excessive
d) galvanic

25. The two types of backflow are
a) backsiphonage and backpressure
b) backpressure and cavitation
c) air gap and rpz
d) dynamic and backsiphonage

26. 25 MGD is equivalent to
a) 1122 gpm and 1560 cu/ft of water
b) 36000 gpm and 187 cuft/sec
c) 17362 gpm and 38.75 cuft/sec
d) 15600 gpm and 466.7 cuft/sec

27. When chlorine is used as a disinfectant in water there reaches a point when the amount of chlorine added is reflected identically with the amount of free residual measured on your DPD
a) chloramination
b) breakpoint
c) ozone
d) liftoff

28. pH, by definition is
a) the ability of particles to stick together
b) the ability to cause color to turn insoluble
c) causes a water molecule to bring in a third hydrogen atom
d) the hydrogen ion concentration in water

29. Which of these does NOT have a primary MCL?
a) nitrate
b) fluoride
c) manganese
d) copper

30. During the coagulation/flocculation process, particulate impurities can be divided into two classifications.
a) primary coagulants and coagulant aids
b) settleable and nonsettleable solids
c) hydraulic and mechanical
d) paddlewheel and walking beam

31. You have noticed cracks appearing in your coagulation basin. If the basin is 20 feet wide and 60 feet long and the water is 12 feet deep how many gallons will need to be pumped out of this basin so work can begin?
a) 107,712 gallons
b) 9,600 gallons
c) 14,400 gallons
d) 211,384 gallons

32. MCLG is an acronym for
a) Most Common Lucky Guess
b) Minimum Colloidal Level Goals
c) Maximum Chlorine Level Gallons
d) Maximum Contaminant Level Goals

33. _____ polymers are positively charged.
a) nonionic
b) anionic
c) cationic
d) platonic

34. Water if flowing through a completely filled 10 inch line at 4 cuft/sec. What is the velocity?
a) 0.4 fps
b) 7.3 fps
c) 2.5 fps
d) 4.0 cuft/sec

35. Generally, the more uniform the media, the _____ the rate of headloss.
a) slower
b) same
c) smaller
d) larger

36. Drinking water systems can reduce THM formation by:
a) Reducing the organic material before chlorinating the water.
b) Optimizing the chlorine dosage.
c) Changing the point of chlorine addition in the treatment series.
d) All of the above

37. The _____ _____ determines how a chemical will be added to the water and could be expressed in mL/min.
a) Feed Rate
b) Pump Flow
c) Calibration Rate
d) Flow Zone

38. A device used to measure the flow rate of gases and liquids:
a) Floatameter
b) Rejectogauge
c) Dynicator
d) Rotameter

39. The vapor pressure of liquid chlorine increases as the temperature _____.
a) Increases
b) Decreases
c) Remains Constant
d) None of the above

40. A one-inch paintbrush or a rag saturated with a strong ammonia solution will indicate gas chlorine leaks by the presence of:
A) A dense white cloud or fume
b) Frozen lines
c) Purple smoke
d) Sparks

41. The Langelier Saturation Index provides an indication of
a) the solubility of iron and manganese
b) the pH necessary to settle out color
c) the rate at which particles will settle
d) the likelihood that your source water is corrosive

42. A fusible plug is designed to soften or melt at _____to prevent buildup of excessive pressures and the possibility of rupture due to a fire or high surrounding temperatures.
a) 130°F to 135°F
b) 158°F to 165°F
c) 110°F to 115°F
d) 145°F to 150°F

43. The chlorine feed room should be kept between 60° F and 120°F to vaporize liquid chlorine. Below 60° F, chlorine gas forms_____, also known as "_____," when it comes in contact with water. This substance can clog the ejector (injector) and gas piping, creating a serious maintenance problem.
a) chlorine hydrate, green ice
b) calcium chloride, white funk
c) sodium hydroxide, white lime
d) chlorine dehydrate, yellow plum

44. Coupon testing is a viable indicator of
a) treatment optimization
b) the speed at which macrofloc is formed
c) the corrosive or scale forming tendencies of your water
d) the super saturation level of dissolved oxygen in your water

45. Community groundwater systems are required to provide continuous disinfection and at least _____ treatment of viruses. (99.99% removal and/or inactivation).
a) 1 log inactivation
b) 2 log inactivation
c) 3 log inactivation
d) 4 log inactivation

46. Overdosing of potassium permanganate will likely cause
a) an extremely high pH
b) pink water
c) taste and odor
d) inadequate settling

47. Which of the following is most likely to be used as a primary coagulant?
a) brine
b) ammonious hydroxide
c) ferric sulfate
d) sodium thiosulfate

48. By using a Venturi rate of flow meter, a system:
a) Is able to adjust chemical feed rates
b) Is able to calculate detention times
c) Is able to monitor the amount of water being treated
d) All of the above

49. Slow stirring is a key aspect of the flocculation process, however stirring too slowly:
a) Is not a problem and can only help the process
b) can prevent particles from clumping enough and will result in ineffective collisions and poor floc formation
c) can cause ineffective collisions that produce perfectly formed floc
d) may tear apart flocculated particles after they have clumped together

50. The LT2ESWTR has decreed that we test our source water for the presence of
a) algae
b) pharmaceuticals
c) cryptosporidium
d) nitrate

51. Heterotrophic Plate Counts measure
a) all pathogens in the sample
b) all bacteria in the sample
c) all giardia lamblia in the sample
d) percent of sludge in the sample

52. Combined filter effluent must be less than _____ NTU in 95% of all measurements (collected every four hours) for each month.
a) 1.0 NTU
b) 2.0 NTU
c) 3.0 NTU
d) 0.3 NTU

53. The normal pH of water supplies is within the range where chlorine may exist as:
a) Only HOCl
b) Only OCl-
c) Both HOCL and OCl-
d) Neither HOCl and OCl-

54. To control algal growths in domestic water supply lakes and reservoirs, a system can add
a) $CuSO_4 \cdot 5\ H_2O$
b) $CaPO_4 \cdot 5\ H_2O$
c) $C_2H_4O_2$
d) NaOCl

55. Fluoride is added to water to
a) create a nuisance
b) aid in the development of teeth and bones
c) so there is something that has both a primary and secondary MCL
d) aid in the protective coating of pipes

56. An atmospheric vacuum breaker backflow prevention device protects against
a) backflow
b) backsiphonage and backpressure
c) neither
d) backsiphonage

57. Which of the following chemicals is a strong base?
a) H_2SO_4
b) NaOH
c) HCl
d) HNO_3

58. Which, surface water or groundwater, usually contain a higher level of pathogens?
a) surface water
b) groundwater
c) both are equal
d) neither

59. High nitrate levels in the water can cause
a) rickets
b) cholera
c) blue baby syndrome
d) dysentery

60. Water is at its most dense state at ____^{o}F.
a) 15
b) 39
c) 60
d) 85

61. The mixing of coagulant chemicals and raw water is called
a) flocculation
b) aeration
c) reverse osmosis
d) flash mixing

62. A system treated 1,750,000 gallons of water using 250 pounds of lime. Calculate the lime dosage in mg/L.
a) 12 mg/l
b) 17 mg/l
c) 1700 mg/l
d) 1200 mg/l

63. An Emergency Response Plan:
a) Is not necessary in a water filtration plant
b) Is a list of guidelines used to permit the release of chemicals
c) an ensure employees are prepared and know what actions must be taken and what materials will be needed during a chemical spill
d) All of the above

64. Chlorine gas is _____ times _____ than air.
a) 2.5, lighter
b) 4.5, heavier
c) 3.5, lighter
d) 2.5, heavier

65. Calculate the feed rate (lbs/day) for a system producing 375 gpm and dosing 100% chlorine 1.3 mg/L
a) 2.5
b) 5.85
c) 150
d) 4066

66. Cathodic protection refers to
a) personal protective equipment
b) thermal electric protection
c) corrosion
d) filtration

67. The two main substances that cause water hardness area
a) benzene and cadmium
b) manganese and calcium
c) calcium and copper
d) magnesium and calcium

68. If you get a positive coliform sample what must be done?
a) retake the original sample
b) retake the original sample plus check samples as per the sample siting plan.
c) retake the original sample, one from the water plant, and one from any service connection close to the original sample site.
d) since no fecal coliform was detected, no more sampling needs to take place.

69. When backwashing filters, bed expansion should be between _____ percent.
a) 15 – 30 %
b) 10 – 20 %
c) 20 – 40 %
d) 30 – 50%

70. The electronic flow meter reads 137,892, 900 gallons at 8:00 AM on Monday and 146, 007, 227 gallons at 8:00 AM on Tuesday. According to the scales 122 lbs of chlorine was fed during that 24 hr period. Free chlorine readings entering the clearwell read 0.8 mg/l. What was the approximate chlorine demand of the raw water that day?
a) 2.6 mg/l
b) 1.0 mg/l
c) 3.2 mg/l
d) 4.1 mg/l

71. If the chlorine demand in the Podunk Water District was 1.2 ppm and the chlorine residual was 0.4 ppm what would the chlorine dosage be?
a) 0.8 ppm
b) 1.6 ppm
c) 2.0 ppm
d) 2.5 ppm

72. How many lbs. of HTH (65%) are required to treat 7 MG of water and satisfy a 2.8 ppm demand as well as a 0.6 ppm residual?
a) 198.5 lbs.
b) 251.9 lbs
c) 288.7 lbs.
d) 305.4 lbs.

73. A jumbled mass or collection of floc, solids, and filter media that could grow into a larger mass and reduce filter efficiency is
a) turbidity mass
b) tuberculation
c) a mudball
d) a media crack

74. The purpose of an electrical lock-out device is to:
a) Introduce electrical current to a specific circuit
b) Keep operators out of an electrical control room while maintenance is being performed
c) Lock out an electrical switch box door
d) Positively prevent the operation of an electrical circuit

75. The two main softening methods used by treatment facilities are
a) reverse osmosis and oxidation
b) distillation and disinfection
c) ultraviolet radiation and electrodialysis
d) ion-exchange and lime-soda ash

76. The effective way to combat taste and odor problems is
a) aeration and tube settlers
b) settling out by particle counting
c) prevent them from occurring
d) coagulation and flocculation

77. Minimum trench depth which require trench wall shoring:
a) 2 feet
b) 3 feet
c) 4 feet
d) 5 feet

78. Which disinfection method provides a residual safeguard?
a) ozonation
b) chlorination
c) membrane filtration
d) ultraviolet radiation

79. Turbidity is used as a process control measurement because
a) everyone has a turbidimeter around
b) the results are foolproof
c) the number of pathogens increase as turbidity increases
d) turbidity removal is an extremely easy task

80. Patula's water plant treated their daily output of 4.5 MGD with 150 lbs of gaseous chlorine. What is their dosage at Patula's plant?
a) 2.5 ppm
b) 3.0 ppm
c) 4.5 ppm
d) 4.0 ppm

81. What does it mean if the C value of a pipe is high?
a) the smoother the interior of the pipe is
b) the easier corrosion will adhere to the inside of the pipe
c) the pipe is stronger
d) the more resistant to corrosion the pipe is

82. The majority of sampling inaccuracy is the result of:
a) Confluent growth
b) Laboratory maintenance
c) Poor sampling techniques
d) None of the above

83. Sources of taste and odor issues include
a) raw water
b) distribution systems
c) consumer plumbing
d) all of the above

84. Sodium thiosulfate is used to:
a) Buffer chlorine solutions
b) Neutralize chlorine residuals
c) Detect chlorine leaks
d) Sterilize sample bottles

85. Determine how many pounds of 65% calcium hypochlorite you will need to disinfect a 400 foot section of main with a diameter of 24 inches. The required dosage to disinfect the pipe is 50 mg/L.
a) 2 lbs
b) 4 lbs
c) 6 lbs
d) 8 lbs

86. What is the pressure (in psi) at a point 22 feet below the surface?
a) 51 psi
b) 35 psi
c) 9.5 psi
d) 4.7 psi

87. Which is the most effective disinfectant when chlorine is added to water?
a) hydrogen Ion
b) calcium dioxide
c) hypochlorous acid
d) haloacetic acid

88. Hard water can cause problems. Which of these is NOT a problem caused by hard water?
a) scale formation in pipes
b) toxic substances occurring because of corrosion
c) white scale on laundry fixtures, sinks, cooking utensil, etc.
d) buildup on water heater heating elements

89. When flushing water mains, what should the minimum flushing velocity be?
a) 2.0 ft/sec
b) 3.0 ft/sec
c) 4.0 ft/sec
d) 5.0 ft/sec

90. A pump is rated at a maximum output of 24 gallons per day. The system feeds about 6 gallons of sodium hypochlorite each of the 2 shifts it runs. What speed and stroke setting would be expected?
a) Speed of 40% and Stroke of 40%
b) Speed of 50% and Stroke of 50%
c) Speed of 70% and Stroke of 70%
d) Speed of 80% and Stroke of 80%

91. A sedimentation tank holds 20,000 gallons and the flow into the plant is 500 gpm. What is the detention time in minutes?
a) 10 minutes
b) 20 minutes
c) 40 minutes
d) 80 minutes

92. When H_2SO_4 is added to water the pH will:
a) Increase
b) Decrease
c) Neutralize
d) Stay the same

93. The capacity of a water to neutralize acids:
a) pH
b) Alkalinity
c) Acid
d) Base

94. Iron and manganese removal can be accomplished by
a) oxidation with chlorine followed by filtration
b) oxidation by aeration followed by filtration
c) oxidation by potassium permanganate followed by filtration
d) all of the above

95. When chlorine reacts with organics in the water it has the tendency to produce
a) chloramines
b) trihalomethanes and haloacetic acids
c) macrofloc
d) apparent color

96. Short circuiting refers to
a) pumps running backwards which stops treatment
b) a movie made in the 80's
c) inadequate voltage applied water treated by electrodialysis
d) uneven flows which result in decreased treatment efficiency

97. A method in which a chemical can be injected at a rate which matches the flow:
a) Uniform Injection
b) Flow Pacing
c) Chemical Monitoring
d) None of the above

98. An instrument used for accurate determination of the pump's feed rate:
a) Calibration Cylinder
b) Strainer Valve
c) Injection Assembly
d) Foot Valve

99. In order to disinfect a sedimentation basin measuring 20 ft in width, 60 feet in length, and is 10 feet deep to obtain 50 ppm would require how many lbs. of 65% available HTH?
a) 5.0 lbs
b) 41.3 lbs
c) 37.4 lbs
d) 57.6 lbs

100. The primary duty of a water treatment operator is to
a) protect the public health
b) perform assigned duties
c) obey the mayor or water board
d) get promoted as often as possible

Answer Key

1. b
2. b
3. a
4. c
5. b
6. d
7. a
8. b
9. d
10. c
11. b
12. b
13. d
14. c
15. a
16. d
17. c
18. b
19. d
20. c
21. c
22. d
23. b
24. d
25. a
26. c
27. b
28. d
29. c
30. b
31. a
32. d
33. c
34. b
35. a
36. d
37. a
38. d
39. a
40. a

41. d
42. b
43. a
44. c
45. d
46. b
47. c
48. d
49. b
50. c
51. b
52. d
53. c
54. a
55. b
56. d
57. b
58. a
59. c
60. b
61. d
62. b
63. c
64. d
65. b
66. c
67. d
68. b
69. a
70. b
71. b
72. d
73. c
74. d
75. d
76. c
77. d
78. b
79. c
80. d
81. a
82. c

83. d
84. b
85. c
86. c
87. c
88. b
89. b
90. c
91. c
92. b
93. b
94. d
95. b
96. d
97. b
98. a
99. d
100. a