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Water Treatment Primer 1 Training Course $100.00

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Water Treatment Primer 1 Answer Key

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1. A B C D E F	13. A B C D E F	25. A B C D E F
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112. A B C D E F	125. A B C D E F	138. A B C D E F
113. A B C D E F	126. A B C D E F	139. A B C D E F
114. A B C D E F	127. A B C D E F	140. A B C D E F
115. A B C D E F	128. A B C D E F	141. A B C D E F
116. A B C D E F	129. A B C D E F	142. A B C D E F
117. A B C D E F	130. A B C D E F	143. A B C D E F
118. A B C D E F	131. A B C D E F	144. A B C D E F
119. A B C D E F	132. A B C D E F	145. A B C D E F
120. A B C D E F	133. A B C D E F	146. A B C D E F
121. A B C D E F	134. A B C D E F	147. A B C D E F
122. A B C D E F	135. A B C D E F	148. A B C D E F
123. A B C D E F	136. A B C D E F	149. A B C D E F
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If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of $50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line**.**

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Water Treatment Primer 1 Training Course Assignment

The Assignment (Exam) is also available in Word on the Internet for your Convenience, please visit www.ABCTLC.com and download the assignment and e- mail it back to TLC.

You'll have 90 days from the start of this course to complete in order to receive your Professional Development Hours (**PDHs**) or Continuing Education Unit (**CEU**). A score of 70 % is necessary to pass this course. We prefer if this exam is proctored. No intentional trick questions. If you should need any assistance, please email all concerns and the completed manual to info@tlch2o.com.

We would prefer that you utilize the enclosed answer sheet in the front, but if you are unable to do so, type out your own answer key. Please include your name and address on your manual and make copy for yourself. You can e-mail or fax your Answer Key along with the Registration Form to TLC. **(S) Means answer may be plural or singular**. **Multiple Choice Section, One answer per question and please use the answer key.**

Water Treatment Introduction

1. The treatment needs of a water system are likely to differ depending on whether the system uses?

A. Adsorption
B. Common treatment filtration
C. Schmutzdecke
D. A groundwater or surface water source
E. Coagulation and flocculation
F. None of the Above

2. Common surface water contaminants include turbidity, microbiological contaminants (Giardia, viruses and bacteria) and low levels of a large number of.

A. Recycling contaminants
B. Organic chemicals
C. Cryptosporidium
D. Microbial pathogens
E. Other disease-causing microbes
F. None of the Above

3. Groundwater contaminants include naturally occurring inorganic chemicals and _____ that have recently been detected in localized areas.

A. Recycling contaminants
B. Microbiological contaminants
C. Cryptosporidium
D. Cryptosporidium and other microbial pathogens
E. A number of volatile organic chemicals (VOCs)
F. None of the Above

4. When selecting among the different treatment options, the water supplier must consider?

A. Adsorption
B. A number of factors
C. Schmutzdecke
D. The grains of the filter media
E. Coagulation and flocculation
F. None of the Above

Preliminary Treatment

5. Most lakes and reservoirs are not free of logs, tree limbs, sticks, gravel, sand and rocks, weeds, leaves, and trash. If not removed, these will cause problems to the treatment plant's pumps and equipment. The best way to protect the plant is?

A. Sedimentation basins
B. Chain and flight collector
C. Screening
D. Some clarifiers
E. Sludge collector mechanism
F. None of the Above

6. Which of the following terms- are made of straight steel bars at the intake of the plant. The spacing of the horizontal bars will rank the size?
A. A screw conveyor D. Wire mesh screens
B. Bar screens E. Flights and chains
C. The drive chain F. None of the Above

7. Which of the following terms- are woven stainless steel material and the opening of the fabric is narrow. Both require manual cleaning?
A. A screw conveyor D. Wire mesh screens
B. Bar screens E. Flights and chains
C. The drive chain F. None of the Above

8. Mechanical bar screens vary in size and use some type of _____that travels horizontally down the bars to scrap the debris off.
A. A screw conveyor D. Wire mesh screens
B. Raking mechanism E. Flights and chains
C. The drive chain F. None of the Above

Pre-Sedimentation
9. Once the water passes the bar screens, sand and grit are still present. This will damage plant equipment and pipes, so it must be removed. This is generally done with?
A. A screw conveyor D. Either rectangular- or round-shaped clarifers
B. Bar screens E. Flights and chains
C. The drive chain F. None of the Above

10. Sedimentation basins are also used after the?
A. Flocculation process D. Some clarifiers
B. Chain and flight collector E. Sludge collector mechanism
C. Hopper in the clarifier F. None of the Above

11. Rectangular clarifiers are designed with scrapers on the bottom to move the settled sludge to one or more hoppers at the influent end of the tank. It could have a screw conveyor or _____used to collect the sludge.
A. A screw conveyor D. Traveling bridge
B. Bar screens E. Flights and chains
C. The drive chain F. None of the Above

12. The most common is a chain and flight collector. Most designs will have _____to prevent short circuiting and scum from entering the effluent.
A. Sedimentation basins D. Some clarifiers
B. Baffles E. Sludge collector mechanism
C. Hoppers F. None of the Above

Flights and Chains
13. The most important thing to consider is the sludge and scum collection mechanism known as the?
A. A screw conveyor D. Wire mesh screens
B. Bar screens E. Flights and chains
C. The drive chain F. None of the Above

14. They move the settled sludge to the _____ for return and they also remove the scum from the surface of the clarifier.

A. Sedimentation basin
B. Chain and flight collector
C. Hopper in the clarifier
D. Clarifier
E. Sludge collector mechanism
F. None of the Above

15. Which of the following terms- are usually wood or nonmetallic flights mounted on parallel chains?

A. Screw conveyors
B. Bar screens
C. The flights
D. Wire mesh screens
E. Flights and chains
F. None of the Above

16. Some clarifiers may not have_____, so the configuration of the shaft may vary.

A. Sedimentation basins
B. Chain and flight collector
C. Hopper in the clarifier
D. Scum removal equipment
E. Sludge collector mechanism
F. None of the Above

17. If a heavy load is put on the sludge collector system then the shear pin should break. This means that the gear would simply slide around the shaft and movement of the _____would stop.

A. Sedimentation basins
B. Chain and flight collector
C. Hopper in the clarifier
D. Drive chain
E. Sludge collector mechanism
F. None of the Above

Circular Clarifiers

18. In some circular or square tanks, rotating scrapers are used. The most common type has a center pier or column. The major mechanic parts of the clarifier are the drive unit; the _____, and the scum removal system**.**

A. Sedimentation basin
B. Chain and flight collector
C. Hopper in the clarifier
D. Some clarifiers
E. Sludge collector mechanism
F. None of the Above

Pre-Treatment

19. Once the water passes the_____, sand and grit are still present. This will damage plant equipment and pipes, so it must be removed. This is generally done with either rectangular or round shaped clarifiers.

A. Screw conveyor
B. Bar screens
C. Traditional treatments
D. Wire mesh screens
E. Flights and chains
F. None of the Above

20. Sedimentation basins are also used after?

A. Conventional technology
B. The conventional process
C. Direct Filtration plant
D. The flocculation process
E. Traditional treatments
F. None of the Above

21. Let's first look at the components of_____, most are designed with scrapers on the bottom to move the settled sludge to one or more hoppers at the influent end of the tank..

A. Conventional technology
B. The conventional process
C. Direct Filtration plant
D. Either rectangular or round shaped clarifiers
E. A rectangular clarifier
F. None of the Above

22. The most common is_____. Most designs will have baffles to prevent short-circuiting and scum from entering the effluent.

A. Conventional technology
B. The conventional process
C. Direct Filtration plant
D. Either rectangular or round shaped clarifiers
E. A chain and flight collector
F. None of the Above

Direct Filtration Plant vs. Conventional Plant

23. The only difference is that the sedimentation process or step is omitted from the?

A. Conventional technology
B. The conventional process
C. Direct Filtration plant
D. The flocculation process
E. Traditional treatments
F. None of the Above

Conventional Treatment Overview & Direct Filtration

24. Which of the following terms- rely on expensive, construction-intensive processes with lengthy times?

A. Conventional technology
B. The conventional process
C. Direct Filtration plant
D. The flocculation process
E. Traditional treatments
F. None of the Above

25. Which of the following terms- carry an electrical charge which causes them to repel one another?

A. A filter bed
B. Suspended particles
C. The filter media
D. The media
E. Chemical pretreatment
F. None of the Above

26. Alum combines with alkalinity in the raw water to form a white precipitate that neutralizes suspended particles' electrical charge and forms a base for coagulating those?

A. Larger suspended particles
B. Suspended particles
C. Large floc
D. Particles
E. Chemicals
F. None of the Above

27. Conventional technology uses a 30 to 50 mg/L alum dosage to form a _____ that requires extensive retention time to permit settling.

A. Larger suspended particles
B. Suspended particles
C. Large floc
D. Particles
E. Chemicals
F. None of the Above

28. Traditional filter systems use graded silica sand filter media, since the sand grains all have about the same density, larger grains lay toward the bottom of _____and finer grains lay at the top of the filter bed.

A. The filter bed
B. The filter
C. The filter media
D. The media
E. A depth filter
F. None of the Above

29. Which of the following terms- has four layers of filtration media, each of different size and density?

A. A filter bed
B. The filter
C. The filter media
D. The media
E. A depth filter
F. None of the Above

30. Which of the following terms- become progressively finer and denser in the lower layers?
A. A filter bed D. The media
B. The filter E. Chemical pretreatment
C. The filter media F. None of the Above

31. Which of the following terms- are trapped throughout the bed, not in just the top few inches?
A. Larger suspended particles D. Particles
B. Suspended particles E. Chemicals
C. Large floc F. None of the Above

32. Operating beyond this pressure drop increases the chance of fouling - called "_____" - within the filter.
A. Larger suspended particles D. Particles
B. Suspended particles E. Chemical pretreatment
C. Large floc F. None of the Above

33. Which of the following terms- consists of an up-flow backwash followed by a down-flow rinse?
A. Conventional technology D. The flocculation process
B. The conventional process E. The reconditioning cycle
C. Direct Filtration plant F. None of the Above

34. Turbidity washes out of the filter bed as _____scour one another. The down-flow rinse settles the bed before the filter returns to service.
A. A filter bed particles D. The filter media particles
B. The filter particles E. Chemical pretreatment particles
C. The filter media F. None of the Above

35. Which of the following terms- is often used to enhance filter performance, particularly when turbidity includes fine colloidal particles?
A. Conventional technology D. The flocculation process
B. The conventional process E. Traditional treatments
C. Chemical pretreatment F. None of the Above

36. Feeding chemicals such as alum, ferric chloride, or a cationic polymer neutralizes the charge, allowing the particles to cling to one another and to?
A. Filter bed D. The media
B. The filter E. Chemical pretreatment
C. The filter media F. None of the Above

37. Which of the following terms- may increase filtered water clarity, measured in NTU, by 90% compared with filtration alone?
A. A filter bed D. The media
B. The filter E. Chemical pretreatment
C. The filter media F. None of the Above

Package Plants

38. Representing a slight modification of _____, package plants are usually built in a factory, mounted on skids, and transported virtually assembled to the operation site.

A. Sedimentation basins D. Conventional filtration technology
B. Rapid-sand filtration E. Conventional filtration processes
C. Filtration F. None of the Above

39. These are appropriate for small community systems where full _____is desired, but without the construction costs and space requirements associated with separately constructed sedimentation basins, filter beds, clear wells, etc.

A. Sedimentation basins D. Coagulation
B. Rapid-sand filtration E. Water treatment
C. Filtration F. None of the Above

40. In addition to the _____, package plants are found as two types: tube-type clarifiers and adsorption clarifiers.

A. Sedimentation basins D. Conventional filtration technology
B. Rapid-sand filtration E. Conventional filtration processes
C. Filtration F. None of the Above

Rapid Sand Filtration

41. Also known as _____, this is the most prevalent form of water treatment technology in use today. This filtration process employs a combination of physical and chemical processes in order to achieve maximum effectiveness.

A. Sedimentation basins D. Coagulation
B. Rapid-sand filtration E. Flash mix
C. Filtration F. None of the Above

Coagulation

42. At the Water Treatment Plant, aluminum sulfate, commonly called alum, is added to the water in the "_____" to cause microscopic impurities in the water to clump together. The alum and the water are mixed rapidly by the flash mixer.

A. Sedimentation basins D. Coagulation
B. Rapid-sand filtration E. Flash mix
C. Filtration F. None of the Above

43. Which of the following terms- is the process of joining together particles in water to help remove organic matter?

A. Sedimentation basins D. Coagulation
B. Rapid-sand filtration E. Flash mix
C. Filtration F. None of the Above

44. Which of the following terms- are required since colloidal particles by themselves have the tendency to stay suspended in water and not settle out?

A. Sedimentation basins D. Coagulation methods
B. Rapid-sand filtration E. Coagulant chemicals
C. Filtration methods F. None of the Above

45. All matter has a residual surface charge to a certain degree. But since_____, their charge per volume is significant.

A. Alum
B. Suspended particles
C. Large floc
D. Colloidal particles are so small
E. Cationic polymers
F. None of the Above

46. Coagulant chemicals such as "_____" work by neutralizing the negative charge, which allows the particles to come together.

A. Alum
B. Suspended particles
C. Large floc
D. Particles
E. Cationic polymers
F. None of the Above

47. Other coagulants are called "_____", which can be thought of as positively charged strings that attract the particles to them, and in the process, form a larger particle.

A. Alum
B. Suspended particles
C. Large floc
D. Particles
E. Cationic polymers
F. None of the Above

48. Also, new chemicals have been developed which combine the properties of _____ and cationic polymers.

A. Alum
B. Alum-type coagulants
C. Aluminum Sulfate
D. Particles
E. Cationic polymers
F. None of the Above

49. Which of the following terms- is the most widely used coagulant in water treatment?

A. Aluminum Sulfate
B. Cationic polymers
C. Colloidal particles
D. Coagulation
E. Coagulant chemicals
F. None of the Above

50. Which of the following terms- is necessary to meet the current regulations for almost all potable water plants using surface water?

A. Aluminum Sulfate
B. Cationic polymers
C. Colloidal particles
D. Coagulation
E. Coagulant chemicals
F. None of the Above

51. Which of the following terms- is also excellent for removing nutrients such as phosphorous in wastewater treatment?

A. Aluminum Sulfate
B. Cationic polymers
C. Colloidal particles
D. Coagulation
E. Coagulant chemicals
F. None of the Above

52. Bacterial removals of 99% are also achievable. More than 98% of poliovirus type 1 was removed by?

A. Sedimentation basins
B. Rapid-sand filtration
C. Filtration
D. Conventional coagulation and filtration
E. Conventional filtration processes
F. None of the Above

53. Several recent studies have shown that bacterial and viral agents are attached to organic and inorganic particulates, removal of these particulates by _____ is a major component of effective treatment for the removal of pathogens.

A. Sedimentation basins
B. Rapid-sand filtration
C. Filtration
D. Conventional coagulation and filtration
E. Conventional filtration processes
F. None of the Above

Flocculation

54. The chemically treated water is sent into a basin where the suspended particles can collide, agglomerate, and form heavier particles called?

A. Floc
B. Cationic polymers
C. The particles
D. Floc particles
E. Suspended solid particles
F. None of the Above

55. Gentle agitation of the _____and appropriate detention times (the length of time water remains in the basin) help facilitate this process.

A. Floc
B. A sedimentation step
C. Particles
D. Floc particles
E. Suspended solid particles
F. None of the Above

56. The water is slowly mixed in contact chambers allowing the coagulated particles, now called "_____," to become larger and stronger.

A. Floc
B. A sedimentation step
C. The particles
D. Floc particles
E. Suspended solid particles
F. None of the Above

Sedimentation

57. The process of _____ settling out in water.

A. Floc
B. A sedimentation step
C. The particles
D. Floc particles
E. Suspended solid particles
F. None of the Above

58. During sedimentation, the velocity of the water is decreased so that the suspended material, including flocculated _____, can settle out by gravity.

A. Floc
B. Sedimentation
C. Particles
D. Floc particles
E. Suspended solid particles
F. None of the Above

59. Once settled, the particles combine to form _____that is later removed from the bottom of the basin.

A. Floc
B. A sludge
C. The particles
D. Floc particles
E. Suspended solid particles
F. None of the Above

Filtration

60. Which of the following terms- used to remove turbidity, dissolved organics, odor, taste and color?

A. Sedimentation basins
B. Rapid-sand filtration
C. Filtration
D. Coagulation
E. A water treatment step
F. None of the Above

61. Which of the following terms- can be adjusted to meet water consumption needs?
A. Sedimentation basins D. Coagulation
B. Rapid-sand filtration E. A water treatment step
C. Filtration F. None of the Above

62. The most widely used are _____filters in tanks. In these units, gravity holds the material in place and the flow is downward.
A. Sedimentation D. Coagulation
B. Rapid-sand E. A water treatment step
C. Filtration F. None of the Above

63. The filter is periodically cleaned by a _____and the discharge of back-flushed water into a drain.
A. Reversal of flow D. Coagulation
B. Rapid-sand filtration E. Cartridge filters
C. Filtration F. None of the Above

64. Which of the following terms- made of fabric, paper, or plastic material are also common and are often much smaller and cheaper, as well as disposable?
A. Sedimentation filters D. Coagulation filters
B. Rapid-sand filters E. Cartridge filters
C. Filtration filters F. None of the Above

65. With most of the larger particles settled out, the water now goes to the _____ process.
A. Sand filtration D. Coagulation filtration
B. Rapid-sand filtration E. Post-disinfection
C. Filtration F. None of the Above

66. Anthracite coal or activated carbon may also be included in the sand to improve the _____, especially for the removal of organic contaminants and taste and odor problems.
A. Coagulation filtration D. Coagulation
B. Rapid-sand filtration E. Filtration process
C. Filtration F. None of the Above

Declining Rate Filters
67. The flow rate will vary with?
A. Media submergence D. Post-disinfection
B. A given rate of flow E. The treatment process
C. Head loss F. None of the Above

Detention Time
68. The actual time required for a small amount of water to pass through a sedimentation basin at a given rate of flow, or the calculated time required for a small amount of liquid to pass through a tank at?
A. Media submergence D. Post-disinfection
B. A given rate of flow E. The treatment process
C. Raise the pH value F. None of the Above

Disinfection
69. Chlorine is added to the water at the flash mix for_____. The chlorine kills or inactivates harmful microorganisms. Chlorine is added again after filtration for post-disinfection.
A. Pre-disinfection D. Post-disinfection
B. A given rate of flow E. The treatment process
C. Raise the pH value F. None of the Above

Jar Testing
70. Which of the following terms- and most economical way to obtain good reliable data on the many variables which affect the treatment process?
A. Media submergence D. It is the quickest
B. A given rate of flow E. The treatment process
C. Raise the pH value F. None of the Above

pH
71. Most natural water has a pH between?
A. Reduce(d) between 5-9 D. 1 &3
B. Adequate between 2-8 E. Continuously between 1-7
C. Even(ly)between 3-9 F. None of the Above

Caustic
72. NaOH (also called Sodium Hydroxide) is a strong chemical used in the treatment process to _____ acidity, increase alkalinity, or raise the pH value.
A. Reduce(d) D. Subsequent
B. Adequate E. Neutralize
C. Even(ly) F. None of the Above

Polymer
73. A type of chemical, when combined with_____, aids in binding small suspended particles to larger particles to help in the settling and filtering processes.
A. Floc D. Floc particles
B. Other types of coagulants E. Suspended solid particles
C. The particles F. None of the Above

Water Quality
74. Water testing is conducted throughout the treatment process. Items like turbidity, pH, and chlorine residual are monitored and recorded?
A. Reduce(d) D. Subsequent
B. Adequate E. Continuously
C. Even(ly) F. None of the Above

Sampling
75. Care should be taken not to disturb the bottom of the water source or along the sides. So as not to stir up any settled solids. This would create _____results.
A. Reduce(d) D. Subsequent
B. Erroneous E. Continuously
C. Even(ly) F. None of the Above

Chemical feed and rapid mix

76. Chemicals are added to the water in order to improve the _____ treatment processes. These may include pH adjusters and coagulants.

A. Reduce(d)
B. Adequate
C. Even(ly)
D. Subsequent
E. Continuously
F. None of the Above

77. Coagulants are chemicals, such as alum, that neutralize positive or negative charges on small particles, allowing them to stick together and form larger particles that are more easily removed by?

A. Sedimentation (settling) or filtration
B. Erroneous results
C. Gravity settling
D. Other types of coagulants
E. Larger particles
F. None of the Above

78. A variety of devices, such as baffles, static mixers, impellers, and in-line sprays can be used to mix the water and distribute the chemicals?

A. Reduce(d)
B. Adequate(ly)
C. Even(ly)
D. Subsequent(ly)
E. Continuously
F. None of the Above

Short-Circuiting

79. Short-Circuiting is a condition that occurs in tanks or basins when some of the water travels faster than the rest of the flowing water. This is_____, since it may result in shorter contact, reaction, or settling times in comparison with the presumed detention times.

A. Undesirable
B. Erroneous results
C. Gravity settling
D. Usually undesirable
E. Larger particles
F. None of the Above

Tube Settlers

80. This modification of the conventional process contains many metal "_____" that are placed in the sedimentation basin, or clarifier.

A. Sedimentation basins
B. Tubes
C. Screens
D. Clarifiers
E. Sludge collectors
F. None of the Above

81. Which of the following terms- facilitates gravity settling of the solids to the bottom of the basin, where they can be collected and removed?

A. Large surface settling area
B. Tubes
C. Screens
D. Adsorption clarifier package plant
E. Slope of the tubes
F. None of the Above

82. Which of the following terms- also means that adequate clarification can be obtained with detention times of 15 minutes or less?

A. Large surface settling area
B. Tubes
C. Screens
D. Adsorption clarifier package plant
E. Slope of the tubes
F. None of the Above

Adsorption Clarifiers

83. The concept of the adsorption clarifier package plant was developed in the early 1980's. This technology uses an up-flow clarifier with low-density plastic bead media, usually held in place by a?

A. Large surface settling area
B. Tubes
C. Screen
D. Adsorption clarifier package plant
E. Slope of the tubes
F. None of the Above

84. Turbidity is _____of the coagulated and flocculated solids onto the adsorption media and onto the solids already adsorbed onto the media.

A. Reduced by adsorption
B. Adequate by adsorption
C. Evened by adsorption
D. Subsequent by adsorption
E. Continuous by adsorption
F. None of the Above

85. Air scouring cleans adsorption clarifiers followed by water flushing. Cleaning of this _____is initiated more often than filter backwashing because the clarifier removes more solids.

A. Large surface settling area
B. Tubes
C. Tube-settler type of package plant
D. Adsorption clarifier package plant
E. Type of clarifier
F. None of the Above

86. As with the_____, the sedimentation/clarification process is followed by mixed-media filtration and disinfection to complete the water treatment.

A. Large surface settling area
B. Tubes
C. Tube-settler type of package plant
D. Adsorption clarifier package plant
E. Type of clarifier
F. None of the Above

Clearwell

87. The final step in the _____process, the clearwell provides temporary storage for the treated water.

A. Sedimentation basins
B. Rapid-sand filtration
C. Filtration
D. Coagulation
E. Conventional filtration
F. None of the Above

EPA Filter Backwash Rule

88. The U.S. Environmental Protection Agency (EPA) has finalized the Long Term 1 Enhanced Surface Water Treatment Rule and Filter Backwash Rule (LT1FBR) to increase protection of finished drinking water supplies from contamination by?

A. Recycling contaminants
B. Microbiological contaminants
C. Cryptosporidium
D. Cryptosporidium and other microbial pathogens
E. Other disease-causing microbes
F. None of the Above

89. This rule will extend protections against _____ and other disease-causing microbes to the 11,500 small water systems which serve fewer than 10,000 people annually.

A. Recycling contaminants
B. Microbiological contaminants
C. Cryptosporidium
D. Cryptosporidium and other microbial pathogens
E. Other disease-causing microbes
F. None of the Above

90. The filter backwash requirements will reduce the potential risks associated with _____ removed during the filtration process.

A. Recycling contaminants
B. Microbiological contaminants
C. Cryptosporidium
D. Cryptosporidium and other microbial pathogens
E. Other disease-causing microbes
F. None of the Above

Background

91. The EPA has determined that the presence of microbiological contaminants is a health concern. If finished water supplies contain _____, disease outbreaks may result.

A. Recycling contaminants
B. Microbiological contaminants
C. Cryptosporidium
D. Cryptosporidium and other microbial pathogens
E. Other disease-causing microbes
F. None of the Above

92. The EPA has set enforceable drinking water treatment requirements to reduce the risk of?

A. Recycling contaminants
B. Microbiological contaminants
C. Waterborne disease outbreaks
D. Cryptosporidium and other microbial pathogens
E. Other disease-causing microbes
F. None of the Above

93. Physical removal is critical to the control of _____ because it is highly resistant to standard disinfection practice.

A. Recycling contaminants
B. Microbiological contaminants
C. Cryptosporidium
D. Cryptosporidium and other microbial pathogens
E. Other disease-causing microbes
F. None of the Above

94. In 1993, _____ caused over 400,000 people in Milwaukee to experience intestinal illness.

A. Recycling contaminants
B. Microbiological contaminants
C. Cryptosporidium
D. Cryptosporidium and other microbial pathogens
E. Other disease-causing microbes
F. None of the Above

95. The IESWTR set the first drinking water standards to control _____ in large water systems, by establishing filtration and monitoring requirements for systems serving more than 10,000 people each.

A. Recycling contaminants
B. Microbiological contaminants
C. Cryptosporidium
D. Cryptosporidium and other microbial pathogens
E. Other disease-causing microbes
F. None of the Above

The Filtration Process

96. Removal of suspended solids by _____plays an important role in the natural treatment of groundwater as it percolates through the soil. It is also a major part of most water treatment.

A. Adsorption
B. Filtration
C. Schmutzdecke
D. The grains of the filter media
E. Coagulation and flocculation
F. None of the Above

97. Groundwater that has been softened or treated through iron and manganese removal will require filtration to remove floc created by?
A. The filter bed D. Iron and manganese removal
B. Adsorption E. Coagulation or oxidation processes
C. Schmutzdecke F. None of the Above

98. Since surface water sources are subject to run-off and_____, it must be filtered to remove particles and impurities.
A. The filter bed D. Iron and manganese removal
B. Adsorption E. Do not undergo natural filtration
C. Schmutzdecke F. None of the Above

99. The filter used in the _____can be compared to a sieve or microstrainer that traps suspended material between the grains of filter media.
A. Adsorption D. The grains of the filter media
B. Filtration process E. Coagulation and flocculation
C. Schmutzdecke F. None of the Above

100. Filtration primarily depends on a combination of complex physical and chemical mechanisms, the most important being?
A. The filter bed D. Iron and manganese removal
B. Adsorption E. Coagulation or oxidation processes
C. Schmutzdecke F. None of the Above

101. Which of the following terms- is the process of particles sticking onto the surface of the individual filter grains or onto the previously deposited materials?
A. Adsorption D. The grains of the filter media
B. Suspended solids E. Coagulation and flocculation
C. Schmutzdecke F. None of the Above

102. Which of the following terms- may occur in the filter bed, especially if coagulation and flocculation of the water before filtration was not properly controlled?
A. Coagulation and flocculation D. Iron and manganese removal
B. Adsorption E. Coagulation or oxidation processes
C. Schmutzdecke F. None of the Above

Types of Filters

103. Several types of filters are used for water treatment. The earliest ones developed were the _____filters.
A. Sand D. Coagulation
B. Rapid-sand E. Filtration process
C. Slow sand F. None of the Above

104. This type of filter requires large filter areas. The top several inches of the sand has to be removed regularly, usually by hand due to the mass of growing material ("_____") that collects in the filter.
A. Sand D. Coagulation
B. Rapid-sand E. Schmutzdecke
C. Slow sand F. None of the Above

105. Most filters are classified by filtration rate, type of filter media, or?
A. Adsorption D. The grains of the filter media
B. Suspended solids E. Coagulation and flocculation
C. Type of operation F. None of the Above

106. Some smaller plants are designed with the filters forming a square of four filters with a central pipe gallery feeding the filters from?
A. Large surface settling area D. Adsorption clarifier
B. Tubes E. A type of clarifier
C. A center well F. None of the Above

Filter Sand
107. The filter sand used in _____filters is manufactured specifically for the purpose of water filtration.
A. Sand D. Coagulation
B. Rapid sand E. Schmutzdecke
C. Slow sand F. None of the Above

108. This is larger than the sand used in _____filtration.
A. Sand D. Slow rate
B. Rapid-sand E. Schmutzdecke
C. Slow sand F. None of the Above

109. The under-gravel also distributes the backwash water evenly across the total filter. This under-gravel supports the filter sand and is usually graded in three to five layers, each generally 6-18 inches in thickness, depending on the type of _____used.
A. Sand D. Coagulation
B. Rapid-sand filtration E. Filtration process
C. Underdrain F. None of the Above

False floor
110. The false floor design of a filter underdrain is used together with a porous plate design or with screens that retain the sand when there is?
A. A filter media D. A Coagulant dosage linear
B. An underdrain E. Other corrosion-resistant materials
C. No undergravel layer F. None of the Above

Leopold system
111. The Leopold system consists of a series of clay or plastic blocks that form the channels to remove the filtered water from the filter and distribute the backwash water. This type of underdrain is generally used with an undergravel layer, although some new designs allow for _____without gravel.
A. Filter media D. Coagulant dosage linear
B. Underdrain E. Other corrosion-resistant materials
C. Sand retention F. None of the Above

Washwater Troughs

112. Washwater troughs placed above the filter media collect the _____and carry it to the drain system.

A. Filter media
B. Backwash water
C. Pollution
D. Coagulant dosage linear
E. Other corrosion-resistant materials
F. None of the Above

113. Which of the following terms - must be installed at the same elevation so that they remove the backwash evenly from the filter and so that an even head is maintained across the entire filter?

A. Filter media
B. Underdrain
C. Wash troughs
D. Backwash troughs
E. Other corrosion-resistant materials
F. None of the Above

114. Which of the following terms - are constructed from concrete, plastic, fiberglass, or other corrosion-resistant materials?

A. Filter media
B. Underdrain
C. Wash troughs
D. Backwash troughs
E. Other corrosion-resistant materials
F. None of the Above

115. Usually, the additional coagulant required is relatively small when turbidities are much higher than normal due to?

A. Filter media
B. Underdrain
C. Pollution
D. Higher collision probabilities of the colloids during high turbidities
E. Other corrosion-resistant materials
F. None of the Above

116. Which of the following terms - can be very difficult to coagulate due to the difficulty in inducing collision between the colloids?

A. Filter media
B. Underdrains
C. Pollution
D. Low turbidity waters
E. Other corrosion-resistant materials
F. None of the Above

117. Organic colloids may be present in a water supply due to pollution, and these colloids can be difficult to remove in the coagulation process. In this situation, higher _____ are generally required.

A. Filter media
B. Underdrain
C. Pollution
D. Coagulant dosages
E. Other corrosion-resistant materials
F. None of the Above

Disposal of Filter Backwash Water

118. Water from the filter backwash cannot be returned directly to?

A. The water
B. Filtered water
C. A filter aid
D. The filter backwash water
E. The environment
F. None of the Above

119. The supernatant, or cleared liquid, is then pumped back to the head of the treatment plant at a rate not exceeding ten percent of _____flow entering the plant.

A. The floc
B. Spent backwash water
C. The suspended material
D. The supernatant
E. The raw water
F. None of the Above

120. The settled material is pumped to a sewer or is treated in the solids-handling process of the plant. This conserves most of the backwash water and eliminates the need to obtain a pollution discharge permit for the disposal of?
A. The water D. The filter backwash water
B. Filtered water E. Suspended material
C. A filter aid F. None of the Above

121. The spent backwash water must be stored in storage tanks and returned slowly to?
A. The floc D. The supernatant
B. Spent backwash water E. The treatment process
C. The suspended material F. None of the Above

Filter to Waste
122. Depending on the type of filter, this may last from two to 20 minutes. This wasting is needed as some suspended material remains in the filter media following?
A. The water D. The filter backwash water
B. The backwash E. Suspended material
C. A filter aid F. None of the Above

123. Which of the following terms - needs to become somewhat sticky again to start to capture the suspended material?
A. The floc D. The media
B. Spent backwash water E. Polymers
C. The suspended material F. None of the Above

124. Which of the following terms - is higher in a clean filter, causing more material to be swept from the filter during the start-up?
A. The filtration rate D. The filter backwash water
B. Filtered water E. Suspended material
C. A filter aid F. None of the Above

Filter Aids
125. Sometimes, when water passes through a filter, the floc is torn apart into smaller particles that will penetrate deeply into the filter media, causing premature turbidity breakthrough. This will require more frequent filter backwashing of the filter and use of large volumes of backwash water to be able to remove the floc that has penetrated deeply into?
A. The floc D. The supernatant
B. Spent backwash water E. The filter bed
C. The suspended material F. None of the Above

126. A filter aid is a material that adds strength to the floc and prevents its breakup. Generally, a polymer is used as a filter aid because it creates strong bonds with the floc. _____, organic compounds that can be purchased in either wet or dry form.
A. The water D. The filter backwash water
B. Filtered water E. Suspended material
C. Polymers are water-soluble F. None of the Above

127. Which of the following terms - have very high molecular weight and cause the floc to coagulate and flocculate quickly.

A. The floc
B. Spent backwash water
C. The suspended material
D. The supernatant
E. Polymers
F. None of the Above

128. Which of the following terms - can have positive or negative charges, depending on the type needed to cause attraction to the specific floc filtered.

A. The floc
B. Spent backwash water
C. The suspended material
D. The supernatant
E. Polymers
F. None of the Above

129. When used as a filter aid, the _____strengthens the bonds and prevents the shearing forces in the filter from breaking the floc apart. For best results, the polymer should be added just ahead of the filter.

A. The floc
B. Spent backwash water
C. The suspended material
D. The supernatant
E. Polymer
F. None of the Above

130. A normal dose of polymer for filter aiding will be less than 0.1 ppm, but the exact dose will be decided by the result of _____and by experimentation in the treatment plant.

A. The floc
B. Spent backwash water
C. The suspended material
D. The supernatant
E. Polymers
F. None of the Above

131. Which of the following terms - will cause the bonds to become too strong, which may then cause the filter to plug, especially the top few inches of the filter media?

A. Too much polymer
B. Filtered water
C. A filter aid
D. The filter backwash water
E. Suspended material
F. None of the Above

Purpose of Coagulation

132. Untreated surface waters contain clay, minerals, bacteria, inert solids, _____, oxidized metals, organic color producing particles, and other suspended materials.

A. Particles
B. Colloidal material ranges
C. Microbiological organisms
D. Both the particle size and specific gravity
E. Organic color producing particles
F. None of the Above

133. The ability of particles to remain suspended in water is a function of both the particle size and specific gravity. _____can range in size from molecular to 50 microns.

A. Particles
B. Turbidity particles
C. Colloidal particles
D. Both the particle size and specific gravity
E. Organic color producing particles
F. None of the Above

134. Which of the following terms - which are greater than one micron in diameter are considered silt, and settle out due to their relatively large size and density without the need to coagulate in a matter of seconds or minutes?

A. Particles
B. Colloidal material ranges
C. Colloidal particles
D. Both the particle size and specific gravity
E. Organic color producing particles
F. None of the Above

135. Which of the following terms - ranges in size from 0.001 to one micron in diameter. These materials require days to months for complete settling?

A. Particles
B. Colloidal material
C. Colloidal particles
D. Both the particle size and specific gravity
E. Organic color producing particles
F. None of the Above

136. Since detention times in the water treatment process are generally less than twelve hours, the rate of settling of these _____ must be increased in the water treatment process.

A. Particles
B. Colloidal material
C. Colloidal particles
D. Both the particle size and specific gravity
E. Organic color producing particles
F. None of the Above

137. This is accomplished in the _____ when tiny particles agglomerate into larger, denser particles which will settle more quickly.

A. Positive charge
B. Olation
C. Coagulation process
D. Van der Waals forces
E. Hydrophobic or water hating colloids
F. None of the Above

138. These tiny colloidal particles have a_____, and this factor is important in keeping the particles suspended for long periods of time.

A. Positive charge
B. Olation
C. Coagulation process
D. Very large surface area to mass ratio
E. Hydrophobic or water hating colloids
F. None of the Above

139. Two types of colloids exist. These are hydrophobic or water hating colloids, and ?

A. Positive charge
B. Olation
C. Coagulation process
D. The Van der Waals forces
E. Hydrophilic or water loving colloids
F. None of the Above

140. Hydrophilic colloids can react chemically with the coagulants commonly added to water under proper conditions. Examples of hydrophilic colloids would be _____ compounds.

A. Organic color forming
B. Iron salt(s)
C. Anions
D. Electrical double layer
E. Hydrophobic colloids
F. None of the Above

141. Hydrophobic colloids do not easily form?

A. Suspensions
B. Iron salt(s)
C. Anions
D. Electrical double layer
E. Hydrophobic colloids
F. None of the Above

142. Examples of hydrophobic colloids would be clays and?
A. Metal oxides D. Electrical double layer
B. Iron salt(s) E. Hydrophobic colloids
C. Anions F. None of the Above

The Coagulation Process

143. Which of the following terms - are added to water. These are aluminum salts and iron salts. The most common aluminum salt is aluminum sulfate, or alum.
A. Aluminum sulfate D. Two major types of coagulants
B. Iron salt(s) E. Hydrophobic colloids
C. Anions F. None of the Above

144. When _____ is added to water, the aluminum ions enter into a series of complicated reactions.
A. Aluminum sulfate D. Two major types of coagulants
B. Iron salt(s) E. Hydrophobic colloids
C. Anions F. None of the Above

145. These reactions result in large, positively charged molecules having aluminum ions at their center. These particles may have charges as high as +4. Following these reactions, a second type of reaction occurs, called?
A. Positive charge D. The Van der Waals forces
B. Olation E. Hydrophobic or water hating colloids
C. Coagulation process F. None of the Above

146. A typical molecule can contain eight aluminum ions, twenty hydroxide ions, and will have a +4 charge. _____ behave in a similar manner when added to water.
A. Sweep floc D. Electrical double layer
B. Iron salt(s) E. Hydrophobic colloids
C. Anions F. None of the Above

147. The coagulant compounds can penetrate the bound water layer because of?
A. Their high positive charge D. The Van der Waals forces
B. Olation E. Hydrophobic action
C. Coagulation process F. None of the Above

148. This rapid adsorption results in the_____, and results in the colloid becoming coated with the coagulant compounds. The net result of this process is that the electrical charges on the particle are reduced.
A. Sweep floc D. Compression of the electrical double layer
B. Iron salt(s) E. Hydrophobic colloids
C. Anions F. None of the Above

149. The suspension is now considered to be destabilized, and the particles can be brought together through, among other forces, _____, and will be held together by the Van der Waals forces.
A. Positive charge D. Brownian Movement
B. Olation E. Hydrophobic or water hating colloids
C. Coagulation process F. None of the Above

150. An additional process occurs which assists this process. As the coagulant continues to undergo the hydrolyzation and olation reactions, progressively larger masses of flocculent material are formed. These compounds can become large enough to settle on their own, and tend to trap turbidity particles as they settle. This is commonly referred to as _____.

A. Sweep floc
B. Iron salt(s)
C. Anions
D. Olation
E. Hydrophobic colloids
F. None of the Above

You are finished with your assignment. Please email or fax the answer key and registration page to us and call an hour later to ensure we've received it.