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AFFIDAVIT OF EXAM COMPLETION

I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

Grading Information

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SDWA ACT Answer Key

Name _____

Phone # _____

Multiple Choice. Pick only one answer per question. Select answer according to text, exactly as in text. Circle, Mark off, underline or Bold the answer.

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| 1. A B C D E F | 38. A B C D E F | 75. A B C D E F |
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| 21. A B C D E F | 58. A B C D E F | 95. A B C D E F |
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| 27. A B C D E F | 64. A B C D E F | 101. A B C D E F |
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| 29. A B C D E F | 66. A B C D E F | 103. A B C D E F |
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200. A B C D E F

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**SDWA ACT CEU COURSE
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2. Please rate the difficulty of the testing process.
Very Easy 0 1 2 3 4 5 Very Difficult
3. Please rate the subject matter on the exam to your actual field or work.
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Please fax or e-mail the answer key to TLC
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For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity. Thank you...

SDWA Training Course Assignment

Your assignment is to correctly answer the following questions about the characteristic of the water quality system, sampling procedures, TCR, pathogens and sampling violations.

You will have 90 days in order to successfully complete this assignment with a score of 70% or better. If you need any assistance, please contact TLC's Student Services. Once you are finished, please, e-mail or fax or e-mail your answer sheet along with your registration form.

Please use the Answer Key and Registration form. Select the exact answer from text. Legend (s) means the answer is either singular or plural. Be careful and examine the "Or" answers too.

The major elements of Safe Drinking Water Act (SDWA) include:

1. The law updates the standard-setting process by focusing regulations on contaminants known to pose greater _____.

- | | |
|--|-------------------------------|
| A. Consumer Confidence Reports | D. Technical assistance funds |
| B. Maximum Contaminant Level Goals (MCLGs) | E. Public health risks |
| C. Cryptosporidium and radon | F. None of the Above |

2. It replaces the current law's demand for _____ every three years with a new process based on occurrence, relative risk, and cost-benefit considerations.

- | | |
|---------------------------------|-------------------------------------|
| A. Training and technical needs | D. State Revolving Loan Fund (SRLF) |
| B. Certification guidelines | E. Violation |
| C. 25 additional standards | F. None of the Above |

3. It also requires the EPA to select at least _____ to consider for regulation every five years.

- | | |
|--|-------------------------------------|
| A. Five new candidate contaminants | D. Technical assistance funds |
| B. Maximum Contaminant Level Goals (MCLGs) | E. State Revolving Loan Fund (SRLF) |
| C. Cryptosporidium and radon | F. None of the Above |

4. The EPA is directed to require public water systems to provide customers with annual " _____ " in newspapers and by direct mail.

- | | |
|---------------------------------|-------------------------------------|
| A. Training and technical needs | D. State Revolving Loan Fund (SRLF) |
| B. Certification guidelines | E. Consumer Confidence Reports |
| C. SDWA | F. None of the Above |

5. The reports must list levels of regulated contaminants along with Maximum Contaminant Levels (MCLs) and _____, along with plainly worded definitions of both.

- | | |
|--|-------------------------------------|
| A. Consumer Confidence Reports | D. Technical assistance funds |
| B. Maximum Contaminant Level Goals (MCLGs) | E. State Revolving Loan Fund (SRLF) |
| C. Cryptosporidium and radon | F. None of the Above |

6. The reports must also include a plainly worded statement of the health concerns for any contaminants for which there has been a violation, describe the utility's sources of drinking water and provide data on unregulated contaminants for which monitoring is required, including _____ and radon.

- | | |
|---------------------------------|-------------------------------------|
| A. Training and technical needs | D. State Revolving Loan Fund (SRLF) |
| B. Cryptosporidium | E. Violation |
| C. SDWA | F. None of the Above |

7. The EPA must establish a _____ customers can call to get additional information.
- | | |
|--|-------------------------------------|
| A. Consumer Confidence Reports | D. Technical assistance funds |
| B. Maximum Contaminant Level Goals (MCLGs) | E. State Revolving Loan Fund (SRLF) |
| C. Cryptosporidium and radon | F. None of the Above |
8. The EPA is required to publish guidelines for states to develop water source assessment programs that _____ and assess contamination risks.
- | | |
|---------------------------------|-------------------------------|
| A. Training and technical needs | D. Delineate protection areas |
| B. Certification guidelines | E. Violation |
| C. SDWA | F. None of the Above |
9. The EPA is required to identify technologies that are affordable for small systems to comply with _____.
- | | |
|--------------------------------|-------------------------------------|
| A. Consumer Confidence Reports | D. Technical assistance funds |
| B. Drinking water regulations | E. State Revolving Loan Fund (SRLF) |
| C. Cryptosporidium and radon | F. None of the Above |
10. Technical assistance funds and Small System Technical Assistance Centers are authorized to meet the _____ of small systems.
- | | |
|---------------------------------|-------------------------------------|
| A. Training and technical needs | D. State Revolving Loan Fund (SRLF) |
| B. Certification guidelines | E. Violation |
| C. SDWA | F. None of the Above |
11. States are authorized to grant variances for _____ with drinking water regulations for systems serving 3,300 or fewer persons.
- | | |
|--------------------------------|-------------------------------------|
| A. Consumer Confidence Reports | D. Technical assistance funds |
| B. Compliance | E. State Revolving Loan Fund (SRLF) |
| C. Cryptosporidium and radon | F. None of the Above |
12. The EPA is required to publish _____ for operators of community and nontransient noncommunity public water systems.
- | | |
|--|-------------------------------|
| A. Consumer Confidence Reports | D. Technical assistance funds |
| B. Maximum Contaminant Level Goals (MCLGs) | E. Certification guidelines |
| C. Cryptosporidium and radon | F. None of the Above |
13. States that do not have operator certification programs that meet the requirements of the guidelines will lose 20 percent of their _____.
- | | |
|-----------------------------|-------------------------------------|
| A. EPA guidance | D. Permissible level |
| B. SRLF grant | E. Adverse health effects to humans |
| C. Technologically feasible | F. None of the Above |
14. A source water petition program for voluntary, incentive-based partnerships among public water systems and others to _____ in source water is authorized.
- | | |
|---------------------------------|-------------------------------------|
| A. Training and technical needs | D. State Revolving Loan Fund (SRLF) |
| B. Certification guidelines | E. Reduce contamination |
| C. SDWA | F. None of the Above |
15. The law establishes a new State Revolving Loan Fund (SRLF) of \$1 billion per year to provide loans to _____ to comply with the new SDWA.
- | | |
|-------------------------------------|----------------------|
| A. Cryptosporidium | D. Feasible |
| B. Public water systems | E. MCL |
| C. Disinfection byproducts (D/DBPs) | F. None of the Above |

16. It also requires states to allocate 15 percent of the _____ to systems serving 10,000 or fewer people unless no eligible projects are available for loans.

- A. Cryptosporidium
- B. SRLF
- C. Disinfection byproducts (D/DBPs)
- D. Feasible
- E. MCL
- F. None of the Above

17. It also allows states to jointly administer SDWA and _____ loan programs and transfer up to 33 percent between the two accounts.

- A. Cryptosporidium
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Clean Water Act
- E. MCL
- F. None of the Above

18. States must ensure that all new systems have _____ and that all current systems maintain capacity, or lose 20 percent of their SRLF grant.

- A. Compliance capacity
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Feasible
- E. MCL
- F. None of the Above

19. Although the EPA will continue to provide policy, regulations and guidance, state governments will now have more _____ allowing for improved communication between water providers and their local regulators.

- A. Training and technical needs
- B. Certification guidelines
- C. SDWA
- D. State Revolving Loan Fund (SRLF)
- E. Regulatory flexibility
- F. None of the Above

20. Increased collaboration will result in solutions that work better and are more fully supported by the _____.

- A. EPA guidance
- B. Regulated community
- C. Technologically feasible
- D. Permissible level
- E. Adverse health effects to humans
- F. None of the Above

21. States that have a _____ may adopt alternative monitoring requirements to provide permanent monitoring relief for public water systems in accordance with EPA guidance.

- A. EPA guidance
- B. Regulated community
- C. Technologically feasible
- D. Source water assessment program
- E. Adverse health effects to humans
- F. None of the Above

Safe Drinking Water Act of 1974

22. This is the _____ legislation protecting drinking water supplied by public water systems (those serving more than 25 people).

- A. Primary Federal
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Feasible
- E. MCL
- F. None of the Above

23. The Environmental Protection Agency (EPA) is lead agency and is mandated to set _____.

- A. Cryptosporidium
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Standards for drinking water
- E. MCL
- F. None of the Above

24. The EPA establishes _____ of which the states are responsible for enforcing.

- A. Cryptosporidium
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. National standards
- E. MCL
- F. None of the Above

25. The act provides for the establishment of primary regulations for the protection of the public health and _____ relating to the taste, odor, and appearance of drinking water.

- A. EPA guidance
- B. Secondary regulations
- C. Technologically feasible
- D. Permissible level
- E. Adverse health effects to humans
- F. None of the Above

26. Primary drinking water regulations, by definition, include either a maximum contaminant level (MCL) or, when a MCL is not economically or technologically _____, a prescribed treatment technique which would prevent adverse health effects to humans.

- A. Cryptosporidium
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Feasible
- E. MCL
- F. None of the Above

27. An MCL is the _____ of a contaminant in water that is delivered to any user of a public water system.

- A. EPA guidance
- B. Regulated community
- C. Technologically feasible
- D. Permissible level
- E. Adverse health effects to humans
- F. None of the Above

28. Primary and secondary drinking water regulations are stated in 40 CFR 141 and 143, respectively. As amended in 1986, the EPA is required to set maximum contaminant levels for 83 contaminants deemed harmful to humans (with specific deadlines). It also has authority over groundwater. Water agencies are required to monitor water to ensure it_____.

- A. Cryptosporidium
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Feasible
- E. Meets standards
- F. None of the Above

National Drinking Water Regulations

29. The Act instructs the _____ on how to select contaminants for regulation and specifies how EPA must establish national primary drinking water regulations once a contaminant has been selected (Section 1412). As of late 1996, the EPA had promulgated 84 drinking water regulations.

- A. EPA
- B. Regulated community
- C. Technologically feasible
- D. Permissible level
- E. Adverse health effects to humans
- F. None of the Above

Contaminant Selection

30. P.L. 104-182 establishes a _____ for the EPA to select contaminants for regulatory consideration based on occurrence, health effects, and meaningful opportunity for health risk reduction.

- A. New process
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Feasible
- E. MCL
- F. None of the Above

31. Starting in 2001, and every 5 years thereafter, the _____ must determine whether or not to regulate at least 5 of the listed contaminants.

- A. Cryptosporidium
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. EPA
- E. MCL
- F. None of the Above

32. _____ directs the EPA to evaluate contaminants that present the greatest health concern and to regulate contaminants that occur at concentration levels and frequencies of public health concern.

- A. Administrator
- B. The Act
- C. The EPA
- D. Information Collection Rule (ICR)
- E. Disinfection byproducts (DBPs)
- F. None of the Above

33. The law also includes a schedule for _____ to complete regulations for disinfectants and disinfection byproducts (D/DBPs) and Cryptosporidium (a waterborne pathogen).
- A. Administrator
 - B. The Act
 - C. The EPA
 - D. Information Collection Rule (ICR)
 - E. Disinfection byproducts (DBPs)
 - F. None of the Above

Standard Setting

34. Developing national drinking water regulations is a two-part process. For each contaminant that _____ has determined merits regulation, the EPA must set a non-enforceable maximum contaminant level goal (MCLG) at a level at which no known or anticipated adverse health effects occur, and which allows an adequate margin of safety.

- A. Administrator
- B. The Act
- C. The EPA
- D. Information Collection Rule (ICR)
- E. Disinfection byproducts (DBPs)
- F. None of the Above

35. The EPA must then set an enforceable standard, a maximum contaminant level (MCL), as close to the _____ as is "feasible" using best technology, treatment techniques, or other means available (taking costs into consideration).

- A. Cryptosporidium
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Feasible
- E. MCLG
- F. None of the Above

36. Standards are generally based on technologies that are affordable for large communities; however, under P.L. 104-182, each regulation establishing an _____ must list any technologies, treatment techniques or other means that comply with the MCL and that are affordable for three categories of small public water systems.

- A. Cryptosporidium
- B. Listed contaminants
- C. Disinfection byproducts (D/DBPs)
- D. Feasible
- E. MCL
- F. None of the Above

National Security

37. Any _____ having jurisdiction over federally owned and maintained public water systems must comply with all federal, state, and local drinking water requirements as well as any underground injection control programs (Section 1447).

- A. Administrator
- B. The Act
- C. The EPA
- D. Federal agency
- E. Disinfection byproducts (DBPs)
- F. None of the Above

38. _____ provides for waivers in the interest of national security. Procedures for judicial review are outlined (Section 1448), and provision for citizens' civil actions is made (Section 1449).

- A. Administrator
- B. The Act
- C. The EPA
- D. Information Collection Rule (ICR)
- E. Disinfection byproducts (DBPs)
- F. None of the Above

39. Citizen suits may be brought against any person or agency allegedly in violation of provisions of _____, or against the Administrator for alleged failure to perform any action or duty which is not discretionary.

- A. Administrator
- B. The Act
- C. The EPA
- D. Information Collection Rule (ICR)
- E. Disinfection byproducts (DBPs)
- F. None of the Above

40. The EPA may use the new estrogenic substances screening program created in the Food Quality Protection Act of 1996 (P .L. 104-170) to provide for testing of substances that may be found in drinking water if the _____ determines that a substantial population may be exposed to such substances (Section 1457).

- A. Administrator
- B. The Act
- C. The EPA
- D. Information Collection Rule (ICR)
- E. Disinfection byproducts (DBPs)
- F. None of the Above

41. The EPA is directed to conduct drinking water studies involving subpopulations at greater risk and biological mechanisms, and studies to support several rules including those addressing_____.

- A. Disinfection byproducts
- B. Trihalomethanes (THM)
- C. Haloacetic Acids (HAA5)
- D. D/DBPs and Cryptosporidium
- E. Total Trihalomethane Rule
- F. None of the Above

New EPA Rules

ICR

42. _____ has collected data required by the Information Collection Rule (ICR) to support future regulation of microbial contaminants, disinfectants, and disinfection byproducts.

- A. Administrator
- B. The Act
- C. The EPA
- D. Information Collection Rule (ICR)
- E. Disinfection byproducts (DBPs)
- F. None of the Above

43. The rule is intended to provide EPA with information on chemical byproducts that form when disinfectants used for microbial control react with chemicals already present in source water (_____ (DBPs)); disease-causing microorganisms (pathogens), including Cryptosporidium; and engineering data to control these contaminants.

- A. Disinfection byproducts
- B. Trihalomethanes (THM)
- C. Haloacetic Acids (HAA5)
- D. Bromate
- E. Total Trihalomethane Rule
- F. None of the Above

Disinfection Byproduct Regulations

44. In December 1998, _____ established the Stage 1 Disinfectants/Disinfection Byproducts Rule that requires public water systems to use treatment measures to reduce the formation of disinfection byproducts and to meet the following specific standards:

- A. Administrator
- B. The Act
- C. EPA
- D. Information Collection Rule (ICR)
- E. Disinfection byproducts (DBPs)
- F. None of the Above

45. Total trihalomethanes (TTHM)

- A. 60 ppb
- B. 80 ppb
- C. 10 ppb
- D. 1.0 parts per million (ppm)
- E. None of the Above

46. Haloacetic acids (HAA5)

- A. 60 ppb
- B. 80 ppb
- C. 10 ppb
- D. 1.0 parts per million (ppm)
- E. None of the Above

47. Bromate
 A. 60 ppb
 B. 80 ppb
 C. 10 ppb
 D. 1.0 parts per million (ppm)
 E. None of the Above
48. Currently trihalomethanes are regulated at a maximum allowable annual average level of 100 ppb for water systems serving more than 10,000 people under the _____ finalized by EPA in 1979.
 A. Disinfection byproducts D. Bromate
 B. Trihalomethanes (THM) E. Total Trihalomethane Rule
 C. Haloacetic Acids (HAA5) F. None of the Above
49. The Stage 1 Disinfectant/Disinfection Byproduct Rule standards became effective for trihalomethanes and other _____ listed above back in December 2001 for large surface water public water systems..
 A. Disinfection byproducts D. Bromate
 B. Trihalomethanes (THM) E. Total Trihalomethane Rule
 C. Haloacetic Acids (HAA5) F. None of the Above
50. _____ are formed when disinfectants used in water treatment plants react with bromide and/or natural organic matter (i.e., decaying vegetation) present in the source water. Different disinfectants produce different types or amounts of disinfection byproducts.
 A. Disinfection byproducts D. Bromate
 B. Trihalomethanes (THM) E. Total Trihalomethane Rule
 C. Haloacetic Acids (HAA5) F. None of the Above
51. _____ for which regulations have been established have been identified in drinking water, including trihalomethanes, haloacetic acids, bromate, and chlorite.
 A. Disinfection byproducts D. Bromate
 B. Trihalomethanes (THM) E. Total Trihalomethane Rule
 C. Haloacetic Acids (HAA5) F. None of the Above
52. _____ are a group of four chemicals that are formed along with other disinfection byproducts when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water.
 A. Disinfection byproducts D. Bromate
 B. Trihalomethanes (THM) E. Total Trihalomethane Rule
 C. Haloacetic Acids (HAA5) F. None of the Above
53. The _____ are chloroform, bromodichloromethane, dibromochloromethane, and bromoform.
 A. Disinfection byproducts D. Bromate
 B. Trihalomethanes E. Total Trihalomethane Rule
 C. Haloacetic Acids (HAA5) F. None of the Above
54. EPA has published the Stage 1 Disinfectants/Disinfection Byproducts Rule to regulate total _____ at a maximum allowable annual average level of 80 parts per billion. This new standard replaced the old standard of a maximum allowable annual average level of 100 parts per billion back in December 2001 for large surface water public water systems.
 A. Disinfection byproducts D. Bromate
 B. Trihalomethanes (TTHM) E. Total Trihalomethane Rule
 C. Haloacetic Acids (HAA5) F. None of the Above

55. _____ are a group of chemicals that are formed along with other disinfection byproducts when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water.

- A. Disinfection byproducts
- B. Trihalomethanes (THM)
- C. Haloacetic Acids (HAA5)
- D. Bromate
- E. Total Trihalomethane Rule
- F. None of the Above

56. The regulated haloacetic acids, known as _____, are: monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid. EPA has published the

- A. Disinfection byproducts
- B. Trihalomethanes (THM)
- C. Haloacetic Acids (HAA5)
- D. Bromate
- E. Total Trihalomethane Rule
- F. None of the Above

57. Stage 1 Disinfectants/Disinfection Byproducts Rule to regulate _____ at 60 parts per billion annual average.

- A. Disinfection byproducts
- B. Trihalomethanes (THM)
- C. Haloacetic Acids (HAA5)
- D. Bromate
- E. Total Trihalomethane Rule
- F. None of the Above

58. _____ is a chemical that is formed when ozone, used to disinfect drinking water, reacts with naturally occurring bromide found in source water. EPA has established the Stage 1 Disinfectants/Disinfection Byproducts Rule to regulate bromate at an annual average of 10 ppb in drinking water.

- A. Disinfection byproducts
- B. Trihalomethanes (THM)
- C. Haloacetic Acids (HAA5)
- D. Bromate
- E. Total Trihalomethane Rule
- F. None of the Above

59. _____ is a byproduct formed when chlorine dioxide is used to disinfect water. The EPA has published the Stage 1 Disinfectants/Disinfection Byproducts Rule to regulate chlorite at a monthly average level of 1 ppm in drinking water.

- A. Disinfectant residual
- B. Chlorite
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. E. Coli, Escherichia coli
- F. None of the Above

Microbial Regulations

60. One of the key regulations developed and implemented by the United States Environmental Protection Agency (USEPA) to counter _____ in drinking water is the Surface Water Treatment Rule.

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Pathogens
- E. E. Coli, Escherichia coli
- F. None of the Above

61. Among its provisions, the rule requires that a public water system, using surface water (or ground water under the direct influence of surface water) as its source, have sufficient treatment to reduce the source water concentration of _____ by at least 99.9% and 99.99%, respectively.

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. E. Coli, Escherichia coli
- F. None of the Above

62. The Surface Water Treatment Rule specifies treatment criteria to assure that these performance requirements are met; they include turbidity limits, _____ and disinfectant contact time conditions.

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. E. Coli, Escherichia coli
- F. None of the Above

Disinfectant Review Statements:

63. The CT values for disinfection are used to determine the disinfection efficiency based upon time and what other parameter?

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. E. Coli, Escherichia coli
- F. None of the Above

64. What types of organisms may transmit waterborne diseases?

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. E. Coli, Escherichia coli
- F. None of the Above

65. _____ The products created due to the reaction of chlorine with organic materials (e.g. leaves, soil) present in raw water during the water treatment process. The EPA has determined that these DBPs can cause cancer.

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. E. Coli, Escherichia coli
- F. None of the Above

66. How is the effectiveness of disinfection determined?

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. From the results of coliform testing.
- F. None of the Above

67. The treatment of water to inactivate, destroy, and/or remove pathogenic bacteria, viruses, protozoa, and other _____.

- A. Disinfectant residual
- B. Parasites
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. E. Coli, Escherichia coli
- F. None of the Above

68. What types of source water are required by law to treat water using filtration and disinfection? _____ under the direct influence of surface water, and related surface water sources.

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Groundwater
- E. E. Coli, Escherichia coli
- F. None of the Above

69. _____: A bacterium commonly found in the human intestine. For water quality analyses purposes, it is considered an indicator organism. These are considered evidence of water contamination. Indicator organisms may be accompanied by pathogens, but do not necessarily cause disease themselves.

- A. Disinfectant residual
- B. Bacteria, Virus and Intestinal parasites
- C. Disinfection By-Products (DBPs)
- D. Giardia and viruses
- E. E. Coli, Escherichia coli
- F. None of the Above

Aquifer

70. Many terms are used to describe the nature and extent of the groundwater resource. The level below which all the spaces are filled with water is called the _____.

- A. Groundwater
- B. Water table
- C. Fractured aquifers
- D. Unconfined aquifers
- E. Confined aquifers
- F. None of the Above

71. Above the _____ lies the unsaturated zone. Here the spaces in the rock and soil contain both air and water.

- A. Groundwater
- B. Water table
- C. Fractured aquifers
- D. Confined aquifers
- E. Unconfined aquifers
- F. None of the Above

72. Water in this zone is called soil moisture. The entire region below the water table is called the saturated zone and water in this _____ is called groundwater.

- A. Groundwater
- B. Water table
- C. Fractured aquifers
- D. Unconfined aquifers
- E. Saturated zone
- F. None of the Above

73. Fractured aquifers are cracks, joints, or fractures in solid rock, through which groundwater moves. Examples of _____ include granite and basalt.

- A. Groundwater
- B. Water table
- C. Fractured aquifers
- D. Confined aquifers
- E. Unconfined aquifers
- F. None of the Above

74. Limestones are often fractured aquifers, but here the cracks and fractures may be enlarged by solution, forming large channels or even caverns. Limestone terrain where solution has been very active is termed _____.

- A. Groundwater
- B. Karst
- C. Fractured aquifers
- D. Unconfined aquifers
- E. Confined aquifers
- F. None of the Above

75. Porous media such as sandstone may become so highly cemented or recrystallized that all of the original space is filled. In this case, the rock is no longer a porous medium. However, if it contains cracks it can still act as a _____.

- A. Groundwater
- B. Water table
- C. Fractured aquifer
- D. Confined aquifers
- E. Unconfined aquifers
- F. None of the Above

76. Most of the aquifers of importance to us are _____ such as sand and gravel. Some very porous materials are not permeable. Clay, for instance, has many spaces between its grains, but the spaces are not large enough to permit free movement of water.

- A. Groundwater
- B. Water table
- C. Fractured aquifers
- D. Unconfined aquifers
- E. Confined aquifers
- F. None of the Above

77. _____ usually flows downhill with the slope of the water table. Like surface water, groundwater flows toward, and eventually drains into, streams, rivers, lakes and the oceans.

- A. Groundwater
- B. Water table
- C. Fractured aquifers
- D. Confined aquifers
- E. Unconfined aquifers
- F. None of the Above

78. _____ flow in the aquifers underlying springs or surface drainage basins, however, does not always mirror the flow of water on the surface.
- A. Groundwater D. Unconfined aquifers
 B. Water table E. Confined aquifers
 C. Fractured aquifers F. None of the Above
79. Therefore, _____ may move in different directions below the ground than the water flowing on the surface.
- A. Groundwater D. Confined aquifers
 B. Water table E. Unconfined aquifers
 C. Fractured aquifers F. None of the Above
80. Unconfined aquifers are those that are bounded by the water table. Some aquifers, however, lie beneath layers of impermeable materials. These are called confined aquifers, or sometimes _____. A well in such an aquifer is called an artesian well.
- A. Groundwater D. Piezometric surface
 B. Water table E. Unconfined aquifers
 C. Artesian aquifers F. None of the Above
81. The water in these wells rises higher than the top of the _____ because of confining pressure. If the water level rises above the ground surface a flowing artesian well occurs.
- A. Aquifer D. Groundwater movement
 B. Movement of water E. Withdrawal from pumping
 C. Drawdown F. None of the Above
82. The _____ is the level to which the water in an artesian aquifer will rise.
- A. Vertical drop D. Groundwater movement
 B. Movement of water E. Piezometric surface
 C. Drawdown F. None of the Above

Cone of Depression

83. When pumping begins, water begins to flow towards the well in contrast to the natural direction of _____.
- A. Vertical drop D. Groundwater movement
 B. Movement of water E. Withdrawal from pumping
 C. Drawdown F. None of the Above
84. The water level in the _____ the water table in the surrounding aquifer. As a result, water begins to move from the aquifer into the well.
- A. Vertical drop D. Groundwater movement
 B. Movement of water E. Well falls below
 C. Drawdown F. None of the Above
85. As pumping continues, the water level in the well continues to increase until the rate of flow into the well equals the rate of _____.
- A. Vertical drop D. Groundwater movement
 B. Movement of water E. Withdrawal from pumping
 C. Drawdown F. None of the Above
86. The _____ from an aquifer into a well results in the formation of a cone of depression.
- A. Vertical drop D. Groundwater movement
 B. Movement of water E. Withdrawal from pumping
 C. Drawdown F. None of the Above

87. The cone of depression describes a three-dimensional _____ surrounding the well that represents the volume of water removed as a result of pumping.

- A. Vertical drop
- B. Movement of water
- C. Drawdown
- D. Inverted cone
- E. Withdrawal from pumping
- F. None of the Above

88. Drawdown is the _____ in the height between the water level in the well prior to pumping and the water level in the well during pumping.

- A. Vertical drop
- B. Movement of water
- C. Drawdown
- D. Groundwater movement
- E. Withdrawal from pumping
- F. None of the Above

89. When a well is installed in an unconfined aquifer, water moves from the aquifer into the well through small holes or slits in the well casing or, in some types of wells, through the open bottom of the well. The level of the water in the well is the same as the _____ in the aquifer.

- A. Vertical drop
- B. Movement of water
- C. Drawdown
- D. Groundwater movement
- E. Water level
- F. None of the Above

90. Groundwater continues to flow through and around the well in one direction in response to _____.

- A. Vertical drop
- B. Gravity
- C. Drawdown
- D. Groundwater movement
- E. Withdrawal from pumping
- F. None of the Above

Common Water Quality Definitions

Acronyms

91. _____ - A required process intended to reduce the level of a contaminant in drinking water.

- A. Treatment Technique (TT)
- B. Maximum Contaminant Level (MCL)
- C. Action Level (AL)
- D. Maximum Contaminant Level Goal (MCLG)
- E. None of the Above

92. _____ - The concentration of a contaminant that, if exceeded, triggers treatment or other requirements which a water system must follow.

- A. Treatment Technique (TT)
- B. Maximum Contaminant Level (MCL)
- C. Action Level (AL)
- D. Maximum Contaminant Level Goal (MCLG)
- E. None of the Above

93. _____ - The highest level of a contaminant that is allowed in drinking water.

- A. Treatment Technique (TT)
- B. Maximum Contaminant Level (MCL)
- C. Action Level (AL)
- D. Maximum Contaminant Level Goal (MCLG)
- E. None of the Above

94. _____ - The level of a contaminant in drinking water below which there is no known or expected risk to health.
- A. Treatment Technique (TT)
 - B. Maximum Contaminant Level (MCL)
 - C. Action Level (AL)
 - D. Maximum Contaminant Level Goal (MCLG)
 - E. None of the Above

Timeline of Existing Federal Water and State Drinking Water Quality Regulations

95. Promulgated 1975-1981 Contained 7 contaminants Targeted: Trihalomethanes, Arsenic, and Radionuclides Established 22 drinking water standards.

- A. NIPDWR
- B. Phase 1 Standards
- C. Phase 2 Standards
- D. Phase 5 Standards
- E. Stage 1 Disinfectant/Disinfection By-product (D/DBP) Rule
- F. None of the Above

96. Promulgated 1987 Contained 8 contaminants Targeted: VOCs.

- A. NIPDWR
- B. Phase 1 Standards
- C. Phase 2 Standards
- D. Phase 5 Standards
- E. Stage 1 Disinfectant/Disinfection By-product (D/DBP) Rule
- F. None of the Above

97. Promulgated 1991 Contained 36 contaminants Targeted: VOCs, SOCs, and IOCs.

- A. NIPDWR
- B. Phase 1 Standards
- C. Phase 2 Standards
- D. Phase 5 Standards
- E. Stage 1 Disinfectant/Disinfection By-product (D/DBP) Rule
- F. None of the Above

98. Promulgated 1992 Contained 23 contaminants Targeted: VOCs, SOCs, and IOCs.

- A. NIPDWR
- B. Phase 1 Standards
- C. Phase 2 Standards
- D. Phase 5 Standards
- E. Stage 1 Disinfectant/Disinfection By-product (D/DBP) Rule
- F. None of the Above

99. Promulgated 1989 Contained 5 contaminants Targeted: Microbiological and Turbidity.

- A. Arsenic Rule
- B. Filter Backwash Recycling Rule
- C. Radionuclide Rule
- D. IESWTR
- E. SWTR
- F. None of the Above

100. Promulgated 1998 Contained 14 contaminants Targeted: DBPs and precursors.

- A. NIPDWR
- B. Phase 1 Standards
- C. Phase 2 Standards
- D. Phase 5 Standards
- E. Stage 1 Disinfectant/Disinfection By-product (D/DBP) Rule
- F. None of the Above

101. Promulgated 1998

Contained 2 contaminants Targeted: Microbiological and Turbidity.

- A. Arsenic Rule
- B. Filter Backwash Recycling Rule
- C. Radionuclide Rule
- D. IESWTR
- E. SWTR
- F. None of the Above

102. Promulgated 2000 Contained 4 contaminants Targeted: Radionuclides.

- A. Arsenic Rule
- B. Filter Backwash Recycling Rule
- C. Radionuclide Rule
- D. IESWTR
- E. SWTR
- F. None of the Above

103. Promulgated 2001 Contained 1 contaminant Targeted: Arsenic.

- A. Arsenic Rule
- B. Filter Backwash Recycling Rule
- C. Radionuclide Rule
- D. IESWTR
- E. SWTR
- F. None of the Above

104. Promulgated 2001 Contained - Targeted: Microbiological and Turbidity.
- A. Arsenic Rule
 - B. Filter Backwash Recycling Rule
 - C. Radionuclide Rule
 - D. IESWTR
 - E. SWTR
 - F. None of the Above

Water Quality Key Words

105. _____: A chlorinated phenoxy compound, functions as a systemic herbicide and is used to control many types of broadleaf weeds. There are many forms or derivatives (esters, amines, salts) of 2,4-D and these vary in solubility and volatility.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

106. _____: A chemical element with the symbol Sb (Latin: stibium, meaning "mark") and atomic number 51.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. ANTIMONY
- F. None of the Above

107. A metalloid, antimony has four allotropic forms. The stable form of _____ is a blue-white metalloid. Yellow and black antimony are unstable non-metals.

- A. ANTIMONY
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

108. _____ is used in flame-proofing, paints, ceramics, enamels, a wide variety of alloys, electronics, and rubber.

- A. CHLORITE
- B. CHROMIUM
- C. ANTIMONY
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

109. _____: A mineral fiber that has been used commonly in a variety of building construction materials for insulation and as a fire-retardant. EPA and CPSC have banned several asbestos products.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

110. _____: A chemical element. It has the symbol Ba, and atomic number 56.

- A. CHLORITE
- B. CHROMIUM
- C. BARIUM
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

111. _____: A chemical element with the symbol Be and atomic number 4.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

112. A bivalent element, _____ is a steel grey, strong, light-weight yet brittle alkaline earth metal. It is primarily used as a hardening agent in alloys, most notably beryllium copper.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

113. Commercial use of _____ metal presents technical challenges due to the toxicity (especially by inhalation) of beryllium-containing dusts.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

114. _____: An inorganic anion, bromate is tasteless and colorless, with a low volatility. As a moderately strong oxidant, bromate is reactive. BrO_3^- is a bromine-based oxoanion.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

115. A _____ is a chemical compound that contains this ion. Examples of bromates include sodium bromate, (NaBrO_3), and potassium bromate, (KBrO_3).

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

116. _____: A chemical element with the symbol Cd and atomic number 48. A relatively abundant, soft, bluish-white, transition metal, cadmium is known to cause cancer and occurs with zinc ores.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. CADMIUM
- F. None of the Above

117. _____ is used largely in batteries and pigments, for example in plastic products.

- A. CHLORITE
- B. CADMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

118. _____: A chlorite (compound) is a compound that contains this group, with chlorine in oxidation state +3. Chlorites are also known as salts of chlorous acid.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

119. _____: A chemical element which has the symbol Cr and atomic number 24.

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

120. This element is a steel-gray, lustrous, hard metal that takes a high polish and has a high melting point. It is also odorless, tasteless, and malleable. Identify the related term...

- A. CHLORITE
- B. CHROMIUM
- C. ASBESTOS
- D. BERYLLIUM
- E. BROMATE
- F. None of the Above

121. _____: To inactivate viruses and bacteria, the minimum disinfection contact time measured before the first customer should be six milligrams per minute per liter (6 mg-min/L).

- A. CONTACT TIME (CT)
- B. HALOACETIC ACIDS
- C. DISINFECTION BYPRODUCTS
- D. HYDROCHLORIC ACID
- E. FORMAZIN TURBIDITY UNIT (FTU)
- F. None of the Above

122. _____ are chemical, organic and inorganic substances that can form during a reaction of a disinfectant with naturally present organic matter in the water.
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. HALOACETIC ACIDS E. FORMAZIN TURBIDITY UNIT (FTU)
 C. DISINFECTION BYPRODUCTS F. None of the Above
123. _____: Presence of free chlorine in the distribution network is indication of correct disinfection.
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. DPD METHOD E. FORMAZIN TURBIDITY UNIT (FTU)
 C. DISINFECTION BYPRODUCTS F. None of the Above
124. Chlorine in water is determined according to ISO 7393-2 by colorimetric HACH method on the basis of DPD (N, N-diethyl - p - phenylendiamine). The photometric detection uses the wave lengths of 490 – 555 nm. Hach elected, for most of his _____ colorimetric systems, the wave length of 530 nm.
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. HALOACETIC ACIDS E. DPD
 C. DISINFECTION BYPRODUCTS F. None of the Above
125. _____: A unit used to measure the clarity of water. The ISO refers to the units as FNU (Formazin Nephelometric Units).
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. HALOACETIC ACIDS E. FORMAZIN TURBIDITY UNIT (FTU)
 C. DISINFECTION BYPRODUCTS F. None of the Above
126. The technique is the same as that for the NTU, but the calibration uses microspheres of the polymer formazin.
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. HALOACETIC ACIDS E. FORMAZIN TURBIDITY UNIT (FTU)
 C. DISINFECTION BYPRODUCTS F. None of the Above
127. _____ are carboxylic acids in which a halogen atom takes the place of a hydrogen atom in acetic acid.
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. HALOACETIC ACIDS E. FORMAZIN TURBIDITY UNIT (FTU)
 C. DISINFECTION BYPRODUCTS F. None of the Above
128. _____: A composition composed mainly of calcium hypochlorite is commonly called high test hypochlorite.
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. HALOACETIC ACIDS E. FORMAZIN TURBIDITY UNIT (FTU)
 C. DISINFECTION BYPRODUCTS F. None of the Above
129. _____ contains not less than 60.0% of available chlorine.
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. HALOACETIC ACIDS E. FORMAZIN TURBIDITY UNIT (FTU)
 C. DISINFECTION BYPRODUCTS F. None of the Above
130. _____: It is the aqueous solution of hydrogen chloride gas (HCl). It is a strong acid, and the major component of gastric acid, and of wide industrial use.
- A. HIGH-TEST HYPOCHLORITE D. HYDROCHLORIC ACID
 B. HALOACETIC ACIDS E. FORMAZIN TURBIDITY UNIT (FTU)
 C. DISINFECTION BYPRODUCTS F. None of the Above

131. _____ must be handled with appropriate safety precautions because it is a highly corrosive liquid.

- A. HIGH-TEST HYPOCHLORITE
- B. HALOACETIC ACIDS
- C. DISINFECTION BYPRODUCTS
- D. HYDROCHLORIC ACID
- E. FORMAZIN TURBIDITY UNIT (FTU)
- F. None of the Above

132. _____: EPA collected data required by the Information Collection Rule (May 14, 1996) to support future regulation of microbial contaminants, disinfectants, and disinfection byproducts.

- A. ICR
- B. IRON BACTERIA
- C. HYDROCHLORIC ACID
- D. MANGANESE (IV) OXIDE
- E. LETHAL CONCENTRATION 50
- F. None of the Above

133. The rule was intended to provide EPA with information on chemical byproducts that form when disinfectants used for microbial control react with chemicals already present in source water (disinfection byproducts (DBPs)); disease-causing microorganisms (pathogens), including Cryptosporidium; and engineering data to control these contaminants. Identify the related term...

- A. ICR
- B. IRON BACTERIA
- C. HYDROCHLORIC ACID
- D. MANGANESE (IV) OXIDE
- E. LETHAL CONCENTRATION 50
- F. None of the Above

134. _____: In the management of water-supply wells, iron bacteria are bacteria that derive the energy they need to live and multiply by oxidizing dissolved ferrous iron (or the less frequently available manganese and aluminum).

- A. ICR
- B. IRON BACTERIA
- C. HYDROCHLORIC ACID
- D. MANGANESE (IV) OXIDE
- E. LETHAL CONCENTRATION 50
- F. None of the Above

135. The resulting ferric oxide is insoluble, and appears as brown gelatinous slime that will stain plumbing fixtures, and clothing or utensils washed with the water carrying it, and may contribute to internal corrosion of the pipes and fixtures the water flows through. Identify the related term...

- A. ICR
- B. IRON BACTERIA
- C. HYDROCHLORIC ACID
- D. MANGANESE (IV) OXIDE
- E. LETHAL CONCENTRATION 50
- F. None of the Above

136. They are known to grow and proliferate in waters containing as low as 0.1mg/l of iron. However, at least 0.3 ppm of dissolved oxygen is needed to carry out oxidation. The proliferation of iron bacteria, in some way, increases the chance of sulfur bacteria infestation. Identify the related term...

- A. ICR
- B. IRON BACTERIA
- C. HYDROCHLORIC ACID
- D. MANGANESE (IV) OXIDE
- E. LETHAL CONCENTRATION 50
- F. None of the Above

137. _____: Also referred to as LC50, a concentration of a pollutant or effluent at which 50 percent of the test organisms die; a common measure of acute toxicity.

- A. ICR
- B. IRON BACTERIA
- C. HYDROCHLORIC ACID
- D. MANGANESE (IV) OXIDE
- E. LETHAL CONCENTRATION 50
- F. None of the Above

138. _____: The chemical compound MnO₂, commonly called manganese dioxide.

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

139. This blackish or brown solid occurs naturally as the mineral pyrolusite, which is the main ore of manganese. It is also present in manganese nodules. Identify the related term...

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

140. The principal use for MnO₂ is for dry-cell batteries, such as the alkaline battery and the zinc-carbon battery. In 1976 this application accounted for 500,000 tons of pyrolusite. MnO₂ is also used for production of MnO₄⁻. It is used extensively as an oxidizing agent in organic synthesis, for example, for the oxidation of allylic alcohols.

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

141. _____: The maximum concentration of a chemical that is allowed in public drinking water systems.

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

142. _____: The maximum level at which a contaminant can exist in drinking water without having an adverse effect on human health.

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

143. _____: The unit used to describe turbidity. Nephelometric refers to the way the instrument, a nephelometer, measures how much light is scattered by suspended particles in the water.

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

144. The greater the scattering, the higher the turbidity. Therefore, low _____ values indicate high water clarity, while high NTU values indicate low water clarity.

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

145. _____: A legal limit in the United States for exposure of an employee to a substance or physical agent.

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

146. For substances it is usually expressed in parts per million (ppm), or sometimes in milligrams per cubic meter (mg/m³). Identify the related term...

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

147. Units of measure for physical agents such as noise are specific to the agent. _____ are established by the Occupational Safety and Health Administration (OSHA).

- A. MCLG
- B. MCL
- C. NTU
- D. MANGANESE (IV) OXIDE
- E. PEL or OSHA PEL
- F. None of the Above

148. _____: A wastewater technology in which powdered activated carbon is added to an anaerobic or aerobic treatment system.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

149. The carbon in the biological treatment process acts as a "buffer" against the effects of toxic organics in the wastewater. Identify the related term...

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

150. _____: Abbreviation for parts per million.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

151. _____: A calcium oxide material produced by calcining limestone to liberate carbon dioxide, also called "calcined lime" or "pebble lime", commonly used for pH adjustment.

- A. SCADA D. PACT
- B. REL E. QUICKLIME
- C. PPM F. None of the Above

152. Chemical formula is CaO. Identify the related term...

- A. SCADA D. PACT
- B. REL E. QUICKLIME
- C. PPM F. None of the Above

153. An occupational exposure limit that has been recommended by the U.S. National Institute for Occupational Safety and Health to OSHA for adoption as a Permissible Exposure Limit.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

154. The _____ is a level that NIOSH believes would be protective of worker safety and health over a working lifetime if used in combination with engineering and work practice controls, exposure and medical monitoring, posting and labeling of hazards, worker training and personal protective equipment.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

155. No _____ has ever been adopted by OSHA, but they have been used as guides by some industry and advocacy organizations.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

156. _____ A remote method of monitoring pumps and equipment.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

157. _____ A water system which provides water in a place such as a gas station or campground where people do not remain for long periods of time.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

158. These systems do not have to test or treat their water for contaminants which pose long-term health risks because fewer than 25 people drink the water over a long period. They still must test their water for microbes and several chemicals.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

159. A _____: Is not required to sample for VOC's.

- A. SCADA D. PACT
- B. REL E. TNCWS
- C. PPM F. None of the Above

160. _____: Solvents used as degreasers or cleaning agents. Improper disposal of VOCs can lead to contamination of natural waters.

- A. SCADA D. PACT
- B. REL E. VOCs
- C. PPM F. None of the Above

161. _____ tend to evaporate very easily. This characteristic gives VOCs very distinct chemical odors like gasoline, kerosene, lighter fluid, or dry cleaning fluid.

- A. SCADA D. PACT
- B. REL E. VOCs
- C. PPM F. None of the Above

162. _____ are organic chemical compounds that have high enough vapor pressures under normal conditions to significantly vaporize and enter the atmosphere.

- A. SCADA D. PACT
- B. REL E. VOCs
- C. PPM F. None of the Above

Water Sampling Terms, and Definitions

Microbes

163. _____ are common in the environment and are generally not harmful.

- A. Giardia lamblia D. Human or animal wastes
- B. Cryptosporidiosis E. Coliform bacteria
- C. Microbial growth F. None of the Above

164. The presence of these bacteria in drinking water is usually a result of a problem with the treatment system or the pipes which distribute water, and indicates that the water may be contaminated with _____.

- A. Giardia lamblia D. Germs that can cause disease
- B. Cryptosporidiosis E. Bacteria
- C. Microbial growth F. None of the Above

165. Fecal Coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with _____.

- A. Giardia lamblia D. Human or animal wastes
- B. Cryptosporidiosis E. Bacteria
- C. Microbial growth F. None of the Above

166. _____ in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms.

- A. Giardia lamblia
- B. Cryptosporidiosis
- C. Microbial growth
- D. Human or animal wastes
- E. Microbes
- F. None of the Above

167. Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for _____.

- A. Giardia lamblia
- B. Cryptosporidiosis
- C. Microbial growth
- D. Human or animal wastes
- E. Bacteria
- F. None of the Above

168. Turbidity may indicate the presence of disease causing organisms. These organisms include _____ that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

- A. Giardia lamblia
- B. Cryptosporidiosis
- C. Microbial growth
- D. Human or animal wastes
- E. Bacteria, viruses, and parasites
- F. None of the Above

169. Cryptosporidium is a parasite that enters lakes and rivers through sewage and animal waste. It causes _____, a mild gastrointestinal disease.

- A. Giardia lamblia
- B. Cryptosporidiosis
- C. Microbial growth
- D. Human or animal wastes
- E. Bacteria
- F. None of the Above

170. The disease can be severe or fatal for people with severely weakened immune systems. The EPA and the CDC have prepared advice for those with severely compromised immune systems who are concerned about _____.

- A. Giardia lamblia
- B. Cryptosporidiosis
- C. Microbial growth
- D. Human or animal wastes
- E. Cryptosporidium
- F. None of the Above

171. Giardia lamblia is a parasite that enters lakes and rivers through sewage and animal waste. It causes _____ (e.g. diarrhea, vomiting, and cramps).

- A. Giardia lamblia
- B. Cryptosporidiosis
- C. Microbial growth
- D. Gastrointestinal illness
- E. Bacteria
- F. None of the Above

Radionuclides

172. _____ Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the EPA standard over many years may have an increased risk of getting cancer.

- A. Beta/photon emitters
- B. Combined Radium 226/228
- C. Alpha emitters
- D. Radon
- E. EPA standard
- F. None of the Above

173. _____ Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the EPA standard over many years may have an increased risk of getting cancer.

- A. Beta/photon emitters
- B. Combined Radium 226/228
- C. Alpha emitters
- D. Radon
- E. EPA standard
- F. None of the Above

174. _____ Some people who drink water containing radium 226 or 228 in excess of EPA standard over many years may have an increased risk of getting cancer.

- A. Beta/photon emitters
- B. Combined Radium 226/228
- C. Alpha emitters
- D. Radon
- E. EPA standard
- F. None of the Above

175. _____ can dissolve and accumulate in underground water sources, such as wells, and in the air in your home. Breathing radon can cause lung cancer. Drinking water containing radon presents a risk of developing cancer.

- A. Beta/photon emitters
- B. Combined Radium 226/228
- C. Alpha emitters
- D. Radon
- E. EPA standard
- F. None of the Above

176. _____ in air is more dangerous than radon in water.

- A. Beta/photon emitters
- B. Combined Radium 226/228
- C. Alpha emitters
- D. Radon
- E. EPA standard
- F. None of the Above

177. _____ Some people who drink water containing arsenic in excess of the EPA standard over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.

- A. Fluoride
- B. Arsenic
- C. Lead
- D. EPA standard
- E. Drinking water
- F. None of the Above

178. _____ Many communities add fluoride to their drinking water to promote dental health. Each community makes its own decision about whether or not to add fluoride.

- A. Fluoride
- B. Arsenic
- C. Lead
- D. EPA standard
- E. Drinking water
- F. None of the Above

179. The EPA has set an enforceable drinking water standard for _____ of 4 mg/L (some people who drink water containing fluoride in excess of this level over many years could get bone disease, including pain and tenderness of the bones).

- A. Fluoride
- B. Arsenic
- C. Lead
- D. EPA standard
- E. Drinking water
- F. None of the Above

180. The EPA has also set a secondary _____ standard of 2 mg/L to protect against dental fluorosis.

- A. Fluoride
- B. Arsenic
- C. Lead
- D. EPA standard
- E. Drinking water
- F. None of the Above

181. Dental fluorosis, in its moderate or severe forms, may result in a brown staining and/or pitting of the permanent teeth. This problem occurs only in developing teeth, before they erupt from the gums. Identify the related term...

- A. Fluoride
- B. Arsenic
- C. Lead
- D. EPA standard
- E. Drinking water
- F. None of the Above

182. Children under nine should not drink water that has more than 2 mg/L of _____.

- A. Fluoride
- B. Arsenic
- C. Lead
- D. EPA standard
- E. Drinking water
- F. None of the Above

183. _____ typically leaches into water from plumbing in older buildings. Lead pipes and plumbing fittings have been banned since August 1998.
- A. Fluoride
 - B. Arsenic
 - C. Lead
 - D. EPA standard
 - E. Drinking water
 - F. None of the Above

Waterborne Pathogens and Disease Section

184. _____ that cause disease are known as pathogens. Most pathogens are generally associated with diseases that cause intestinal illness and affect people in a relatively short amount of time, generally a few days to two weeks.

- A. Intestinal illness
- B. Pathogens
- C. Microscopic particles
- D. Bacteria, viruses, and protozoan
- E. Feces-to-mouth route
- F. None of the Above

185. _____ that may cause waterborne outbreaks through drinking water have one thing in common: they are spread by the fecal-oral or feces-to-mouth route.

- A. Intestinal illness
- B. Pathogens
- C. Microscopic particles
- D. Stomach flu
- E. Feces-to-mouth route
- F. None of the Above

186. _____ may get into water and spread when infected humans or animals pass the bacteria, viruses, and protozoa in their stool. For another person to become infected, he or she must take that pathogen in through the mouth.

- A. Intestinal illness
- B. Pathogens
- C. Microscopic particles
- D. Stomach flu
- E. Feces-to-mouth route
- F. None of the Above

187. Waterborne pathogens are different from other types of _____ such as the viruses that cause influenza (the flu) or the bacteria that cause tuberculosis. Influenza virus and tuberculosis bacteria are spread by secretions that are coughed or sneezed into the air by an infected person.

- A. Intestinal illness
- B. Pathogens
- C. Microscopic particles
- D. Stomach flu
- E. Feces-to-mouth route
- F. None of the Above

188. Human or animal wastes in watersheds, failing septic systems, failing sewage treatment plants or cross-connections of water lines with sewage lines provide the potential for contaminating water with _____.

- A. Intestinal illness
- B. Pathogens
- C. Microscopic particles
- D. Stomach flu
- E. Feces-to-mouth route
- F. None of the Above

189. The water may not appear to be contaminated because the feces has been broken up, dispersed, and diluted into _____.

- A. Intestinal illness
- B. Pathogens
- C. Microscopic particles
- D. Microscopic particles
- E. Feces-to-mouth route
- F. None of the Above

190. These particles, containing _____, may remain in the water and be passed to humans or animals unless adequately treated.

- A. Intestinal illness
- B. Pathogens
- C. Microscopic particles
- D. Stomach flu
- E. Feces-to-mouth route
- F. None of the Above

191. Only proper treatment will ensure eliminating the _____.
- A. Intestinal illness
 - B. Pathogens
 - C. Microscopic particles
 - D. Stomach flu
 - E. Spread of disease
 - F. None of the Above
192. In addition to water, other methods exist for spreading pathogens by the _____. The foodborne route is one of the more common methods.
- A. Intestinal illness
 - B. Pathogens
 - C. Microscopic particles
 - D. Stomach flu
 - E. Fecal-oral route
 - F. None of the Above
193. A frequent source is a _____ who does not wash his hands after a bowel movement and then handles food with unclean hands.
- A. Food handler
 - B. Pathogens
 - C. Microscopic particles
 - D. Stomach flu
 - E. Feces-to-mouth route
 - F. None of the Above
194. The individual who eats _____ may become infected and ill. It is interesting to note the majority of foodborne diseases occur in the home, not restaurants.
- A. Intestinal illness
 - B. Pathogens
 - C. Microscopic particles
 - D. Feces-contaminated food
 - E. Feces-to-mouth route
 - F. None of the Above
195. Day care centers are another common source for spreading _____ by the fecal-oral route.
- A. Intestinal illness
 - B. Pathogens
 - C. Microscopic particles
 - D. Stomach flu
 - E. Feces-to-mouth route
 - F. None of the Above
196. Infected children in diapers may get _____ on their fingers, then put their fingers in a friend's mouth or handle toys that other children put into their mouths.
- A. Intestinal illness
 - B. Pathogens
 - C. Microscopic particles
 - D. Stomach flu
 - E. Feces
 - F. None of the Above
197. The general public and some of the medical community usually refer to diarrhea symptoms as _____.
- A. Intestinal illness
 - B. Pathogens
 - C. Microscopic particles
 - D. Stomach flu
 - E. Feces-to-mouth route
 - F. None of the Above
198. Technically, influenza is an upper respiratory illness and rarely has diarrhea associated with it; therefore, _____ is a misleading description for foodborne or waterborne illnesses, yet is accepted by the general public.
- A. Intestinal illness
 - B. Pathogens
 - C. Microscopic particles
 - D. Stomach flu
 - E. Feces-to-mouth route
 - F. None of the Above
199. The next time you get the _____, you may want to think twice about what you've digested within the past few days.
- A. Intestinal illness
 - B. Pathogens
 - C. Microscopic particles
 - D. Stomach flu
 - E. Feces-to-mouth route
 - F. None of the Above

200. Chain of Transmission

Water is contaminated with feces. This contamination may be of human or animal origin. The feces must contain _____ (disease-causing bacteria, viruses or protozoa).

- A. Cryptosporidium
- B. Pathogens
- C. Susceptible person
- D. Campylobacteriosis
- E. Cholera, Legionellosis, salmonellosis, shigellosis, and yersiniosis
- F. None of the Above

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