

Registration form

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Distribution ___ Water Treatment ___ Other _____

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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.

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- the current TCEQ Criminal Conviction Guidelines for Occupational Licensing, which describes the process by which the TCEQ's Executive Director determines whether a criminal conviction:
 - renders a prospective applicant an unsuitable candidate for an occupational license;
 - warrants the denial of a renewal application for an existing license; or
 - warrants revocation or suspension of a license previously granted.
- the right to request a criminal history evaluation from the TCEQ under Texas Occupations Code Section 53.102; and
- that the TCEQ may consider an individual to have been convicted of an offense for the purpose of denying, suspending or revoking a license under circumstances described in Title 30 Texas Administrative Code Section 30.33.

Enrollee Signature: _____ Date: _____

Name of Training Provider/Organization: Technical Learning College

Contact Person: Melissa Durbin Role/Title: Dean

SDWA ACT Answer Key

Name _____

Phone # _____

You are solely responsible that this course is accepted for credit by your State. Did you check with your State agency to ensure this course is accepted for credit?

Method of Course acceptance confirmation. Please fill this section
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**SDWA ACT CEU COURSE
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PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.

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Very Easy 0 1 2 3 4 5 Very Difficult

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Very Similar 0 1 2 3 4 5 Very Different

4. How did you hear about this Course? _____

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Any other concerns or comments.

This course contains general EPA's SDWA federal rule requirements. Please be aware that each state implements water / sampling procedures/safety/ environmental / building regulations that may be more stringent than EPA's regulations. Check with your state environmental/health agency for more information. These rules change frequently and are often difficult to interpret and follow. Be careful to be in full-compliance and do not follow this course for proper compliance.

SDWA 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 will 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 Answer Key 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.**

Disinfection Byproduct Regulations

- Which compound/element/substance are a group of chemicals that are formed along with other disinfection byproducts when chlorine or other disinfectants are used?
A. Disinfectant residual
B. Chlorite
C. Haloacetic Acids (HAA5)
D. Giardia and viruses
E. Disinfection By-Products (DBPs)
F. None of the Above
- _____ is a disinfection byproduct that forms when ozone reacts with naturally occurring bromide in the source water.
A. Bromate
B. Counter pathogens
C. Monobromoacetic acid
D. From the results of coliform testing
E. Bacteria, Virus and Intestinal parasites
F. None of the Above
- Under the _____, total trihalomethanes (TTHM) are regulated at a maximum allowable annual average level of 80 ppb for large surface water public water systems.
A. Cryptosporidium Rules
B. Disinfection Rules
C. Disinfection byproduct
D. Total Trihalomethane Rule
E. Stage 1 DBPR
F. None of the Above
- The new TTHM standards in the _____ became effective in December 2001 for large surface water public water systems, and in December 2003 for small surface water and all ground water systems.
A. Cryptosporidium Rules
B. Disinfection Rules
C. Disinfection byproduct
D. Total Trihalomethane Rule
E. Stage 1 DBPR
F. None of the Above

5. When disinfectants used in water treatment plants react with bromide and/or natural organic matter in the source water, _____ are formed.
- A. Cryptosporidium
 - B. Giardia
 - C. Chlorine byproducts
 - D. New regulations
 - E. Disinfection byproducts (DBPs)
 - F. None of the Above

Understanding Disinfection Byproducts (DBPS)

6. Public water systems have widely used _____, along with filtration, to remove microbial pathogens in drinking water.
- A. Chlorates
 - B. UV
 - C. THMs and HAAs
 - D. Ozone
 - E. Chlorine and other chemical disinfectants
 - F. None of the Above

7. Natural organic matter (NOM) in the source water affects the levels of DBPs that form.
- A. True
 - B. False

8. The levels of _____ can vary significantly in different parts of the distribution system, since many continue to form after the water leaves the treatment facility.
- A. Haloforms
 - B. Trihalomethane(s)
 - C. Total concentration
 - D. Alternative disinfectants
 - E. DBPs
 - F. None of the Above

Updating the Safe Drinking Water Act Regulations

9. The first limit for _____ was 100 parts per billion (ppb) for systems serving more the 10,000 people.
- A. Potential DBP risks
 - B. THMs
 - C. HAAs
 - D. Many trihalomethanes
 - E. Enforceable Maximum Contaminant Levels (MCLs)
 - F. None of the Above

Stage 1 DBP Rule

10. The _____ was issued by USEPA in December 1998,
- A. Haloforms rule
 - B. Trihalomethane rule
 - C. Total concentration
 - D. MCL
 - E. Stage 1 DPB rule
 - F. None of the Above
11. A process called enhanced coagulation was mandated by _____ to reduce the potential for DBPs to form.
- A. Potential DBP risks
 - B. The Stage 1 DBP rule
 - C. THMs and HAAs
 - D. Trihalomethane
 - E. Enforceable Maximum Contaminant Levels (MCLs)
 - F. None of the Above
12. The _____ sets enforceable MCLs for DBPs: 80 ppb for TTHMs and 60 ppb for HAAs.
- A. Potential DBP rule
 - B. Stage 1 DBP rule
 - C. THMs and HAAs
 - D. Trihalomethane rule
 - E. Enforceable Maximum Contaminant Levels (MCLs)
 - F. None of the Above

13. The Stage 1 DBP rule set _____ for TTHM and HAAs based on system-wide running annual averages.

- A. Haloforms
- B. Trihalomethanes
- C. Total concentration
- D. MCLs
- E. Stage 1 Disinfectants and Disinfection Byproducts
- F. None of the Above

14. The EPA recognized that, while alternative disinfectants might reduce _____, other, less understood, byproducts may be produced

- A. Potential DBP risks
- B. THM(s)
- C. THMs and HAAs
- D. Many trihalomethanes
- E. Enforceable Maximum Contaminant Levels (MCLs)
- F. None of the Above

Total Trihalomethanes

15. Which element/compound/substance are chemical compounds in which three of the four hydrogen atoms of methane (CH₄) are replaced by halogen atoms?

- A. Haloforms
- B. Trihalomethanes (THMs)
- C. Total concentration
- D. HAAs
- E. Chloramines
- F. None of the Above

16. Trihalomethanes with all the same halogen atoms are called?

- A. Haloforms
- B. Trihalomethane(s)
- C. HAAs
- D. Chloramines
- E. Stage 1 Disinfectants and Disinfection Byproducts
- F. None of the Above

17. Trihalomethanes represent one group of chemicals generally referred to as?

- A. Haloforms
- B. Disinfection by-products
- C. Total concentration
- D. Humic and fulmic acids
- E. Stage 1 Disinfectants and Disinfection Byproducts
- F. None of the Above

18. There are many hundreds of _____ in addition to trihalomethanes, and the vast majority of them are not monitored.

- A. Potential DBP risks
- B. THM(s)
- C. THMs and HAAs
- D. Many trihalomethanes
- E. Possible disinfection by-products
- F. None of the Above

19. In the United States, the EPA limits the total concentration of the four chief constituents (chloroform, bromoform, bromodichloromethane, and dibromochloromethane), referred to as _____, to 80 parts per billion in treated water.

- A. Haloforms
- B. Trihalomethane(s)
- C. Total concentration
- D. MCL(s)
- E. Total trihalomethanes (TTHM)
- F. None of the Above

THM Treatment

20. THM levels tend to increase with pH, temperature, time, and the level of " _____ " present.

- A. Haloforms
- B. Trihalomethane(s)
- C. Total concentration
- D. MCL(s)
- E. Precursors
- F. None of the Above

21. Organic materials which react with chlorine to form THMs are called _____.

A. Haloforms D. MCL(s)
B. Trihalomethane(s) E. Precursors
C. Total concentration F. None of the Above

22. THM levels can be decreased is by eliminating or reducing chlorination before the _____.

A. Haloforms D. MCLs
B. Trihalomethanes E. Filters
C. Total concentration F. None of the Above

23. An alternative disinfectant like _____ could be used to provide oxidation before filtration if needed.

A. Haloforms D. Potassium permanganate or peroxide
B. Trihalomethane(s) E. Disinfectants and Disinfection Byproducts
C. Total concentration F. None of the Above

24. Removal of _____ through "enhanced coagulation" is considered by the EPA to be the best available technology for THM control at treatment plants.

A. Haloforms D. MCL(s)
B. Trihalomethane(s) E. Precursors
C. Total concentration F. None of the Above

25. Enhanced coagulation includes treatment techniques to optimize the filtration process to maximize removal of _____.

A. Potential DBP risks D. Many trihalomethanes
B. THM(s) E. Precursors
C. THMs and HAAs F. None of the Above

26. Removal of THM precursors by filtration is improved by decreasing the pH of the water and increasing the feed rate of _____ prior to filtration.

A. Potential DBP risks D. Many trihalomethanes
B. THM(s) E. Enforceable Maximum Contaminant Levels (MCLs)
C. THMs and HAAs F. None of the Above

Disinfection Byproduct Regulations

27. In December 1998, the EPA 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: Currently trihalomethanes are regulated at a maximum allowable annual average level of 100 parts per billion for water systems serving over 10,000 people under the Total Trihalomethane Rule finalized by the EPA in 1979.

A. True B. False

28. The Stage 1 Disinfectant/Disinfection Byproduct Rule standards became effective for trihalomethanes and other disinfection byproducts listed above in December 2001 for large surface water public water systems. Those standards became effective in December 2003 for small surface water and all ground water public water systems.

A. True B. False

29. Disinfection byproducts that have been identified in drinking water include trihalomethanes, _____, bromate, and chlorite.
- A. Cryptosporidium
 - B. Giardia
 - C. Haloacetic acids
 - D. Chlorine
 - E. Disinfection byproducts (DBPs)
 - F. None of the Above

Bromate

30. The Stage 1 Disinfectants/Disinfection Byproducts Rule regulates Bromate at this?
- A. Monthly average of 10 parts per billion
 - B. Annual average of 10 parts per million
 - C. Annual average of 100 parts per billion
 - D. Annual average of .10 parts per billion
 - E. Annual average of 10 parts per billion
 - F. None of the Above
31. The bromate standard became effective for large **public water systems** back in December 2001 and for small surface water and?
- A. Waterborne disease outbreaks
 - B. Diagnosed cases of waterborne illness
 - C. Treatment measures
 - D. Amounts of disinfection byproducts
 - E. All ground public water systems
 - F. None of the Above

Stage 2 DBP Rule Federal Register Notices

32. The Microbial and Disinfection Byproducts Rules (MDBPs) are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/disinfection byproducts. The _____ is one part of these rules.
- A. Groundwater Rule (GWR)
 - B. Compliance Rule
 - C. Stage 2 DBP Rule
 - D. Total Coliform Rule
 - E. ICR Rule
 - F. None of the Above
33. The _____ limits exposure to DBPs, specifically total trihalomethanes (TTHM) and five haloacetic acids (HAA5).
- A. Disinfectant used
 - B. DBP exposure
 - C. Stage 2 DBP Rule
 - D. LT2 Enhanced Surface Water Treatment Rule
 - E. Traditional disinfection practices
 - F. None of the Above
34. The Stage 2 DBP Rule applies to water systems that add a primary or residual disinfectant other than _____.
- A. Ultraviolet (UV) light
 - B. The open-channel system
 - C. Ozone
 - D. Chlorine
 - E. Chloramine
 - F. None of the Above
35. In the past 30 years, the _____ has been highly effective in protecting public health and has also evolved to respond to new and emerging threats to safe drinking water.
- A. Stage 2 DBPR
 - B. DBP exposure
 - C. The Stage 2 DBP rule
 - D. Long Term 2 Enhanced Surface Water Treatment Rule
 - E. Safe Drinking Water Act (SDWA)
 - F. None of the Above
36. There are specific microbial pathogens, such as _____, which can cause illness, and are highly resistant to traditional disinfection practices.
- A. Enteric virus(es)
 - B. Oocyst(s)
 - C. Cryptosporidium
 - D. C. perfringens
 - E. E. coli host culture
 - F. None of the Above

37. The Stage 1 Disinfectants and Disinfection Byproducts Rule and _____, promulgated in December 1998, were the first phase in a rulemaking strategy required by Congress as part of the 1996 Amendments to the Safe Drinking Water Act.

- A. Major public health advances
- B. The Stage 2 DBPR
- C. This final rule
- D. Amendments to the SDWA in 1996
- E. Interim Enhanced Surface Water Treatment Rule
- F. None of the Above

38. The Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) builds upon the _____ to address more stringent protection measures for higher risk public water systems

- A. Stage 2 DBPR
- B. DBP exposure
- C. Stage 1 DBPR
- D. Long Term 2 Enhanced Surface Water Treatment Rule
- E. Traditional disinfection practices
- F. None of the Above

39. The _____ and the Long Term 2 Enhanced Surface Water Treatment Rule are the second phase of rules that address disinfectants/disinfection byproducts and microbial pathogens.

- A. Major public health advances
- B. The Stage 2 DBPR
- C. Final rule
- D. Amendments to the SDWA in 1996
- E. Primary or residual disinfectant
- F. None of the Above

40. The _____ will reduce the risk of cancer and reproductive and developmental health issues caused by disinfection byproducts (DBPs) in drinking water.

- A. Stage 3 DBPR
- B. DBP exposure
- C. Stage 2 DBPR
- D. Long Term 2 Enhanced Surface Water Treatment Rule
- E. Traditional disinfection practices
- F. None of the Above

41. Which Rule strengthens public health protection for customers by tightening compliance monitoring requirements for two groups of DBPs, trihalomethanes (TTHM) and haloacetic acids (HAA5)?

- A. Major public health advances
- B. The Stage 3 DBPR
- C. Stage 2 Disinfection Byproducts
- D. Amendments to the SDWA in 1996
- E. Primary or residual disinfectant
- F. None of the Above

42. The _____ builds incrementally upon the Stage 1 DBPR to reduce DBP exposure and related health risks.

- A. Stage 3 DBPR
- B. Stage 2 DBPR
- C. Stage 1 DBP rule
- D. Long Term 2 Enhanced Surface Water Treatment Rule
- E. Stage 4 DBPR
- F. None of the Above

43. The _____ and the Long Term 2 Enhanced Surface Water Treatment Rule are being promulgated at the same time to address concerns about risk tradeoffs between pathogens and DBPs.

- A. Major public health advances
- B. Stage 2 DBPR
- C. Final rule
- D. Amendments to the SDWA in 1996
- E. Primary or residual disinfectant
- F. None of the Above

What does the rule require?

44. Under which Rule, systems will conduct an evaluation of their distribution systems, known as an Initial Distribution System Evaluation (IDSE), to identify the locations with high disinfection byproduct concentrations?

- A. Stage 2 DBPR
- B. DBP exposure
- C. The Stage 1 DBP rule
- D. Long Term 2 Enhanced Surface Water Treatment Rule
- E. Traditional disinfection practices
- F. None of the Above

45. Compliance with the maximum contaminant levels for TTHM and HAA5 will be calculated for each monitoring location in the distribution system. This approach is referred to as the _____.

- A. TTHM and HAA5
- B. DBP MCLs
- C. LRAA
- D. Disinfection byproducts (DBPs)
- E. Trihalomethanes and haloacetic acids
- F. None of the Above

46. Each system has an operational evaluation level to provide early warning of possible future MCL violations.

- A. True
- B. False

47. If an operational evaluation level is exceeded, the system is required to review its operational practices and identify actions that may be taken to mitigate future high _____.

- A. TTHM and HAA5
- B. DBP MCLs
- C. DBP levels
- D. Disinfection byproducts (DBPs)
- E. Trihalomethanes and haloacetic acids
- F. None of the Above

Who must comply with the rule?

48. The _____ regulates community and nontransient noncommunity water systems that treat their water with a primary or residual disinfectant other than ultraviolet light.

- A. DBPs from chlorination
- B. Chlorine and chloramine
- C. Stage 2 DBPR
- D. Total Coliform Rule
- E. TTHM and HAA5
- F. None of the Above

49. A public water system that serves year-round residents of a community, subdivision, or mobile home park that has at least 15 service connections or an average of at least 25 residents is called _____.

- A. A nontransient non-community water system (NTNCWS)
- B. A non-community water system
- C. A community water system (CWS)
- D. Trailer park
- E. A nontransient water system
- F. None of the Above

50. A water system that serves at least 25 of the same people more than six months of the year, but not as primary residence, such as schools, businesses, and day care facilities is called _____.

- A. Trailer park
- B. A non-community water system
- C. A community water system (CWS)
- D. A nontransient non-community water system (NTNCWS)
- E. A nontransient water system
- F. None of the Above

What are Disinfection Byproducts (DBPs)?

51. _____ form when disinfectants used to treat drinking water react with naturally occurring materials in the water.
- A. Disinfectants
 - B. DBLs
 - C. Humic
 - D. Disinfection byproducts (DBPs)
 - E. Sodium Thiosulfates
 - F. None of the Above
52. Total trihalomethanes and haloacetic acids are widely occurring _____ formed during disinfection with chlorine and chloramine.
- A. Sodium Thiosulfate
 - B. Chlorine and chloramine
 - C. Stage 2 DBPR
 - D. Classes of DBPs
 - E. Disinfectants
 - F. None of the Above

Water Sampling Terms and Definitions

Microbes

53. Coliform bacteria are common in the environment and are considered harmful.
- A. True
 - B. False
54. The presence of Coliform bacteria in drinking water indicates that the water may be contaminated with germs that can cause disease.
- A. True
 - B. False
55. _____ in human or animal wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms.
- A. Microbes
 - B. Giardia lamblia
 - C. Microorganisms
 - D. Cryptosporidiosis
 - E. Coliform bacteria
 - F. None of the Above
56. The presence of _____ bacteria indicates that the water may be contaminated with fecal matter from humans or animals.
- A. Fecal Coliform and E coli
 - B. Protozoa
 - C. Thermophilic
 - D. Bac-T
 - E. Coliforinia bacteria
 - F. None of the Above
57. _____ is a parasite that enters drinking water sources through sewage and animal waste. This parasite causes cryptosporidiosis.
- A. Fecal Coliform and E coli
 - B. Giardia lamblia
 - C. Microorganisms
 - D. Cryptosporidiosis
 - E. Cryptosporidium
 - F. None of the Above
58. What does Giardia lamblia cause?
- A. Fecal Coliform and E coli
 - B. Gastrointestinal illness
 - C. Microorganisms
 - D. Cryptosporidiosis
 - E. Coliform bacteria
 - F. None of the Above

Radionuclides

59. Some people who consume water containing _____ over many years may have an increased risk of getting cancer.
- A. Lead
 - B. Fluoride
 - C. Copper
 - D. Aluminum
 - E. Arsenic
 - F. None of the Above

60. Some people who drink water containing this compound/element in excess of the EPA standard over many years may have an increased risk of getting cancer.

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

61. Which compound/element can dissolve and accumulate in underground water sources, such as wells, and in the air in your home?

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

62. _____ is added to drinking water to promote dental health.

- A. Fluorine
- B. Fluoride
- C. Floc
- D. Chlorine
- E. Arsenic
- F. None of the Above

63. The EPA standard for _____ in drinking water is 4 mg/L.

- A. Lead
- B. Fluoride
- C. Intestinal illness
- D. Waterborne outbreaks
- E. Arsenic
- F. None of the Above

64. Which compound/element typically leaches into water from plumbing in older buildings?

- A. Lead
- B. Fluoride
- C. Intestinal illness
- D. Waterborne outbreaks
- E. Arsenic
- F. None of the Above

65. Which secondary standard of 2 mg/L is there to protect against dental fluorosis?

- A. Lead
- B. Fluoride
- C. Arsenic
- D. Florentine
- E. Floraslitic
- F. None of the Above

How Diseases Are Transmitted.

66. How are waterborne pathogens spread?

- A. Fecal-oral, or feces-to-mouth, route
- B. Dermal to fecal route
- C. Oral to fecal route
- D. Influenza route
- E. Waterborne mishaps
- F. None of the Above

67. A source of waterborne pathogens is the stool of infected humans or animals. The stool contains the disease-causing bacteria, viruses, and _____.

- A. Fecal Coliform and E coli
- B. Protozoa
- C. Macroorganisms
- D. Cryptosporidiosis
- E. Bioslime
- F. None of the Above

68. Another person must take that pathogen in through the mouth to become infected.

- A. True
- B. False

69. _____ are different from the pathogens that cause influenza or the bacteria that cause tuberculosis.

- A. Fecal Coliform and E coli
- B. Giardia lamblia
- C. Microorganism(s)
- D. Waterborne Pathogen(s)
- E. Coliform bacteria
- F. None of the Above

70. _____ are spread through the air when an infected person coughs or sneezes.

- A. Fecal Coliform and E coli
- B. Giardia lamblia
- C. Microorganisms
- D. Influenza virus and tuberculosis bacteria
- E. Coliform bacteria
- F. None of the Above

Waterborne Pathogens and Disease Section

Viral-Caused Diseases

71. _____ is a viral disease that may be spread through water.

- A. Pathogen
- B. Yersiniosis
- C. Hepatitis A
- D. Campylobacteriosis
- E. Incubation period
- F. None of the Above

72. Chlorine inactivates most _____ in drinking water.

- A. Illnesses
- B. Giardiasis
- C. Viruses
- D. Pathogen(s)
- E. Infections
- F. None of the Above

Protozoan Caused Diseases

73. Which of the following bugs is larger than bacteria and viruses but still microscopic, they invade and inhabit the gastrointestinal tract?

- A. HIV infections
- B. Symptoms
- C. Giardiasis
- D. Hepatitis A
- E. Protozoan pathogens
- F. None of the Above

74. A few of the parasites enter the environment in a dormant form, with a protective cell wall, called a?

- A. Lamblia
- B. Shell
- C. Case
- D. Cyst
- E. Infection
- F. None of the Above

75. Which of the following terms can survive in the environment for long periods of time and is extremely resistant to conventional disinfectants such as chlorine?

- A. HIV
- B. Symptoms
- C. Infection
- D. Hepatitis A cyst
- E. Cyst
- F. None of the Above

76. Which of the following bugs has been responsible for more community-wide outbreaks of disease in the U.S. than any other, drug treatment is not 100% effective?

- A. HIV infection
- B. Giardia lamblia
- C. Giardiasis
- D. Hepatitis A
- E. Cryptosporidiosis
- F. None of the Above

77. The mode of transmission of _____ is fecal-oral, either by person-to-person or animal-to-person, there is no specific treatment.
- A. HIV infection
 - B. Giardia lamblia
 - C. Giardiasis
 - D. Hepatitis A
 - E. Cryptosporidiosis
 - F. None of the Above

Chain of Transmission

78. If the source of feces in water is not infected with a _____, no disease will result.

- A. Campylobacteriosis
- B. Pathogen
- C. Waterborne illness
- D. Fecal-oral material
- E. Contaminated water
- F. None of the Above

79. How long pathogens survive in the water depends on the water temperature and the length of time the _____ are in the water.

- A. Stomach bugs
- B. Turbidity
- C. Microscopic particles
- D. Germs
- E. Pathogens
- F. None of the Above

80. Giardia and _____ are pathogens that may survive in water for months.

- A. Illness
- B. Cryptosporidium
- C. Bacteria
- D. Campylobacteriosis
- E. Tampylobacteriosis
- F. None of the Above

81. For disease to spread, the pathogens must enter the water system's intake, be inadequately treated, and the water must be consumed by a susceptible person.

- A. True
- B. False

Bacteriological Monitoring Section

82. _____ are usually harmless, occur in high densities, and are easily cultured.

- A. Indicator bacteria
- B. Bacteria tests
- C. Contaminate
- D. Microbiological analysis
- E. Presence of an indicator
- F. None of the Above

83. Commonly used indicators for routine monitoring of drinking water include total coliforms, fecal coliforms, and _____.

- A. Sample container
- B. Bacteria tests
- C. Coliform bacteria
- D. Escherichia coli (E. coli)
- E. Iron bacteria
- F. None of the Above

84. The routine microbiological analysis of drinking water is for _____, which is an indicator organism used to determine the biological quality of the water

- A. Indicator bacteria
- B. Bacteria tests
- C. Contamination
- D. Coliform bacteria
- E. Presence of an indicator
- F. None of the Above

85. Which of the following terms is used as an indicator organism to determine the biological quality of your water?

- A. Microbiological analysis
- B. Bac-T
- C. Coliform bacteria
- D. Escherichia coli (E. coli)
- E. Presence of an indicator
- F. None of the Above

86. The presence of an indicator or _____ in drinking water is an important health concern because of the risk of waterborne diseases and illnesses.

- A. Indicator bacteria
- B. Pathogenic bacteria
- C. Contaminate
- D. Microbiological analysis
- E. Presence of an indicator
- F. None of the Above

87. If _____ are present, the water may be contaminated with fecal material and, therefore, pathogens.

- A. Indicator bacteria
- B. Pathogenic bacteria
- C. Contaminate
- D. Microbiological analysis
- E. Presence of an indicator
- F. None of the Above

Bacteria Sampling

88. A sterile container must always be used to collect water samples for _____.

- A. Indicator bacteria
- B. Bacteria tests
- C. Contamination
- D. pH analysis
- E. Presence of an indicator
- F. None of the Above

89. Bacteria samples must be refrigerated and transported to the testing laboratory within 24 hours.

- A. True
- B. False

90. A water test is not needed to identify _____. It forms an obvious reddish-brown slime on the inside of pipes and fixtures.

- A. Colonies
- B. Algae
- C. Coliform bacteria
- D. Escherichia coli (E. coli)
- E. Iron bacteria
- F. None of the Above

91. The presence of _____ in drinking water indicates that the water may be contaminated with disease-causing organisms.

- A. Diseases
- B. Germs
- C. Coliform bacteria
- D. Escherichia coli (E. coli)
- E. Iron bacteria
- F. None of the Above

Laboratory Procedures

92. One of four methods approved by the USEPA may be used by the laboratory to perform the _____.

- A. Colilert
- B. Coliform
- C. Sample time
- D. Total coliform analysis
- E. Pathogen test
- F. None of the Above

Methods

93. The MMO-MUG test, marketed as _____, is the most common method used for total coliform analysis.

- A. Colilert
- B. Coliform
- C. Sample stuff
- D. Total coliform analysis
- E. Pathogen media
- F. None of the Above

94. If coliforms are present, the laboratory will analyze the sample further for _____.

- A. Colilert or E. coli
- B. Coliforms or E. coli
- C. Fecal coliforms or E. coli
- D. Total coliform analysis or Pathogens
- E. Pathogens or Total coliform analysis
- F. None of the Above

Types of Water Samples

95. The type of _____ you are collecting must be properly identified on the laboratory form.

- A. Colilert
- B. Coliforms
- C. Sample
- D. Total coliform analysis
- E. Pathogens
- F. None of the Above

The three (3) types of samples are:

96. Repeat samples must be collected following a 'coliform present' routine sample. The number of repeat samples required is based on the number of _____ samples the water system normally collects.

- A. Repeat
- B. Special
- C. QA QC
- D. Total coliform analysis
- E. Routine
- F. None of the Above

97. A sample collected after repairs to the system and before it is placed back in operation is an example of a _____ sample.

- A. Repeat
- B. Special
- C. Sample
- D. Total coliform analysis
- E. Routine
- F. None of the Above

98. _____ samples are collected routinely in accordance with an approved sampling plan to monitor for contamination.

- A. Repeat
- B. Special
- C. Sample
- D. Total coliform analysis
- E. Routine
- F. None of the Above

Repeat Sampling

99. If a _____ is total coliform or fecal coliform present, a set of repeat samples must be collected within 24 hours after being notified by the laboratory.

- A. MCL compliance
- B. Distribution system
- C. Routine sample
- D. Original sampling location
- E. Repeat sample(s)
- F. None of the Above

The follow-up for repeat sampling is:

100. If a system collects only one _____ per month or quarter, it must collect four (4) repeat samples.

- A. Special Sample
- B. Routine sample
- C. Repeat sample
- D. Coliform present
- E. Original sampling location
- F. None of the Above

101. For systems collecting two (2) or more routine samples per month, three (3) _____ must be collected.

- A. Compliance sample
- B. Distribution sample
- C. Routine sample
- D. QA/QC Split
- E. Repeat sample(s)
- F. None of the Above

102. One of the repeat samples must be collected from within five (5) service connections upstream from the _____.

- A. MCL compliance
- B. Distribution system
- C. Routine sample
- D. Original sampling location
- E. Repeat sample(s)
- F. None of the Above

103. One of the repeat samples must be collected from within five (5) service connections downstream from the _____.

- A. Special Sample
- B. Routine sample
- C. Repeat sample(s)
- D. Coliform present
- E. Original sampling location
- F. None of the Above

104. The _____ must be collected from the same sampling location over a four-day period, or on the same day, for water systems that have only one service connection.

- A. Special Sample
- B. Routine sample
- C. Repeat sample(s)
- D. Coliform present
- E. Original sampling location
- F. None of the Above

105. All _____ are included in the MCL compliance calculation.

- A. Special Sample
- B. Routine sample
- C. Repeat sample(s)
- D. Coliform present
- E. Original sampling location
- F. None of the Above

Sampling Procedures

106. Which must be followed and all operating staff must be clear on how to follow the sampling plan?

- A. Seal individual samples
- B. Chain of custody
- C. Distribution system
- D. Sample siting plan
- E. Positive for total coliform
- F. None of the Above

107. In order to properly implement the sample-siting plan, staff must understand the required sampling frequency and the _____ to be used for collecting the samples.

- A. Multiple sources
- B. Sample siting plan
- C. Total coliform rule
- D. Proper procedures and sampling containers
- E. Laboratory containers
- F. None of the Above

108. In order to properly implement the sample-siting plan, staff must also understand the proper procedures for identification, storage and transport of the samples to the laboratory.

- A. True B. False

Chain of Custody Procedures

109. A _____ begins when the sample containers are obtained from the laboratory. After that, a chain of custody record will accompany the sample containers.

- A. Multiple sources D. Chain of custody record
B. Sample siting plan E. Sampling containers
C. Total coliform F. None of the Above

110. In addition to a _____, each custody sample may require a seal.

- A. Seal individual samples D. Sample siting plan
B. Chain of custody record E. Positive for total coliform
C. Distribution system F. None of the Above

111. Since a sample may be used as physical evidence, _____ procedures are used to maintain and document sample possession.

- A. Multiple sources D. TCR
B. Sample siting plan E. Chain of custody
C. Total coliform F. None of the Above

112. Any time _____, both parties involved must sign, date, and note the time on the chain of custody record.

- A. Multiple sources are used D. Samples transfer possession
B. The sample siting plan is used E. Sampling containers are lost
C. Total coliform is positive F. None of the Above

113. If a sample must be split and sent to more than one laboratory, a separate _____ is required for each part of the sample.

- A. Form D. Sample siting plan
B. Chain of custody record E. Positive for total coliform
C. Shipping invoice F. None of the Above

114. If the samples are delivered to after-hours night drop-off boxes, the custody record should note such _____ and be locked with the sealed samples inside sealed boxes.

- A. Multiple sources D. TCR
B. Sample siting plan E. A transfer
C. Total coliform F. None of the Above

115. There are two types of MCL violations for coliform bacteria. The first is for total coliform; the second is an acute risk to health violation characterized by the confirmed presence of fecal coliform or E. coli.

- A. True B. False

Maximum Contaminant Levels (MCLs)

116. State and federal laws establish standards for drinking water quality. Under normal circumstances when these guidelines are being met, the water is somewhat safe to drink with little threat to human health.

- A. True B. False

117. EPA had developed standards that are known as maximum contaminant levels (MCL). When a particular contaminant exceeds _____ a potential health threat may occur.

- A. Coliform bacteria count D. HPC
B. MCL E. CFU
C. Standards F. None of the Above

118. This acronym generally expresses properties of the contaminants, risk assessments and factors, short-term (acute) exposure and long-term (chronic) exposure.

- A. Coliform bacteria D. HPC
B. MCLs E. CFU
C. Standards F. None of the Above

119. When you as the operator take samples to ensure your water is in compliance with the MCL, there are two types of _____ for coliform bacteria.

- A. Coliform bacteria D. MCL violations
B. MCLs E. CFU
C. Standards F. None of the Above

120. The first type of MCL violations is for total coliform; the second is _____ violation characterized by the confirmed presence of fecal coliform or E. coli.

- A. Coliform bacteria D. MCL violations
B. MCLs E. An acute risk to health
C. Standards F. None of the Above

Heterotrophic Plate Count HPC

121. Heterotrophic Plate Count (HPC) --- formerly known as the Standard Plate Count, is a procedure for estimating the number of live heterotrophic bacteria and measuring changes during water treatment and distribution in water or in swimming pools.

- A. True B. False

122. Colonies may arise from pairs, chains, clusters, or single cells, all of which are included in the term "_____ " (CFU).

- A. Coliform bacteria units D. HPC units
B. MCLs units E. Colony-forming units
C. Standards F. None of the Above

Spread Plate Method

123. During this method, colonies are on the _____ where they can be distinguished readily from particles and bubbles.

- A. Agar surface D. Bottom
B. Surface growth area E. Material
C. Top F. None of the Above

124. During the Spread Plate Method, colonies can be transferred quickly, and _____ easily can be discerned and compared to published descriptions.

- A. Colonies grow
- B. Surface growth
- C. Low counts
- D. Heterotrophic organisms will grow
- E. Colony morphology
- F. None of the Above

Membrane Filter Method

125. This method permits testing large volumes of _____ and is the method of choice for low-count waters.

- A. Colonies
- B. Surface water
- C. Low-turbidity water
- D. Heterotrophic organisms
- E. MCL
- F. None of the Above

**Heterotrophic Plate Count
(Spread Plate Method)**

126. Which term uses inorganic carbon sources as their carbon source (food or substrate)?

- A. Colonies
- B. Surface growth
- C. AGAR
- D. Heterotrophic organisms
- E. Autotrophic organisms
- F. None of the Above

127. Which term provides a technique to quantify the bacteriological activity of a sample?

- A. Colonies
- B. Heat
- C. Agar
- D. Heterotrophic Plate Count
- E. MCL
- F. None of the Above

128. The R2A agar provides a medium that will support a large variety of?

- A. Colonies
- B. Bugs
- C. Germs
- D. Heterotrophic bacteria
- E. MCL
- F. None of the Above

Total Coliforms

129. This MCL is based on the presence of total coliforms, and compliance is on a daily or weekly basis, depending on your water system type and state rule.

- A. True
- B. False

130. For systems which collect fewer than _____ samples per month, no more than one sample per month may be positive. In other words, the second positive result (repeat or routine) in a month or quarter results in a MCL violation.

- A. 5
- B. 10
- C. 100
- D. 200
- E. 40
- F. None of the Above

131. For systems which collect _____ or more samples per month, no more than five (5) percent may be Positive, check with your state drinking water section or health department for further instructions.

- A. 5
- B. 10
- C. 100
- D. 200
- E. 40
- F. None of the Above

Acute Risk to Health (Fecal coliforms and E. coli)

132. A(n) _____ to human health violation occurs if either one of the following happens: 1. A routine analysis shows total coliform present and is followed by a repeat analysis which indicates fecal coliform or E. coli present. 2. A routine analysis shows total and fecal coliform or E. coli present

- A. Routine analysis
- B. Drinking violation
- C. Acute risk
- D. Human health violation
- E. Fecal coliform or E. coli is present
- F. None of the Above

133. If a routine analysis shows total coliform present, and a follow-up repeat analysis indicates fecal coliform or E. coli present, _____ has occurred.

- A. A routine analysis violation
- B. A drinking violation
- C. A water penalty
- D. An acute risk to human health violation
- E. Fecal coliform or E. coli present
- F. None of the Above

134. If routine analysis shows _____, and a follow-up repeat analysis indicates total coliform present, an acute risk to human health violation has occurred.

- A. A routine analysis violation
- B. A drinking violation
- C. A MCL violation
- D. Presence of bacteria
- E. Total and fecal coliform or E. coli present
- F. None of the Above

135. A water system is required to provide public notice via radio and television stations in the area when _____ occurs.

- A. A routine analysis violation
- B. A drinking water rule violation
- C. A MCL violation
- D. A human health violation
- E. An acute health risk violation
- F. None of the Above

136. A public notice for an acute health risk violation must be given as soon as possible, but no later than 24 hours after notification from the laboratory of the test results.

- A. True
- B. False

Public Notice

137. A public notice must be issued by a water system whenever it fails to comply with an applicable MCL or _____.

- A. Routine analysis
- B. Drinking water rule
- C. Treatment technique
- D. Human health violation
- E. Fecal coliform or E. coli present
- F. None of the Above

138. Whenever a water system fails to comply with its monitoring and/or reporting requirements, a _____ is required.

- A. Routine analysis
- B. Drinking water rule
- C. MCL violation
- D. Public notice
- E. Fecal coliform or E. coli present count
- F. None of the Above

139. There shall be certain information, be issued properly and in a timely manner, and contain certain _____ on the public notice.

- A. Legal analysis
- B. Drinking water rule information
- C. NOVs
- D. Mandatory language
- E. Fecal language
- F. None of the Above

140. The timing and place of posting of the public notice will depend on whether _____ is present to water users.

- A. A routine analysis
- B. A drinking water rule
- C. An acute risk
- D. Legal analysis
- E. Fecal coliform or E. coli
- F. None of the Above

The following are acute violations:

141. Violation of the _____ for nitrate is an acute violation.

- A. Presence
- B. MCL
- C. MCLG
- D. Count
- E. Acute violations
- F. None of the Above

142. Any violation of the _____ for total coliforms, when fecal coliforms or E. coli are present, is an acute violation.

- A. Presence
- B. MCL
- C. MCLG
- D. Count
- E. Acute violations
- F. None of the Above

143. Any outbreak of _____ is an acute violation.

- A. Total coliforms
- B. MCL
- C. Waterborne disease
- D. Radioactive bacteria
- E. Acute violations
- F. None of the Above

pH Section

144. What is the term associated with a charged species, an atom or a molecule, that has lost or gained one or more electrons?

- A. A proton
- B. Ion
- C. Anti-matter
- D. An electron
- E. A cation
- F. None of the Above

145. What is a substance that has the ability to reduce other substances and is said to be reductive in nature?

- A. Protons
- B. An electron donor
- C. Anti-matter
- D. Electrons
- E. Cations
- F. None of the Above

146. Solutions with a pH less than 7 are said to be acidic and solutions with a pH greater than 7 are basic or alkaline. Pure water has a pH very close to _____.

- A. 5
- B. 6
- C. 7
- D. 7.7
- E. 7.5
- F. None of the Above

147. According to the manual, which of the following parameter/methods/measurements determine a parameter using a concentration cell with transference by measuring the potential difference.

- A. Primary pH standard values
- B. Alkalinity
- C. pH
- D. pH measurement(s)
- E. Measurement of pH
- F. None of the Above

148. One definition of pH is that it is defined as the decimal logarithm of the reciprocal of the _____, a_{H^+} , in a solution.

- A. Hydrogen ion activity
- B. Ion-selective electrode(s)
- C. (Solvated) hydronium ion
- D. Brønsted–Lowry acid–base theory
- E. Acid-base behavior
- F. None of the Above

149. Alkalinity is able to neutralize _____ and is measured in a quantitative capacity in an aqueous solution.

- A. Acid
- B. Base
- C. pH
- D. pH measurement(s)
- E. Bond formation
- F. None of the Above

150. When using a visual comparison of the test solution with a standard color chart, measuring pH values should be done to the?

- A. Universal indicator
- B. Colorwheel measurement
- C. Nearest whole number
- D. Spectrophotometer Example
- E. Lab test
- F. None of the Above

151. According to the manual, this device/method/calculation consists of a mixture of indicators which shows a continuous color change from pH 2 to pH 10.

- A. Universal indicator
- B. Colorimeter of spectrophotometer
- C. Spectrophotometer
- D. Excess of alkaline earth metal concentrations
- E. A set of non-linear simultaneous equations
- F. None of the Above

152. A(n) _____ is an example of a mathematical procedure for calculating the concentrations of all chemical species that are present in the solution.

- A. Universal indicator
- B. pH log
- C. A set of linear equations
- D. Chemical speciation calculation
- E. A set of non-linear simultaneous equations
- F. None of the Above

153. According to the manual, under normal circumstances strong acids and bases are compounds that, for practical purposes, are completely dissociated in water, this means that the concentration of hydrogen ions in acidic solution can be taken to be equal to the concentration of the acid. The pH is then equal to minus the logarithm of _____.

- A. The concentration value
- B. The pH
- C. The Spectrophotometer
- D. End-point pH
- E. A set of non-linear simultaneous equations
- F. None of the Above

154. The sum of all the titratable bases is the Alkalinity of water and its acid-neutralizing capacity. What would cause the measured value to vary significantly?

- A. Acid
- B. Alkalinity
- C. pH
- D. pH measurement(s)
- E. End-point pH
- F. None of the Above

155. For strong acids and bases no calculations are necessary except in extreme situations. The pH of a solution containing a weak acid requires the solution of a quadratic equation.

- A. True
- B. False

156. Because alkalinity is significant in many uses and treatments of natural waters and wastewaters, the measured values also may include contributions from _____ or other bases if these are present.

- A. Acids
- B. Light metals
- C. Rare earths
- D. Borates, phosphates, silicates
- E. Caustics
- F. None of the Above

157. Calculations are not necessary except in extreme situations for strong acids and bases. The pH of a solution containing a weak acid requires_____.

- A. The concentration value
- B. The solution of a quadratic equation
- C. The Spectrophotometer
- D. Visual comparison
- E. The solution of a cubic equation
- F. None of the Above

158. What factor is key in determining the suitability of water for irrigation?

- A. pH of 8
- B. pH of 7
- C. pH of 3
- D. Alkaline earth metal concentrations
- E. Borates, phosphates, silicates
- F. None of the Above

159. Since pH is a logarithmic scale, a difference of one pH unit is equivalent to a _____ difference in hydrogen ion concentration

- A. 1
- B. 2
- C. 5
- D. 10
- E. 100
- F. None of the Above

160. According to the manual, which key water measurement is used in the interpretation and control of water and wastewater treatment processes?

- A. Acid
- B. Alkalinity
- C. pH
- D. Chemical ion
- E. Hydrogen bond formation
- F. None of the Above

161. Which compounds for all practical purposes, are completely dissociated in water?

- A. Strong acids and bases
- B. Strong bases
- C. Chemical ions in chains
- D. Strong bases and weak acids
- E. Weak acids and weak bases
- F. None of the Above

162. According to the text, what is the pH of pure water at 50 °C?

- A. 7.7
- B. 8.0
- C. 9.0
- D. 6.55
- E. 7.00
- F. None of the Above

Giardia Lamblia

163. Which bug/creature/organism absorb their nutrients from the lumen of the small intestine, and are anaerobes?

- A. Water-borne sources
- B. Giardia trophozoites
- C. Giardia cysts
- D. Giardia infections
- E. Giardia parasites
- F. None of the Above

164. Which bug/creature/organism/disease can occur through ingestion of dormant cysts in contaminated water, or by the fecal-oral route (through poor hygiene practices)?

- A. Giardiasis
- B. Giardia trophozoites
- C. Cytoplasm
- D. Giardia infection
- E. Trophozoites and cysts
- F. None of the Above

165. Which bug/creature/organism/disease can also occur, for example in day care centers, where children may have poorer hygiene practices?

- A. Water-borne sources
- B. Giardia trophozoites
- C. Giardia cyst
- D. Giardia infections
- E. Fecal-oral transmission
- F. None of the Above

166. Which bug/creature/organism/disease is not symptomatic, so some people can unknowingly serve as carriers of the parasite?

- A. Water-borne illness sources
- B. Giardia trophozoites
- C. Giardia problems
- D. Giardia infections
- E. Parasites
- F. None of the Above

Cryptosporidium

167. According to the text, municipal drinking water utilities may meet federal standards for safety and quality of drinking water, but complete protection from _____ is not guaranteed.

- A. Symptoms
- B. Ameba
- C. Cryptosporidial infection
- D. Prokaryotes
- E. Entamoeba histolytica or E. histolytica
- F. None of the Above

168. Which method of testing can give false negatives due the "patchy" nature of the intestinal?

- A. Entamoeba histolytica or E. histolytica
- B. Parasite
- C. Cryptosporidial infection
- D. Cryptosporidiosis
- E. Parasitic infection
- F. None of the Above

169. The modified acid-fast stain is traditionally used to most reliably, and specifically detect the presence of?

- A. Cyst of C. parvum
- B. Outbreaks
- C. C. parvum
- D. Entamoeba histolytica
- E. Cryptosporidial oocysts
- F. None of the Above

170. The parasite is transmitted by environmentally hardy cysts _____ that, once ingested, excyst in the small intestine and result in an infection of intestinal epithelial tissue.

- A. Cryptosporidium
- B. Parasite
- C. Oocysts
- D. Cryptosporidiosis
- E. Parasitic infection
- F. None of the Above

171. According to the text, the highly environmentally resistant cyst of _____ allows the pathogen to survive various drinking water filtrations and chemical treatments such as chlorination.

- A. Cyst of C. parvum
- B. Outbreaks
- C. C. parvum
- D. Cryptosporidiosis
- E. Cryptosporidial oocysts
- F. None of the Above

Entamoeba histolytica

172. Which bug/creature/organism/species/disease invades the liver and forms an abscess. Even less commonly, it spreads to other parts of the body, such as the lungs or brain?

- A. Symptoms
- B. Ameba
- C. Cryptosporidiosis
- D. Shigellosis (bacillary dysentery)
- E. Entamoeba histolytica or E. histolytica
- F. None of the Above

173. Which bug/creature/organism/species/disease may eat the dead cell or just absorb nutrients released from the cell?

- A. Symptoms
- B. Ameba
- C. Endoplasmic reticulum
- D. Prokaryotes
- E. Cells
- F. None of the Above

174. Amebic dysentery is a severe form of _____ associated with stomach pain, bloody stools, and fever.

- A. Cyst of *C. parvum*
- B. Amebiasis
- C. *C. parvum*
- D. Cryptosporidiosis
- E. Amebic dysentery
- F. None of the Above

Mitochondria

175. Which terms means that the bacterial cell is surrounded by a lipid membrane, or cell membrane, which encloses the contents of the cell and acts as a barrier to hold nutrients?

- A. Ciliate group
- B. Unicellular ciliate protozoa
- C. Endoplasmic reticulum
- D. Prokaryotes
- E. Cytoplasm
- F. None of the Above

Fecal Coliform Bacteria

176. A microscopic organism that lives in the intestines of warm-blooded animals is _____.

- A. Enrichment culture
- B. Microscopic organisms
- C. Fecal matter
- D. Fecal coliform bacteria
- E. Conditions are favorable for growth
- F. None of the Above

177. Fecal coliform bacteria are present in high numbers in a water sample; it means that the water has received _____ from one source or another.

- A. Bacteria levels
- B. Fecal coliform bacteria
- C. Salmonellae
- D. Bacterial concentrations
- E. Fecal matter
- F. None of the Above

178. Although _____ do not necessarily cause disease, they are indicators that other disease-carrying organisms may be present.

- A. Enrichment culture
- B. Microscopic organisms
- C. Fecal matter
- D. Fecal coliform bacteria
- E. Conditions are favorable for growth
- F. None of the Above

Reasons for Natural Variation

179. _____ are living organisms, unlike other drinking water quality parameters.

- A. Bacteria levels
- B. Fecal coliform bacteria
- C. Salmonellae
- D. Bacterial concentrations
- E. Fecal matter
- F. None of the Above

180. Fecal coliform counts are difficult to predict because _____ are dependent on specific conditions for growth that can change quickly.

- A. Bacteria levels
- B. Fecal coliform bacteria
- C. Salmonellae
- D. Bacterial concentrations
- E. Fecal matter
- F. None of the Above

181. Winter rains may wash more _____ from urban areas into a stream; cool water temperatures may cause a major die-off.

- A. Enrichment culture
- B. Microscopic organisms
- C. Fecal matter
- D. Fecal coliform bacteria
- E. Favorable for growth
- F. None of the Above

Expected Impact of Pollution

182. The primary sources of _____ to fresh water are wastewater treatment plant discharges, failing septic systems, and animal waste.

- A. Enrichment culture
- B. Microscopic organisms
- C. Fecal matter
- D. Fecal coliform bacteria
- E. Conditions are favorable for growth
- F. None of the Above

183. Urbanization does not necessarily decrease bacterial levels in a watershed because _____ are developed.

- A. Bacteria levels
- B. Fecal coliform bacteria
- C. New sources of bacteria
- D. Bacterial concentrations
- E. Fecal matter
- F. None of the Above

E. coli O157:H7

184. E. coli O157:H7 is found in human feces and causes _____ when consumed.

- A. Shigella dysenteriae
- B. Bacterium
- C. Enterococcus bacteria
- D. E. coli
- E. Gastroenteritis
- F. None of the Above

185. _____ has been identified as a cause of foodborne illness.

- A. Preventive measures
- B. Escherichia coli O157:H7
- C. Enterovirulent E. coli
- D. Gastroenteritis
- E. Person-to-person contact
- F. None of the Above

186. Illnesses caused by _____ have been associated with eating undercooked, contaminated ground beef.

- A. Shigella dysenteriae
- B. Bacterium
- C. Most illnesses
- D. E. coli
- E. E. coli O157:H7
- F. None of the Above

187. Which term is used to express that in families and childcare centers are an important mode of transmission and that infection can also occur after drinking raw milk and after swimming in or drinking sewage-contaminated water?

- A. Preventive measures
- B. E. coli O157:H7
- C. Enterovirulent E. coli
- D. A cause of illness
- E. Person-to-person contact
- F. None of the Above

What is Escherichia coli O157:H7?

188. Systems serving 25 to 1,000 people typically take one sample per month. Some states reduce this frequency to quarterly for ground water systems if a recent sanitary survey shows that the system is free of sanitary defects.

- A. True
- B. False

189. Larger types of systems can qualify for five samples a month.

- A. True
- B. False

190. Systems using surface water, rather than ground water, are required to take extra steps to protect against bacterial contamination because surface water sources are more vulnerable to such contamination.

- A. True
- B. False

191. At a minimum, all systems using surface waters must properly treat the water; this will kill E. coli O157:H7.

- A. True
- B. False

192. _____ normally inhabit the intestines of humans and animals. It is the dominant species found in feces.

- A. Shigella dysenteriae
- B. Bacterium
- C. Most illnesses
- D. E. coli bacteria
- E. Giardia
- F. None of the Above

How is E. coli O157:H7 spread?

193. The _____ can be found on a small number of cattle farms and can live in the intestines of healthy cattle. Meat can become contaminated during slaughter, and organisms can be thoroughly mixed into beef when it is ground.

- A. Organism(s)
- B. Bacteria
- C. E. coli O157:H7
- D. Infected persons
- E. Hemorrhagic colitis
- F. None of the Above

Protozoa

194. When protozoa are in the form of _____, they actively feed and grow.

- A. Cysts
- B. Trophozoites
- C. Pathogens
- D. Hermaphroditic
- E. Apicomplexans
- F. None of the Above

195. Which bug/creature/organism/species play a role both as herbivores and as consumers in the decomposer link of the food chain?

- A. Protozoa
- B. Malaria parasites
- C. Microinvertebrates
- D. Algal production
- E. Trophozoites and cysts
- F. None of the Above

196. According to the text, the process by which the protozoa takes its cyst form is called encystation, while the process of transforming back into _____ is called excystation.

- A. Cysts
- B. Trophozoite
- C. Pathogens
- D. Hermaphroditic
- E. Apicomplexans
- F. None of the Above

197. Protozoa occupy a range of trophic levels, as predators, they prey upon unicellular or filamentous algae, bacteria, and?

- A. Microfungi
- B. Malaria parasites
- C. Microinvertebrates
- D. Algal production
- E. Trophozoites and cysts
- F. None of the Above

198. Most protozoa exist in 5 stages of life which are in the form of _____.

- A. Protozoa
- B. Malaria parasites
- C. Microinvertebrates
- D. Algal production
- E. Trophozoites and cysts
- F. None of the Above

Protozoa Information

199. _____ have been found in almost every type of soil and in every kind of environment, from peat bogs to the dry sands of deserts.

- A. Foraminifera
- B. Protozoan fauna
- C. Soil-dwelling protozoa
- D. Soil-loving Amoeba
- E. Microsporidia
- F. None of the Above

Environmental Quality Indicators

200. A rich and characteristic _____ can often be found in polluted waters.

- A. Foraminifera
- B. Protozoan fauna
- C. Cytoplasm of protozoa
- D. Soil biomass
- E. Microsporidia
- F. None of the Above