Registration form

ACTIVATED SLUDGE CEU TRAINING COURSE $100.00

48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL $40.00

Start and finish dates:_____
You will have 90 days from this date in order to complete this course

Name_____**Signature**_____
(This will appear on your certificate as above)

Address:_____

City_____**State**_____**Zip**_____**Email**_____

Phone:
Home ( )_____**Work ( )**_____**Fax ( )**_____

Operator ID #_____**Exp Date**_____

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

Water Treatment Water Distribution Wastewater Collection Wastewater Treatment

Other _____

Your certificate will be mailed to you in about two weeks.

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PO Box 420, Payson AZ 85547-0420
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3 digit code on back of card_____

American Express
Master Card / Visa Card #_____ **Exp. Date**_____

If you've paid on the Internet, please write your Customer #_____

Referral's Name _____

Activated Sludge Answer Key Name

Phone # **Address**

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Please e mail or fax your answers and registration form to TLC.

Please fax the answer key to TLC

Call us a couple hours after faxing to ensure that we received your paperwork.
Your certificate will be mailed to you in about two weeks.

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Thank you…

Please mail or fax this survey along with your final exam

ACTIVATED SLUDGE CEU COURSE

CUSTOMER SERVICE RESPONSE CARD

DATE:_____

NAME:_____

ADDRESS:_____

E-MAIL_____PHONE_____

PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.

1. Please rate the difficulty of your course.
   Very Easy 0 1 2 3 4 5 Very Difficult

2. Please rate the difficulty of the testing process.
   Very Easy 0 1 2 3 4 5 Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.
   Very Similar 0 1 2 3 4 5 Very Different

4. How did you hear about this Course? _____

5. What would you do to improve the Course?

Any other concerns or comments.

Conventional Activated Sludge CEU Training Course Assignment

Your assignment is to correctly answer the following questions about the characteristic of the activated sludge process.

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

Please use the Answer Key and Registration form.

1. When large amounts of oils and greases are discharged to receiving waters from community systems, they increase _____ and they may float to the surface and harden, causing aesthetically unpleasing conditions.
A. Proteins
B. Organic matter or organic compounds or organic materials
C. Synthetic organics
D. BOD
E. None of the Above

2. _____also can trap trash, plants, and other materials, causing foul odors and attracting flies and mosquitoes and other disease vectors. In some cases, too much oil and grease causes septic conditions in ponds and lakes by preventing oxygen from the atmosphere from reaching the water.
A. Inorganic minerals
B. Inorganic substances
C. Oils and greases
D. Petroleum-based waste oils
E. Stormwater

3. Onsite systems also can be harmed by too much _____, which can clog onsite system drainfield pipes and soils, adding to the risk of system failure.
A. Inorganic minerals
B. Inorganic substances
C. Oils and grease
D. Petroleum-based waste oils
E. Stormwater

4. Excessive _____ also adds to the septic tank scum layer, causing more frequent tank pumping to be required. Both possibilities can result in significant costs to homeowners.
A. Inorganic minerals
B. Inorganic substances
C. Grease
D. Petroleum-based waste oils
E. Stormwater

5. _____used for motors and industry are considered hazardous waste and should be collected and disposed of separately from wastewater.
A. Inorganic minerals
B. Inorganic substances
C. Oils and greases
D. Petroleum-based waste oils
E. Stormwater

6. _____, metals, and compounds, such as sodium, potassium, calcium, magnesium, cadmium, copper, lead, nickel, and zinc are common in wastewater from both residential and nonresidential sources.
A. Inorganic minerals
B. Inorganic substances
C. Oils and greases
D. Petroleum-based waste oils
E. Stormwater

7. They can originate from a variety of sources in the community including industrial and commercial sources, _____, and inflow and infiltration from cracked pipes and leaky manhole covers.
A. Inorganic minerals
B. Inorganic substances
C. Oils and greases
D. Petroleum-based waste oils
E. Stormwater

8. Most _____are relatively stable, and cannot be broken down easily by organisms in wastewater.
A. Inorganic minerals
B. Inorganic substances
C. Oils and greases
D. Petroleum-based waste oils
E. Stormwater

9. Although acute poisonings from heavy metals in drinking water are rare in the U.S., potential long-term health effects of ingesting small amounts of some _____over an extended period of time are possible.
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen
E. None of the Above

10. Wastewater often contains large amounts of the _____ nitrogen and phosphorus in the form of nitrate and phosphate, which promote plant growth.
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen
E. None of the Above

11. Large amounts of many _____ can contaminate soil and water. Some are toxic to animals and humans and may accumulate in the environment. For this reason, extra treatment steps are often required to remove inorganic materials from industrial wastewater sources.
A. Inorganic minerals
B. Inorganic substances
C. Oils and greases
D. Petroleum-based waste oils
E. Stormwater

12. Heavy metals are discharged with many types of industrial wastewaters, are difficult to remove by _____.
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen
E. None of the Above

13. Organisms only require small amounts of nutrients in biological treatment, so there normally is an excess available in treated wastewater. In severe cases, excessive _____ in receiving waters cause algae and other plants to grow quickly depleting oxygen in the water.
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen
E. None of the Above

14. _____, fish and other aquatic life die, emitting foul odors.
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen
E. None of the Above

15. _____ from wastewater have also been linked to ocean "red tides" that poison fish and cause illness in humans.
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen
E. None of the Above

16. The solids must be significantly reduced by treatment or they can increase BOD when discharged to receiving waters and provide places for _____ to escape disinfection. They also can clog soil absorption fields in onsite systems.
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen
E. None of the Above

17. _____ in drinking water may contribute to miscarriages and is the cause of a serious illness in infants called methemoglobinemia or "blue baby syndrome."
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen
E. None of the Above

18. _____in wastewater can consist of organic and/or inorganic materials and organisms.
A. Solid materials
B. Nitrogen
C. Nutrients
D. Deprived of oxygen

19. Certain substances, such as sand, grit, and heavier organic and inorganic materials settle out from the rest of the wastewater stream during the preliminary stages of treatment.
A. Suspended solids
B. Settleable solids
C. Biologically active layer
D. Dissolved solids
E. None of the Above

20. On the bottom of settling tanks and ponds, organic material makes up a _____of sludge that aids in treatment.
A. Suspended solids
B. Settleable solids
C. Biologically active layer
D. Dissolved solids
E. None of the Above

21. Materials that resist settling may remain suspended in wastewater.
A. Suspended solids
B. Settleable solids
C. Biologically active layer
D. Dissolved solids
E. None of the Above

22. _____in wastewater must be treated, or they will clog soil absorption systems or reduce the effectiveness of disinfection systems.
A. Suspended solids
B. Settleable solids
C. Biologically active layer
D. Dissolved solids
E. None of the Above

23. Small particles of certain wastewater materials can dissolve like salt in water.
A. Suspended solids
B. Settleable solids
C. Biologically active layer
D. Dissolved solids
E. None of the Above

24. Some dissolved materials are consumed by microorganisms in wastewater, but others, such as heavy metals, are difficult to remove by conventional treatment. Excessive amounts of _____ in wastewater can have adverse effects on the environment.
A. Suspended solids
B. Settleable solids
C. Biologically active layer
D. Dissolved solids
E. None of the Above

25. Certain gases in wastewater can cause _____, affect treatment, or are potentially dangerous.
A. Suspended solids
B. Settleable solids
C. Biologically active layer
D. Dissolved solids
E. None of the Above

26. _____is a byproduct of anaerobic biological treatment and is highly combustible.
A. Hydrogen sulfide
B. Methane gas
C. Wastewater odors
D. Ammonia
E. Substances

27. Special precautions need to be taken near septic tanks, manholes, treatment plants, and other areas where _____can collect.
A. Hydrogen sulfide
B. Methane gas
C. Wastewater gases
D. Ammonia
E. Substances

28. The gases _____and ammonia can be toxic and pose asphyxiation hazards.
A. Hydrogen sulfide
B. Methane gas
C. Wastewater odors
D. Ammonia
E. Substances

29. _____ as a dissolved gas in wastewater also is dangerous to fish.
A. Hydrogen sulfide
B. Methane gas
C. Wastewater odors
D. Ammonia
E. Substances

30. Unless effectively contained or minimized by design and location, _____can affect the mental well-being and quality of life of residents. In some cases, odors can even lower property values and affect the local economy.
A. Hydrogen sulfide
B. Methane gas
C. Wastewater odors
D. Ammonia
E. Substances

31. In addition to the many _____ found in wastewater, there are other characteristics system designers and operators use to evaluate wastewater.
A. Temperatures
B. Turbidity
C. Alkalinity
D. pH
E. None of the Above

32. The best temperatures for wastewater treatment probably range from 77 to 95 degrees Fahrenheit. In general, biological treatment activity accelerates in warm _____ and slows in cool temperatures, but extreme hot or cold can stop treatment processes altogether.
A. Temperatures
B. Turbidity
C. Alkalinity
D. pH
E. None of the Above

33. The color, odor, and _____ of wastewater give clues about the amount and type of pollutants present and treatment necessary.
A. Temperatures
B. Turbidity
C. Alkalinity
D. pH
E. None of the Above

34. The following are some other important wastewater characteristics that can affect public health and the environment, as well as the _____, cost, and effectiveness of treatment.
A. Temperatures
B. Turbidity
C. Alkalinity
D. pH
E. None of the Above

35. Some systems are _____during cold weather and some may not be appropriate for very cold climates.
A. Temperatures
B. Turbidity
C. Alkalinity
D. pH
E. None of the Above

36. Wastewater _____ also affects receiving waters. Hot water is a byproduct of many manufacturing processes, can be a pollutant.
A. Temperature
B. Turbidity
C. Alkalinity
D. pH
E. None of the Above

37. When hot water is discharged in large quantities, it can raise the _____ of receiving streams locally and disrupt the natural balance of aquatic life.
A. Temperature
B. Turbidity
C. Alkalinity
D. pH
E. None of the Above

38. The _____ or alkalinity of wastewater affects both treatment and the environment.
A. Temperatures
B. Acidity
C. Alkalinity
D. pH
E. None of the Above

39. Low _____ indicates increasing acidity, while a high pH indicates increasing alkalinity (a pH of 7 is neutral).
A. Temperatures
B. Acid
C. Alkalinity
D. pH

40. The _____ of wastewater needs to remain between 6 and 9 to protect organisms.
A. Temperatures
B. Acid
C. Alkalinity
D. pH
E. None of the Above

41. Systems that are inadequately designed or _____may fail to provide treatment and allow the release of pollutants to the environment.
A. Hydraulically overloaded
B. Based on observations
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

42. To design systems that are both as safe and as cost-effective as possible, engineers must estimate the average and maximum (peak) amount of _____by various sources.
A. Hydraulically overloaded
B. Based on observations
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

43. Acids and other substances that alter _____ can inactivate treatment processes when they enter wastewater from industrial or commercial sources.
A. Temperatures
B. Acid
C. Alkalinity
D. pH
E. None of the Above

44. Whether a system serves a single home or an entire community, it must be able to _____ in the quantity and quality of wastewater it receives to ensure proper treatment is provided at all times.
A. Hydraulically overloaded
B. Based on observations
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

45. Because extreme fluctuations in flow can occur during different times of the day and on different days of the week, estimates are _____of the minimum and maximum amounts of water used on an hourly, daily, weekly, and seasonal basis.
A. Hydraulically overloaded
B. Based on observations
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

46. The _____ peak flow events that result from several or all water-using appliances or fixtures being used at once also is taken into account.
A. Hydraulically overloaded
B. Based on observations
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

47. Peak flows at stores and other businesses _____ business hours and during meal times at restaurants.
A. Hydraulically overloaded
B. Typically occur during
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

48. _____ for centralized treatment systems is a complicated task, especially when designing a new treatment plant in a community where one has never existed previously.
A. Hydraulically overloaded
B. Estimating flow volumes
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

49. Engineers must allow for additional flows during wet weather due to _____ of extra water into sewers.
A. Hydraulically overloaded
B. Inflow and infiltration
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

50. Excess water can enter sewers through leaky manhole covers and cracked pipes and pipe joints, diluting wastewater, which affects its overall characteristics. This _____ to treatment plants sometimes by as much as three or four times the original design load.
A. Hydraulically overloaded
B. Can increase flows
C. Handle fluctuations
D. Flows generated
E. Possibility of instantaneous

51. The main focus of wastewater treatment plants _____the BOD and COD in the effluent discharged to natural waters, meeting state and federal discharge criteria.
A. Is to reduce
B. Bioconversion of
C. Are designed to
D. To remove
E. None of the Above

52. Wastewater treatment plants _____function as "microbiology farms," where bacteria and other microorganisms are fed oxygen and organic waste.
A. Is to reduce
B. Bioconversion of
C. Are designed to
D. To remove
E. None of the Above

53. Treatment of wastewater usually involves biological processes such as the activated sludge system in the secondary stage after preliminary screening _____coarse particles and primary sedimentation that settles out suspended solids.
A. Is to reduce
B. Bioconversion of
C. Are designed to
D. To remove
E. None of the Above

54. These secondary treatment steps are _____ environmental biotechnologies that harness natural self-purification processes contained in bioreactors for the biodegradation of organic matter and bioconversion of soluble nutrients in the wastewater.
A. Is to reduce
B. Bioconversion of
C. Are designed to
D. Generally considered
E. None of the Above

55. Each wastewater stream is unique, and so too are the community of microorganisms that process it. This "application-specific microbiology" is the preferred methodology in wastewater treatment_____ of biological nutrient removal.
A. Is to reduce
B. Bioconversion of
C. Affecting the efficiency
D. To remove
E. None of the Above

56. The right laboratory-prepared bugs _____ in organics removal-if they have the right growth environment. This efficiency is multiplied if microorganisms are allowed to grow as a layer-a biofilm-on specifically designed support media. In this way, optimized biological processing of a waste stream can occur.
A. Are more efficient
B. Bioconversion of
C. Are designed to
D. To remove
E. None of the Above

57. To reduce the start up phase for growing a _____one can also purchase "application specific bacterial cultures" from appropriate microbiology vendors.
A. Aerobic digestion
B. Biological denitrification
C. Microbes feed
D. Micro-organisms
E. Mature biofilm

58. _____, like all living things, require food for growth.
A. Aerobic digestion
B. Biological denitrification
C. Microbes feed
D. Micro-organisms
E. Mature biofilm

59. Biological sewage treatment consists of many different _____, mostly bacteria, carrying out a stepwise, continuous, sequential attack on the organic compounds found in wastewater and upon which the microbes feed.
A. Aerobic digestion
B. Biological denitrification
C. Microbes feed
D. Micro-organisms
E. Mature biofilm

60. _____of waste is the natural biological degradation and purification process in which bacteria that thrive in oxygen-rich environments break down and digest the waste.
A. Aerobic digestion
B. Biological denitrification
C. Microbes feed
D. Micro-organisms
E. Mature biofilm

61. During the oxidation process, pollutants are broken down into carbon dioxide (CO_2), water (H_2O), nitrates, sulfates and biomass (_____). By optimizing the oxygen supply -with so-called aerators- the process can be significantly accelerated.
A. Aerobic digestion
B. Biological denitrification
C. Microbes feed
D. Micro-organisms
E. Mature biofilm

62. Most activated sludge processes are used to degrade carbonaceous BOD. It is also possible to design and/or operate the basic system to oxidize ammonia (_____).
A. Aerobic digestion
B. Nitrification
C. Microbes feed
D. Micro-organisms
E. Mature biofilm

63. Many plants are now designed to achieve _____. Other system modifications include phosphorus removal and biological denitrification. Activated sludge plants are usually designed from pilot plant and laboratory studies.
A. Aerobic digestion
B. Nitrification
C. Microbes feed
D. Micro-organisms
E. Mature biofilm

64. It is possible to design a process based on the amount of time the _____ spends in the system, generally termed mean cell residence time (MCRT), or on the amount of food provided to the bacteria in the aeration tank (the food-to-microorganism ratio, F/M).
A. Aerobic digestion
B. Biological denitrification
C. Microbes feed
D. Sludge
E. Mature biofilm

65. The operating control point is that point when the best effluent and _____ quality is obtained for the existing conditions.
A. Aerobic digestion
B. Biological denitrification
C. Microbes feed
D. Sludge
E. Mature biofilm

66. Swimming and gliding _____ engulf bacteria or other prey.
A. Ciliates
B. Microorganism or Organism
C. Bacteria
D. Floc-forming bacteria
E. None of the Above

67. Stalked _____ attach to the biomass and vortex suspended bacteria into their gullets, while crawlers break bacteria loose from the floc surface.
A. Ciliates
B. Microorganism or Organism
C. Bacteria
D. Floc-forming bacteria
E. None of the Above

68. Predators feed mostly on stalked and swimming ciliates. The omnivores, such as most rotifers, eat whatever is readily available, while the worms feed on the floc or prey on larger organisms. _____ are directly affected by their treatment environment.
A. Ciliates
B. Microorganisms
C. Bacteria
D. Floc-forming bacteria
E. None of the Above

69. Changes in food, dissolved oxygen, temperature, pH, total dissolved solids, sludge age, presence of toxins, and other factors create a dynamic environment for the treatment _____.
A. Ciliates
B. Organisms
C. Bacteria
D. Floc-forming bacteria
E. None of the Above

70. Food (organic loading) regulates _____ numbers, diversity, and species when other factors are not limiting.
A. Ciliates
B. Microorganism
C. Bacteria
D. Floc-forming bacteria
E. None of the Above

71. The relative abundance and occurrence of organisms at different loadings can reveal why some _____ are present in large numbers while others are absent.
A. Ciliates
B. Organisms
C. Bacteria
D. Floc-forming bacteria
E. None of the Above

72. The aerobic bacteria that occur are similar to those found in other treatment processes such as _____.
A. Ciliates
B. Microorganism or Organism
C. Bacteria
D. Floc-forming bacteria
E. None of the Above

73. Three functional groups occur: freely dispersed, single bacteria; _____; and filamentous bacteria. All function similarly to oxidize organic carbon (BOD) to produce CO2 and new bacteria (new sludge).
A. Ciliates
B. Microorganism or Organism
C. Bacteria
D. Floc-forming bacteria
E. None of the Above

74. Many bacterial species that degrade wastes grow as single bacteria dispersed in the wastewater. Although these readily oxidize BOD, they do not settle and hence often leave the lagoon system in the effluent as solids (_____).
A. Filamentous
B. Heterotrophic
C. TSS
D. Floc
E. BOD

75. These tend to grow in lagoons at high organic loading and low oxygen conditions. More important are the floc-forming bacteria, those that grow in a large aggregate (_____) due to exocellular polymer production (the glycocalyx).
A. Filamentous
B. Heterotrophic
C. TSS
D. Floc
E. BOD

76. This growth form is important as these flocs degrade BOD and settle at the end of the process, producing a low _____ effluent.
A. Filamentous
B. Heterotrophic
C. TSS
D. Nitrification
E. BOD

77. A number of _____ bacteria occur in lagoons, usually at specific growth environments.
A. Filamentous
B. Heterotrophic
C. TSS
D. Nitrification
E. BOD

78. These generally do not cause any operational problems in lagoons, in contrast to activated sludge where _____ bulking and poor sludge settling is a common problem.
A. Filamentous
B. Heterotrophic
C. TSS
D. Nitrification
E. BOD

79. Most heterotrophic bacteria have a wide range in environmental tolerance and can function effectively in _____ removal over a wide range in pH and temperature.
A. Filamentous
B. Heterotrophic
C. TSS
D. Nitrification
E. BOD

80. Aerobic _____ removal generally proceeds well from pH 6.5 to 9.0 and at temperatures from 3-4^{o}C to 60- 70°C (mesophilic bacteria are replaced by thermophilic bacteria at temperatures above 35°C).
A. Filamentous
B. Heterotrophic
C. TSS
D. Nitrification
E. BOD

81. BOD removal generally declines rapidly below 3-4°C and ceases at 1-2°C.A very specialized group of bacteria occurs to some extent in lagoons (and other wastewater treatment systems) that can oxidize ammonia via nitrite to nitrate, termed_____.
A. Filamentous
B. Heterotrophic
C. Nitrifying bacteria
D. Nitrification
E. BOD

82. It was once thought that only two bacteria were involved in nitrification: Nitrosomonas europaea, which oxidizes ammonia to nitrite, and Nitrobacter winogradskyi, which _____to nitrate.
A. Filamentous
B. Heterotrophic
C. Oxidize nitrite
D. Nitrification
E. BOD

83. It is now known that at least 5 genera of bacteria _____and at least three genera of bacteria oxidize nitrite.
A. CO2
B. Heterotrophic
C. Oxidize ammonia
D. Nitrification
E. BOD

84. Besides oxygen, these nitrifying bacteria require a neutral pH (7-8) and substantial alkalinity (these autotrophs use _____ as a carbon source for growth).
A. CO2
B. MLSS
C. Oxidize nitrite
D. Nitrification
E. BOD

85. _____ ceases at pH values above 9 and declines markedly at pH values below 7. This results from the growth inhibition of the nitrifying bacteria.
A. CO2
B. Heterotrophic
C. Oxidize nitrite
D. Nitrification
E. BOD

86. _____, is not a major pathway for nitrogen removal in lagoons.
A. CO2
B. MLSS
C. Oxidize nitrite
D. Nitrification
E. BOD

87. Nitrifying bacteria exist in low numbers in lagoons. They prefer attached growth systems and/or high _____ sludge systems.
A. CO2
B. MLSS
C. Oxidize nitrite
D. Nitrification
E. BOD

88. Anaerobic, heterotrophic bacteria that commonly occur in lagoons are involved in _____ formation and in sulfate reduction.
A. CO2
B. MLSS
C. Methane
D. Nitrification

89. Anaerobic methane formation involves three different groups of anaerobic bacteria that function together to convert organic materials to _____ via a three step process.
A. CO2
B. MLSS
C. Methane
D. Nitrification
E. BOD

90. _____ - many genera of anaerobic bacteria hydrolyze proteins, fats, and poly saccharides present in wastewater to amino acids, short-chain peptides, fatty acids, glycerol, and mono- and di-saccharides. These have a wide environmental tolerance in pH and temperature.
A. Methane forming bacteria
B. General anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

91. _____ - this diverse group of bacteria converts products from above under anaerobic conditions to simple alcohols and organic acids such as acetic, propionic, and butyric. These bacteria are hardy and occur over a wide pH and temperature range.
A. Methane forming bacteria
B. Anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

92. _____ - these bacteria convert formic acid, methanol, methylamine, and acetic acid under anaerobic conditions to methane.
A. Methane forming bacteria
B. Anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

93. _____ is derived in part from these compounds and in part from CO_2 reduction.
A. Methane
B. Anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

94. _____ are environmentally sensitive and have a narrow pH range of 6.5- 7.5 and require temperatures > 14^{o} C.
A. Methane bacteria
B. Anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

95. Note that the products of the acid formers (principally acetic acid) become the substrate for the _____.
A. Methane producers
B. Anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

96. A problem at times exists where the acid formers overproduce organic acids, lowering the pH below where the _____ can function (a pH < 6.5). This can stop methane formation and lead to a buildup of sludge in a lagoon with a low pH.
A. Methane bacteria
B. Anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

97. In an _____, this is called a **"stuck digester"**.
A. Methane forming bacteria
B. Anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

98. _____ ceases at cold temperatures, probably not occurring in most lagoons in the wintertime in cold climates.
A. Methane fermentation
B. Anaerobic degraders
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

99. A number of _____ (14 genera reported to date) called sulfate reducing bacteria can use sulfate as an electron acceptor, reducing sulfate to hydrogen sulfide. This occurs when BOD and sulfate are present and oxygen is absent.
A. Methane forming bacteria
B. Anaerobic bacteria
C. Acid-forming bacteria
D. Anaerobic fermenter
E. None of the Above

100. _____is a major cause of odors in ponds.
A. Sulfur compounds
B. Sulfate reduction
C. H_2S
D. Sulfur bacteria
E. None of the Above

101. Anaerobic, photosynthetic bacteria occur in all lagoons and are the predominant photo-synthetic organisms in anaerobic lagoons. The anaerobic sulfur bacteria, generally grouped into the red and green sulfur bacteria and represented by about 28 genera, oxidize reduced sulfur compounds (_____) using light energy to produce sulfur and sulfate.
A. Sulfur compounds
B. Sulfate reduction
C. H_2S
D. Sulfur bacteria
E. None of the Above

102. _____ is used in place of H_2O as used by algae and green plants, producing $S0_4$- instead of O_2. All are either strict anaerobes or microaerophilic. Most common are Chromatium, Thiocystis, and Thiopedia, which can grow in profusion and give a lagoon a pink or red color.
A. Sulfur compounds
B. Sulfate reduction
C. H_2S
D. Sulfur bacteria
E. None of the Above

103. Conversion of odorous sulfides to sulfur and sulfate by these _____is a significant odor control mechanism in facultative and anaerobic lagoons, and can be desirable.
A. Sulfur compounds
B. Sulfate reduction
C. H_2S
D. Sulfur bacteria
E. None of the Above

104. The _____ at a treatment lagoon is determined by the various chemical species of alkalinity that are present.
A. Sulfur compounds
B. Sulfate reduction
C. H_2S
D. Sulfur bacteria
E. None of the Above

105. The main species present are carbon dioxide (CO_2, bicarbonate ion (_____), and carbonate ion (CO_3=).
A. Alkalinity
B. HCO_3
C. H_2S
D. pH
E. None of the Above

106. _____ and pH can affect which species will be present. High amounts of CO_2 yield a low lagoon pH, while high amounts of CO_3= yield a high lagoon pH.
A. Alkalinity
B. CO_2
C. H_2S
D. pH
E. None of the Above

107. Bacterial growth on _____ releases CO_2 which subsequently dissolves in water to yield carbonic acid (H_2CO_3). This rapidly dissociates to bicarbonate ion, increasing the lagoon alkalinity.
A. Alkalinity
B. BOD
C. H_2S
D. pH
E. None of the Above

108. Bacterial oxidation of BOD causes a decrease in lagoon pH due to _____ release.
A. Alkalinity
B. CO_2
C. H_2S
D. pH
E. None of the Above

109. Algal growth in lagoons has the opposite effect on lagoon pH, raising the pH due to algal use for growth of inorganic carbon (_____ and HCO_3).
A. Alkalinity
B. CO_2
C. H_2S
D. pH
E. None of the Above

110. Algal growth reduces the lagoon alkalinity which may cause the _____ to increase if the lagoon alkalinity (pH buffer capacity) is low.
A. Alkalinity
B. CO_2
C. H_2S
D. pH
E. None of the Above

111. _____ can grow to such an extent in lagoons (a bloom) that they consume for photosynthesis all of the CO_2 and HCO3-present, leaving only carbonate (CO_3=) as the pH buffering species.
A. Alkalinity
B. CO_3
C. Algae
D. pH
E. None of the Above

112. The above situation causes the pH of the lagoon to become _____.
A. Alkaline
B. CO_2
C. H_2S
D. pH
E. None of the Above

113. pH values of 9.5 or greater are common in _____ during algal blooms, which can lead to lagoon effluent pH violations (in most states this is pH = 9).
A. Culex tarsalis
B. Lagoon (s)
C. Rotifers
D. Microinvertebrates

114. It should be noted that an increase in the_____ pH caused by algal growth can be beneficial. Natural disinfection of pathogens is enhanced at higher pH.
A. Culex tarsalis
B. Lagoon (s)
C. Rotifers
D. Microinvertebrates
E. None of the Above

115. Phosphorus removal by natural chemical precipitation is greatly enhanced at pH values greater than pH = 8.5. In addition, _____to the atmosphere is enhanced at higher pH values (NH_3 is strippable, not NH_4+).
A. Culex tarsalis
B. Lagoon (s)
C. Rotifers
D. Microinvertebrates
E. None of the Above

116. Many higher life forms (animals) develop in lagoons. These include protozoans and microinvertebrates such as rotifers, daphnia, _____, chironomids (midge larvae), and mosquito larvae (often termed zooplankton).
A. Annelids
B. Lagoon (s)
C. Rotifers
D. Microinvertebrates
E. None of the Above

117. These organisms mentioned above play a role in waste purification by feeding on bacteria and _____ and promoting flocculation and settling of particulate material.
A. Culex tarsalis
B. Lagoon (s)
C. Algae
D. Microinvertebrates
E. None of the Above

118. Protozoans are the most common higher life forms in _____, with about 250 species identified in lagoons to date.
A. Culex tarsalis
B. Lagoon (s)
C. Rotifers
D. Microinvertebrates
E. None of the Above

119. _____ and daphnia are particularly important in controlling algal overgrowth and these often **"bloom"** when algal concentrations are high.
A. Culex tarsalis
B. Lagoon (s)
C. Rotifers
D. Microinvertebrates
E. None of the Above

120. These _____ are relatively slow growing and generally only occur in systems with a detention time of >10 days.
A. Culex tarsalis
B. Lagoon (s)
C. Rotifers
D. Microinvertebrates
E. None of the Above

121. This is an indirect measure of biodegradable organic compounds in water, and is determined by measuring the dissolved oxygen decrease in a controlled water sample over a five-day period.
A. Biochemical Oxygen Demand
B. Aerobic
C. Nutrients
D. Organic Carbon
E. None of the Above

122. During the five-day BOD period, _____ (oxygen-consuming) bacteria decompose organic matter in the sample and consume dissolved oxygen in proportion to the amount of organic material that is present.
A. Biochemical Oxygen Demand
B. Aerobic
C. Nutrients
D. Organic Carbon
E. None of the Above

123. In general, a high _____ reflects high concentrations of substances that can be biologically degraded, thereby consuming oxygen and potentially resulting in low dissolved oxygen in the receiving water.
A. Biochemical Oxygen Demand
B. Aerobic
C. Nutrients
D. Organic Carbon
E. None of the Above

124. The BOD test was developed for samples dominated by oxygen-demanding pollutants like sewage. While its merit as a pollution parameter continues to be debated, _____ has the advantage of a long period of record.
A. Biochemical Oxygen Demand
B. Aerobic
C. Nutrients
D. Organic Carbon
E. None of the Above

125. _____ are chemical elements or compounds essential for plant and animal growth.
A. Biochemical Oxygen Demand
B. Aerobic
C. Nutrients
D. Organic Carbon
E. None of the Above

126. _____ parameters include ammonia, organic nitrogen, Kjeldahl nitrogen, nitrate nitrogen (for water only) and total phosphorus.
A. Biochemical Oxygen Demand
B. Aerobic
C. Nutrients
D. Organic Carbon
E. None of the Above

127. High amounts of nutrients have been associated with eutrophication, or overfertilization of a water body, while low levels of _____ can reduce plant growth and (for example) starve higher level organisms that consume phytoplankton.
A. Biochemical Oxygen Demand
B. Aerobic
C. Nutrients
D. Organic Carbon
E. None of the Above

128. Most _____in water occurs as partly degraded plant and animal materials, some of which are resistant to microbial degradation.
A. Aerobic Bacteria
B. Aerobic
C. Total Organic Carbon
D. Organic Carbon
E. None of the Above

129. _____is important in the estuarine food web and is incorporated into the ecosystem by photosynthesis of green plants, then consumed as carbohydrates and other organic compounds by higher animals.
A. Aerobic Bacteria
B. Aerobic
C. Total Organic Carbon
D. Organic Carbon
E. None of the Above

130. In another process, formerly living tissue containing _____ is decomposed as detritus by bacteria and other microbes.
A. Aerobic Bacteria
B. Aerobic
C. Total Organic Carbon
D. Carbon
E. None of the Above

131. Following taxonomic identification, enumeration and evaluation of the characteristics of the _____and structures present in a wastewater sample, the information can be used to draw conclusions regarding the treatment process.
A. Various organisms
B. Activated sludge
C. Floc particles
D. Spherical floc
E. None of the Above

132. Bears a direct relationship with biological and chemical oxygen demand.
A. Aerobic Bacteria
B. Aerobic
C. Total Organic Carbon
D. Organic Carbon
E. None of the Above

133. High levels of _____ can result from human sources, the high oxygen demand being the main concern.
A. Aerobic Bacteria
B. Aerobic
C. Total Organic Carbon
D. Organic Carbon
E. None of the Above

134. A condition in which free or dissolved oxygen is present in the aquatic environment
A. Aerobic Bacteria
B. Aerobic
C. Total Organic Carbon
D. Organic Carbon
E. None of the Above

135. Bacteria which will live and reproduce only in an environment containing oxygen. Oxygen combined chemically, such as in water molecules (H_2O), cannot be used for respiration by aerobes
A. Anaerobic
B. Aerobic
C. Anaerobic Bacteria
D. Aerobic Bacteria
E. None of the Above

136. A condition in which **"free"** or dissolved oxygen is not present in the aquatic environment.
A. Anaerobic
B. Aerobic
C. Anaerobic Bacteria
D. Aerobic Bacteria
E. None of the Above

137. Bacteria that thrive without the presence of oxygen.
A. Anaerobic
B. Aerobic
C. Anaerobic Bacteria
D. Aerobic Bacteria
E. None of the Above

138. Bacteria that break down complex solids to volatile acids.
A. Anaerobic
B. Methane Fermenters
C. Anaerobic Bacteria
D. Saprophytic bacteria
E. None of the Above

139. Bacteria that break down the volatile acids to methane (CH_4) carbon dioxide (CO_2) and water (H_2O).
A. Anaerobic
B. Methane Fermenters
C. Anaerobic Bacteria
D. Saprophytic bacteria
E. None of the Above

140. The addition of oxygen to an element or compound, or removal of hydrogen or an electron from an element or compound in a chemical reaction. The opposite of reduction.
A. Anaerobic
B. Methane Fermenters
C. Anaerobic Bacteria
D. Saprophytic bacteria
E. None of the Above

141. The addition of hydrogen, removal of oxygen or addition of electrons to an element or compound. Under anaerobic conditions in wastewater, sulfur compounds or elemental sulfur are reduced to H_2S or sulfide ions.
A. Anaerobic
B. Methane Fermenters
C. Anaerobic Bacteria
D. Reduction
E. None of the Above

142. We have some wastewater treatment plants that grow the microorganisms (Bugs) in large tanks. To have enough _____ in the tanks we add oxygen by blowing air into the tank that is full of wastewater and microorganisms.
A. Oxygen
B. Settled bugs
C. Activated sludge
D. Secondary treatment
E. None of the Above

143. The air is bubbled in the water and mixes **"the bugs"** and food and _____ together. When we treat wastewater this way, we call it the activated sludge method. With all of this food and air the microbes grow and multiply very rapidly.
A. Oxygen
B. Settled bugs
C. Activated sludge
D. Secondary treatment
E. None of the Above

144. Pretty soon the population of bugs gets too large and some of them need to be removed to make room for new bugs to grow. We remove the excess bugs by sedimentation in the same kind of tanks used for _____. In the tank, the bugs sink to the bottom and we remove them.
A. Oxygen
B. Settled bugs
C. Activated sludge
D. Primary treatment
E. None of the Above

145. The _____are also called waste activated sludge.
A. Oxygen
B. Settled bugs
C. Activated sludge
D. Secondary treatment
E. None of the Above

146. The waste sludge is treated separately. The remaining wastewater is now much cleaner. In fact, after primary and _____, about 85% or more of all pollutants in the wastewater has been removed and it goes on to Disinfection.
A. Oxygen
B. Settled bugs
C. Activated sludge
D. Secondary treatment
E. None of the Above

147. Four (4) groups of bugs do most of the **"eating"** in the _____process. The first group is the bacteria which eat the dissolved organic compounds.
A. Oxygen
B. Settled bugs
C. Activated sludge
D. Secondary treatment
E. None of the Above

148. The second and third groups of bugs are microorganisms known as the free-swimming and _____. These larger bugs eat the bacteria and are heavy enough to settle by gravity.
A. Mixed liquor
B. Suctoria
C. Stalked ciliates
D. Bacteria
E. None of the Above

149. The fourth group is a microorganism, known as _____, which feed on the larger bugs and assist with settling.
A. Mixed liquor
B. Suctoria
C. Activated sludge
D. Bacteria
E. None of the Above

150. The interesting thing about the bacteria that eat the dissolved organics is that they have no mouth. The _____ have an interesting property--their "fat reserve" is stored on the outside of their body. This fat layer is sticky and is what the organics adhere to.
A. Mixed liquor
B. Suctoria
C. Activated sludge
D. Bacteria
E. None of the Above

151. Once the bacteria have **"contacted"** their food, they start the digestion process. A chemical _____ is sent out through the cell wall to break up the organic compounds.
A. Mixed liquor
B. Enzyme
C. Activated sludge
D. Bacteria
E. None of the Above

152. This hydrolytic enzyme, breaks the organic molecules into small units which are able to pass through the cell wall of the _____.
A. Mixed liquor
B. Suctoria
C. Activated sludge
D. Bacteria
E. None of the Above

153. In wastewater treatment, this process of using bacteria-eating-bugs in the presence of oxygen to reduce the organics in water is called _____.
A. Mixed liquor
B. Suctoria
C. Activated sludge
D. Bacteria
E. None of the Above

154. The first step in the process, the contact of the bacteria with the _____, takes about 20 minutes. The second step includes the breaking up, ingestion and digestion processes, which take 4 to 24 hours.
A. Mixed liquor
B. Suctoria
C. Organic process
D. Bacteria
E. None of the Above

155. The fat storage property of the bacteria is also an asset in settling. As the _____ "bump" into each other, the fat on each of them sticks together and causes flocculation of the non-organic solids and biomass.
A. Mixed liquor
B. Suctoria
C. Bugs
D. Bacteria
E. None of the Above

156. From the aeration tank, the wastewater, now called _____, flows to a secondary clarification basin to allow the flocculated biomass of solids to settle out of the water.
A. Mixed liquor
B. Suctoria
C. Activated sludge
D. Bacteria
E. None of the Above

157. The _____, which is the activated sludge, contains millions of bacteria and other microorganisms, and is used again by returning it to the influent of the aeration tank for mixing with the primary effluent and ample amounts of air.
A. Vorticella
B. Euglypha
C. Solids biomass
D. Bacteria
E. None of the Above

158. Paramecium is a medium size to large swimming _____, commonly observed in activated sludge, sometimes in abundant numbers.
A. Vorticella
B. Ciliate
C. Paramecium
D. Bacteria
E. None of the Above

159. Paramecium is described as a filter-feeding ciliate because its cilia move and filter _____ from the water.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria

160. Vorticella is a stalked ciliate. There are at least a dozen species found in _____ranging in length from about 30 to 150 m.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

161. The _____ body is either foot-shaped or cigar-shaped, and somewhat flexible.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

162. _____ is uniformly ciliated over the entire body surface with longer cilia tufts at the rear of the cell.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

163. Paramecium swims with a smooth gliding motion. It may also be seen paired up with another _____ which makes a good diagnostic key.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

164. These Vorticella organisms are oval to round shaped, have a _____, a domed feeding zone, and a water vacuole located near the terminal end of the feeding cavity.
A. Vorticella
B. Euglypha
C. Contractile stalk
D. Bacteria
E. None of the Above

165. One organism is found on each stalk except during cell division. After reproducing, the offspring develops a band of swimming cilia and goes off to form its own stalk. The evicted Vorticella organism is called a _____.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

166. _____ feeds by producing a vortex with its feeding cilia. The vortex draws bacteria into its gullet.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

167. Vorticella's principal food source is suspended bacteria. The contracting stalk provides some mobility to help the organism capture _____ and avoid predators.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

168. The Vorticella's stalk resembles a coiled spring after its rapid contraction. Indicator: If treatment conditions are bad, for example low DO or toxicity, _____ will leave their stalks. Therefore, a bunch of empty stalks indicates poor conditions in an activated sludge system.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

169. _____ sp. are present when the plant effluent quality is high.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria
E. None of the Above

170. _____ is a shelled amoeba.
A. Vorticella
B. Euglypha
C. Paramecium
D. Bacteria

171. _____ have jelly-like bodies. Motion occurs by extending a portion of the body (pseudopodia) outward.
A. Euglypha
B. Amoebas
C. Euchlanis
D. None of the Above

172. Shelled _____ have a rigid covering which is either secreted or built from sand grains or other extraneous materials.
A. Euglypha
B. Amoebas
C. Euchlanis
D. Mastax
E. None of the Above

173. The shell of _____ is often transparent, allowing the hyaline body to be seen inside the shell. The pseudopodia extend outward in long, thin, rays when feeding or moving.
A. Euglypha
B. Amoebas
C. Euchlanis
D. Mastax
E. None of the Above

174. Euglypha primarily eats _____.
A. Euglypha
B. Amoebas
C. Euchlanis
D. Mastax
E. None of the Above

175. The secreted shell of this _____. consists of about 150 oval plates. Its spines project backward from the lower half of the shell.
A. Euglypha
B. Amoebas
C. Euchlanis
D. Mastax
E. None of the Above

176. _____spines may be single or in groups of two or three. The shell has an opening surrounded by 8-11 plates that resemble shark teeth under very high magnification.
A. Euglypha
B. Amoebas
C. Euchlanis
D. Mastax

177. Indicator: Shelled _____ are common in soil, treatment plants, and stream bottoms where decaying organic matter is present. They adapt to a wide range of conditions and therefore are not good indicator organisms.
A. Euglypha
B. Amoebas
C. Euchlanis
D. Mastax

178. This microscopic animal is a typical rotifer. _____ is a swimmer, using its foot and cilia for locomotion. In common with other rotifers, it has a head rimmed with cilia, a transparent body, and a foot with two strong swimming toes.
A. Euglypha
B. Amoebas
C. Euchlanis
D. Mastax
E. None of the Above

179. _____function similar to floc forming bacteria in that they degrade BOD quite well. In small amounts, they are quite good to a biomass.
A. Filamentous Bacteria
B. Corona
C. Euchlanis
D. Rotifers
E. None of the Above

180. _____can add stability and a backbone to the floc structure that keeps the floc from breaking up or shearing due to turbulence from pumps, aeration or transfer of the water.
A. Filamentous Bacteria
B. Corona
C. Euchlanis
D. Rotifers
E. None of the Above

181. Aeration and _____ building are the key operational parameters that contribute to the efficient degradation of organic matter (BOD/COD removal). Over time the application specific bacteria become site specific as the biofilm develops and matures and is even more efficient in treating that site-specific waste stream.
A. Anaerobic
B. Organic material
C. Facultative
D. Biofilm
E. Metabolism

182. Most of the bacteria that absorb the organic material in a wastewater treatment system are _____ in nature.
A. Anaerobic
B. Organic material
C. Facultative
D. Biofilm
E. Metabolism

183. Facultative means they are adaptable to survive and multiply in either _____ or aerobic conditions. The nature of individual bacteria is dependent upon the environment in which they live.
A. Anaerobic
B. Organic material
C. Facultative
D. Biofilm
E. Metabolism

184. Usually, _____ bacteria will be anaerobic unless there is some type of mechanical or biochemical process used to add oxygen to the wastewater.
A. Anaerobic
B. Organic material
C. Facultative
D. Biofilm
E. Metabolism

185. When bacteria are in the process of being transferred from one environment to the other, the metamorphosis from _____ to aerobic state (and vice versa) takes place within a couple of hours.
A. Anaerobic
B. Organic material
C. Facultative
D. Biofilm
E. Metabolism

186. Anaerobic bacteria live and reproduce in the absence of free _____.
A. Anaerobic
B. Oxygen
C. Facultative
D. Hydrogen sulfide
E. Metabolism

187. They utilize compounds such as sulfates and nitrates for energy and their _____ is substantially reduced.
A. Anaerobic
B. Oxygen
C. Facultative
D. Hydrogen sulfide
E. Metabolism

188. A typical use for anaerobic bacteria would be in a septic tank. The slower _____of the anaerobic bacteria dictates that the wastewater be held several days in order to achieve even a nominal 50% reduction in organic material.
A. Anaerobic
B. Oxygen
C. Facultative
D. Hydrogen sulfide
E. Metabolism

189. The advantage of using the _____ process is that electromechanical equipment is not required.
A. Anaerobic
B. Oxygen
C. Facultative
D. Hydrogen sulfide
E. Metabolism

190. Anaerobic bacteria release _____as well as methane gas, both of which can create hazardous conditions. Even as the anaerobic action begins in the collection lines of a sewer system, deadly hydrogen sulfide or explosive methane gas can accumulate and be life threatening.
A. Anaerobic
B. Oxygen
C. Facultative
D. Hydrogen sulfide
E. Metabolism

191. _____ bacteria live and multiply in the presence of free oxygen.
A. Aerobic
B. Oxygen
C. Facultative
D. Hydrogen sulfide
E. Metabolism

192. "Aerobic" implies breathing air, dissolved oxygen is the primary source of energy for _____bacteria.
A. Aerobic
B. Oxygen
C. Facultative
D. Hydrogen sulfide
E. Metabolism

193. The _____ of aerobes is much higher than for anaerobes. This increase means that 90% fewer organisms are needed compared to the anaerobic process, or that treatment is accomplished in 90% less time. This provides a number of advantages including a higher percentage of organic removal.
A. Anaerobic
B. Oxygen
C. Facultative
D. Hydrogen sulfide
E. Metabolism

194. Following _____, a gravity clarifier separates and settles out the floc. Because of the mechanical nature of the aerobic digestion process, maintenance and operator oversight are required.
A. Anaerobic
B. Oxygen
C. Digestion
D. Aerobic
E. None of the Above

195. _____ floc in a healthy state is referred to as activated sludge.
A. Anaerobic
B. Oxygen
C. Digestion
D. Aerobic
E. None of the Above

196. While _____ floc has a metabolic rate approximately ten times higher than anaerobic sludge, it can be increased even further by exposing the bacteria to an abundance of oxygen.
A. Anaerobic
B. Oxygen
C. Digestion
D. Aerobic
E. None of the Above

197. There are a number of types of _____ bacteria which proliferate in the activated sludge process.
A. Clarifier
B. Activated sludge tank
C. Treatment components
D. Filamentous
E. None of the Above

198. When _____ organisms are in low concentrations in the process, they serve to strengthen the floc particles. This effect reduces the amount of shearing in the mechanical action of the aeration tank and allows the floc particles to increase in size.
A. Clarifier
B. Activated sludge tank
C. Treatment components
D. Filamentous
E. None of the Above

199. If the filamentous organisms reach too high a concentration, they can extend dramatically from the floc particles and tie one floc particle to another (interfloc bridging) or even form a _____ mat of extra large size.
A. Clarifier
B. Activated sludge tank
C. Treatment components
D. Filamentous
E. None of the Above

200. In a wastewater treatment system, the next higher life form above bacteria is _____. These single-celled animals perform three significant roles in the activated sludge process. These are floc formation, cropping of bacteria and the removal of suspended material.
A. Rotifers
B. Protozoans
C. Metazoans
D. Filamentous
E. None of the Above

Call us a couple hours after faxing to ensure that we received your paperwork.