

Registration form

Bacteriological Diseases II CEU Training Course \$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. _____

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I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible. I fully understand that this type of study program deals with dangerous, changing conditions and various laws and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable in any fashion for any errors, omissions, advice, suggestions or neglect contained in this CEU education training course or for any violation or injury, death, neglect, damage or loss of your license or certification caused in any fashion by this CEU education training or course material suggestion or error or my lack of submitting paperwork. It is my responsibility to call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded. It is my responsibility to ensure all information is correct and to abide with all rules and regulations.

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.

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.

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Bacteriological Diseases II Answer Key

Name _____

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You are solely responsible to ensure this course is accepted for credit by your State. **No refunds.** Did you check with your State agency to ensure this course is accepted for credit?

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Please circle, underline, bold or X only one correct answer

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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. These regulations change very frequently.

**Please fax the answer key to TLC
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Always confirm that we received the assignment.

**BACTERIOLOGICAL DISEASES II
CEU TRAINING COURSE**

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1. Please rate the difficulty of your course.
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3. Please rate the subject matter on the exam to your actual field or work.
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Poor _____ Fair _____ Average _____ Good _____ Great _____

Any other concerns or comments.

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Bacteriological Diseases II CEU Training Course Assignment

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

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

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

Microbes

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

Waterborne Pathogens and Disease Introduction

- Pathogens are bacteria, viruses and protozoans that cause disease.
A. True B. False

8. 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.

9. This term means when in nature it is different from other types of pathogens such as the viruses that cause influenza (the flu) 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

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

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

11. How are waterborne pathogens spread?

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

12. 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

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

- A. True
- B. False

Chain of Transmission

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

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

15. The 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

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

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

17. How long pathogens survive in the water depends on the water temperature and the length of time the _____ are in the water.
- A. Stomach bugs
 - B. Turbidity
 - C. Microscopic particles
 - D. Germs
 - E. Pathogens
 - F. None of the Above

Bacterial Diseases

18. What is the most common diarrhea illness caused by bacteria?
- A. Pathogen
 - B. Yersiniosis
 - C. Hepatitis A
 - D. Campylobacteriosis
 - E. Incubation period
 - F. None of the Above
19. 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

Types of Bacteria

20. _____ can also cause "travelers' diarrhea."
- A. Illness
 - B. Cryptosporidium
 - C. Bacteria
 - D. Campylobacteriosis
 - E. Transmission of disease
 - F. None of the Above
21. 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
22. Chlorine kills or inactivates _____ in water.
- A. Cysts
 - B. Cryptogiardia
 - C. Bacteria
 - D. Viral Plaques
 - E. Oocysts
 - F. None of the Above

Viral-Caused Diseases

23. _____ is a viral disease that may be spread through water.
- A. Pathogen
 - B. Yersiniosis
 - C. Hepatitis A
 - D. Campylobacteriosis
 - E. Incubation period
 - F. None of the Above
24. Chlorine inactivates most _____ in drinking water.
- A. Illnesses
 - B. Giardiasis
 - C. Viruses
 - D. Pathogens
 - E. Infections
 - F. None of the Above

Protozoan Caused Diseases

25. 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

26. 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

27. 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

28. 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

29. 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

30. 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

31. 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

32. 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

33. 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

34. 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

35. 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

Circumstances under which Koch's postulates do not easily apply

36. An opportunistic pathogen has to invade a susceptible host for certain _____ to develop.

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

37. Many _____, such as scurvy and rickets, are caused by dietary deficiencies.

- A. Diseases
- B. Mutations
- C. Carriers
- D. Pathogens
- E. Microorganisms
- F. None of the Above

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

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

39. Cultures of human or animal cells can now be used to grow some of the fastidious organisms.

- A. True
- b. False

40. All _____ do not affect all laboratory animals.

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

41. 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

Metabolism

42. A cell's _____ includes all the chemical reactions by which food is transformed for use by the cell.

- A. Fastidious
- B. Metabolism
- C. Chemical reactions
- D. Germ theory of disease
- E. Osmosis
- F. None of the Above

43. A cell can respond to changes in its environment through its metabolism.

- A. True
- b. False

Bacteria

44. Bacteria are prokaryotes, and thus have no true nucleus.

- A. True
- B. False

45. 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

46. Bacteria consist of only?

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

47. 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

Prokaryotes

48. The only prokaryotes are bacteria and archaea. All other life forms have cells with nuclei and are called _____.

- A. Bacteria
- B. Peptidoglycan
- C. Bacilli
- D. Eukaryotes
- E. Microorganism
- F. None of the Above

Early Origins

49. Bacilli bacteria are rod or stick-shaped. Cocci bacteria are shaped like little balls.

- A. True
- B. False

50. Some bacterial cells cluster together to form _____.

- A. An organism
- B. An organelle
- C. Cellulose
- D. Pairs, chains, squares or other groupings
- E. Helical or spiral in shape
- F. None of the Above

51. The mitochondria that make energy for your body cells is one example of?

- A. Chloroplasts
- B. An organelle
- C. Cellulose
- D. Bacilli
- E. Eukaryote(s)
- F. None of the Above

52. There can be more than a billion (1,000,000,000) bacteria in a single teaspoon of topsoil.
A. True B. False

Peptidoglycan

53. Bacterial cell walls do not contain cellulose, but are made mostly of _____.
A. Capsule D. Cell membrane/plasma membrane/cytoplasmic membrane
B. Peptidoglycan E. True nucleus
C. Cytoplasmic granules F. None of the Above
54. Some antibiotics, like penicillin, stop bacteria from making _____, which keeps the bacteria from growing.
A. Disease(s) D. Peptidoglycan
B. Mutation(s) E. Bacteria
C. Carriers F. None of the Above
55. If a person stops taking an antibiotic too soon, any living bacteria left could start growing and reproducing by making _____.
A. Bacteria D. Germ theory of disease
B. Peptidoglycan E. Microorganism
C. Eukaryotes F. None of the Above

Primary Waterborne Pathogens and Diseases Related Diseases and Associated Illnesses

56. Water providers need to be alert to illness patterns and diagnostic clues that might indicate an unusual infectious disease outbreak associated with intentional release of a biologic agent and should report any clusters or findings to their local or state health department.
A. True B. False
57. CDC defines three categories of biologic agents with potential to be used as weapons, based on ease of dissemination or transmission, potential for major public health impact, potential for public panic and social disruption, and requirements for public health preparedness.
A. True B. False

Pathogens/Disease Alphabetical Order

58. Amebiasis is an infection of the intestines caused by?
A. Pathogens D. Foodborne or waterborne illnesses
B. Bacterial diseases E. The parasite Entamoeba histolytica
C. Norwalk agent F. None of the Above
59. Amoebiasis, or Amebiasis, refers to infection caused by?
A. Amoebiasis D. The amoeba Entamoeba histolytica
B. Cholera E. Cystic fibrosis gene
C. Antibacterial drugs F. None of the Above
60. Which of the following organism/disease related term is usually transmitted by the fecal-oral route, but it can also be transmitted indirectly through contact with dirty hands or objects as well as by anal-oral contact?
A. Amoebiasis D. Rapid dehydration and electrolyte imbalance
B. Cholera E. Diarrheal disease
C. Antibacterial drugs F. None of the Above

61. Any non-encysted amoebae, or _____, die quickly after leaving the body?

- A. Amoebiasis
- B. Cholera
- C. Trophozoites
- D. Electrolytes
- E. Cystic fibrosis gene
- F. None of the Above

62. Which of the following organism/disease term that may or may not be symptomatic and can remain latent in an infected person for several years?

- A. Gastrointestinal infection
- B. Cholera
- C. Antibacterial drugs
- D. Rapid dehydration and electrolyte imbalance
- E. Diarrheal disease
- F. None of the Above

63. Which of the following organism/disease term can live in the large intestine (colon) without causing disease?

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

Entamoeba histolytica

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

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

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

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

66. Which bug/creature/organism/species/disease on the average, only about one in 10 people who are infected will become sick from the infection?

- A. Cyst of C. parvum
- B. Shigellosis (bacillary dysentery)
- C. E. histolytica
- D. Cryptosporidiosis
- E. Cryptosporidial oocysts
- F. None of the Above

67. Which bug/creature/organism/species/disease can cause diarrhea or a more serious invasive liver abscess?

- A. Cyst of C. parvum
- B. Shigellosis (bacillary dysentery)
- C. Entamoeba histolytica
- D. Cryptosporidiosis
- E. Cryptosporidial oocysts
- F. None of the Above

68. There is a rapid influx of _____ into the contacted cell, it quickly stops all membrane movement save for some surface blebbing. Internal organization is disrupted, organelles lyse, and the cell dies.

- A. Zinc
- B. Calcium
- C. Glucosamine
- D. Iron
- E. Magnesium
- F. None of the Above

69. Amebic dysentery is a severe form of _____ associated with stomach pain, bloody stools, and fever.
- A. Cyst of *C. parvum*
 - B. Amebiasis
 - C. *C. parvum*
 - D. Cryptosporidiosis
 - E. Amebic dysentery
 - F. None of the Above

Amebic Meningoencephalitis - PAM *Naegleria fowleri*

70. The ameba that causes the PAM infection lives in soil and in salt water pools throughout the world.
- A. True
 - B. False
71. *Naegleria* thrives in warm, stagnant bodies of fresh water when temperatures are low, usually above 50 degrees.
- A. True
 - B. False
72. The ameba is commonly found in the environment; PAM is very common.
- A. True
 - B. False

Cholera *Vibrio cholerae*

73. Cholera is an infection of the small intestine that causes a large amount of watery diarrhea.
- A. True
 - B. False
74. 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
75. 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
76. 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
77. 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
78. 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

79. 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

80. 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

81. 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

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

- A. True
- B. False

83. 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

84. Cholera has two strains, toxic and nontoxic.

- A. True
- B. False

85. 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

86. Genetic research has determined that a person's susceptibility to cholera and other diarrheas) is affected by their blood type. Those with type A blood is the most susceptible. Those with type O are the most resistant, virtually immune. Between these two extremes are the O and O negative blood types.

- A. True
- B. False

87. 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

88. 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

89. 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

90. 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

91. 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, where they can thrive. *V. cholerae* bacteria start up production of the hollow cylindrical protein flagellin to make flagella, the cork-screw helical fibers they rotate to propel themselves through the mucus of the small intestine.

- A. True
- B. False

92. 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

93. On reaching the intestinal wall, *V. cholerae* start producing the Antibiotic treatments that give the infected person a watery diarrhea. This carries the multiplying new generations of *V. cholerae* bacteria out into the drinking water of the next host if proper sanitation measures are not in place.

- A. True
- B. False

94. 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

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

- A. True
- B. False

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

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

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

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

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

- A. True
- B. False

99. 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

100. 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

Cryptosporidiosis Cryptosporidium

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

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

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

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

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

104. 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 D. Congenital agammaglobulinemia
B. Cryptosporidiosis E. Cryptosporidium
C. AIDS F. None of the Above

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

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

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

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

107. 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 D. Congenital agammaglobulinemia
B. Cryptosporidiosis E. Cryptosporidium
C. Giardiasis F. None of the Above

108. Staining methods were developed to detect and identify the oocysts directly from stool samples.
A. True B. False
109. The modified acid-fast stain is traditionally used to most reliably and specifically detect the presence of?
A. *Cryptosporidium parvum* D. Giardiasis
B. Cryptosporidiosis E. *Cryptosporidium*
C. Cryptosporidial oocysts F. None of the Above
110. According to the text, even though 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* D. Congenital agammaglobulinemia
B. Cryptosporidiosis E. *Cryptosporidium*
C. AIDS F. None of the Above
111. 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* D. Congenital agammaglobulinemia
B. Cryptosporidiosis E. *Cryptosporidium*
C. AIDS F. None of the Above
112. 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 which are excreted in feces and are capable of transmission to a new host?
A. *Cryptosporidium parvum* D. Cryptosporidiosis
B. Giardiasis E. Anti-water Infection
C. Malaise F. None of the Above
113. El Tor strain has a low degree of "epidemic virulence," allowing it to spread across the world as previous strains have done. First, the ratio of cases to carriers is much less than in *Giardia lamblia* due to classic biotypes (1: 30-100 for El Tor vs. 1: 2 - 4 for "classic" biotypes).
A. True B. False

Entamoeba histolytica

114. About one in 10 people who are infected with _____ becomes sick from the infection.
A. Cytotoxic D. *Lambliia intestinalis*
B. *E. histolytica* E. El Tor strain
C. Symptoms F. None of the Above
115. Which term is associated to describe that the infected person illness is quite mild and can include loose stools, stomach pain, and stomach cramping?
A. Illness D. Ameba
B. Symptoms E. Transmission of disease
C. Bacteria F. None of the Above
116. *E. histolytica* rarely invades the liver and forms an abscess. Even less commonly, it spreads to other parts of the body, such as the lungs or brain.
A. True B. False

117. Which term is a severe form of amebiasis associated with stomach pain, bloody stools, and fever?

- A. Cytotoxic
- B. *E. histolytica*
- C. Symptoms
- D. *Lamblia intestinalis*
- E. Amebic dysentery
- F. None of the Above

118. Another waterborne pathogen is *Entamoeba histolytica*, which can cause diarrhea or a more serious invasive liver abscess, and when in contact with human cells, these amoebae are?

- A. Cytotoxic
- B. Malaise
- C. Symptoms
- D. *Lamblia intestinalis*
- E. Toxoplasmosis
- F. None of the Above

119. Because of the infection, internal organization is disrupted, organelles lyse, and the cell dies. The _____ may eat the dead cell or just absorb nutrients released from the cell.

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

Giardiasis *Giardia lamblia*

120. *Giardia lamblia* is 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

121. The most frequent cause of non-bacterial diarrhea in North America is giardiasis.

- A. True
- B. False

122. Greasy diarrhea, gas, stomach cramps, fatigue, and weight loss begin approximately one week after ingestion of the _____.

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

123. The basic biology of *Giardia duodenalis*, the _____ that causes giardiasis, is poorly understood.

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

124. The _____ uses mitosomes in the maturation of iron-sulfur proteins.

- 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

125. 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

135. In order to use a fluorescent antibody kit for staining, _____ may be concentrated by sedimentation or flotation.

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

136. _____ that detects excretory secretory products of the organism may also be used to diagnose *Giardia lamblia*.

- 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

137. 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

138. The overall incidence of _____ in the United States is estimated to be 2% of the population.

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

139. _____ of giardiasis are common with infants, not because of the water, but because of diaper changing hygiene procedures at childcare centers.

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

140. 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

141. 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

142. 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

143. 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

144. Chronic symptomatic giardiasis is more common in adults than children.

- A. True
- B. False

Hepatitis Section

145. Which of the following hepatitis types affects only those who also have hepatitis B, and hepatitis E is extremely rare in the United States?

- A. Type B
- B. Type A
- C. Type C
- D. Type D
- E. Type E hepatitis
- F. None of the Above

146. Which of the following hepatitis can be passed through contact with infected blood, contaminated needles, or by sexual contact with an HIV-infected person?

- A. Type A hepatitis
- B. Type B hepatitis
- C. Type C hepatitis
- D. Type D hepatitis
- E. Type E hepatitis
- F. None of the Above

147. Which of the following hepatitis is most likely to be transmitted in feces, through oral contact, or in water that's been contaminated.

- A. Type B hepatitis
- B. Type A hepatitis
- C. Type C hepatitis
- D. Type D hepatitis
- E. Type E hepatitis
- F. None of the Above

148. Which of the following hepatitis is contracted through anal-oral contact, by coming in contact with the feces of someone with it, or by eating or drinking hepatitis contaminated food or water.

- A. Type A hepatitis
- B. Type B hepatitis
- C. Type C hepatitis
- D. Type D hepatitis
- E. Type E hepatitis
- F. None of the Above

149. Which of the following hepatitis can be contracted from infected blood, seminal fluid, vaginal secretions, or contaminated drug needles, including tattoo or body-piercing equipment.

- A. Type A hepatitis
- B. Type B hepatitis
- C. Type C hepatitis
- D. Type D hepatitis
- E. Type E hepatitis
- F. None of the Above

150. Which of the following hepatitis is not easily spread through sex?

- A. Type B hepatitis
- B. Type A hepatitis
- C. Type C hepatitis
- D. Type D hepatitis
- E. Type E hepatitis
- F. None of the Above

Noroviruses

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

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

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

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

153. 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
- B. Salmonellosis
- C. Salmonella enterocolitis
- D. Salmonella infection
- E. Norovirus
- F. None of the Above

154. This genus name norovirus is derived from?

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

155. 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
- B. Salmonella
- C. Typhoidal Salmonella
- D. Viruses
- E. Nonbacterial outbreaks of gastroenteritis
- F. None of the Above

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

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

157. According to the text, after infection, immunity to _____ is usually incomplete and temporary.

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

158. 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

Salmonellosis

159. Which of the following terms in causes Salmonella enterocolitis, an infection in the lining of the small intestine?

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

160. Which of the following terms is an infection with Salmonella bacteria?

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

161. According to the text, most people infected with _____ develop diarrhea, fever, vomiting, and abdominal cramps 12 to 72 hours after infection.

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

162. At the hospital, the patient may receive intravenous fluids to treat the dehydration, and may be given medications to provide symptomatic relief, such as fever reduction. In severe cases, the nonbacterial outbreaks of gastroenteritis may spread from the intestines to the blood stream, and then to other body sites, and can cause death unless the person is treated promptly with antibiotics.

- A. True
- B. False

163. Which term is a form of Salmonella can lead to typhoid fever?

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

164. Typhoid fever is a life-threatening illness, and about 400 cases are reported each year in the United States, and 75% of these are acquired while traveling out of the country.

- A. True
- B. False

165. Typhoid fever is carried only by humans and is usually contracted through direct contact with the fecal matter of an infected person.

- A. True
- B. False

166. Which term is more commonly found in poorer countries, where unsanitary conditions are more likely to occur?

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

Causes, incidence, and risk factors

167. Which term is one of the most common types of food poisoning. It occurs when you swallow food or water that contains the salmonella bacteria?

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

168. Which term may get into the food you eat in several ways?

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

Symptoms

169. Which term is an infection with bacteria called Salmonella. Most persons infected with Salmonella develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection?

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

170. The Salmonella illness usually lasts 4 to 7 days, and most persons recover without treatment.

- A. True
- B. False

Shigella dysenteriae

171. Some strains produce enterotoxin and Shiga toxin, similar to the verotoxin of E. coli O157:H7. Both Shiga toxin and verotoxin are associated with causing hemolytic uremic syndrome.

- A. True
- B. False

172. Which term invades the host through epithelial cells of the large intestine?

- A. Bacillary dysentery
- B. Shigellae
- C. S. dysenteriae
- D. Shigella
- E. Verotoxin
- F. None of the Above

173. Which term are diarrhea, fever, nausea, vomiting, stomach cramps, and straining to have a bowel movement?

- A. Bacillary dysentery
- B. Shigellae
- C. S. dysenteriae
- D. Shigella infection
- E. Verotoxin
- F. None of the Above

174. Shigella dysenteriae is a species of the ball-shaped bacterial genus Shigella.

- A. True
- B. False

175. Which term can cause shigellosis (bacillary dysentery)?

- A. Bacillary dysentery
- B. Shigella
- C. S. dysenteriae
- D. Infection
- E. Verotoxin
- F. None of the Above

176. Which term are Gram-negative, non-spore-forming, facultatively anaerobic, non-motile bacteria?

- A. Bacillary dysentery
- B. Shigellae
- C. S. dysenteriae
- D. Shigella
- E. Verotoxin
- F. None of the Above

177. According to the text, S. dysenteriae, spread by contaminated water and food, causes the most severe dysentery because of its potent and deadly _____, but other species may also be dysentery agents.

- A. Bacillary dysentery
- B. Shigellae
- C. S. dysenteriae
- D. Shiga toxin
- E. Verotoxin
- F. None of the Above

178. Which term is typically via ingestion (fecal–oral contamination); depending on age and condition of the host as few as ten bacterial cells can be enough to cause an infection?

- A. Bacillary dysentery
- B. Shigellae
- C. *S. dysenteriae*
- D. Shigella infection
- E. Verotoxin
- F. None of the Above

179. Which term causes dysentery that result in the destruction of the epithelial cells of the intestinal mucosa in the cecum and rectum?

- A. Bacillary dysentery
- B. Shigellae
- C. *S. dysenteriae*
- D. Shigella
- E. Verotoxin
- F. None of the Above

Shigellosis

180. Which term is an infectious disease caused by a group of bacteria called Shigella?

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

181. Those who are infected with Shigella develop diarrhea, fever, and stomach cramps starting a week or two after they are exposed to the bacteria. The diarrhea is often watery.

- A. True
- B. False

182. Which term usually resolves in 5 to 7 days?

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

183. Persons with shigellosis in the United States often require hospitalization.

- A. True
- B. False

184. According to the text, some persons who are infected may have no symptoms at all, but may still pass the _____ to others.

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

185. Which term is an acute bacterial infection of the lining of the intestines?

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

Typhoid

186. 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

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

- A. True
- B. False

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

- A. True B. False

189. This fever received various names, such as gastric fever, _____, infantile remittent fever, slow fever, nervous fever, pythogenic fever, etc.

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

190. Typhoid fever is unrelated to?

- A. Typhoid flu D. Typhus
B. Gastric fever E. Typhoid hurricane
C. Shigellosis F. None of the Above

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

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

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

How is typhoid fever spread?

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

- A. True B. False

194. Typhoid fever is spread through food or drink beverages that have been handled by a person who is shedding _____ or if sewage contaminated with Salmonella Typhi bacteria gets into the water you use for drinking or washing food.

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

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

Viruses

196. Which term are acellular microorganisms, made up of only genetic material and a protein coat?

- A. Viruses D. Antiviral therapies
B. Genetic material E. Virions
C. Poxviruses F. None of the Above

197. Which term depend on the energy and metabolic machinery of the host cell to reproduce?

- A. Fungi
- B. Genetic material
- C. Poxviruses
- D. Virus(es)
- E. Virions
- F. None of the Above

198. Viruses are found in virtually all life forms, including humans, animals, plants, _____, and bacteria.

- A. Fungi
- B. Genetic material
- C. Poxviruses
- D. Antiviral therapies
- E. Virions
- F. None of the Above

199. According to the text, viruses consist of genetic material—either _____ or ribonucleic acid (RNA)—surrounded by a protective coating of protein, called a capsid, with or without an outer lipid envelope.

- A. Deoxyribonucleic acid (DNA)
- B. Genetic material
- C. Poxviruses
- D. Antiviral therapies
- E. Virions
- F. None of the Above

200. Which of the following terms are between 20 and 100 times smaller than bacteria and hence are too small to be seen by light microscopy?

- A. Viruses
- B. Genetic material
- C. Poxviruses
- D. Fungi
- E. Virions
- F. None of the Above

201. Which of the following terms vary in size from the largest poxviruses of about 450 nanometers in length to the smallest polioviruses of about 30 nanometers?

- A. Viruses
- B. Genetic material
- C. Poxviruses
- D. Bacteria
- E. Virions
- F. None of the Above

202. Which of the following terms are not considered free-living, since they cannot reproduce outside of a living cell; they have evolved to transmit their genetic information from one cell to another for the purpose of replication?

- A. Viruses
- B. Genetic material
- C. Poxviruses
- D. Bacteria
- E. Virions
- F. None of the Above

203. Which of the following terms often damage or kill the cells that they infect, causing disease in infected organisms?

- A. Viruses
- B. Genetic material
- C. Poxviruses
- D. Antiviral therapies
- E. Virions
- F. None of the Above

204. Because of the difficulty in developing antiviral therapies stems from the large number of variant _____ that can cause the same disease, as well as the inability of drugs to disable a virus without disabling healthy cells.

- A. Viruses
- B. Genetic material
- C. Poxviruses
- D. Antiviral therapies
- E. Virions
- F. None of the Above

205. With the development of antiviral agents is a major focus of current research, and the study of _____ has led to many discoveries important to human health.

- A. Viruses
- B. Genetic material
- C. Poxviruses
- D. Antiviral therapies
- E. Virions
- F. None of the Above

206. A few viruses stimulate cells to grow uncontrollably and produce cancers. Although many infectious diseases, such as the common cold, are caused by viruses, there are no cures for these illnesses.

- A. True
- B. False

Viral Gastroenteritis

207. 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

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

- A. True
- B. False

209. 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

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

- A. True
- B. False

211. Common causes of bacterial gastroenteritis include salmonella infection, shigella infection, cholera, Campylobacter enteritis, and pseudomembranous colitis.

- A. True
- B. False

212. Gastroenteritis has also been referred to as gastro, stomach bug, and stomach virus.

- A. True
- B. False

Water Sampling and Laboratory Procedures Section

213. 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

214. 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

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

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

216. 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

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

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

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

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

Bacteria Sampling

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

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

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

- A. True
- B. False

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

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

222. 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 which distribute water, and indicates that 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

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

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

Methods

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

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

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

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

Types of Water Samples

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

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

The three (3) types of samples are:

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

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

228. 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

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

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

Repeat Sampling

230. If a _____ is total coliform- or fecal coliform-positive, 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:

231. 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

232. If a system collects two (2) or more routine samples per month, it must collect three (3) _____.

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

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

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

234. 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

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

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

236. The results of all _____ are included in the MCL compliance calculation.

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

Sampling Procedures

237. This 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

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

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

239. 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)

240. 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

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

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

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

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

243. 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

244. 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

245. 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

246. 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

247. 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

248. Heterotrophic Plate Count (HPC) is a procedure for estimating the number of live heterotrophic bacteria and measuring changes during water treatment and distribution

- A. True
- B. False

249. The term " _____ " (CFU) refers to the chains, clusters, or single cells that form colonies of bacteria.

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

Spread Plate Method

250. During the Spread Plate Method, all 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

251. During the Spread Plate Method, _____ can easily be discerned and compared to published descriptions.

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

Membrane Filter Method

252. 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)

253. _____ use inorganic carbon sources as their substrate. The Heterotrophic Plate Count provides a technique to quantify the bacteriological activity of a sample.

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

254. 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

255. 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

256. 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

257. For systems which collect fewer than _____ samples per month, no more than one sample per month may be total-coliform positive.
- A. 5
 - B. 10
 - C. 100
 - D. 200
 - E. 40
 - F. None of the Above

258. For systems which collect _____ or more samples per month, no more than five (5) percent of the samples may be total-coliform 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)

259. 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

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

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

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

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

262. 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

263. 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

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

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

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

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

266. Each public notice must be issued properly and in a timely manner, and must contain certain information and _____.

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

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

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

The following are acute violations:

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

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

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

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

270. Any outbreak of _____ is an acute violation.

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

Chain of Custody Procedures

271. Which of the following terms begins when the sample containers are obtained from the laboratory. From this point on, a chain of custody record will accompany the sample containers?

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

280. 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

281. Color is an indicator of the physical removal of particulates, including pathogens.

- A. True B. False

Chlorine (DDBP)

282. These term means that chlorine is present as Cl, HOCl, and OCl⁻ is called _____, and that which is bound but still effective is _____.

- A. Free available chlorine and Total D. Free available chlorine and Combined Chlorine
B. Free and Residual E. Combined chlorine and Readily available
C. Break point and Free F. None of the Above

283. Chloramines are formed by reactions with?

- A. Acid and Cl₂ D. Folic Acid and Cl₂
B. Ammonia and Cl₂ E. THMs and Haploidic acid
C. THMS and Cl₂ F. None of the Above

284. While testing chlorine disinfection process, you will need to understand one especially important feature is the ease of overdosing to create a "_____" concentration.

- A. Free available chlorine and Total D. Free available chlorine and Combined Chlorine
B. Residual E. Combined chlorine and Readily available
C. Break point and Free F. None of the Above

285. According to the text, this type of chlorine residual concentration residual is from 0.1 to 0.5 ppm.

- A. Free available chlorine and Total D. Free available
B. Residual E. Combined chlorine and readily available
C. Break point and Free F. None of the Above

286. Typically, this type of chlorine residual is 2 ppm?

- A. Free available chlorine and Total D. Combined Chlorine
B. Residual E. Combined chlorine and readily available
C. Break point and Free F. None of the Above

Chlorine By-Products

287. The most common chlorination by-products found in U.S. drinking water supplies are?

- A. Chlorate and Chlorite D. Ammonia and THMS
B. CO₂ and H₂SO₄ E. Chloramines
C. Trihalomethanes (THMs) F. None of the Above

The Principal Trihalomethanes are:

288. Chloroform, bromodichloromethane, chlorodibromomethane, and bromoform. Other less common chlorination by-products include the haloacetic acids and haloacetonitriles. The amount of THMs formed in drinking water can be influenced by a number of factors, including the season and the source of the water.

- A. True B. False

289. THM concentrations are generally higher in winter than in summer, because concentrations of natural organic matter are greater and more chlorine is required to disinfect at colder temperatures.

- A. True B. False

290. THM levels are also low when wells or large lakes are used as the drinking water source, because organic matter concentrations are generally low in these sources. The opposite — high organic matter concentrations and high THM levels — is true when rivers or other surface waters are used as the source of the drinking water.

- A. True B. False

291. The available studies on health effects do not provide conclusive proof of a relationship between exposure to THMs and cancer or reproductive effects, but indicate the need for further research to confirm their results and to assess the potential health effects of chlorination by-products other than THMs.

- A. True B. False

Halogen Chapter Halides

292. What is the negative ion often referred to as?

- A. Salts D. Free radical
B. A halide proton E. Diatomic Compound
C. A halide ion F. None of the Above

293. _____ containing these ions are known as halides.

- A. Salts D. Many synthetic organic compounds
B. CXT values E. Neither fluorine nor bromine
C. Primary disinfectant F. None of the Above

294. Halide ions combined with single hydrogen atoms form the hydrohalic acids (i.e., HF, HCl, HBr, HI), a series of particularly strong acids, one being?

- A. HCl D. Chlorine gas
B. HOCl E. The hypochlorite ion (OCl-)
C. Hydrastatic acid F. None of the Above

295. Many synthetic organic compounds such as plastic polymers, and a few natural ones, contain halogen atoms; these are known as halogenated compounds or?

- A. Organic halides D. Many synthetic organic compounds
B. Free radicals E. Neither fluorine nor bromine
C. Diatomic Compound F. None of the Above

Chlorine

296. Which is the only halogen is needed in relatively large amounts (as chloride ions) by humans?

- A. Chlorine D. Halogen(s)
B. Chlorine dioxide E. Inhibitory transmitter GABA
C. Iodine F. None of the Above

297. This halogen is needed only in very small amounts for the production of thyroid hormones such as thyroxine?

- A. Chlorine D. Halogen(s)
B. Chlorine dioxide E. Inhibitory transmitter GABA
C. Iodine F. None of the Above

298. On the other hand, neither fluorine nor bromine are believed to be essential for humans, although small amounts of _____ can make tooth enamel resistant to decay.

- A. Salts
- B. Iodine
- C. Chlorine
- D. Synthetic organic compounds
- E. Fluoride
- F. None of the Above

Halogens

299. All Halogens have 7 electrons in their outer shells, giving them an oxidation number of -1. The halogens exist, at room temperature, in all three states of matter:

- A. True
- B. False

Chlorine Section Chlorine Exposure Limits

300. OSHA PEL _____

- A. 10 PPM
- B. 1 PPM
- C. 00.1 PPM
- D. 1,000 PPM
- E. 100 PPM
- F. None of the Above

301. Physical and chemical properties: A yellowish green, nonflammable and liquefied gas with an unpleasant and irritating smell.

- A. Cl₃
- B. Chlorine
- C. HOCl and OCl-
- D. Combined Available Chlorine
- E. Monochloramine
- F. None of the Above

302. This can be readily compressed into a clear, amber-colored liquid, a _____, and a strong oxidizer.

- A. Cl₂
- B. Cl
- C. HOCl and OCl-
- D. Combined Available Chlorine
- E. Noncombustible gas
- F. None of the Above

303. Chlorine gas is about _____ times heavier than air.

- A. 1.5
- B. 1.0
- C. 0.5
- D. 2.5
- E. 3.0
- F. None of the Above

304. The IDLH (Immediately Dangerous to Life and Health) value for chlorine is _____.

- A. 10 PPM
- B. 1 PPM
- C. 00.1 PPM
- D. 1,000 PPM
- E. 100 PPM
- F. None of the Above

305. The Fatal Exposure Limit for chlorine is _____.

- A. 10 PPM
- B. 1 PPM
- C. 00.1 PPM
- D. 1,000 PPM
- E. 100 PPM
- F. None of the Above

306. A worker's exposure to chlorine shall at no time exceed the OSHA PEL.

- A. True
- B. False

307. Only use chlorine gas in a well-ventilated area so that _____ cannot concentrate.

- A. Chlorine exposure
- B. The connection
- C. The leak area
- D. Any leaking gas
- E. Several safety precautions
- F. None of the Above

308. When chlorine is added to water, _____ (HOCl) and the hypochlorite ion (OCl⁻) are formed.

- A. Cl₂
- B. Hypochlorous acid
- C. Hypochlorite ion
- D. Combined Available Chlorine, Total
- E. Monochloramine, Cl₂
- F. None of the Above

309. The chemical equation that best describes the reaction when _____ is added to water is: Cl₂ + H₂O → H⁺ + Cl⁻ + HOCl.

- A. Chlorine gas
- B. Cl
- C. HOCl and OCl⁻
- D. Combined Available Chlorine
- E. Monochloramine
- F. None of the Above

310. Which of the following substances is the most germicidal of the chlorine compounds with the possible exception of chlorine dioxide?

- A. Hydrochlorous acid
- B. Sulfuric acid
- C. Hypochlorous acid
- D. Combined Available Chlorine
- E. Monochloramine
- F. None of the Above

311. Yoke-type connectors should be used on a _____ assuming that the threads on the valve may be worn.

- A. Chlorine regulator
- B. Connection
- C. Leak area
- D. Protective bonnet
- E. Chlorine cylinder's valve
- F. None of the Above

312. What is the Atomic number of chlorine?

- A. 17.7
- B. 17
- C. 0.17
- D. 17 PPM
- E. 23
- F. None of the Above

313. _____ is the elemental symbol and _____ is the chemical formula.

- A. Cl, Cl₂
- B. Cl₂, Cl
- C. HOCl and OCl⁻
- D. Chlorine, Cl₂
- E. Cl₂, ClH₄
- F. None of the Above

314. Monochloramine, _____, and trichloramine are also known as Combined Available Chlorine. Cl₂ + NH₄.

- A. Cl₂
- B. Dichloramine
- C. HOCl and OCl⁻
- D. Combined Available Chlorine
- E. Monochloramine
- F. None of the Above

315. Always follow your manufacturer's instructions when changing the connection from a _____ to a chlorinator.

- A. Chlorine exposure
- B. Connection
- C. Chlorine cylinder
- D. Protective bonnet
- E. Several safety precautions
- F. None of the Above

316. Emergency procedures in the case of a large uncontrolled chlorine leak are to: notify local emergency response team, warn and evacuate people in adjacent areas, and be sure that no one enters the leak area without adequate self-contained breathing equipment.

- A. True
- B. False

317. Here are several symptoms of chlorine exposure : burning of eyes, nose, and mouth; coughing, sneezing, choking; nausea and vomiting; headaches and dizziness; fatal pulmonary edema, pneumonia and skin blisters.

- A. True B. False

318. When storing a 150 - 200-pound chlorine cylinder: secure each cylinder in an upright position, attach the _____ over the valve and firmly secure each cylinder.

- A. Chlorine regulator D. Protective bonnet
B. Connection E. Flange
C. Leak area F. None of the Above

319. Store the empty in an upright, secure position with?

- A. Chlorine exposure D. Protective bonnet
B. Proper signage E. Several safety precautions
C. Leak area F. None of the Above

Risks and Benefits of Chlorine

320. Many cities utilize the use of ozone to disinfect their source water and to reduce formation of this parameter?

- A. Chlorate and Chlorite D. Ammonia and THMS
B. CO₂ and H₂SO₄ E. Chloramines
C. Trihalomethanes (THMs) F. None of the Above

321. _____ is a highly effective disinfectant, it breaks down quickly, so that small amounts of _____ or other disinfectants must be added to the water to ensure continued disinfection as the water is piped to the consumer's tap.

- A. Ozone, Chlorine D. Chlorine Dioxide, Chlorine
B. UV, Chlorine E. Chloramines, Chlorine
C. Chlorite, Chlorine F. None of the Above

322. Modifying water treatment facilities to use _____ can be expensive, and _____ treatment can create other undesirable by-products that may be harmful to health if they are not controlled.

- A. Ozone D. Chlorine Dioxide
B. UV E. Chloramines
C. Chlorite F. None of the Above

323. This term is a weaker disinfectant than chlorine, especially against viruses and protozoa; however, they are very persistent and, as such, can be useful for preventing re-growth of microbial pathogens in drinking water distribution systems.

- A. Ozone D. Chlorine Dioxide
B. UV E. Chloramines
C. Chlorite F. None of the Above

324. Chlorine dioxide can be an effective disinfectant, but it forms?

- A. Chlorate and Chlorite D. Ammonia and THMS
B. CO₂ and H₂SO₄ E. Chloramines
C. THMS F. None of the Above

325. It is extremely important that water treatment plants ensure that methods used to control chlorination by-products do not compromise the effectiveness of water disinfection.

- A. True B. False

326. Regulators and the general public have focused greater attention on potential health risks from chemical contaminants in drinking water. One such concern relates to disinfection byproducts (DBPs), chemical compounds formed unintentionally when chlorine and other disinfectants react with certain inorganic matter in water.

- A. True B. False

327. Water system managers may also consider switching from chlorine to alternative disinfectants to reduce formation of THMs and HAAs.

- A. True B. False

328. However, all chemical disinfectants form some DBPs. Much less is known about the byproducts of these alternatives than is known about chlorination byproducts. Furthermore, each disinfection method has other distinct advantages and disadvantages.

- A. True B. False

What Happens to Chlorine When it Enters the Environment?

329. When chlorine is released to soil, chlorine will react with moisture forming?

- A. Free oxygen radicals D. A greenish-yellow, noncombustible gas
B. Chlorine gas E. Hypochlorous acid and hydrochloric acid
C. Hydrochloric acid F. None of the Above

330. According to the text, chlorine does not accumulate in the?

- A. Food chain D. Water
B. Bacteria and viruses E. Treatment filter
C. In air F. None of the Above

331. When released to air, chlorine will react with water to form hypochlorous acid and hydrochloric acid, which are removed from the atmosphere by generation of free oxygen radicals.

- A. True B. False

332. Chlorine reacts with water to form hypochlorous acid and hydrochloric acid. The hypochlorous acid breaks down rapidly. The hydrochloric acid also breaks down; its breakdown products will raise the pH of the water (makes it more basic).

- A. True B. False

Disinfectant Qualities

333. Chlorine is so important in poultry processing that the US Department of Agriculture requires an almost constant chlorine rinse for much of the cutting equipment. In fact, no proven economical alternative to chlorine disinfection exists for use in Meat and poultry processing facilities.

- A. True B. False

Properties

334. Because it is highly reactive, chlorine is usually found in nature bound with other elements like sodium, potassium, and magnesium.

- A. True B. False

335. In studying and _____ -- compounds that have at least one atom of the element carbon in their molecular structure. All living organisms, including humans, are composed of organic compounds.

- A. Synthesizing organic compounds
- B. Chlorine disinfection compounds
- C. Chlorine inorganic compounds
- D. Organic compounds
- E. Abundant chemical elements
- F. None of the Above

336. This is a huge reservoir of dissolved chlorine weathered from the continents and transported to the oceans by Earth's rivers.

- A. Brine
- B. Sodium chloride
- C. Ancient seawater
- D. Useful chemical elements
- E. Seawater
- F. None of the Above

337. Chemical elements have their own set of unique properties and chlorine is known as _____--so reactive, in fact, that it is usually found combined with other elements in the form of compounds.

- A. Synthesizing organic compounds
- B. A very reactive element
- C. Chlorine compounds
- D. Organic compounds
- E. One of the most abundant chemical elements
- F. None of the Above

338. This substance capable of removing a wide variety of disease-causing germs from drinking water and wastewater as well as from hospital and food production surfaces.

- A. Inorganic disinfectant
- B. Chlorine-based disinfectants
- C. Ancient seawater
- D. Useful chemical elements
- E. Organic compounds
- F. None of the Above

339. Various states of chlorine include when chlorine is isolated as a free element, chlorine is a greenish yellow gas, which is?

- A. 2.5 times heavier than water
- B. 2.5 times lighter than air
- C. 10 times heavier than air
- D. 2.5 times heavier than air
- E. 25 times heavier than air
- F. None of the Above

Chemistry of Chlorination

340. The hypochlorite ion is a much weaker disinfecting agent than Hypochlorous acid, about 100 times less effective.

- A. True
- B. False

341. According to the text, pH and temperature affect the ratio of hypochlorous acid to hypochlorite ions. As the temperature is decreased, the _____ increases.

- A. Reduction Ratio
- B. CT actual
- C. Free chlorine residual
- D. "CT" disinfection concept
- E. Ratio of hypochlorous acid
- F. None of the Above

342. Under normal water conditions, hypochlorous acid will also chemically react and break down into the hypochlorite ion.

- A. True
- B. False

343. Although the ratio of _____ is greater at lower temperatures, pathogenic organisms are actually harder to kill.
- A. Hypochlorous acid D. Total chlorine
 B. The amount of chlorine E. pH value and temperature
 C. Chlorine Demand F. None of the Above
344. If all other things were equal, _____ and a lower pH are more conducive to chlorine disinfection.
- A. Lower pH D. Lower water temperature
 B. Hypochlorous acid E. The hypochlorite ion
 C. Higher water temperatures F. None of the Above
345. The disassociation of chlorine gas
 (OCI^-): $\text{HOCl} \rightarrow \text{H}^+ + \text{OCI}^-$ Also expressed $\text{HOCl} \rightarrow \text{H}^+ + \text{OCI}^-$
 (hypochlorous acid) (hydrogen) (hypochlorite ion)
- A. True B. False
346. All three forms of chlorine produce Sodium hypochlorite when added to water.
- A. True B. False
347. Hypochlorous acid is a strong acid but a weak disinfecting agent. The amount of hypochlorous acid depends on the pH and temperature of the water.
- A. True B. False
348. Which term is used for all the chlorine that is available for disinfection?
- A. Chlorine residual D. Break-point chlorination
 B. Chlorine demand E. Total chlorine
 C. Free chlorine F. None of the Above
349. Total chlorine residual = free + _____.
- A. Chlorine residual D. Combined chlorine residual
 B. Chlorine demand E. Total chlorine residual
 C. Free chlorine F. None of the Above
350. In water, there are always other substances (interfering agents) such as iron, manganese, turbidity, etc., which called the?
- A. Chlorine residual D. Break-point chlorination
 B. Chlorine demand E. Total chlorine residual
 C. Pathogen reduction F. None of the Above
351. According to the text, once chlorine molecules are combined with these interfering agents, they are not capable of disinfection. _____ is much more effective as a disinfecting agent.
- A. Chlorine residual D. Break-point chlorination
 B. Chlorine demand E. Total chlorine residual
 C. Free chlorine F. None of the Above
352. Either a total or a _____ can be read when a chlorine residual test is taken,
- A. Chlorine residual D. Break-point chlorination
 B. Chlorine demand E. Total chlorine residual
 C. Free chlorine residual F. None of the Above

353. Which term is used that expresses a much stronger disinfecting agent. Therefore, most water regulating agencies will require that your daily chlorine residual readings be of free chlorine residual?

- A. Free chlorine
- B. Total residual
- C. Free chlorine residual
- D. "CT" disinfection concept
- E. T10 of the process unit
- F. None of the Above

354. Which term is used where the chlorine demand has been satisfied, and any additional chlorine will be considered free chlorine?

- A. Chlorine residual
- B. Chlorine demand
- C. Free chlorine
- D. Break-point chlorination
- E. Total chlorine residual
- F. None of the Above

Residual Concentration/Contact Time (CT) Requirements

355. Since monitoring for very low levels of pathogens in treated water is analytically very difficult, utilizing the _____ is recommended to demonstrate satisfactory treatment.

- A. Free chlorine
- B. Total residual
- C. Free chlorine residual
- D. "CT" disinfection concept
- E. T10 of the process unit
- F. None of the Above

356. _____ = Concentration (mg/L) x Time (minutes)

- A. CT
- B. The amount of chlorine
- C. Chlorine Demand
- D. Total chlorine
- E. pH value and temperature
- F. None of the Above

Waterborne Microorganisms and Bacteria Appendix

Protozoa

357. 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

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

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

359. 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

360. An important ecological role of protozoa is the transfer of bacterial and _____ to successive trophic levels.

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

361. 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

362. 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

363. 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

364. 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

365. An individual protozoan is?

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

366. 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

367. 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

368. 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. However, protozoans are neither Animalia nor Metazoa (with the possible exception of the enigmatic, moldy Myxozoa).

- A. True
- B. False

369. 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

370. 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

371. 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

372. The organisms that carry out all of their life functions within a single eukaryotic are called _____.

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

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

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

374. Some _____ can be closely related to animals or plants, while others are relatively unique.

- A. Eukaryotic cells D. Marine ciliates
B. Protozoa E. Cytoplasm
C. Amoebas F. None of the Above

375. Another name for _____ is algae.

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

Free-living Protozoa

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

377. _____ live in the interstices of sediment and beach sands, surfaces, and in cold Antarctic environments.

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

378. _____ live in all moist habitats within the United States.

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

Amoebas - How does an amoeba locomote?

379. _____ locomote by movement of their cytoplasm.

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

380. The _____ have false feet 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

381. The false feet of amoebas, called pseudopods, are also used to capture prey. 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

382. 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

383. The _____ exist in greater numbers in freshwater habitats than in marine habitats.

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

Environmental Quality Indicators

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

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

385. 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

386. Which of the following terms are caused by dietary deficiencies (scurvy, rickets).

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

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

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

388. Fastidious organisms can now be grown in cultures of human or animal cells or in small animals.
A. True b. False

389. 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

390. 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

Protozoa Parasites

391. A unique group of obligate, intracellular parasitic protozoa is _____.

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

392. _____ are diverse organisms 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

393. Worldwide infections in AIDS patients caused by four different genera of microsporidia (Encephalitozoon, Nosema, Pleistophora, and _____) have increased since 1985.

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

Protozoan Reservoirs of Disease

394. Which of the following bugs/disease/causes terms represents the causative organism of Legionnaires' disease?

- A. Centrioles D. Amoebae
- B. Viruses E. Bacterium Legionella pneumophila
- C. Autotrophic F. None of the Above

395. Which of the following bugs/disease/causes terms live and reproduce in the cytoplasm of some free-living amoebae?

- A. Centrioles D. Amoebae
- B. Viruses E. Bacterium Legionella pneumophila
- C. Autotrophic F. None of the Above

396. The presence of bacteria in the cytoplasm of protozoa is well known, whereas that of viruses is less frequently reported. Most of these reports simply record the presence of bacteria or viruses and assume some sort of symbiotic relationship between them and the Protozoa.

- A. True B. False

397. Which of the following terms were shown to not only survive but also to multiply in the cytoplasm of free-living, nonpathogenic protozoa?

- A. Human pathogens
- B. Foraminifera
- C. Freshwater protozoan
- D. Soil-dwelling protozoa
- E. Marine protozoa
- F. None of the Above

398. Protozoa are the natural habitat for certain pathogenic bacteria.

- A. True
- B. False

Symbionts

399. Which of the following terms inhabit the rumen and reticulum of ruminates and the cecum and colon of equids?

- A. Protozoa
- B. Foraminifera
- C. Freshwater protozoan
- D. Soil-dwelling protozoa
- E. Ciliates
- F. None of the Above

Data on Protozoa

400. Most ecologists who include _____ in their studies of aquatic habitats do not identify them, even if they do count and measure them for biomass estimates.

- A. Protozoa
- B. Foraminifera
- C. Freshwater protozoan
- D. Fossil foraminifera
- E. Marine protozoa
- F. None of the Above

Ecological Role of Protozoa

401. _____ play an important role in many communities where they occupy a range of trophic levels, although they are frequently overlooked,

- A. Protozoa
- B. Foraminifera
- C. Freshwater protozoan
- D. Fossil foraminifera
- E. Marine protozoa
- F. None of the Above

402. Protozoa are predators upon unicellular algae, _____, and microfungi.

- A. Bacteria
- B. Many ecological conditions
- C. Amazingly diverse organisms
- D. Pathogenic bacteria
- E. Bacterium
- F. None of the Above

403. The ecological role of Foraminifera in the transfer of bacterial and algal production to successive trophic levels is important.

- A. True
- B. False

Factors Affecting Growth and Distribution

404. _____ multiply by cell division.

- A. Most free-living protozoa
- B. Foraminifera
- C. Freshwater protozoan
- D. Fossil foraminifera
- E. Marine protozoa
- F. None of the Above

Symbionts

405. Some _____ can be beneficial symbionts.

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

Contractile Vacuoles

406. Which bug/creature/organism are variously involved in movement, feeding, and sensation?

- A. Eukaryotes
- B. Bacteria or viruses
- C. Protozoa
- D. Free-living amoebae
- E. Centrioles
- F. None of the Above

407. Which bug/creature/organism are entirely distinct from prokaryotic flagella?

- A. Eukaryotes
- B. Bacteria or viruses
- C. Protozoa
- D. Free-living amoebae
- E. Centrioles
- F. None of the Above

408. Flagella also may have hairs or mastigonemes, scales, connecting membranes, and internal rods, their interior is continuous with the?

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

Centrioles

409. Centrioles are often found in cells that do not have flagella. They generally occur in groups of one or two, called _____.

- A. Kinetosome or centriole
- B. Kinetids
- C. Beneficial symbionts
- D. Nonpathogenic protozoa
- E. Various microtubular roots
- F. None of the Above

Paramecium

410. _____ are single-celled organisms in the kingdom Protista that live in fresh water.

- A. Kinetosome or centriole
- B. E-coli
- C. Paramecium
- D. Eukaryotes
- E. Bacterium Legionella pneumophila
- F. None of the Above

411. The osmotic concentration in the external environment of paramecium is much lower than that in their _____.

- A. Contractile vacuoles
- B. Haptonema
- C. Cyst
- D. Protozoan pathogens
- E. Cytoplasm
- F. None of the Above

412. The continuous influx of water into Paramecium is caused by the difference in _____ concentration between their environment and cytoplasm.

- A. Contractile vacuoles
- B. Cytoplasm
- C. Homeostasis
- D. Osmotic
- E. Hypotonic to their cytoplasm
- F. None of the Above

Protozoan Diseases

413. Which bug/creature/organism are larger than bacteria and viruses, but still microscopic?

- A. Paramecium(s)
- B. Parasite(s)
- C. Amoeba
- D. Protozoan pathogens
- E. Centriole(s)
- F. None of the Above

414. Which bug/creature/organism invade and inhabit the gastrointestinal tract?

- A. Paramecium(s) D. Protozoan pathogens
- B. Parasite(s) E. Centriole(s)
- C. Amoeba F. None of the Above

415. Which bug/creature/organism Some parasites enter the environment in a dormant form, with a Protective cell wall called a "cyst."

- A. Paramecium(s) D. Protozoan pathogens
- B. Parasite(s) E. Centriole(s)
- C. Amoeba F. None of the Above

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

- A. Paramecium D. Protozoan pathogen
- B. Host E. Cytoplasm
- C. Cyst F. None of the Above

Giardia Lamblia

417. Which bug/creature/organism/disease is (synonymous with *Lamblia intestinalis* and *Giardia duodenalis*) is a flagellated protozoan parasite that colonizes and reproduces in the small intestine?

- A. Giardia trophozoites D. Giardia lamblia
- B. Incubations E. Cryptosporidium infections
- C. Animal-to-person contact F. None of the Above

418. Which bug/creature/organism/disease attaches to the epithelium by a ventral adhesive disc, and reproduces via binary fission?

- A. Water-borne source D. Giardia infection(s)
- B. Giardia trophozoites E. Giardia parasite
- C. Giardia cyst F. None of the Above

419. Which bug/creature/organism/disease does not spread via the bloodstream, nor does it spread to other parts of the gastro-intestinal tract, but remains confined to the lumen of the small intestine?

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

420. Which bug/creature/organism/disease can survive for weeks to months in cold water and therefore can be present in contaminated wells and water systems?

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

421. Which bug/creature/organism/disease is also possible, and therefore Giardia infection is a concern for people camping in the wilderness or swimming in contaminated streams?

- A. Giardiasis D. Giardia infection
- B. Infected E. Zoonotic transmission
- C. Cytoplasm F. None of the Above

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

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

423. Cysts are distinguished by a retracted?

- A. Tubular sheath
- B. Shell
- C. Cytoplasm
- D. Viroids and prions
- E. Trophozoites
- F. None of the Above

424. Which bug/creature/organism/disease is not primitively amitochondrial and that it has retained a functional organelle derived from the original mitochondrial endosymbiont?"

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

Cryptosporidium

425. 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

426. All waterborne outbreaks of _____ have occurred in communities where the local utilities met all state and federal drinking water standards.

- A. Cyst of *C. parvum*
- B. Outbreaks
- C. *C. parvum*
- D. Cryptosporidiosis
- E. Entamoeba histolytica or E. histolytica
- F. None of the Above

427. Which bug/creature/organism/disease was first identified as a human pathogen, diagnosis was made by a biopsy of intestinal tissue?

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

428. Sometime this method of testing can give false negatives due the "patchy" nature of the intestinal?

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

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

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

438. According to the text, the highly environmentally resistant cyst of _____ allows the pathogen to survive various drinking water filtrations and chemical treatments such as chlorination.
- A. Cyst of *C. parvum*
 - B. Outbreaks
 - C. *C. parvum*
 - D. Cryptosporidiosis
 - E. Cryptosporidial oocysts
 - F. None of the Above

Mitochondria

439. Which term means that the bacterial cell is surrounded by a lipid membrane, or cell membrane, which encloses the contents of the cell and acts as a barrier to hold nutrients?
- A. Ciliate group
 - B. Unicellular ciliate protozoa
 - C. Endoplasmic reticulum
 - D. Prokaryotes
 - E. Cytoplasm
 - F. None of the Above
440. Which bug/creature/organism/species/disease do not tend to have membrane-bound organelles in their cytoplasm and thus contain few large intracellular structures?
- A. Ciliate group
 - B. Unicellular ciliate protozoa
 - C. Endoplasmic reticulum
 - D. Prokaryotes
 - E. Bacterial cell
 - F. None of the Above
441. Which bug/creature/organism/species/disease lack a nucleus, mitochondria, chloroplasts and the other organelles present in eukaryotic cells, such as the Golgi apparatus and endoplasmic reticulum?
- A. Ciliate group
 - B. Unicellular ciliate protozoa
 - C. Endoplasmic reticulum
 - D. Prokaryotes
 - E. Bacterial cell
 - F. None of the Above

Paramecia

442. According to the text, Paramecia are a group of unicellular ciliate protozoa formerly known as _____ from their slipper shape.
- A. Ciliate group
 - B. Unicellular ciliate protozoa
 - C. Slipper animalcules
 - D. Prokaryotes
 - E. Bacterial cell
 - F. None of the Above
443. According to the text, Paramecia are commonly studied as a representative of the?
- A. Ciliate group
 - B. Unicellular ciliate protozoa
 - C. Endoplasmic reticulum
 - D. Prokaryotes
 - E. Bacterial cell
 - F. None of the Above
444. This term covers the body which allows the cell to move with a synchronous motion (like a caterpillar).
- A. Paramecia
 - B. Osmoregulation
 - C. Unicellular organism
 - D. Compound oral cilia
 - E. Simple cilia
 - F. None of the Above
445. There is also a deep oral groove containing inconspicuous _____ (as found in other peniculids) that is used to draw food inside.
- A. Paramecia
 - B. Osmoregulation
 - C. Unicellular organism
 - D. Compound oral cilia
 - E. Acidic conditions
 - F. None of the Above

446. Osmoregulation is carried out by a pair of _____, which actively expel water absorbed by osmosis from their surroundings.

- A. IpaB and IpaC proteins
- B. Osmoregulation
- C. Unicellular organism
- D. Compound oral cilia
- E. Contractile vacuoles
- F. None of the Above

447. Which bug/creature/organism/species/disease are widespread in freshwater environments, and are especially common in scums?

- A. Shigella
- B. Bacteria
- C. S. dysenteriae
- D. Paramecia
- E. Shigellosis (bacillary dysentery)
- F. None of the Above

448. Paramecia are attracted by?

- A. Paramecia
- B. Osmoregulation
- C. Natural condition
- D. Basic conditions
- E. Acidic conditions
- F. None of the Above

449. Which bug/creature/organism/species/disease such as Paramecium, are examples for exceptions to the universality of the genetic code?

- A. Paramecia
- B. Bacteria
- C. Unicellular organism
- D. Amoeboids
- E. Eukaryotes
- F. None of the Above

Amoeba

450. Amoeba (sometimes amœba or ameba, plural amoebae) is a genus of protozoa that moves by means of pseudopods, and is well-known as a?

- A. Paramecia
- B. Pleomorphic bacteria
- C. Unicellular organism
- D. Amoeboids
- E. Non-motile bacteria
- F. None of the Above

451. The word amoeba or ameba is variously used to refer to it and its close relatives, now grouped as the Amoebozoa, or to all protozoa that move using pseudopods, otherwise termed?

- A. Paramecia
- B. Osmoregulation
- C. Unicellular organism
- D. Compound oral cilia
- E. Amoeboids
- F. None of the Above

Bacteria Section Peritrichous Bacteria

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

- A. True
- B. False

453. Pleomorphic bacteria can assume a variety of shapes.

- A. True
- B. False

454. 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

455. 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

466. Salmonellae usually do not ferment lactose; most of them produce hydrogen sulfide, which in media containing _____, reacts to form a black spot in the center of the creamy colonies.

- A. Ferric ammonium citrate
- B. Fecal coliform bacteria
- C. Salmonellae
- D. Bacterial concentrations
- E. Fecal matter
- F. None of the Above

Fecal Coliform Bacteria

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

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

468. If fecal coliform bacteria are present in high numbers in a water sample, it means that the water has been contaminated with _____.

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

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

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

Reasons for Natural Variation

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

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

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

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

472. Although winter rains may wash more _____ into a river or stream, cool water temperatures may cause a major die-off of fecal coliform bacteria.

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

Expected Impact of Pollution

473. Wastewater treatment plant discharges, failing septic systems, and animal waste all contribute _____ to fresh water.

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

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

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

475. Surprisingly high _____ have been found in stormwater runoff in urbanized areas because other sources are present such as pets and leaking sanitary sewers

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

Indicator Connection Varies

476. The microbiological quality of water can be assessed by measuring the levels of certain " _____ " organisms such as general coliforms, E. Coli, and Enterococcus bacteria.

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Enterococcus bacteria
- E. Indicator
- F. None of the Above

What are these Indicators?

477. Which bug/creature/organism/species may indicate that there are feces from warm blooded animals in the water.

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Enterococcus bacteria
- E. Fecal streptococci
- F. None of the Above

478. Which bug/creature/organism/species is a type of Fecal streptococci.

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Enterococcus
- E. Fecal streptococci
- F. None of the Above

479. According to studies conducted by the EPA, _____ have a greater correlation with swimming-associated gastrointestinal illness.

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Gastroenteritis
- E. Enterococci
- F. None of the Above

480. There isn't currently a quantitative method for measuring specifically _____ (expensive genetic studies can give a presence/absence result).

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Human fecal bacteria
- E. Gastroenteritis
- F. None of the Above

481. Which term represents that the water has come in contact with plant or animal life?

- A. Pathogen are present
- B. General coliforms
- C. Fecal coliforms
- D. Enterococcus bacteria
- E. Biological
- F. None of the Above

482. Which bug/creature/organism/species/disease are universally present, including in pristine spring water?

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Enterococcus bacteria
- E. Shigella dysenteriae
- F. None of the Above

483. Which bug/creature/organism/species/disease at very high levels they indicate there is what amounts to a lot of compost in the water, which could easily include (Ten thousand general coliform bacteria will get you a beach closure, compared to two or four hundred fecal coliforms, or fifty enterococcus).

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Enterococcus bacteria
- E. Shigella dysenteriae
- F. None of the Above

484. Which bug/creature/organism/species/disease, particularly E. coli, indicate that there are mammal or bird feces in the water?

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Enterococcus bacteria
- E. Shigella dysenteriae
- F. None of the Above

485. The more closely related the animal, the more likely _____ excreted with their feces can infect us.

- A. Pathogens
- B. General coliforms
- C. Fecal coliforms
- D. Enterococcus bacteria
- E. Gastroenteritis
- F. None of the Above

E. coli O157:H7

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

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

487. _____ has been identified as a cause of foodborn 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

488. 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

489. _____ can be spread by person-to-person contact in families and child care centers, consuming raw milk, or swimming in water contaminated with sewage.

- 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

490. Infection from _____ can be prevented 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

What is Escherichia coli O157:H7?

491. 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

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

- A. True
- B. False

493. 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

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

- A. True
- B. False

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

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

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

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

497. 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

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

- 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

How is E. coli O157:H7 spread?

499. Meat can become contaminated which _____ during slaughter of cattle, and the organisms can be thoroughly mixed into beef when it is ground.

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

500. _____ present on a cow's udders contaminate the raw milk.

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