

**Registration form**

**LAB ANALYST \$200.00  
48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL \$50.00**

**Start and Finish Dates:** \_\_\_\_\_

*You will have 90 days from this date in order to complete this course*

**List number of hours worked on assignment must match State Requirement.** \_\_\_\_\_

**Name** \_\_\_\_\_ **Signature** \_\_\_\_\_

*I have read and understood the disclaimer notice on page 2. Digitally sign XXX*

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**Class/Grade** \_\_\_\_\_

*Your certificate will be emailed to you in about two weeks.*

**Please circle/check which certification you are applying the course CEU's.**

Water Treatment \_\_\_ Water Distribution \_\_\_ Other \_\_\_\_\_

Lab Analyst \_\_\_ Wastewater Treatment \_\_\_

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**Professional Engineers;** Most states will accept our courses for credit but we do not officially list the States or Agencies. Please check your State for approval.

**State Approval Listing Link,** check to see if your State accepts or has pre-approved this course. Not all States are listed. Not all courses are listed. Do not solely trust our list for it may be outdated. It is your sole responsibility to ensure this course is accepted for credit.

## **State Approval Listing URL...**

<http://www.tlch2o.com/PDF/CEU%20State%20Approvals.pdf>

*You can obtain a printed version of the course manual from TLC for an additional \$69.95 plus shipping charges.*

## **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**

In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

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.

**Many States and employers require the final exam to be proctored.**

**Do not solely depend on TLC's Approval list for it may be outdated.**

**A second certificate of completion for a second State Agency \$50 processing fee.**

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# LAB ANALYST Answer Key

Name \_\_\_\_\_

Phone \_\_\_\_\_

You are solely responsible to ensure this course is accepted by your State.  
Did you check with your State agency to ensure this course is accepted for credit?  
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*Method of Course acceptance confirmation. Please fill this section*

Website \_\_\_ Telephone Call \_\_\_ Email \_\_\_ Spoke to \_\_\_\_\_

Did you receive the approval number, if applicable? \_\_\_\_\_

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*You are responsible to ensure that TLC receives the Assignment and Registration Key. Please call us to ensure that we received it. No refunds.*

Please Circle, Bold, Underline or X, one answer per question.

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*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 not be in non-compliance and do not follow this course for proper compliance.*

**Please fax the answer key to  
TLC Western Campus Fax (928) 272-0747  
Backup Fax (928) 468-0675**

You are responsible to ensure that TLC receives the Assignment and Registration Key. Please call us to ensure that we received it.

Always call us after faxing the paperwork to confirm that we've received it.





**Please e-mail or fax this survey along with your final exam**

**LAB ANALYST CEU COURSE  
CUSTOMER SERVICE RESPONSE CARD**

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2. Please rate the difficulty of the testing process.

Very Easy 0 1 2 3 4 5 Very Difficult

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Any other concerns or comments.

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If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of \$50.00

## LAB ANALYST CEU Training Course Assignment

*The Assignment (Exam) is also available in Word on the Internet for your Convenience, please visit [www.ABCTLIC.com](http://www.ABCTLIC.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](mailto: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.**

### Waterborne Disease Introduction

#### Bacterial Diseases

1. Which of the following terms is the most common diarrhea illness caused by bacteria? Symptoms include abdominal pain, malaise, fever, nausea and vomiting, and they usually begin three to five days after exposure.

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

2. Which of the following terms is been the cause of outbreaks have most often been associated with food, especially chicken and unpasteurized milk, as well as un-chlorinated water?

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

3. Which of the following terms is an important cause of travelers' diarrhea? Medical treatment generally is not prescribed because recovery is usually rapid.

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

4. Cholera, Legionellosis, salmonellosis, \_\_\_\_\_, and yersiniosis are other bacterial diseases that can be transmitted through water.

- A. Shigellosis
- B. Cysts
- C. Hepatitis A
- D. Campylobacteriosis
- E. HIV
- F. None of the Above

5. Which of the following terms lives in water, readily killed or inactivated with chlorine or other disinfectants?

- A. Cysts
- B. Cryptogiardia
- C. Bacteria
- D. Viral Plaques
- E. Oocysts
- F. None of the Above

### **Viral-Caused Diseases**

6. Which of the following terms is an example of a common viral disease that may be transmitted through water? The onset is usually abrupt with fever, malaise, loss of appetite, nausea and abdominal discomfort, followed within a few days by jaundice.

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

7. Most \_\_\_\_\_ in drinking water can be inactivated by chlorine or other disinfectants.

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

### **Water Sampling and Laboratory Procedures Chapter 1**

#### **New EPA Rules**

##### **Arsenic**

8. Long-term exposure of which compound/element/substance in drinking water to a variety of cancers in humans?

- A. Arsenic
- B. Copper
- C. Basalt
- D. THHMMS
- E. Silica
- F. None of the Above

9. The EPA set a standard limit on the amount of which compound/element/substance in drinking water to 10 ppb?

- A. Arsenic
- B. Trihalomethanes
- C. Disinfection
- D. Copper
- E. Disinfection byproducts (DBPs)
- F. None of the Above

10. Which compound/element/substance is a chemical that occurs naturally in the earth's crust? When rocks, minerals, and soil erode, they release this compound/element/substance into water supplies.

- A. Arsenic
- B. Trihalomethanes
- C. Disinfection byproducts
- D. Basalt
- E. Granite
- F. None of the Above

##### **ICR**

11. The EPA has collected data required by the Information Collection Rule (ICR) to support future regulation of Microbial contaminants, disinfectants, and disinfection byproducts.

- A. True
- B. False

12. 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 (disinfection byproducts (DBPs)); Disease-causing microorganisms (pathogens), including Cryptosporidium; and engineering data to control these contaminants.

- A. True
- B. False

### Stage 1 and 2 Rules

13. Chlorine is the most widely used water disinfectant due to its effectiveness and cost. Using chlorine as a drinking water disinfectant has prevented millions of water borne diseases, such as typhoid, cholera, dysentery, and diarrhea. Most states require community water systems to use chlorination.

- A. True      B. False

14. Chlorine and chlorine-based compounds (halogens) react with organics in water causing the chlorine atom to substitute other atoms resulting in?

- A. Chlorine      D. Halogenated by-products  
B. Organic sulfide(s)      E. HOCl  
C. Calcium carbonate      F. None of the Above

15. Oxidation reactions, where chlorine oxidizes \_\_\_\_\_ present in water.

- A. Carbon      D. Chlorine and chlorine-based compounds (halogens)  
B. Surface water      E. Secondary by-products  
C. Compounds      F. None of the Above

16. EPA's \_\_\_\_\_ requires systems using public water supplies from either surface water or groundwater under the direct influence of surface water to disinfect.

- A. TTHM and HAA5 Rule      D. Disinfection byproducts (DBPs) Rule  
B. DBP MCLs Rule      E. Surface Water Treatment Rule (SWTR)  
C. A community water system (CWS)      F. None of the Above

17. At this time, an MCL is set for only \_\_\_\_\_, and proposed for additional disinfection byproducts.

- A. TTHM and HAA5 Rule      D. Disinfection byproducts (DBPs) Rule  
B. DBP MCLs Rule      E. Total Trihalomethanes  
C. A community water system (CWS)      F. None of the Above

18. The \_\_\_\_\_ rules apply to all community and non-community water systems using a disinfectant such as chlorine, chloramines, ozone, and chlorine dioxide.

- A. TTHM and HAA5 Rule      D. Disinfection byproducts (DBPs) Rule  
B. DBP MCLs Rule      E. Disinfectants and Disinfection Byproducts (DBP)  
C. A community water system      F. None of the Above

19. The Long Term 2 Enhanced Surface Water Treatment Rule (LT2) rule applies to all water systems using \_\_\_\_\_ under the influence of a surface water, as well as groundwater/surface water blends.

- A. Surface water, groundwater      D. Disinfection byproducts (DBPs) Rule  
B. DBP MCLs Rule      E. Total Trihalomethanes  
C. A community water system (CWS)      F. None of the Above

20. While disinfectants are effective in controlling many microorganisms, they react with natural organic and inorganic matter in source water and distribution systems to form?

- A. DBPs      D. Classes of DBPs  
B. Chlorine and chloramine      E. Ultraviolet light  
C. Stage 2 DBPR      F. None of the Above

## Stage 2 DBP Rule Federal Register Notices

21. Which Rule is part of the Microbial and Disinfection Byproducts Rules (MDBPs), which are a set of interrelated regulations that address risks from microbial pathogens and disinfectants/disinfection byproducts?

- A. Groundwater Rule (GWR)
- B. Compliance
- C. The Stage 2 DBP
- D. Long Term 2 Enhanced Surface Water Treatment
- E. Interim Enhanced Surface Water Treatment
- F. None of the Above

22. Which Rule will reduce potential cancer and reproductive and developmental health risks from disinfection byproducts (DBPs) in drinking water, which form when disinfectants are used to control microbial pathogens?

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

23. 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

24. 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

25. Amendments to the SDWA in 1996 require EPA to develop rules to balance the risks between microbial pathogens and disinfection byproducts (DBPs). 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

26. The Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) builds upon the \_\_\_\_\_ to address higher risk public water systems for protection measures beyond those required for existing regulations.

- 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

27. Which Rule and the Long Term 2 Enhanced Surface Water Treatment Rule are the second phase of rules required by Congress?

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

28. Which Rule will reduce potential cancer and reproductive and developmental health risks from disinfection byproducts (DBPs) in drinking water, which form when disinfectants are used to control microbial pathogens?

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

29. 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

30. Which Rule targets systems with the greatest risk and builds incrementally on existing rules. This regulation will reduce DBP exposure and related potential health risks and provide more equitable public health protection?

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

31. Which Rule is being promulgated simultaneously with the Long Term 2 Enhanced Surface Water Treatment Rule to address concerns about risk tradeoffs between pathogens and DBPs?

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

**What does the rule require?**

32. 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

33. Compliance with the maximum contaminant levels for two groups of disinfection byproducts (TTHM and HAA5), referred to as?

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

34. Which Rule also requires each system to determine if they have exceeded an operational evaluation level, which is identified using their compliance monitoring results?

- 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

35. A system that exceeds an operational evaluation level is required to review their operational practices and submit a report to their state that identifies actions that may be taken to mitigate future high \_\_\_\_\_, particularly those that may jeopardize their compliance with the DBP MCLs.

- A. TTHM5 and HTAA5
- B. Halos
- C. DBP levels
- D. UV
- E. Amounts of rainfall
- F. None of the Above

36. Entities potentially regulated by the \_\_\_\_\_ are community and nontransient noncommunity water systems that produce and/or deliver water that is treated with a primary or residual disinfectant other than ultraviolet light.

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

37. Which system is 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?

- A. 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

38. Which system is 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?

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

#### **What are Disinfection Byproducts (DBPs)?**

39. Which term forms when disinfectants used to treat drinking water react with naturally occurring materials in the water?

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

40. 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. Trihalomethanes and haloacetic acids
- F. None of the Above

41. Which term in drinking water can change from day to day, depending on the season, water temperature, amount of disinfectant added, the amount of plant material in the water, and a variety of other factors?

- A. Thiols
- B. Chlorine and chloramine
- C. Stage 2 DBPR
- D. Classes of DBPs
- E. Trihalomethanes and haloacetic acids
- F. None of the Above



42. The presence of which term is representative of the occurrence of many other chlorination DBPs; thus, a reduction in these generally indicates a reduction of DBPs from chlorination?
- A. DBPs from chlorination
  - B. Chlorine and chloramine
  - C. Stage 2 DBPR
  - D. Classes of DBPs
  - E. TTHM and HAA5
  - F. None of the Above

### Stage 2 DBP Rule Federal Register Notices

43. Chlorine and its \_\_\_\_\_ are neutrally charged and therefore easily penetrate the negatively charged surface of pathogens.
- A. Halogen
  - B. Water chlorination
  - C. Chlorine as a disinfectant
  - D. Hydrolysis product hypochlorous acid
  - E. Hypochlorous acid
  - F. None of the Above
44. There are specific microbial pathogens, such as \_\_\_\_\_, which can cause illness and is resistant to traditional disinfection practices.
- A. Cryptosporidium
  - B. Sodium hypochlorite
  - C. Bromoform
  - D. Emerging threats to safe drinking water
  - E. Hypochlorous acid (HOCl), and hydrochloric acid (HCl)
  - F. None of the Above

### Microbial Regulations

45. One of the key regulations developed and implemented by the United States Environmental Protection Agency (USEPA) to counter pathogens in drinking water is the Surface Water Treatment 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 Giardia and viruses by at least 99.9% and 99.99%, respectively.
- A. True
  - B. False
46. Which rule specifies treatment criteria to assure that these performance requirements are met; they include turbidity limits, disinfectant residual, and disinfectant contact time conditions?
- A. Long Term 1 Rule
  - B. Maximum Contaminant Level Goal (MCLG)
  - C. Stage 1 Byproducts Rule
  - D. Surface Water Treatment Rule
  - E. Interim Enhanced Surface Water
  - F. None of the Above
47. Which rule was established to maintain control of pathogens while systems lower disinfection byproduct levels to comply with the Stage 1 Disinfectants/Disinfection Byproducts Rule and to control Cryptosporidium?
- A. Long Term 1 Enhanced Surface Water Treatment Rule
  - B. Maximum Contaminant Level Goal (MCLG)
  - C. Stage 1 Disinfectants/Disinfection Byproducts Rule
  - D. Surface Water Treatment Rule
  - E. Interim Enhanced Surface Water Treatment Rule
  - F. None of the Above
48. The EPA established a MCL of 0.0010 for all public water systems and a 99% removal requirement for Cryptosporidium in filtered public water systems that serve at least 100,000 people. The new rule will tighten turbidity standards by December 2001.
- A. True
  - B. False
49. Color is an indicator of the physical removal of particulates, including pathogens.
- A. True
  - B. False

50. Which rule improves physical removal of Cryptosporidium, and to maintain control of pathogens?

- A. Long Term 1 Enhanced Surface Water Treatment Rule
- B. Maximum Contaminant Level Goal (MCLG)
- C. Stage 1 Disinfectants/Disinfection Byproducts Rule
- D. Surface Water Treatment Rule
- E. Interim Enhanced Surface Water Treatment Rule
- F. None of the Above

### **Distribution System Water Quality Problems**

#### **Turbidity**

51. Turbidity in water is significant from a public health standpoint because \_\_\_\_\_ could shelter microorganisms from the disinfectant.

- A. Germs
- B. Hardness
- C. Chlorine
- D. Turbidity
- E. Suspended particles
- F. None of the Above

52. EPA regulations direct that, for most water systems, the turbidity of water entering the distribution system must be equal or less than 0.5 ntu in at least 95 percent of the measurements taken each month; at no time may the turbidity exceed 5 ntu.

- A. True
- B. False

53. Increases in turbidity may be caused by changes in velocity or inadequate flushing following main replacement.

- A. True
- B. False

#### **Hardness**

54. Water hardness usually comes from water contacting rock formations, such as water from wells in?

- A. Turbidity
- B. Hard and soft water
- C. Ferrous iron
- D. Concentration of calcium and magnesium
- E. Limestone formations
- F. None of the Above

55. Most surface water is of?

- A. Hard hardness
- B. Hardness
- C. Medium hardness
- D. Hard and soft water
- E. Soft hardness
- F. None of the Above

56. Water with 300 mg/L of hardness usually is considered soft.

- A. True
- B. False

57. Hard water usually is quite corrosive, and may have to be treated to reduce the corrosivity.

- A. True
- B. False

#### **Iron**

58. Ferrous iron (Fe<sup>2+</sup>) is in a \_\_\_\_\_, and water containing ferrous iron is colorless.

- A. Corrosivity
- B. Hardness
- C. Dissolved state
- D. Turbidity
- E. Rust-colored
- F. None of the Above

59. Ferric iron (Fe<sup>3</sup>) has been oxidized, and water containing it is?

- A. Corrosivity
- B. Hardness
- C. Medium hardness
- D. Turbidity
- E. Rust-colored
- F. None of the Above

60. Gallionella can cause \_\_\_\_\_, tastes and odors, clogged pipes, and pump failure.

- A. Bacteriological safety
- B. System failure
- C. Bacteria
- D. Entry of contaminants
- E. Red water
- F. None of the Above

61. Water samples show increased iron concentrations between the point where water enters the distribution system and the consumer's tap, either corrosion, Iron bacteria, or both are probably taking place.

- A. True
- B. False

62. If the problem is caused by system pressure, flushing mains, shock chlorination, and carrying increased residual chlorine are alternatives to consider.

- A. True
- B. False

### **Manganese**

63. The NSDWR recommend a concentration not to exceed 0.05 mg/L to avoid?

- A. Corrosion
- B. Customer complaints
- C. Pressure loss
- D. Harmful effects on humans
- E. Water system contamination
- F. None of the Above

### **Water Quality Safeguards**

64. Which of the following terms are recommended above is absolutely necessary to prevent back siphonage and the entry of contaminants?

- A. Bacteriological safety
- B. Static pressure
- C. Chlorine
- D. Monitoring
- E. Continuous positive pressure
- F. None of the Above

65. Either water use must be restricted or the water system must be upgraded to be capable of supplying more water, if water demands are so great during peak demand periods that pressure declines in parts of the systems.

- A. True
- B. False

66. Which of the following terms also may be reduced during a main break because of the large amount of escaping water?

- A. Bacteriological safety
- B. System pressure
- C. Backpressure
- D. Cross connection
- E. Backflow
- F. None of the Above

### **pH Section**

67. What is the theory that states than an acid is a substance that produces Hydronium ions when it is dissolved in water, and a base is one that produces hydroxide ions when dissolved in water?

- A. Newton's
- B. Alkalinity
- C. Lord Calvin's
- D. Amadeus
- E. Arrhenius
- F. None of the Above

68. 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

69. 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

70. In chemistry, pH is a measure of the acidity or basicity of an aqueous solution. 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

71. 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

72. Mathematically speaking, pH is the negative logarithm of the activity of the (solvated) hydronium ion, often expressed as the measurement of?

- A. Electrons
- B. Alkalinity
- C. Hydronium ion concentration
- D. Cation measurement(s)
- E. Ions
- F. None of the Above

73. When measuring alkalinity in determining a stream's ability to neutralize acidic pollution from rainfall or wastewater, this measurement can be one of the best measures of the sensitivity of the stream to acid inputs.

- A. True
- B. False

74. 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

75. With respect to standard buffer values, when more than two buffer solutions are used the electrode can be calibrated by fitting observed pH values to a straight line.

- A. True
- B. False

76. Commercial standard buffer solutions usually comes with information about value and a correction factor to be applied for what temperatures?

- A. 4 °C
- B. 25 °C
- C. 39 °F
- D. 10 °C
- E. 70 °F
- F. None of the Above

77. Because the pH scale is logarithmic, therefore pH is?
- A. Universal indicator                      D. Excess of Ion concentrations  
 B. A dimensionless quantity              E. A set of non-linear equations  
 C. A Spectrophotometer                  F. None of the Above
78. What is the new pH scale is referred to as?
- A. Total scale      D.  $\text{Ph}_3$   
 B. POH              E. POE  
 C. P3H              F. None of the Above
79. Alkalinity is able to neutralize \_\_\_\_\_ and is measured in a quantitative capacity in an aqueous solution.
- A. Acid      D. pH measurement(s)  
 B. Base      E. Bond formation  
 C. pH      F. None of the Above
80. 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                      D. Spectrophotometer Example  
 B. Colorwheel measurement              E. Lab test  
 C. Nearest whole number                  F. None of the Above
81. 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                      D. Excess of alkaline earth metal concentrations  
 B. Colorimeter of spectrophotometer      E. A set of non-linear simultaneous equations  
 C. Spectrophotometer                      F. None of the Above
82. Which of the following is an example of a mathematical procedure for calculating the concentrations of all chemical species that are present in the solution?
- A. Universal indicator                      D. Chemical speciation calculation  
 B. pH log                                      E. A set of non-linear simultaneous equations  
 C. A set of linear equations                  F. None of the Above
83. The pH is equal to minus the logarithm of?
- A. The concentration value                  D. End-point pH  
 B. The pH                                      E. A set of non-linear simultaneous equations  
 C. The Spectrophotometer                  F. None of the Above
84. 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                      D. pH measurement(s)  
 B. Alkalinity                  E. End-point pH  
 C. pH                          F. None of the Above
85. 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

86. If the pH of a solution contains a weak base, this may require?
- A. The solution of a cubic equation      D. A set of linear simultaneous equations  
 B. The solution of a linear equation      E. A set of non-linear equations  
 C. The solution of a squared equation      F. None of the Above
87. While the general case requires the pH solution of?
- A. The solution of a cubic equation      D. A set of linear simultaneous equations  
 B. The solution of a linear equation      E. A set of non-linear simultaneous equations  
 C. The solution of a squared equation      F. None of the Above
88. 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      D. Borates, phosphates, silicates  
 B. Light metals      E. Caustics  
 C. Rare earths      F. None of the Above
89. 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      D. Visual comparison  
 B. The solution of a quadratic equation      E. The solution of a cubic equation  
 C. The Spectrophotometer      F. None of the Above
90. What factor is key in determining the suitability of water for irrigation.
- A. pH of 8      D. Alkaline earth metal concentrations  
 B. pH of 7      E. Borates, phosphates, silicates  
 C. pH of 3      F. None of the Above
91. The calculation of the pH of a solution containing acids and/or bases is an example of a \_\_\_\_\_ calculation, that is, a mathematical procedure for calculating the concentrations of all chemical species that are present in the solution
- A. Universal indicator      D. Visual comparison  
 B. Colorwheel measurement      E. Chemical speciation  
 C. Spectrophotometer      F. None of the Above
92. Since pH is a logarithmic scale, a difference of one pH unit is equivalent to a \_\_\_\_\_ difference in hydrogen ion concentration
- A. 1      D. 10  
 B. 2      E. 100  
 C. 5      F. None of the Above
93. According to the manual, this key water measurement is used in the interpretation and control of water and wastewater treatment processes.
- A. Acid      D. Chemical ion  
 B. Alkalinity      E. Hydrogen bond formation  
 C. pH      F. None of the Above
94. These compounds for all practical purposes are completely dissociated in water.
- A. Strong acids and bases      D. Strong bases and weak acids  
 B. Strong bases      E. Weak acids and weak bases  
 C. Chemical ions in chains      F. None of the Above

95. Sodium hydroxide, NaOH, is an example of?  
 A. Strong acid and base    D. Strong base and weak acid  
 B. Strong base                E. Weak acids and weak bases  
 C. Weak base                 F. None of the Above
96. According to the text, what is the pH of pure water at 50 °C?  
 A. 7.7                          D. 6.55  
 B. 8.0                          E. 7.00  
 C. 9.0                          F. None of the Above

**Water Sampling Terms and Definitions**

**Microbes**

97. Coliform bacteria are common in the environment and are considered harmful.  
 A. True    B. False
98. The presence of coliform bacteria in drinking water indicates the water may be contaminated with germs that can cause disease.  
 A. True    B. False
99. Microbes that are in human wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms and are caused by?  
 A. Fecal Coliform and E coli                          D. Cryptosporidiosis  
 B. Giardia lamblia                                        E. Coliform bacteria  
 C. Microorganisms                                        F. None of the Above
100. What is the bacteria whose presence indicates the water may be contaminated with human or animal wastes?  
 A. Fecal Coliform and E coli            D. Bac-T  
 B. Protozoa                                    E. Coliform bacteria  
 C. Thermophilic                                F. None of the Above
101. What is the parasite that enters lakes and rivers through sewage and animal waste? It causes cryptosporidiosis, a mild gastrointestinal disease?  
 A. Fecal Coliform and E coli                          D. Cryptosporidiosis  
 B. Giardia lamblia                                        E. Cryptosporidium  
 C. Microorganisms                                        F. None of the Above
102. What does Giardia lamblia causes?  
 A. Fecal Coliform and E coli                          D. Cryptosporidiosis  
 B. Gastrointestinal illness                            E. Coliform bacteria  
 C. Microorganisms                                        F. None of the Above

**Radionuclides**

103. Some people who drink water containing this compound/element 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. Lead                          D. Aluminum  
 B. Fluoride                        E. Arsenic  
 C. Copper                         F. None of the Above

104. 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

105. 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

106. Which compound/element do communities add to their drinking water to promote dental health?

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

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

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

108. 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

109. 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

### **Bacteriological Monitoring Section**

110. Which of the following are usually harmless, occur in high densities in their natural environment and are easily cultured in relatively simple bacteriological media?

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

111. Indicators in common use today 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



112. According to the text, the routine microbiological analysis of your water is for?

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

113. 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

114. The presence of an indicator or \_\_\_\_\_ in your drinking water is an important health concern.

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

115. Which of the following terms is used to signal possible fecal contamination, and therefore, the potential presence of pathogens?

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

### **Bacteria Sampling**

116. Water samples for this process must always be collected in a sterile container.

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

117. Refrigerate the sample and transport it to the testing laboratory within eight hours (in an ice chest). Many labs will accept bacteria samples on Friday. Mailing Indicator bacteria is not recommended because laboratory analysis results are not as reliable.

- A. True
- B. False

118. Which bug forms an obvious slime on the inside of pipes and fixtures? A water test is not needed for identification. Check for a reddish-brown slime inside a toilet tank or where water stands for several days.

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

119. Which of the following are common in the environment and are generally not harmful, but the presence of these bacteria in drinking water is usually a result of a problem with the treatment system or the pipes that distribute water, and indicates the water may be contaminated with germs that can cause disease?

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

### Laboratory Procedures

120. The laboratory may perform the \_\_\_\_\_ in one of four methods approved by the U.S. EPA and your local environmental or health division.

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

### Methods

121. The MMO-MUG test, a product marketed as \_\_\_\_\_, is the most common. The sample results will be reported by the laboratories as simply coliforms present or absent.

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

122. If coliforms are present, the laboratory will analyze the sample further to determine if these are \_\_\_\_\_ and \_\_\_\_\_ and report their presence or absence.

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

### Types of Water Samples

123. It is important to properly identify the type of \_\_\_\_\_ you are collecting.

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

124. Samples collected following a coliform present' routine sample. The number of repeat samples to be collected is based on the number of \_\_\_\_\_ samples you normally collect.

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

125. What type of samples can be collected for other reasons? Examples would be a sample collected after repairs to the system.

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

126. What type of samples can be collected on a routine basis to monitor for contamination? Collection should be in accordance with an approved sampling plan.

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

### Repeat Sampling

127. Which of the following terms 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:**

128. If only one \_\_\_\_\_ per month or quarter is required, four (4) repeat samples must be collected.

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

129. 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

130. 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

131. 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

132. Repeat samples must be collected from: If the system has only one service connection, the \_\_\_\_\_ must be collected from the same sampling location over a four-day period or on the same day.

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

133. Repeat samples must be collected from: 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**

134. Which term 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

135. Staff must be aware of how often sampling must be done, the \_\_\_\_\_ to be used for collecting the samples, and the proper procedures for identification, storage and transport of the samples to an approved laboratory.

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

136. In addition, proper procedures must be followed for repeat sampling whenever a routine sample result is?

- 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

**Maximum Contaminant Levels (MCLs)**

137. 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

138. When a particular contaminant exceeds this missing term, a potential health threat may occur.

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

139. Which acronym generally expresses properties of the contaminants, risk assessments and factors, short-term exposure and long-term exposure?

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

140. 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
- B. MCLs
- C. Standards
- D. MCL violations
- E. CFU
- F. None of the Above

141. Which of the following terms 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. Coliform bacteria
- B. MCLs
- C. Standards
- D. MCL violations
- E. CFU
- F. None of the Above

**Positive or Coliform Present Results**

142. According to the text, if you are notified of a positive test result you need to contact either the Drinking Water Program or your local county health department within 24 hours, or by the next business day after the?

- A. Results are reported to you
- B. Positive violation
- C. Repeat sampling immediately
- D. Sample violation
- E. MCL compliance violation
- F. None of the Above

143. Ideally speaking, your Drinking Water Program Agency should contract with health departments to provide \_\_\_\_\_ to water systems.

- A. Assistance
- B. Harassment
- C. Hostility
- D. Sample help
- E. Compliance calculation
- F. None of the Above

144. It is very important to initiate the \_\_\_\_\_ as the corrective measures will be based on those results.

- A. Storage and distribution
- B. Repeat sampling immediately
- C. Upgrading of the wellhead area
- D. Perform routine procedures
- E. Corrective measures
- F. None of the Above

### Heterotrophic Plate Count HPC

145. 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

146. Colonies may arise from pairs, chains, clusters, or single cells, all of which are included in the term?

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

### Spread Plate Method

147. During this method, colonies are on the \_\_\_\_\_ where they can be distinguished readily from particles and bubbles.

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

148. 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

149. 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)

150. Which of the following terms use inorganic carbon sources, this is in contrast to Heterotrophic organisms utilize organic compounds as their carbon source?

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

151. Which of the following terms 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

152. 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

153. 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

154. For systems that 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

155. For systems that collect \_\_\_\_\_ or more samples per month, no more than five (5) percent may be positive?

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

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

156. A(n) \_\_\_\_\_ to human health violation occurs if either one of the following happens:

- 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

157. A routine analysis shows total coliform present and is followed by a repeat analysis that indicates?

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

158. A routine analysis shows total and \_\_\_\_\_ is followed by a repeat analysis that indicates total coliform present.

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

159. Which of the following terms requires the water system to provide public notice via radio and television stations in the area?

- A. Routine analysis violation
- B. Drinking water rule violation
- C. MCL violation
- D. Human health violation
- E. Acute health risk violation
- F. None of the Above

160. According to the text, the type of contamination can pose an immediate threat to human health and notice must be given as soon as possible, but no later than 24 hours after notification from your laboratory of the test results.
- A. True                      B. False

**Public Notice**

161. A public notice is required to be issued by a water system whenever it fails to comply with an applicable MCL or \_\_\_\_\_, or fails to comply with the requirements of any scheduled variance or permit.

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

162. This term best describes what also is required whenever a water system fails to comply with its monitoring and/or reporting requirements or testing procedure.

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

163. There shall be certain information, be issued properly and in a timely manner, and contain certain \_\_\_\_\_ on the public notice.

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

164. If there is a(n) \_\_\_\_\_ present to users, the timing and place of posting of the public notice may have different priorities.

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

**The following are acute violations:**

165. Which is violation of nitrate?

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

166. Concerning total coliforms - when fecal coliforms or E. coli are present in the distribution system and is a violation of the?

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

167. Any outbreak of \_\_\_\_\_, as defined by the rules.

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

## The Main Players- History and Biology Chapter 2

### Circumstances under which Koch's postulates do not easily apply

168. According to the text, which of the following terms may develop only when an opportunistic pathogen invades a susceptible host?

- A. Disease(s)
- B. Mutation(s)
- C. Carriers
- D. Divide
- E. Reproduction
- F. None of the Above

169. Which of the following terms are caused by dietary deficiencies?

- A. Disease(s)
- B. Mutation(s)
- C. Carriers
- D. Pathogen(s)
- E. Microorganisms
- F. None of the Above

170. Fastidious organisms can now be grown in cultures of human or animal cells or in small animals.

- A. True
- b. False

171. Not all laboratory animals are susceptible to all?

- A. Pathogens
- B. Secondary invaders
- C. Microorganisms
- D. Disease
- E. Chemical reactions
- F. None of the Above

172. Some of the diseases are inherited or are caused by abnormality in chromosomes are influenced by?

- A. Environmental factors
- B. Secondary invaders
- C. Microorganisms
- D. Disease
- E. Chemical reactions
- F. None of the Above

### Bacteria

173. Bacteria are prokaryotes, which means that they have no true nucleus. They do have one chromosome of double-stranded DNA in a ring.

- A. True
- B. False

174. There are some bacteria relatives that can do photosynthesis--they don't have chloroplasts, but their \_\_\_\_\_ and other needed chemicals are built into their cell membranes.

- A. Chlorophyll
- B. An organelle
- C. Cellulose
- D. Double-stranded DNA
- E. Bacilli
- F. None of the Above

175. Bacteria consist of only?

- A. Chloroplasts
- B. An organelle
- C. Cellulose
- D. Double-stranded DNA
- E. A single cell
- F. None of the Above

176. Pathogens have been found that can live in temperatures above the boiling point and in cold that would freeze your blood. They "eat" everything from sugar and starch to sunlight, sulfur and iron.

- A. True
- B. False



## Gram Stain

177. One of the two possible types of \_\_\_\_\_ has more peptidoglycan than the other.

- A. Bacteria
- B. Peptidoglycan
- C. Gram<sup>+</sup> or Gram<sup>-</sup>
- D. Bacterial cell walls
- E. Gram stain
- F. None of the Above

178. In the Gram process, the amount of peptidoglycan in the cell walls of the bacteria under study will determine how those bacteria absorb the dyes with which they are stained; thus, bacterial cells can be Gram<sup>+</sup> or Gram<sup>-</sup>.

- A. True
- B. False

179. Which type of bacteria have simpler cell walls with lots of peptidoglycan, and stain a dark purple color?

- A. Aerobic
- B. Positive
- C. Gram<sup>+</sup> or Gram<sup>-</sup>
- D. Gram<sup>+</sup>
- E. Gram<sup>-</sup>
- F. None of the Above

180. Which type of bacteria have more complex cell walls with less peptidoglycan, thus absorb less of the purple dye used and stain a pinkish color?

- A. Positive
- B. Fastidious
- C. Gram<sup>+</sup> or Gram<sup>-</sup>
- D. Gram<sup>+</sup>
- E. Gram<sup>-</sup>
- F. None of the Above

181. Which type of bacteria often incorporate toxic chemicals into their cell walls, and thus tend to cause worse reactions in our bodies?

- A. Positive
- B. Fastidious
- C. Gram<sup>+</sup> or Gram<sup>-</sup>
- D. Gram<sup>+</sup>
- E. Gram<sup>-</sup>
- F. None of the Above

182. Which of the bacteria have less peptidoglycan, antibiotics like penicillin are less effective against them?

- A. Positive
- B. Fastidious
- C. Gram<sup>+</sup> or Gram<sup>-</sup>
- D. Gram<sup>+</sup>
- E. Gram<sup>-</sup>
- F. None of the Above

183. *Pseudomonas aeruginosa* is a strictly aerobic, oxidase positive, non-fermentative bacterium are?

- A. Positive
- B. Fastidious
- C. Gram<sup>+</sup> or Gram<sup>-</sup>
- D. Gram<sup>+</sup>
- E. Gram negative
- F. None of the Above

184. The Gram-stain appearance is not particularly characteristic although rods are somewhat thinner than those seen for the?

- A. Coliform bacteria
- B. Enteric-like bacteria
- C. Standard plate count
- D. HPC
- E. CFU
- F. None of the Above

### **Bacteria Section Peritrichous Bacteria**

185. Microbiologists broadly classify bacteria according to their shape: spherical, rod-shaped, and spiral-shaped.

A. True B. False

186. Pleomorphic bacteria can assume a variety of shapes.

A. True B. False

187. Bacteria may be further classified according to whether they require oxygen (aerobic or anaerobic) and how they react to a test with Gram's stain.

A. True B. False

188. Bacteria in which alcohol washes away Gram's stain is called gram-negative, while bacteria in which alcohol causes the bacteria's walls to absorb the stain are called Gram-positive.

A. True B. False

### **Pili or Fimbriae**

189. Pili or Fimbriae enable the bacteria to attach to other bacteria or to membrane surfaces such as intestinal linings or?

- A. Chromosomes
- B. RBC
- C. Cell membrane
- D. Macromolecular polymer-peptidoglycan
- E. Cytoplasmic organelles
- F. None of the Above

190. Which of the following terms is used to transfer genetic material from one bacteria cell to another?

- A. Chromosomes
- B. Pili or Fimbriae
- C. Cell membrane
- D. Macromolecular polymer-peptidoglycan
- E. Cytoplasmic organelles
- F. None of the Above

### **Spores**

191. Which of the following terms is enclosed in several protein coats that are resistant to heat, drying and most chemicals?

- A. Spores
- B. Genetic material
- C. Cytoplasmic granules
- D. Spore formation
- E. Macromolecular polymer-peptidoglycan
- F. None of the Above

192. Which of the following terms lands on a nutrient rich surface, can form a new vegetative cell?

- A. Spores
- B. Genetic material
- C. Several protein coats
- D. Spore formation
- E. Dried spore
- F. None of the Above

193. Spore formation is related to the survival of bacterial cells, not reproduction.

A. True B. False

### **Bacterial Nutrition**

194. Which of the following terms may in significant quantities, but some seem to only need it in trace amounts?

- A. Water
- B. Nitrogen
- C. Iron, Zinc, Cobalt
- D. Oxygen
- E. Calcium
- F. None of the Above

195. Which of the following terms all life requires in order to grow and reproduce?

- A. Water
- B. Copper
- C. Iron, Zinc, Cobalt
- D. Oxygen
- E. Calcium
- F. None of the Above

196. Which of the following terms are required by some enzymes to function?

- A. Water
- B. Copper
- C. Iron, Zinc, Cobalt
- D. Oxygen
- E. Calcium
- F. None of the Above

197. All life has the same basic nutritional requirements that include: Energy. This may be light or inorganic substances like sulfur, carbon monoxide or ammonia, or preformed organic matter like sugar, protein, fats etc.

- A. True
- B. False

198. Which of the following terms may be nitrogen gas, ammonia, nitrate/nitrite, or a nitrogenous organic compound like protein or Nucleic acid?

- A. Water
- B. Nitrogen
- C. Iron, Zinc, Cobalt
- D. Oxygen
- E. Calcium
- F. None of the Above

199. Which of the following terms may be carbon dioxide, methane, carbon monoxide, or a complex organic material?

- A. Water
- B. Carbon
- C. Iron, Zinc, Cobalt
- D. Oxygen
- E. Calcium
- F. None of the Above

200. Which of the following terms may require gaseous air?

- A. Water
- B. DNA molecule
- C. Iron, Zinc, Cobalt
- D. Oxygen
- E. Calcium
- F. None of the Above

### **Fastidious**

201. Which of the following terms may synthesize every complex molecule they need from the basic minerals?

- A. Eukaryote(s)
- B. Bacteria
- C. Prokaryote(s)
- D. Centrioles
- E. Viruses
- F. None of the Above

202. Which of the following terms are said to be fastidious, require preformed organic molecules like vitamins, amino acids, nucleic acids, carbohydrates?

- A. Eukaryote(s)
- B. Bacteria
- C. Prokaryote(s)
- D. Centrioles
- E. Viruses
- F. None of the Above

### What in the World is an Eukaryote?

203. Which of the following terms represents animals, plants, and fungi, which are mostly multicellular, as well as various other groups called protists, many of which are unicellular?

- A. Eukaryote(s)    D. Centrioles
- B. Bacteria        E. Viruses
- C. Prokaryote(s)    F. None of the Above

204. Which of the following terms represents organisms such as bacteria lack nuclei and other complex cell structures?

- A. Eukaryote(s)    D. Centrioles
- B. Bacteria        E. Viruses
- C. Prokaryote(s)    F. None of the Above

205. The eukaryotes share a common origin, and are often treated formally as a super kingdom, empire, or domain.

- A. True    B. False

### Eukaryotic Cells

206. According to the text, Eukaryotic cells are generally much larger than \_\_\_\_\_, typically with a thousand times their volumes.

- A. Eukaryote(s)    D. Centrioles
- B. Bacteria        E. Viruses
- C. Prokaryote(s)    F. None of the Above

207. Many cells ingest food and other materials through a process of osmosis, where the outer membrane invaginates and then pinches off to form a flagella.

- A. True    B. False

208. Which of the following terms is surrounded by a double membrane, with pores that allow material to move in and out?

- A. The nucleus                      D. Cilia
- B. Flagella                            E. Cell wall
- C. DNA molecule                    F. None of the Above

209. Which of the following terms represents a variety of internal membranes and structures, called organelles, and a cytoskeleton composed of microtubules and microfilaments?

- A. Eukaryote(s)    D. Centrioles
- B. Bacteria        E. Viruses
- C. Prokaryote(s)    F. None of the Above

210. Which of the following terms represent DNA which is divided into several bundles called chromosomes, which are separated by a microtubular spindle during nuclear division?

- A. Eukaryote(s)    D. Centrioles
- B. Bacteria        E. Viruses
- C. Prokaryote(s)    F. None of the Above

211. Which of the following terms represent cells that include a variety of membrane-bound structures, collectively referred to as the endomembrane system.

- A. Eukaryote(s)
- B. Golgi bodies or dictyosomes
- C. Prokaryote(s)
- D. Centrioles
- E. Eukaryotic
- F. None of the Above

### Amoebas

**How does an amoeba locomote? Some of this information is also in the Appendix**

212. Which bug/creature/organism/species locomote by way of cytoplasmic movement?

- A. Eukaryotes
- B. Protozoa(ns)
- C. Amoeba(s)
- D. Marine ciliates
- E. E. coli
- F. None of the Above

213. Which bug/creature/organism/species forms pseudopods with which they 'flow' over a surface?

- A. Eukaryotes
- B. Protozoa(ns)
- C. Amoeba(s)
- D. Marine ciliates
- E. E. coli
- F. None of the Above

214. These pseudopods are also used to capture prey; they simply engulf the food. They can detect the kind of prey and use different?

- A. Eukaryotic cell
- B. Protozoa(ns)
- C. Amoeba(s)
- D. 'Engulfing tactics'
- E. Cytoplasm
- F. None of the Above

**Protozoa Information Some of this information is also in the Appendix**

215. Which bug/creature/organism/species have been documented from almost every type of soil and in every kind of environment, from the peat-rich soil of 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

216. In freshwater habitats, the foraminifera and radiolaria common in marine environments are absent or low in numbers while \_\_\_\_\_ exist in greater numbers.

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

### Environmental Quality Indicators

217. Polluted waters often have a rich and characteristic?

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

218. According to the text, which of the following terms may develop only when an opportunistic pathogen invades a susceptible host?

- A. Disease(s)
- B. Mutation(s)
- C. Carriers
- D. Divide
- E. Reproduction
- F. None of the Above

219. Which of the following terms are caused by dietary deficiencies?

- A. Disease(s)      D. Pathogen(s)
- B. Mutation(s)    E. Microorganisms
- C. Carriers        F. None of the Above

220. According to the text, which of the following terms are very difficult to grow under in-vitro (in the laboratory) conditions?

- A. Disease(s)      D. Pathogen(s)
- B. Mutation(s)    E. Microbes
- C. Carriers        F. None of the Above

221. Fastidious organisms can now be grown in cultures of human or animal cells or in small animals.

- A. True    b. False

222. Not all laboratory animals are susceptible to all?

- A. Pathogens              D. Disease
- B. Secondary invaders    E. Chemical reactions
- C. Microorganisms        F. None of the Above

223. Some of the diseases are inherited or are caused by abnormality in chromosomes are influenced by?

- A. Environmental factors    D. Disease
- B. Secondary invaders    E. Chemical reactions
- C. Microorganisms        F. None of the Above

**Symbiotic Protozoa Some of this information is also in the Appendix Parasites**

224. Which term means or comprises a unique group of obligate, intracellular parasitic protozoa?

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

225. Which term means or comprises amazingly diverse organisms with more than 700 species and 80 genera that are capable of infecting a variety of plant, animal, and even other protist hosts?

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

226. There are four different genera of microsporidia (Encephalitozoon, Nosema, Pleistophora, and?)

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

### Protozoan Reservoirs of Disease

227. The presence of bacteria in this is well known, whereas that of viruses is less frequently reported.

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

228. Most of these reports simply record the presence of bacteria or viruses and assume some sort of symbiotic relationship between them and the?

- A. Flagella
- B. Bacteria or viruses
- C. Protozoa
- D. Free-living amoebae
- E. Cell's cytoplasm
- F. None of the Above

229. Some human pathogens were shown to not only survive but also to multiply in the cytoplasm of free-living?

- A. Amoeba
- B. Organisms
- C. Beneficial symbionts
- D. Nonpathogenic protozoa
- E. Various protozoa
- F. None of the Above

230. To date, the focus of attention has been on the \_\_\_\_\_, the causative organism of Legionnaires' disease; these bacteria live and reproduce in the cytoplasm of some free-living amoebae.

- A. Amoeba
- B. Bacteria or viruses
- C. Protozoa
- D. Free-living amoebae
- E. Bacterium Legionella pneumophila
- F. None of the Above

### Symbionts

231. According to the text, some of these creatures are harmless or even beneficial symbionts.

- A. Amoeba
- B. Viruses
- C. Protozoa
- D. Free-living amoebae
- E. Bacterium Legionella pneumophila
- F. None of the Above

### Protozoan Diseases

232. 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

233. 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

234. 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

235. Which of the following terms is a commonly reported protozoan-caused disease, it has also been referred to as backpacker's disease?

- A. Giardia lamblia
- B. Giardiasis
- C. Malaise
- D. Cryptosporidiosis
- E. Anti-water Infection
- F. None of the Above

236. The backpacker's disease incubation period is 5-25 days or longer, with an average of 7-10 days, many infections are?

- A. Total
- B. Weak
- C. Strong
- D. Asymptomatic
- E. Unisymptomatic
- F. None of the Above

237. Which of the following bugs/disease terms occurs worldwide primarily because customers are receiving their drinking water from streams or rivers without adequate disinfection or a filtration system?

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

### **Giardia lamblia**

238. 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

### **Cryptosporidiosis**

239. The mode of transmission of this bug 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

240. All of these diseases, with the exception of this bug, have one symptom in common: diarrhea. They also have the same mode of transmission, fecal-oral, whether through person-to-person or animal-to-person contact.

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

241. Which of the following is an example of a protozoan disease that is common worldwide, but was only recently recognized as causing human disease?

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

242. Which of the following usually come and go, and end in fewer than 30 days in most cases, the incubation period is 1-12 days, with an average of about seven days?

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



### Giardiasis Giardia lamblia Chapter 3

243. According to the text, Giardia lamblia (intestinalis) is a single celled animal, i.e., a protozoa, that moves with the aid of five flagella. In Europe, it is sometimes referred to as?

- A. Chronic cases
- B. The organism
- C. Lamblia intestinalis
- D. Typically, the disease
- E. Morphologically distinct organism
- F. None of the Above

244. Giardiasis is the most frequent cause of non-bacterial diarrhea in North America. Giardia duodenalis, cause of giardiasis, is a one-celled, Microscopic parasite that can live in the intestines of animals and people. It is found in every region throughout the world and has become recognized as one of the most common causes of waterborne (and occasionally foodborne) illness often referred to as "Beaver Fever."

- A. True
- B. False

245. Approximately one week after ingestion of the \_\_\_\_\_, prolonged, greasy diarrhea, gas, stomach cramps, fatigue, and weight loss begin.

- A. Intestinal flora
- B. Giardia cysts
- C. Human giardiasis
- D. Various degrees of symptoms
- E. The microaerophilic Giardia
- F. None of the Above

246. Giardiasis disease runs its course in a week or two, although in some cases, the disease may linger for months, causing severe illness and weight loss. Nonetheless, the basic biology of this \_\_\_\_\_--including how it ravages the digestive tract--is poorly understood.

- A. Chronic case
- B. Organism
- C. Parasite
- D. Disease
- E. Morphologically distinct organism
- F. None of the Above

247. Which of the following terms uses these mitosomes in the maturation of iron-sulfur proteins rather than in ATP synthesis, as is the case in mitochondria-possessing eukaryotes?

- A. Intestinal flora
- B. The disease mechanism
- C. Human giardiasis
- D. Various degrees of symptoms
- E. Microaerophilic Giardia
- F. None of the Above

### Nature of Disease

248. Which of the following terms that appear identical to those that cause human illness have been isolated from domestic animals and wild animals.

- A. Chronic cases
- B. The organism
- C. Lamblia intestinalis
- D. Typically, the disease
- E. Organisms
- F. None of the Above

249. Which of the following terms may involve diarrhea within 1 week of ingestion of the cyst, which is the environmental survival form and infective stage of the organism?

- A. Intestinal flora
- B. The disease mechanism
- C. Human giardiasis
- D. Various degrees of symptoms
- E. The microaerophilic Giardia
- F. None of the Above

250. Chronic cases, both those with defined \_\_\_\_\_ and those without, are difficult to treat.

- A. Immune deficiencies
- B. The organism
- C. *Giardia lamblia*
- D. Typically, the disease
- E. Morphologically distinct organism
- F. None of the Above

251. Which of the following terms is unknown, with some investigators reporting that the organism produces a toxin while others are unable to confirm its existence?

- A. Intestinal flora
- B. The disease mechanism
- C. Human giardiasis
- D. Various degrees of symptoms
- E. The microaerophilic *Giardia*
- F. None of the Above

252. Which of the following terms has been demonstrated inside host cells in the duodenum, but most investigators think this is such an infrequent occurrence that it is not responsible for disease symptoms?

- A. Intestinal flora
- B. The organism
- C. *Giardia lamblia*
- D. Typically, the disease
- E. Morphologically distinct organism
- F. None of the Above

253. Which of the following terms of the absorptive surface of the intestine has been proposed as a possible pathogenic mechanism, as has a synergistic relationship with some of the intestinal flora?

- A. Intestinal flora
- B. The disease mechanism
- C. Human giardiasis
- D. Various degrees of symptoms
- E. Mechanical obstruction
- F. None of the Above

254. Which of the following terms can be excysted, cultured and encysted in vitro; new isolates have bacterial, fungal, and viral symbionts?

- A. Intestinal flora
- B. The organism
- C. *Giardia lamblia*
- D. Typically, the disease
- E. *Giardia*
- F. None of the Above

255. Which of the following terms have been isolated and described through analysis of their proteins and DNA; type of strain, is not consistently associated with disease severity?

- A. Several strains of *G. lamblia*
- B. The disease mechanism
- C. Human giardiasis
- D. Various degrees of symptoms
- E. The microaerophilic *Giardia*
- F. None of the Above

256. Different individuals show various degrees of symptoms when infected with the same strain, and the symptoms of an individual may vary during the?

- A. Intestinal flora
- B. Disease mechanism
- C. Human giardiasis
- D. Various degrees of symptoms
- E. Course of the disease
- F. None of the Above

### Diagnosis of Human Illness

257. *Giardia lamblia* is frequently diagnosed by visualizing the organism, either the trophozoite or the cyst in stained preparations or unstained wet mounts with the aid of a microscope.

- A. True
- B. False

258. Which of the following terms may be concentrated by sedimentation or flotation; these procedures reduce the number of recognizable organisms in the sample?

- A. Organisms
- B. Infective cysts
- C. Acute outbreaks
- D. Giardiasis
- E. Recognizable organisms in the sample
- F. None of the Above

259. Which of the following terms that detects excretory secretory products of the organism is also available?

- A. Bac-T
- B. An enzyme
- C. Lab array
- D. Infective cysts
- E. An enzyme linked immunosorbant assay (ELISA)
- F. None of the Above

### Relative Frequency of Disease

260. Which of the following terms is more prevalent in children than in adults, possibly because many individuals seem to have a lasting immunity after infection?

- A. Cryptosporidium
- B. An enzyme
- C. Giardiasis
- D. Infective cysts
- E. Trophozoite
- F. None of the Above

261. Which of the following terms is implicated in 25% of the cases of gastrointestinal disease and may be present asymptotically, the overall incidence of infection is estimated at 2% of the population.

- A. Cryptosporidium
- B. An enzyme
- C. Giardiasis
- D. Infective cysts
- E. Trophozoite
- F. None of the Above

262. Which of the following terms appear to be common with infants and is not usually associated with water but is related to childcare and diaper changing hygiene procedures?

- A. Flagyl
- B. Infective cysts
- C. Acute outbreaks
- D. Giardiasis
- E. Intestinal flora
- F. None of the Above

263. According to the text, this is an example of infectious diarrhea due to \_\_\_\_\_ infection of the small intestine.

- A. This organism
- B. Giardia lamblia
- C. Giardiasis
- D. Infective cysts
- E. The small pear-shaped trophozoites
- F. None of the Above

264. Which of the following terms in immunodeficient and normal individuals are frequently refractile to drug treatment?

- A. This organism
- B. An enzyme
- C. Giardiasis
- D. Infective cysts
- E. Chronic cases of giardiasis
- F. None of the Above

265. Which of the following terms is normally quite effective in terminating infections?

- A. Flagyl
- B. Infective cysts
- C. Acute outbreaks
- D. Giardiasis
- E. Recognizable organisms in the sample
- F. None of the Above

### Target Populations

266. Which of the following terms occurs throughout the population, although the prevalence is higher in children than adults?

- A. This organism
- B. An enzyme
- C. Giardiasis
- D. Infective cysts
- E. The small pear-shaped trophozoites
- F. None of the Above

267. Chronic symptomatic giardiasis is more common in adults than children are.

- A. True
- B. False

### Cryptosporidiosis Cryptosporidium Chapter 4

268. Which bug or disease term describes the following symptoms, watery diarrhea and cramps, sometimes severe, weight loss, nausea, vomiting, and fever are also possible?

- A. Agammaglobulinemia
- B. Toxoplasmosis
- C. Malaise
- D. Cryptosporidiosis
- E. Anti-water Infection
- F. None of the Above

269. Cryptosporidium is a protozoan pathogen of the Phylum Apicomplexa and causes a diarrheal illness called?

- A. Cryptosporidium parvum
- B. Cryptosporidiosis
- C. AIDS
- D. Congenital agammaglobulinemia
- E. Cryptosporidium
- F. None of the Above

270. Apicomplexan pathogens include the malaria parasite Plasmodium, and Toxoplasma, the causative agent of?

- A. Cryptosporidium parvum
- B. Cryptosporidiosis
- C. Toxoplasmosis
- D. Congenital agammaglobulinemia
- E. Cryptosporidium
- F. None of the Above

271. Few people had heard of \_\_\_\_\_, or the disease it causes, cryptosporidiosis that until 1993, when over 400,000 people in Milwaukee became ill with diarrhea after drinking water contaminated with the parasite.

- A. Cryptosporidium parvum
- B. Cryptosporidiosis
- C. AIDS
- D. Congenital agammaglobulinemia
- E. Cryptosporidium
- F. None of the Above

272. Which of the following is most particularly a danger for the immunocompromised, especially HIV-positive persons and persons with AIDS?

- A. Giardia lamblia
- B. Giardiasis
- C. Malaise
- D. Cryptosporidiosis
- E. Anti-water Infection
- F. None of the Above

273. Immunosuppression if severe enough, can lead to chronic?

- A. Cryptosporidium parvum
- B. Giardiasis
- C. Malaise
- D. Cryptosporidiosis
- E. Anti-water Infection
- F. None of the Above

274. Which of the following organism/disease related terms was first identified as a human pathogen, diagnosis was made by a biopsy of intestinal tissue?

- A. *C. parvum*
- B. Cryptosporidiosis
- C. Giardiasis
- D. Congenital agammaglobulinemia
- E. *Cryptosporidium*
- F. None of the Above

275. Staining methods were developed to detect and identify the oocysts directly from stool samples.

- A. True
- B. False

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

- A. *Cryptosporidium parvum*
- B. Cryptosporidiosis
- C. Cryptosporidial oocysts
- D. Giardiasis
- E. *Cryptosporidium*
- F. None of the Above

277. Persons who are taking immunosuppressive drugs may develop chronic and/or severe \_\_\_\_\_, the infection usually resolves when these drugs are decreased or stopped.

- A. *Cryptosporidium parvum*
- B. Cryptosporidiosis
- C. AIDS
- D. Congenital agammaglobulinemia
- E. *Cryptosporidium*
- F. None of the Above

278. The following persons include child care workers; diaper-aged children who attend child care centers; persons exposed to human feces by sexual contact; and caregivers who might come in direct contact with feces while caring for a person infected with?

- A. *Cryptosporidium parvum*
- B. Cryptosporidiosis
- C. AIDS
- D. Congenital agammaglobulinemia
- E. *Cryptosporidium*
- F. None of the Above

279. Which term below does not utilize an insect vector and is capable of completing its life cycle within a single host, resulting in cyst stages that are excreted in feces and are capable of transmission to a new host?

- A. *Cryptosporidium parvum*
- B. Giardiasis
- C. Malaise
- D. Cryptosporidiosis
- E. Anti-water Infection
- F. None of the Above

### **Cholera *Vibrio cholerae* Chapter 5**

280. Cholera is an infection of the small intestine that causes watery diarrhea.

- A. True
- B. False

281. According to the text, Cholera is an infection in the small intestine caused by?

- A. Amoebiasis
- B. Cholera
- C. The bacterium *Vibrio cholerae*
- D. Rapid dehydration and electrolyte imbalance
- E. Diarrheal disease
- F. None of the Above

282. Which of the following terms is protected from the severe effects of cholera because they don't lose water as quickly?

- A. Blood types
- B. Thin people
- C. Antibacterial drugs
- D. Carriers of the cystic fibrosis gene
- E. Carriers of rabies
- F. None of the Above

283. Which of the following terms appears in a community it is essential to ensure three things: hygienic disposal of human feces, an adequate supply of safe drinking water, and good food hygiene?

- A. Cryptosporidium parvum
- B. Cryptosporidiosis
- C. Cholera
- D. El Tor
- E. Cryptosporidium
- F. None of the Above

284. Because of the severity of the diarrhea and vomiting can lead to rapid dehydration and electrolyte imbalance, and?

- A. Amoebiasis
- B. Cholera
- C. Antibacterial drugs
- D. Death
- E. Diarrheal disease
- F. None of the Above

285. To shorten its duration and severity, antibacterial drugs are beneficial in those with?

- A. Amoebiasis
- B. Cholera
- C. Severe disease
- D. Rapid dehydration and electrolyte imbalance
- E. Diarrheal disease
- F. None of the Above

286. Which of the following organism/disease related term has been very rare in industrialized nations for the last 100 years?

- A. Amoebiasis
- B. Cholera
- C. Mexicana cholera
- D. Entamoeba histolytica
- E. Cystic fibrosis gene
- F. None of the Above

287. Which of the following organism/disease related term is the most feared epidemic diarrheal disease because of its severity?

- A. Amoebiasis
- B. Vibrio cholerae
- C. Bacterial meningitis
- D. Entamoeba histolytica
- E. Cystic fibrosis
- F. None of the Above

288. Which of the following organism/disease related term is a disease of the gastrointestinal tract caused by the Vibrio cholerae bacterium and is also known as?

- A. Amoebic cholera
- B. Amoebiasis
- C. Mexicana cholera
- D. European cholera
- E. Asiatic cholera
- F. None of the Above

289. Cholera has been found in only two other animal populations: shellfish and plankton.

- A. True
- B. False

290. Which of the following terms is rarely spread directly from person to person?

- A. Cryptosporidium parvum
- B. Cryptosporidiosis
- C. Cholera
- D. El Tor
- E. Cryptosporidium
- F. None of the Above

291. Cholera has two strains, toxic and nontoxic.

- A. True
- B. False

292. Which of the following organism/disease related term was prevalent in the 1800s but has been virtually eliminated by modern sewage and water treatment systems?

- A. Amoebic cholera
- B. Cholera
- C. Mexicana cholera
- D. European cholera
- E. Asiatic cholera
- F. None of the Above

293. Genetic research has determined that a person's susceptibility to cholera and other diarrheas is affected by their blood type.

- A. True
- B. False

294. The mode of transmission of this disease by water was proven in 1849 by John Snow.

- A. Cryptosporidium parvum
- B. Cryptosporidiosis
- C. Cholera
- D. El Tor
- E. Cryptosporidium
- F. None of the Above

295. Cholera is typically transmitted by either contaminated food or water. With seafood being the usual cause, while in the developing world it is more often water.

- A. True
- B. False

### **Cholera Treatment**

296. When consumed, most bacteria do not survive the?

- A. Stomach acid
- B. Lack of nutrients
- C. Antibacterial drugs
- D. Resistance
- E. Antibiotic treatments
- F. None of the Above

297. During the passage through the stomach, few surviving bacteria conserve their energy and stored nutrients by shutting down much?

- A. Life support
- B. Protein production
- C. Reproduction
- D. Resistance
- E. Antibiotic treatments
- F. None of the Above

298. Surviving Cholera Bacteria exit the stomach and reach the small intestine, they need to propel themselves through the thick mucus that lines the small intestine to get to the intestinal walls.

- A. True
- B. False

299. If Cholera bacteria reach the intestinal wall, they will no longer need?

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

300. On reaching the intestinal wall, *V. cholerae* start producing the Antibiotic treatments that give the infected person a watery diarrhea.

- A. True
- B. False

301. Which of the following terms can be administered for one to three days shorten the course of the disease and reduce the severity of the symptoms?

- A. Verotoxin
- B. Antibiotic treatments
- C. Antibacterial drugs
- D. Resistance
- E. Aspirin
- F. None of the Above

302. If sufficient hydration is maintained people will recover without drugs.

- A. True B. False

303. Which of the following terms is typically used first line, although some strains of *V. cholerae* that have shown resistance?

- A. Verotoxin D. Resistance  
B. Doxycycline E. Aspirin  
C. Antibacterial drugs F. None of the Above

304. Rapid diagnostic assay methods are available for the identification of?

- A. Cholera bacteria-resistant cases D. Resistance  
B. Multiple drug-resistant cases E. Antibiotic treatments  
C. Antibacterial drugs F. None of the Above

305. Cholera remains a pandemic in many areas of the world.

- A. True B. False

306. According to the text, much is known about the mechanisms behind the spread of cholera, this has led to a full understanding of what makes cholera outbreaks happen in some places and not others.

- A. True B. False

307. The term Cholera morbus was used to describe both nonepidemic cholera and other gastrointestinal diseases that resembled cholera. That term is not in current use, but is found in many older references.

- A. True B. False

### **Legionnaires' Disease Legionella Chapter 6**

308. What is the causative agent, this agent would come to be known as?

- A. Legionella D. Legionnaire's disease  
B. Pontiac fever E. Legionella pneumophila  
C. Aerosolized water F. None of the Above

### **The disease has two distinct forms:**

309. Fill in the two missing answers. The more severe form of infection \_\_\_\_\_ which includes pneumonia, and \_\_\_\_\_, a milder illness.

- A. Legionella, Pontiac fever D. Legionnaire's disease  
B. Pontiac fever, Pontiac fever E. Pontiac fever, Legionella pneumophila  
C. Legionnaires' disease, Pontiac fever F. None of the Above

### **What have been the water sources for Legionnaires' disease?**

310. Legionnaire's disease is caused most commonly by the inhalation of small droplets of water or fine aerosol containing?

- A. Legionella D. Legionnaire's disease  
B. Pontiac fever E. Legionella pneumophila  
C. Legionella bacteria F. None of the Above



311. What are naturally found in environmental water sources such as rivers, lakes and ponds and may colonize manmade water systems that include air conditioning systems, humidifiers, cooling tower waters, hot water systems, spas and pools?

- A. Legionella bacteria
- B. Pontiac fever
- C. Aerosolized water
- D. Legionnaire's disease
- E. Legionella pneumophila
- F. None of the Above

**How do people contract Legionella?**

312. Routine biocide treatments will not eradicate \_\_\_\_\_ in the environment, only in laboratory studies.

- A. Legionella
- B. Monoclonal antibodies
- C. Legionella bacteria
- D. Legionnaire's disease
- E. Legionella pneumophila
- F. None of the Above

313. Which of the following bugs that within one month, this bacterium can multiply, in warm water-containing systems, from less than 10 per milliliter to over 1,000 per milliliter of water?

- A. Legionella
- B. Pontiac fever
- C. Monoclonal antibodies
- D. Legionnaire's disease
- E. Legionella pneumophila
- F. None of the Above

314. If high numbers of \_\_\_\_\_ have been found, a relatively simple procedure for disinfecting water systems with chlorine and detergent is available.

- A. Legionella
- B. Pontiac fever
- C. Monoclonal antibodies
- D. Legionnaire's disease
- E. Legionella pneumophila
- F. None of the Above

315. Which is the most common way that Legionella bacteria enter into the lungs to cause pneumonia?

- A. Choking
- B. Pontiac fever
- C. Aspiration
- D. Breathing
- E. Coffee drinking
- F. None of the Above

316. Culture methods are good during Laboratory studies for bio-typing; but culture methods lack sensitivity for routine, quantitative monitoring.

- A. True
- B. False

317. Many factors will inhibit growth or identification of Legionella on BCYE with or without antimicrobial agents, heat or acid treatment.

- A. True
- B. False

318. Culture methods will not identify which bug that can still cause outbreaks (non-culturable, viable legionella have been reported in several peer-reviewed journals)?

- A. Legionella
- B. Bugs
- C. Microbial mats
- D. Legionnaire's disease
- E. Non-culturable legionella
- F. None of the Above

319. Direct fluorescent antibody (DFA) tests using a battery of \_\_\_\_\_ provide more useful routine monitoring information than culture methods.

- A. Legionella
- B. Laboratory studies
- C. Microbial mats
- D. Legionnaire's disease
- E. Monoclonal antibodies
- F. None of the Above

320. Legionella species of bacteria, these bugs are strictly aerobic rods and are considered?
- A. Legionella
  - B. Microbial mats
  - C. Gram negative
  - D. Legionnaire's disease
  - E. Legionella pneumophila
  - F. None of the Above

### **Escherichia Coli Chapter 7 More information in the Appendix**

#### **E. coli O157:H7**

321. Symptoms of E. coli O157:H7 (bacterium) vary with type caused \_\_\_\_\_.

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

322. Which bug/creature/organism/species is an emerging 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

323. Which bug/creature/organism/species 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

324. Which term is used to express that in families and childcare centers are an important mode of transmission and that infection can 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

325. Consumers can prevent \_\_\_\_\_ infection by thoroughly cooking ground beef, avoiding unpasteurized milk, and washing hands carefully.

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

326. 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

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

- A. True
- B. False

328. 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

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

A. True B. False

330. Which bug/creature/organism/species is a normal inhabitant of the intestines of all animals, including humans?

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

331. Under the Safe Drinking Water Act, the EPA requires public water systems to monitor for?

- A. Indicators D. E. coli contamination  
B. Five samples a month E. Coliform bacteria  
C. Bacterial contamination F. None of the Above

332. Systems analyze first for total coliform, any time that a sample is positive for total coliform, the same sample must be analyzed for either?

- A. Total coliform D. EPA regulations  
B. Sanitary survey E. Coliform bacteria  
C. Fecal coliform or E. coli F. None of the Above

333. Smaller systems must take at least five samples a month unless the state has conducted a sanitary survey – a survey in which a state inspector examines system components and ensures they will protect public health – at the system within the last five years.

A. True B. False

334. E. coli O157:H7 is one of hundreds of strains of the Enterococcus bacteria.

A. True B. False

335. E. coli O157:H7 was first recognized as a cause of illness in 1982 during an outbreak of severe bloody diarrhea; the outbreak was traced to contaminated hamburgers. Since then, most infections have come from eating undercooked ground beef.

A. True B. False

336. The combination of letters and numbers in the name of the bacterium refers to the specific markers found on its surface and distinguishes it from other types of E. coli.

A. True B. False

337. Currently, there are four recognized classes of \_\_\_\_\_ (collectively referred to as the EEC group) that cause gastroenteritis in humans.

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

### How is E. coli O157:H7 spread?

338. 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

339. Which bug/creature/organism/species is present on a cow's udders or on equipment may get into raw milk?

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

### Waterborne Pathogens and Disease Review

340. Bacteria, viruses and protozoan that cause disease are known as pathogens.

- A. True
- B. False

341. Most pathogens are generally associated with diseases that \_\_\_\_\_ and affect people in a relatively short amount of time, generally a few days to two weeks.

- A. Limits the treatment process
- B. Are mild in nature
- C. Cause intestinal illness
- D. Will cause fatalities
- E. Limit the travel of pathogens
- F. None of the Above

### How Diseases Are Transmitted.

342. Waterborne pathogens are primarily spread by the?

- 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

343. When infected humans or animals pass the bacteria, viruses, and \_\_\_\_\_ in their stool, pathogens may get into water and spread disease.

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

344. For another person to become infected, he or she must take that pathogen in through the mouth.

- A. True
- B. False

345. Which term means when in nature it is different from other types of pathogens such as the viruses 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

346. According to the text, \_\_\_\_\_ are spread by secretions that are coughed or sneezed into the air by an infected person.

- 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

### Chain of Transmission

347. Which pathogen may survive for months such as Giardia or?

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

348. This chain lists the events that must occur for the transmission of disease via drinking water. By breaking the chain at any point, the Transmission of disease will be prevented.

- A. True
- B. False

349. Water must have feces and must contain this term to cause a waterborne disease.

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

350. The pathogens must survive in the water, which will depend on the temperature of the water 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

### Related Diseases and Associated Illnesses Chapter 8

#### Amebic Meningoencephalitis PAM *Naegleria fowleri*

351. The ameba that causes the PAM infection lives in soil and in salt water pools throughout the world.

- A. True
- B. False

352. *Naegleria* thrives in warm, stagnant bodies of fresh water when temperatures are low, usually above 50 degrees.

- A. True
- B. False

353. The ameba is commonly found in the environment; PAM is very common.

- A. True
- B. False

#### Gastroenteritis

354. Gastroenteritis is characterized by inflammation of the gastrointestinal tract that involves both the stomach and the small intestine resulting in some combination of diarrhea, vomiting, and abdominal pain and cramping.

- A. True
- B. False

355. Gastroenteritis is unrelated to influenza, it has also been called stomach flu and gastric flu.

- A. True
- B. False

356. Gastroenteritis transmission may occur due to consumption of improperly prepared foods, contaminated water, or via close contact with individuals who are infectious.

- A. True
- B. False

357. A person with bacterial gastroenteritis has inflammation of the intestines or stomach caused by a bacterial infection.

- A. True
- B. False

358. Common causes of bacterial gastroenteritis include salmonella infection, shigella infection, cholera, Campylobacter enteritis, and pseudomembranous colitis.  
A. True                      B. False

359. Gastroenteritis has also been referred to as gastro, stomach bug, and stomach virus.  
A. True                      B. False

**Noroviruses**

360. Which of the terms are a genetically diverse group of single-stranded RNA, non-enveloped viruses in the Caliciviridae family?

- A. Typhoid fever                      D. Salmonella infection
- B. Salmonellosis                      E. Noroviruses
- C. Salmonella enterocolitis        F. None of the Above

361. Which of the terms have been traced to food that was handled by one infected person?

- A. Amebic dysentery        D. Many norovirus outbreaks
- B. Salmonella infection    E. Nonbacterial outbreaks of gastroenteritis
- C. Typhoidal Salmonella    F. None of the Above

362. Which of the terms is rapidly inactivated by either sufficient heating or by chlorine-based disinfectants, but the virus is less susceptible to alcohols and detergents, as it does not have a lipid envelope?

- A. Typhoid fever                      D. Salmonella infection
- B. Salmonellosis                      E. Norovirus
- C. Salmonella enterocolitis        F. None of the Above

363. This genus name norovirus is derived from?

- A. Norovirus outbreaks              D. Norwalk virus
- B. Salmonella infection              E. Nonbacterial outbreaks of gastroenteritis
- C. Typhoidal Salmonella            F. None of the Above

364. Which of the terms are transmitted by fecally contaminated food or water, by person-to-person contact, and via aerosolization of the virus and subsequent contamination of surfaces?

- A. Norovirus outbreaks    D. Viruses
- B. Salmonella                      E. Nonbacterial outbreaks of gastroenteritis
- C. Typhoidal Salmonella    F. None of the Above

365. Which of the terms are the most common cause of viral gastroenteritis in humans?

- A. Typhoid fever                      D. Salmonella infection
- B. Salmonellosis                      E. Norovirus
- C. Salmonella enterocolitis        F. None of the Above

366. According to the text, after infection, immunity to \_\_\_\_\_ is usually incomplete and temporary.

- A. Norovirus outbreaks              D. Incomplete and temporary
- B. Salmonella infection              E. Norovirus
- C. Typhoidal Salmonella            F. None of the Above

367. Which of the terms outbreaks will often occur in closed or semiclosed communities, such as long-term care facilities, overnight camps, hospitals, prisons, dormitories, and cruise ships, where the infection spreads very rapidly either by person-to-person transmission or through contaminated food?

- A. Typhoid fever
- B. Salmonellosis
- C. Salmonella enterocolitis
- D. Salmonella infection
- E. Norovirus infection
- F. None of the Above

### **Typhoid Fever Salmonella typhi Section**

368. Typhoid fever, also known as Typhoid, is a common worldwide bacterial disease, transmitted by the ingestion of food or water contaminated with the feces of an infected person, which contain the bacterium Salmonella typhi, Serovar Typhi.

- A. True
- B. False

369. Salmonella typhi is a Gram-negative short bacillus that is motile due to its peritrichous flagella.

- A. True
- B. False

370. Salmonella typhi grows best at 37°C / 98.6°F – human body temperature.

- A. True
- B. False

371. This fever received various names, such as gastric fever, \_\_\_\_\_, infantile remittent fever, slow fever, nervous fever, pythogenic fever, etc.

- A. Typhoid fever
- B. Gastric fever
- C. Abdominal typhus
- D. Gram-negative short bacillus
- E. A positive reaction
- F. None of the Above

372. Typhoid fever is unrelated to Typhus.

- A. True
- B. False

373. Which term is divided into 4 individual stages, each lasting approximately 1 week. In the 1st week, the temperature rises slowly and fever fluctuations are seen with relative bradycardia, malaise, headache, and cough?

- A. Typhoid fever
- B. Gastric fever
- C. Shigellosis
- D. Gram-negative short bacillus
- E. A positive reaction
- F. None of the Above

374. According to the text, there is leukopenia, with eosinopenia and relative lymphocytosis, a positive reaction and blood cultures are positive for?

- A. Typhoid fever
- B. Gastric fever
- C. Shigellosis
- D. Salmonella typhi or paratyphi
- E. A positive reaction
- F. None of the Above

### **How is typhoid fever spread?**

375. Salmonella Typhi lives only in humans. Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract.

- A. True
- B. False

376. Typhoid fever is spread through food or drink beverages that have been handled by a person who is shedding \_\_\_\_\_ or if sewage contaminated with

- A. Typhoid bugs
- B. Gastric fever
- C. Shigellosis
- D. Salmonella Typhi
- E. A positive reaction
- F. None of the Above

377. Which term when eaten or drunk, they multiply and spread into the bloodstream, the body reacts with fever and other signs and symptoms?

- A. Typhoid fever
- B. Gastric fever
- C. Shigellosis
- D. Gram-negative short bacillus
- E. Salmonella Typhi
- F. None of the Above

### **Waterborne Microorganisms and Bacteria Appendix Protozoa Section**

378. 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

379. Which bug/creature/organism/species are an important food source for microinvertebrates?

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

380. The ecological role of protozoa in the transfer of bacterial and \_\_\_\_\_ to successive trophic levels is important.

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

381. 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

382. 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

383. 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



384. Which bug/creature/organism/species can survive harsh conditions, such as exposure to extreme temperatures and harmful chemicals, or long periods without access to nutrients, water, or oxygen for a period of time?

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

385. An individual protozoan is?

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

386. Which bug/creature/organism/species are around 10–50 micrometer, but can grow up to 1 mm and can easily be seen under a microscope?

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

387. Which bug/creature/organism/species exist throughout aqueous environments and soil?

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

### Classification

388. Protozoa were commonly grouped in the kingdom of Protista together with the plant-like algae and fungus-like water molds and slime molds. In the 21st-century systematics, protozoans, along with ciliates, mastigophorans, and apicomplexans, are arranged as animal-like protists. Protozoans are neither Animalia nor Metazoa.

- A. True
- B. False

389. Trophozoite usually have non-specific routes by which they are transmitted, and these routes may depend on the type of cells and tissue that a particular agent targets.

- A. True
- B. False

390. Once in the air, the viruses can infect another person who is unlucky enough to inhale air containing the Virus particles.

- A. True
- B. False

391. Agents vary greatly in their stability in the environment. Some viruses may survive for only a few minutes outside of a host, while some Apicomplexans are extremely durable and may survive in a dormant state for a week or more.

- A. True
- B. False

### Protozoa Section

392. The diverse assemblage of organisms that carry out all of their life functions within the confines of a single, complex \_\_\_\_\_ are called protozoa.

- A. Eukaryotic cell
- B. Protozoa(ns)
- C. Amoeba(s)
- D. Marine ciliates
- E. Cytoplasm
- F. None of the Above

393. Which bug/creature/organism/species, and Paramecium, and Amoeba are well-known examples of these major groups of protozoans?

- A. Eukaryotes
- B. Enterovirulent E. coli
- C. Marine ciliates
- D. Euglena
- E. Cytoplasm
- F. None of the Above

394. Which bug/creature/organism/species are more closely related to animals, others to plants, and still others are relatively unique?

- A. Eukaryotic cell
- B. Protozoa(ns)
- C. Amoeba(s)
- D. Marine ciliates
- E. Cytoplasm
- F. None of the Above

395. Which bug/creature/organism/species are sometimes also called algae and are addressed elsewhere?

- A. Eukaryotes
- B. Enterovirulent E. coli
- C. Amoeba(s)
- D. Marine ciliates
- E. Unicellular photosynthetic protozoa
- F. None of the Above

### Free-living Protozoa

396. Because of their small size, production of resistant cysts, and ease of distribution from one place to another, many species appear to be cosmopolitan and may be collected in similar?

- A. Eukaryotic cell
- B. Protozoa(ns)
- C. Amoeba(s)
- D. Marine ciliates
- E. Cytoplasm
- F. None of the Above

397. Which bug/creature/organism/species inhabit interstices of sediment and beach sands, surfaces, deep sea and cold Antarctic environments, planktonic habitats, and the algal mats and detritus of estuaries and wetlands?

- A. Eukaryotes
- B. Protozoa(ns)
- C. Amoeba(s)
- D. Marine ciliates
- E. Cytoplasm
- F. None of the Above

398. Which bug/creature/organism/species are found in all moist habitats within the United States, but we know little about their specific geographic distribution?

- A. Eukaryotes
- B. Protozoa(ns)
- C. Amoeba(s)
- D. Marine ciliates
- E. Cytoplasm
- F. None of the Above

399. 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

400. 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