Registration Form

Onsite 101 CEU Training Course $300.00

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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Wastewater Collection____ Wastewater Treatment____ Onsite Installer ____

Other _____

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

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Onsite 101 Answer Key

Name _____ Phone_____

Did you check with your State agency to ensure this course is accepted for credit? No refunds.

Method of Course acceptance confirmation. Please fill this section

Website __ Telephone Call___ Email____ Spoke to_____

Did you receive the approval number, if applicable? _____

What is the course approval number, if applicable? _____

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

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

Please Circle, Bold, Underline or X, one answer per question. A **felt tipped pen** works best.

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336. A B C D	353. A B C D	370. A B C D	387. A B C D
337. A B C D	354. A B C D	371. A B C D	388. A B C D
338. A B C D	355. A B C D	372. A B C D	389. A B C D
339. A B C D	356. A B C D	373. A B C D	390. A B C D
340. A B C D	357. A B C D	374. A B C D	391. A B C D
341. A B C D	358. A B C D	375. A B C D	392. A B C D
342. A B C D	359. A B C D	376. A B C D	393. A B C D
343. A B C D	360. A B C D	377. A B C D	394. A B C D
344. A B C D	361. A B C D	378. A B C D	395. A B C D
345. A B C D	362. A B C D	379. A B C D	396. A B C D
346. A B C D	363. A B C D	380. A B C D	397. A B C D
347. A B C D	364. A B C D	381. A B C D	398. A B C D
348. A B C D	365. A B C D	382. A B C D	399. A B C D
349. A B C D	366. A B C D	383. A B C D	400. A B C D

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Please write down any questions you were not able to find the answers or that have errors.

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

ONSITE 101 CEU TRAINING COURSE

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

Please fax the answer key to TLC Western Campus
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If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of $50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line. *Thank you…*

Onsite 101 CEU Training Assignment

You will have 90 days from the start of this assignment to finish it. Only one answer per question. Please utilize the Answer Key. Please fax or e-mail your completed answer key and registration form to TLC.

You are expected to circle or mark the correct answer on the enclosed answer key. Please include your name and address on your exam. The answer key is in the front. There are no intentional trick questions. (s) means the answer may be plural or singular in nature.

You can e-mail or fax your Answer Key along with the Registration Form to TLC.

Please write down any questions you were not able to find the answers or that have errors.

ONSITE SEWAGE FACILITIES (OSSF) ONSITE SYSTEMS SECTION

1. Onsite sewage treatment systems supply septic system owners with _____to keep their septic systems functioning properly.

A. The tank effluent
B. Best management practices
C. Primary and secondary treatment
D. None of the above

Onsite Sewage Facilities (OSSF)

2. Onsite/decentralized wastewater treatment systems, commonly called septic system(s), treat sewage from homes and businesses that are not connected to a_____.

A. Decentralized sewer system(s)
B. Municipal wastewater treatment
C. Centralized wastewater treatment plant
D. None of the above

3. Which of the following include individual onsite septic systems, cluster systems, and alternative wastewater treatment technologies like constructed wetlands, recirculating sand filters, mound systems, and ozone disinfection systems?

A. Decentralized treatment systems
B. Municipal wastewater treatment
C. Centralized wastewater treatment plant
D. None of the above

4. A septic tank and drainfield combination is the oldest and most common type of OSSF, although newer aerobic and biofilter units exist which represent scaled down versions of_____.

A. Groundwater system(s)
B. Municipal sewage treatments
C. Collection system
D. None of the above

5. OSSFs account for approximately _____% of all domestic wastewater treatment in the United States.

A. 25
B. 15
C. 50
D. None of the above

(s) means the answer may be plural or singular in nature.

6. Acknowledgement of the impacts of onsite systems on ground water and _____ (e.g., nitrate and bacteria contamination, nutrient inputs to surface waters) has increased interest in optimizing the systems' performance.

A. Surface water quality
B. Clustered wastewater system
C. Water quality of receiving waters
D. None of the above

7. Most current onsite regulatory programs focus on_____.

A. Septic system(s)
B. Permitting and installation
C. Onsite wastewater management program(s)
D. None of the above

8. Which of the following requires rigorous planning, design, installation, operation, maintenance, monitoring, and controls?

A. Effective management
B. Water quality of receiving waters
C. Effective management of onsite systems
D. None of the above

Types of Sewer Systems

9. Centralized sewer systems are generally broken out into three different categories: sanitary sewers, storm sewers, and_____.

A. Septic system(s)
B. Combined sewers
C. Onsite wastewater management program(s)
D. None of the above

10. Which of the following are designed to quickly get rainwater off the streets during rain events?

A. Septic system(s)
B. Combined sewers
C. Storm sewers
D. None of the above

11. Most _____do not connect with a treatment plant, but instead drain directly into nearby rivers, lakes, or oceans.

A. Septic system(s)
B. Combined sewers
C. Storm sewers
D. None of the above

12. Leaking, overflowing, and insufficient _____can release untreated wastewater into receiving waters.

A. Wastewater collection systems
B. Combined sewers
C. Storm sewers
D. None of the above

What is EPA doing to help manage onsite systems?

13. EPA develops _____ for onsite wastewater management program(s).

A. Homeowner awareness
B. Voluntary policies and guidance
C. State-of-the-art research
D. None of the above

14. EPA sponsors _____ on onsite and clustered wastewater system technologies through demonstration projects.

A. Homeowner awareness
B. Voluntary policies and guidance
C. State-of-the-art research
D. None of the above

15. EPA promotes _____ to strengthen onsite wastewater management

A. Homeowner awareness
B. Voluntary policies and guidance
C. State-of-the-art research
D. None of the above

(s) means the answer may be plural or singular in nature.

16. Which of the following increases the percentage of contaminants, particularly nitrogen and fecal coliform, removed in wastewater?

A. Sanitary sewer(s)
B. Advanced wastewater treatment
C. Wastewater management system(s)
D. None of the above

Key Terms

17. Which of following means a sewage treatment plant that incorporates a means of introducing air and oxygen into the sewage to provide aerobic biochemical stabilization during a detention period?

A. Alternative System
B. Aerobic System
C. Aerobic Sewage Treatment Facility
D. None of the above

18. Which of following means an alternative system that incorporates a septic tank or other treatment facility, an aerobic sewage treatment facility, and an absorption facility to provide treatment before dispersal?

A. Alternative System
B. Aerobic System
C. Aerobic Sewage Treatment Facility
D. None of the above

19. Which of following means any onsite wastewater treatment system DEQ or the Commission approves for use in lieu of the standard subsurface system?

A. Alternative System
B. Aerobic System
C. Aerobic Sewage Treatment Facility
D. None of the above

20. Which of following means may include anaerobic processes as part of the treatment system?

A. Alternative System
B. Aerobic System
C. Aerobic Sewage Treatment Facility
D. None of the above

Onsite Treatment Processes Options

21. The high cost of _____ and the advances made in individual and cluster (decentralized) system technologies have expanded the array of available treatment options and supported development of a more tailored approach to wastewater management services.

A. Sewage
B. Collection system
C. Centralized wastewater treatment plants
D. None of the above

22. Options now exist that span the full spectrum of treatment facilities, from large centralized plants, to_____, to individual treatment systems providing conventional or enhanced service.

A. Large and small soil-discharging clustered facilities
B. Centralized wastewater treatment plants
C. Collection system
D. None of the above

Key Considerations

23. Wastewater flow and strength, site and local infrastructure conditions, and performance requirements for the _____are all key considerations in deciding what type of wastewater collection and treatment system is needed and how it should be designed.

A. Dispersed or discharged effluent
B. Septic system
C. Centralized wastewater treatment
D. None of the above

(s) means the answer may be plural or singular in nature.

Basic Onsite Treatment Processes

24. Which of the following are designed to accomplish the same thing—the treatment of wastewater—but how this is accomplished is based on the type of treatment technology used?

A. Individual and clustered wastewater systems
B. Centralized water system(s)
C. Collection method
D. None of the above

Primary Treatment

25. Physical treatment processes involving capture of solids and fats/oils/grease in an enclosed vessel, typically by settling and flotation, such as provided in a septic tank or grease interceptor tank. This process also includes trapping of solids via _____or screens prior to discharge of the tank effluent.

A. Conventional system(s)
B. The tank effluent
C. Septic tank effluent filters
D. None of the above

Secondary Treatment

26. Which of the following is designed to remove organic matter, mostly through digestion and decomposition, often aided by introduction of or exposure to atmospheric oxygen?

A. Wastewater
B. Onsite sewage treatment
C. Biological and chemical processes
D. None of the above

Key Septic Terms

Identify the missing term.

27. Which of following means a sewage treatment plant that incorporates a means of introducing air and oxygen into the sewage to provide aerobic biochemical stabilization during a detention period?

A. Alternative System
B. Aerobic System
C. Aerobic Sewage Treatment Facility
D. None of the above

28. Means the distribution of effluent to a set of absorption trenches in which each trench receives effluent in equivalent or proportional volumes.

A. Equal Distribution
B. Holding Tank System
C. Intermittent Sand Filter
D. None of the above

29. Means a structure used for disposal of human waste without the aid of water. It consists of a shelter built above a pit or vault in the ground into which human waste falls.

A. Septic tank
B. Cesspool
C. Privy
D. None of the above

30. Means a lined pit that receives raw sewage, allows separation of solids and liquids, retains the solids, and allows liquids to seep into the surrounding soil through perforations in the lining.

A. Black Waste
B. Cesspool
C. Swamp
D. None of the above

31. Means the sidewall area within an absorption trench or a seepage trench from the bottom of the trench to a level 2 inches above the distribution pipes, the sidewall area of any cesspool, seepage pit, unsealed earth pit privy, graywater waste absorption sump seepage chamber, or trench with drain media substitute, or the bottom area of a pressurized soil absorption facility installed in soil.

A. Alternative System
B. Cesspool
C. Effective Seepage Area
D. None of the above

32. Means a conventional sand filter.
A. Fast sand filter C. Intermittent Sand Filter
B. Slow sand filter D. None of the above

33. Means an alternative system consisting of the combination of a holding tank, service riser, and level indicator (alarm), designed to receive and store sewage for intermittent removal for treatment at another location.
A. Septic tank C. Intermittent septic tank
B. Holding Tank System D. None of the above

34. The absence of dissolved molecular oxygen.
A. Black Waste C. Anaerobic
B. Aerobic D. None of the above

35. Means human body wastes including feces, urine, other substances of body origin, and toilet paper.
A. Black Waste C. Grey water
B. Cesspool D. None of the above

36. Means the wastewater treatment that takes place prior to discharging to any component of an onsite wastewater treatment system, including but not limited to pH adjustment, oil and grease removal, BOD5 and TSS reduction, screening, and detoxification.
A. Pretreatment C. Post-treatment
B. Holding Tank System D. None of the above

Septic System Basics Described
37. When _____ within the tank rise to the level of the outflow pipe, they enter the next part of the treatment system (pre-treatment device, distribution box, pump chamber, etc., depending on the type of system).
A. Solids C. Gases
B. Liquids D. None of the above

Types of Systems – General
38. Standard gravity systems require _____ feet of "good" soil under the trenches while pressure distribution systems only require _____ feet.
A. 3 & 3 C. 3 & 2
B. 2 & 3 D. None of the above

39. Advanced Treatment systems are more complicated and treat the wastewater to a fairly high level before allowing it to reach the soil. Because of this treatment, they can be used where there is only _____ foot of "good" dirt beneath the trench bottom.
A. 1 C. 3
B. 2 D. None of the above

Conventional Septic Systems Typically have three Main Components.
40. Which of the following separates the solids from the liquids, and serves a storage area for the solids to decompose and if properly maintained will decompose the solids faster then they build up?
A. A gravity system C. A pressure distribution system
B. A septic tank D. None of the above

41. Which of the following allows the separated water to drain out of the system and to absorb into the leach field?
A. A gravity system C. A pressure distribution system
B. A drain field D. None of the above

42. Which of the following is the final treatment area for the effluent water to be treated; microorganisms in the soil will treat the drain water before it peculates out of the system?
A. A gravity system C. Soil
B. A drain tank D. None of the above

43. If installed properly, the _____is environmentally safe, long lasting and almost maintenance free. This is why septic system design is so important.
A. Conventional system C. A pressure distribution system
B. Septic system design D. None of the above

Pressure Distribution
44. Pressure distribution systems are usually required when there is less than optimal soil depth available for complete treatment of the effluent by _____.
A. A gravity system C. A pressure distribution system
B. Septic system design D. None of the above

45. A minimum of _____ feet of properly drained soil is required under the trenches.
A. Three C. Five
B. Two D. None of the above

Conventional Septic Systems
46. Which of the following are the most commonly used wastewater treatment technologies, combining primary and secondary treatment?
A. The tank effluent C. Conventional treatment systems
B. The quantity of contaminants D. None of the above

47. _____ is similar to that of primary sedimentation in larger treatment facilities, except that it is generally devoid of oxygen (i.e., anaerobic).
A. The tank effluent C. Wastewater
B. The soil absorption system D. None of the above

Basic Onsite Wastewater Treatment Systems and Components
48. Building sewers and other sewer lines: watertight pipes, which deliver waste by _____ from a building to the onsite system or carry effluent by gravity from sewage tanks to other system components.
A. Gravity C. Lateral trenches
B. Pressure manifolds D. None of the above

Septic Tanks
49. The septic tank's function is to separate solids from liquid, digest organic matter, store liquids through a period of detention and allow the _____to discharge to other components of an onsite system.
A. Biological processes C. Organic matter
B. Clarified liquids D. None of the above

50. Which of the following are stored and periodically need to be pumped out and hauled to a point for further treatment?
A. Gases C. Solids
B. Liquids D. None of the above

Septic/Sewage Tank Removal
51. _____need to be properly abandoned to prevent them from becoming a safety hazard.
A. Unused sewage tanks C. Lateral trenches
B. Pressure manifolds D. None of the above

Septic Treatment
52. A septic tank removes many of the settleable solids, oils, greases, and floating debris in the raw wastewater, achieving _____ percent removal.
A. 50 to 80 C. 60 to 90
B. 60 to 80 D. None of the above

53. At the same time, gases can carry active anaerobic and facultative microorganisms that might help to treat _____present in the wastewater column.
A. Organic suspended solid(s) C. Colloidal and dissolved solids
B. Volatile fatty acid(s) D. None of the above

54. Septic tank effluent varies naturally in quality depending on the characteristics of _____and condition of the tank.
A. Organic suspended solid(s) C. The wastewater
B. Volatile fatty acid(s) D. None of the above

55. Typical septic tank BOD removal efficiencies are _____percent.
A. 50 to 80 C. 60 to 90
B. 30 to 50 D. None of the above

Typical SWIS Performance
56. Results from numerous studies have shown that septic tanks (SWISs) achieve high removal rates of many pollutants of concerns with the notable exception of _____.
A. Nitrogen C. Phosphorous and metals
B. Nitrate(s) D. None of the above

57. Biochemical oxygen demand (BOD), suspended solids, fecal bacteria indicators and surfactants are effectively removed within _____ feet of unsaturated, aerobic soil.
A. 2-5 C. 2-6
B. 1-4 D. None of the above

Septic Pretreatment Components
58. Which of the following remove many of the contaminants from the wastewater to prepare the effluent for final treatment and dispersal into the environment? The level of treatment is selected to match the receiving environment and the intended use.
A. Pretreatment components C. Gravity flow systems
B. Advanced systems D. None of the above

Submerged-Flow Wetland or Vegetative Submerged-Bed (VSB)

59. Which of the following are also called submerged-flow wetlands? This system type treats septic tank effluent by horizontal flow through a lined bed of unmulched gravel planted with wetland species. The plants fill in spaces between the rocks and provide aesthetic appeal.

A. Unsaturated soil C. Vegetative submerged bed(s)
B. Media filter(s) D. None of the above

60. Which of the following are extremely passive and require little management in producing a good quality effluent (typically BOD and TSS of less than 30 mg/L)?

A. Cluster system(s) C. Wetland system(s)
B. Treatment facilities D. None of the above

61. Effluent is further treated when discharged to _____following flow through the wetland cell(s).

A. Unsaturated soil C. Vegetative submerged bed(s)
B. Media filter(s) D. None of the above

Cluster System Applications

62. A cluster system is designed to collect wastewater from _____ homes.

A. Three to fifty C. Two to several hundred
B. Two to one hundred D. None of the above

63. The Cluster Wastewater Systems Planning Handbook lists a number of potential wastewater collection technologies for small and large cluster systems, including: grinder pump systems, which transport all sewage; effluent sewers, such as the_____; the septic tank effluent gravity (STEG) collection system; and vacuum systems.

A. Septic tank effluent pump (STEP) C. Infiltration area protection
B. Individual and clustered systems D. None of the above

Septic System Failures

64. Which of the following are effective, cost efficient, and easy to maintain?

A. Septic tank effluent pump (STEP) C. Septic systems
B. Individual and clustered systems D. None of the above

65. Failing systems are a major source of groundwater pollution, cause _____, such as dysentery and hepatitis, and are expensive for homeowners to replace. There are many different types of wastewater collection and treatment technologies.

A. Aerobic microsite(s) C. Chemical diseases
B. Waterborne illnesses D. None of the above

66. Which of the following for clustered facilities can work by gravity or operate via vacuum or pressure pump?

A. Septic system(s) C. Collection systems
B. Cluster system(s) D. None of the above

Advanced (Tertiary) Systems Introduction

67. If a soil dispersal area malfunctions hydraulically due to a buildup of the biomat (inorganic, organic, and/or bacterial slime) at the infiltrative surface, it may be restored, and treatment may be enhanced, by improving _____through timed dosing of septic tank effluent to the dispersal field.

A. Soil oxidation C. Infiltrative surface
B. Septic tank effluent D. None of the above

68. _____ allows the soil to drain between doses, improving soil oxygen transfer.

A. The dose/rest cycle C. Infiltrative surface
B. Septic tank effluent D. None of the above

Advanced Onsite Wastewater Treatment Systems and Components
Elevated (Mound or At-Grade) Systems

69. This system type includes _____to provide primary (and sometimes secondary) treatment prior to discharging the effluent to a modified drainfield.

A. Pressure distribution C. A septic tank or prefabricated treatment unit
B. Septic system D. None of the above

70. Effluent flows from the tank or treatment unit to a pump tank and periodically dosed to the_____, which is typically constructed of a layer of clean, uniformly graded sand on a plowed or roughened natural soil surface.

A. Above-grade systems C. Modified dispersal area
B. Clay dispersal field D. None of the above

71. The tank effluent is uniformly dosed onto the _____within the mound, which may be 1-4 ft. above the natural grade. Sand within the mound compensates for shallow unsaturated soil conditions below the natural grade.

A. Media filter(s) C. Infiltrative surface
B. ATU(s) D. None of the above

Mound Systems

72. Mound systems are appropriate for areas with a high water table or shallow, fractured bedrock. After treatment through the_____, the effluent percolates directly into the soil under the mound.

A. Effluent dispersal piping C. Sand
B. Aerobic treatment units (ATUs) D. None of the above

73. _____feature effluent dispersal piping placed at natural grade, with the mound consisting mostly of cover soil for the piping.

A. At-grade systems C. Effluent flows from the tank
B. Aerobic treatment units (ATUs) D. None of the above

Aerobic Treatment Units

74. _____) consist of prefabricated units featuring consecutive or compartmentalized tanks, pumps, blowers, and internal piping, and are designed to treat wastewater via suspended or attached growth decomposition in an oxygen rich environment.

A. Effluent dispersal piping C. Effluent flows from the tank
B. Aerobic treatment units (ATUs) D. None of the above

(s) means the answer may be plural or singular in nature.

75. When _____ is supplied, the rate of microbial activity and related treatment processes accelerates.
A. Nitrogen C. Hydrogen
B. Oxygen D. None of the above

76. Three processes are involved in most_____: physical separation (mostly settling), aerobic treatment (aeration and mixing), and clarification (final settling).
A. Media filter(s) C. Aerobic systems
B. Anaerobic systems D. None of the above

77. _____ vary in design and can consist of simple activated sludge variations, sequencing batch reactors, trickling filters, and combinations of two or more of these unit processes.
A. Media filter(s) C. Septic tank effluent
B. ATU(s) D. None of the above

Media Filters
78. _____can be applied to a layer of sand or gravel, a tank containing peat or plastic media, or compartments of hanging textile or other material to improve oxygen access and enhance biochemical treatment processes.
A. Media filter(s) C. Septic tank effluent
B. ATU(s) D. None of the above

ONSITE OPERATION AND MAINTENANCE SECTION

System Operation and Maintenance Requirements
79. Ongoing O&M requirements associated with the various individual and clustered wastewater collection and treatment systems and the technologies employed. Most technologies come with suggested O&M maintenance activities from the manufacturer. These requirements are crucial to the proper operation and performance of the system.
A. True B. False

80. Adjustments could involve reducing _____at the source (e.g., better plate and pot scraping prior to dishwashing in restaurant kitchens, adding grease trap tanks, etc.), applying the effluent at lower soil loading rates, or inserting a fixed film or suspended growth treatment unit between the septic tank and drainfield.
A. Septic system maintenance C. Pollutant inputs
B. Failure(s) D. None of the above

Septic System Failures
81. Septic system failures are a major source of _____.
A. Groundwater pollution C. Failure(s)
B. Hydraulic failures D. None of the above

82. _____ is like automobile maintenance; a little effort on a regular basis can save you a lot of money and significantly prolong the life of the system.
A. Septic system maintenance C. Suspended growth treatment unit
B. Failure(s) D. None of the above

83. Failure to perform routine maintenance, such as pumping the septic tank generally at least every _____ years, can cause solids in the tank to migrate into the drain field and clog the system.
A. 1 to 2 C. 3 to 4
B. 3 to 5 D. None of the above

Regular Maintenance
84. Verification of _____ contracts, operator expertise, and reporting requirements for system maintenance such as tank pumping and repairs should be included in the approval process.
A. Drainage features C. System maintenance
B. Installation specifications D. None of the above

These records should reflect:
85. If properly designed, installed, and maintained, a septic system can effectively treat household wastewater for up to _____ years or more. Look to see if the house has a system that is near the end of its life-span.
A. 500 C. 20
B. 300 D. None of the above

Individual Wastewater Systems
86. Individual treatment systems collect, treat, and disperse wastewater from _____and are associated with low-density communities and developments, such as rural residential and small commercial developments.
A. Type of system C. An individual property
B. Subsurface dispersal system D. None of the above

Septic System Evaluation Guideline
Enhanced Treatment Systems
87. _____have proven to be effective in situations where conventional systems are not appropriate.
A. Treatment performance C. Wastewater treatment system(s)
B. Several wastewater alternative technologies D. None of the above

Enhanced Wastewater Treatment
88. Enhanced wastewater treatment systems are more complex than _____and require greater oversight to keep all aspects of the treatment process in balance.
A. Treatment performance C. Conventional systems
B. O&M requirement(s) D. None of the above

Perforated Pipe
89. Perforated pipe is laid in the bottom of upslope trenches excavated into the restrictive horizon. A durable, porous medium is placed around the piping and up to a level above the estimated _____.
A. Low-saturated zone C. Seasonally high-saturated zone
B. An outfall for the drain D. None of the above

90. _____should avoid capture of the SWIS percolate plume and ground water infiltrating from below the SWIS or near the end of the drain.
A. SWIS C. The drain
B. Outlet locations D. None of the above

91. The _____between the bottom of the SWIS and the drain and soil permeability characteristics should determine this distance.
A. SWIS C. Vertical distance
B. Outlet locations D. None of the above

92. As the vertical distance increases and the _____decreases, the necessary separation distance increases.
A. SWIS C. Plume and ground water
B. Permeability D. None of the above

93. A _____-foot separation is used for most applications.
A. 2 C. 4
B. 10 D. None of the above

94. If both ends of the drain cannot be extended to the ground surface, the upslope end should be extended some distance along the surface contour beyond the_____.
A. End of the SWIS C. Plume and ground water
B. Outlet locations D. None of the above

Inspections and Maintenance Requirements

95. A four-bedroom home might have a daily flow of 480 gallons per day (assuming 120 gallons per bedroom per day). In a 1,000-gallon tank, this provides _____ days for solids to settle.
A. 2 C. 4
B. 3 D. None of the above

96. Nevertheless, as the solids build up, there is less room in the tank for the liquid and thus less settling time. The accepted maximum level of solids in the tank is _____ of the liquid depth. Any more than this and the tank is overdue for pumping. Having these solids removed, is a critical component of how well the septic system, as a whole, will function.
A. 1/2 C. 1/4
B. 1/3 D. None of the above

SWIS Designs

97. There are several different designs for_____. They include trenches, beds, seepage pits, at grade systems, and mounds.
A. Seepage pits C. Secondary infiltrative surface
B. SWISs D. None of the above

98. SWIS applications differ in their geometry and location in the_____.
A. Sidewall infiltration C. Infiltration surface(s)
B. Soil profile D. None of the above

99. _____have a large length-to-width ratio, while beds have a wide, rectangular or square geometry.
A. Seepage pits C. Trenches
B. Infiltration surface D. None of the above

100. _____are deep, circular excavations that rely almost completely on sidewall infiltration.
A. Sidewall infiltration C. Infiltration surface(s)
B. Seepage pits D. None of the above

101. _____ are no longer permitted in many jurisdictions because their depth and relatively small horizontal profile create a greater point-source pollutant loading potential to ground water than other geometries. Because of these shortcomings, seepage pits are not recommended in this manual.

A. Seepage pits C. Secondary infiltrative surface
B. Infiltration surface D. None of the above

102. Infiltration surfaces may be created in natural soil or imported fill material. Most traditional systems are constructed below_____.

A. Ground surface in natural soil C. Infiltration surface(s)
B. Soil profile D. None of the above

103. In some instances, _____above a more permeable horizon may be removed and the excavation filled with suitable porous material in which to construct the infiltration surface.

A. A restrictive horizon C. Secondary infiltrative surface
B. Infiltration surface D. None of the above

104. _____ may be constructed at the ground surface ("at-grades") or elevated in imported fill material above the natural soil surface ("mounds").

A. Sidewall infiltration C. Infiltration surface(s)
B. Soil profile D. None of the above

105. An important difference between infiltration surfaces constructed in natural soil and those constructed in fill material is that a secondary infiltrative surface (which must be considered in design) is created at the_____.

A. Fill/natural soil interface C. Secondary infiltrative surface
B. Infiltration surface D. None of the above

Maintenance Inspections

106. Maintenance inspections are gaining appeal as a management tool to assess the condition of systems and determine pumping or_____.

A. Other O&M needs C. Alternative and enhanced wastewater technologies
B. Advances in technology D. None of the above

107. Typical pumping requirements vary from three to five years or more based on the _____and individual household wastewater characteristics.

A. Typical pumping requirement(s) C. Daily sewage flow
B. Enhanced system(s) D. None of the above

108. Alternative and _____require additional maintenance and/or ongoing attention. In states and communities where these systems are authorized, performance inspections are mandated in the state code or in the system's operating permit.

A. O&M needs C. Enhanced wastewater technologies
B. Advances in technology D. None of the above

Maintenance of Systems

109. A key part of _____is to track the maintenance of systems. The only way to ensure that maintenance contracts are kept in effect and that systems are monitored when required is for the management entity or regulatory authority to have a structured reporting program.

A. An O&M program C. Alternative and enhanced wastewater technologies

B. Advances in technology D. None of the above

110. Service providers should report maintenance events and any lapses in maintenance contracts to the management or regulatory authority. This information should be managed in a database to monitor _____and provide a system of accountability.

A. Typical pumping requirement(s) C. O&M activities
B. Enhanced system(s) D. None of the above

Standard Leach Field Septic System Inspection

111. As the septic system is used, there is an accumulation of solids in the tank, which is sometime referred to as _____.

A. Slime C. Long-term biochemical oxygen demand
B. Sludge D. None of the above

112. The septic tank removes solids by holding wastewater in the tank for at least 24 hours, allowing the _____ to settle and _____ to rise to the top. This is accomplished by a series of baffles inside the tank.

A. Scum - Solids C. Solids - Scum
B. Sludge - Scum D. None of the above

113. Up to _____% of the solids retained in the tank will decompose over time.

A. 25 C. 40
B. 50 D. None of the above

114. Effluent water discharges from the tank to perforated drain pipes. From there, it drains to a _____

A. Constructed absorption or leach field C. A septic tank, the septic drain field
B. Leach fields or leach drains D. None of the above

115. Septic drain fields, also called leach fields or leach drains are used to remove contaminants and impurities from the liquid that emerges from_____.

A. Effluent water discharges C. The septic tank
B. Leach fields or leach drains D. None of the above

116. A septic tank, the septic drain field, and the associated piping compose_____.

A. Effluent water discharges C. A complete septic system
B. Leach fields or leach drains D. None of the above

117. _____is effective for disposal of organic materials readily catabolized by a microbial ecosystem.

A. Effluent water discharges C. The septic drain field
B. Leach tanks D. None of the above

118. _____typically consists of an arrangement of trenches containing perforated pipes and porous material (often gravel) covered by a layer of soil to prevent animals and surface runoff from reaching the wastewater distributed within those trenches.

A. Effluent water discharges C. A trench
B. The drain field D. None of the above

119. Primary design considerations are hydraulic for the _____requiring disposal and catabolic for the long-term biochemical oxygen demand of that wastewater.
A. Septic tank effluent C. Insoluble particles small enough
B. Volume of wastewater D. None of the above

120. Many health departments require a percolation test ("perc" test) to establish suitability of drain field soil to receive_____. An engineer or licensed designer may be required to work with the local governing agency to design a system that conforms to these criteria.
A. Groundwater levels C. Percolation rates
B. Septic tank effluent D. None of the above

121. A certain vertical distance is required between the effluent level in the disposal trench and the water level where the effluent is leaving the drain field for gravitational force to overcome _____ resisting flow through porous soil.
A. Viscous frictional forces C. Percolation rates
B. Gravitational force D. None of the above

122. Effluent levels in the vicinity of the _____will appear to rise toward the ground surface to preserve that vertical distance difference if groundwater levels surrounding the drain field approach the level of effluent in the disposal trench.
A. Groundwater levels C. Drain field
B. Gravitational force D. None of the above

Septic Management Considerations
123. In the past, state and local wastewater management programs rarely specified O&M requirements for_____. The regulation of system design, construction, and operation was considered to be satisfactory community oversight.
A. Cluster system(s) C. Conventional or enhanced wastewater systems
B. O&M requirement(s) D. None of the above

124. As more and more systems malfunction and threaten waterways and as more systems include higher maintenance electrical and mechanical components, communities are recognizing the value of _____.
A. Clustered system(s) C. Advanced or innovative technologies
B. O&M requirement(s) D. None of the above

125. Many are strengthening programs with a number of tools, including requirements for homeowner service contracts, routine maintenance inspections, revocable operating permits, monitoring, and enhanced reporting and data management that support proper _____.
A. System performance C. Wastewater alternatives
B. Pretreatment requirement(s) D. None of the above

Aerobic Treatment Units (ATUs)
126. A mechanical onsite treatment unit that provides _____by mixing air (oxygen) and aerobic and facultative microbes with the wastewater in a sewage tank.
A. Secondary wastewater treatment C. Size of the household and the size of the tank
B. Sewage tank D. None of the above

Gravity Effluent Distribution Devices

127. Divide and/or transport the liquid effluent from a _____ to absorption trenches for dispersal into the soil. These devices include distribution boxes, drop boxes, and step-downs.

A. Proper maintenance
B. Pressure manifold(s)
C. Septic tank or ATU
D. None of the above

Gravity Laterals

128. A system of trenches excavated along ground contours used to distribute effluent by gravity flow from a _____and apply the effluent to the soil infiltrative surface.

A. Sand/media filter(s)
B. Septic tank or ATU
C. Onsite system
D. None of the above

129. Generally, _____-inch deep trenches are used; however, with approval trenches can be up to _____ inches deep.

A. 18-30
B. 16-36
C. 12-24
D. None of the above

Dosed Gravity Systems

130. Use siphons or pumps to dose into a _____or through a pressure manifold into the ends of gravity lateral trenches.

A. Necessary pumping frequency
B. Gravity distribution device
C. Pressure manifold(s)
D. None of the above

Impacts of Effluent on Groundwater

131. When the soil is overloaded with a treatable contaminant, or when the _____cannot be treated by the soil, the quality of the underlying groundwater may change significantly.

A. Distribution media
B. Contaminant
C. Dispersal zone
D. None of the above

132. When a septic system fails to effectively treat and disperse _____, it can become a source of pollution. This type of failure can occur in three different ways.

A. Effluent
B. Anaerobic bacteria
C. Unsaturated flow
D. None of the above

133. The first way is when effluent ponds on the soil surface, causing a wet seepy area. The second obvious way that _____can fail is to have effluent backing up into the dwelling. It is also important to prevent a third, and less obvious, type of failure, which is contamination of the ground or surface waters.

A. Septic system
B. Distribution media
C. Soil treatment trench
D. None of the above

Soil Treatment Processes

134. The soil treatment and _____ provides for the final treatment and dispersal of septic tank effluent.

A. Distribution media
B. Biomat
C. Dispersal zone
D. None of the above

(s) means the answer may be plural or singular in nature.

135. To varying degrees, the _____ and dispersal zone treats the wastewater by acting as a filter, exchanger, or absorber by providing a surface area on which many chemical and biochemical processes occur. The combination of these processes, acting on the effluent as it passes through the soil, and purifies the water.
A. Pollution of groundwater C. Soil treatment
B. Effluent D. None of the above

Biomat
136. As septic tank effluent flows into a soil treatment trench, it moves vertically through the distribution media to the _____ where treatment begins.
A. Distribution media C. Dispersal zone
B. Biomat D. None of the above

137. The biomat is a biological layer formed by _____, which secrete a sticky substance and anchor themselves to the soil, rock particles, or other available surfaces.
A. Aerobic bacteria C. Unsaturated flow
B. Anaerobic bacteria D. None of the above

Sewage Treatment Utilizing Soil
138. A developed biomat reaches _____ over time, remaining at about the same thickness and the same permeability if effluent quality is maintained.
A. Equilibrium C. Permeability of the biomat
B. Quality of the effluent D. None of the above

139. For equilibrium to be maintained, the biomat and the effluent ponded within the trench must be in_____, the organic materials in the wastewater feed the anaerobic microorganisms, which grow and multiply, increasing the thickness and decreasing the permeability of the biomat.
A. Equilibrium C. Permeability of the biomat
B. Anaerobic conditions D. None of the above

140. On the soil side of the biomat beneath the drainfield, oxygen is present so that conditions are allowing aerobic soil bacteria to feed on and continuously break down the_____. These two processes occur at about the same rate so that the thickness and permeability of the biomat remain in equilibrium.
A. Aerobic bacteria C. Biomat
B. Equilibrium D. None of the above

141. _____leaving the septic tank decreases because of failure to regularly pump out the septic tank, more food will be present for the anaerobic bacteria, which will cause an increase in the thickness of the biomat and decrease its permeability.
A. Wastewater flow/strength C. If the quality of the effluent
B. Quality of the effluent D. None of the above

142. If seasonally saturated conditions occur in the soil outside the trench, aerobic conditions will no longer exist, which will prevent _____from breaking down the biomat. Under these conditions the biomat will thicken, reducing its permeability and the effectiveness of effluent entering the soil.
A. Aerobic bacteria C. Aerobic
B. Equilibrium D. None of the above

Site Evaluations

143. Site evaluations are a key driver of treatment system design. The success of any soil-discharging wastewater treatment system depends on the appropriate match between_____, the treatment system design, and the site that receives effluent from the system.

A. Site-specific C. Wastewater flow/strength
B. Quality of the effluent D. None of the above

144. _____ and characterization by a qualified, experienced professional is essential to understanding local site conditions and ensuring the proper operation of individual and clustered wastewater systems.

A. Site-specific observations C. Wastewater flow/strength
B. Quality of the effluent D. None of the above

Improving OSSF Treatment through Performance Requirements

145. Most onsite wastewater treatment systems are of the conventional type, consisting of a septic tank and a_____.

A. Regular maintenance C. Subsurface wastewater infiltration system (SWIS)
B. Site limitations D. None of the above

146. _____ and more stringent performance requirements have led to significant improvements in the design of wastewater treatment systems and how they are managed.

A. Regular maintenance C. Subsurface wastewater infiltration system (SWIS)
B. Site limitations D. None of the above

147. Over the past 20 years the onsite wastewater treatment system (OWTS) industry has developed many _____that can achieve high performance levels on sites with size, soil, ground water, and landscape limitations that might preclude installing conventional systems.

A. Water resources C. New treatment technologies
B. Fixed-film reactors D. None of the above

148. New technologies and _____are based on defining the performance requirements of the system, characterizing wastewater flow and pollutant loads, evaluating site conditions, defining performance and design boundaries, and selecting a system design that addresses these factors.

A. Existing technologies C. Wastewater characteristics and site conditions
B. Improvements to existing technologies D. None of the above

149. _____ can be expressed as numeric criteria (e.g., pollutant concentration or mass loading limits) or narrative criteria (e.g., no odors or visible sheen) and are based on the assimilative capacity of regional ground water or surface waters, water quality objectives, and public health goals.

A. Performance requirements C. Primary and secondary processes
B. Water resources D. None of the above

150. _____ help define system design and size and can be estimated by comparing the size and type of facility with measured effluent outputs from similar, existing facilities.

A. Existing technologies C. Wastewater characteristics and site conditions
B. Wastewater flow and pollutant content D. None of the above

151. _____integrate detailed analyses of regional hydrology, geology, and water resources with site specific characterization of soils, slopes, structures, property lines, and other site features to further define system design requirements and determine the physical placement of system components.

A. Site evaluations
B. Infiltration area protection
C. Individual and clustered systems
D. None of the above

152. _____applied today treat wastes after they exit the septic tank; the tank retains settleable solids, grease, and oils and provides an environment for partial digestion of settled organic wastes.

A. Regular maintenance
B. Septic system
C. Most of the alternative treatment technologies
D. None of the above

153. Post-tank treatment can include aerobic (with oxygen) or anaerobic (with no or low oxygen) biological treatment in suspended or fixed-film reactors, physical/chemical treatment, soil infiltration,_____.

A. Fixed-media filtration, and/or disinfection
B. Water resources
C. Primary and secondary processes
D. None of the above

154. _____based on these technologies are defined by performance requirements, wastewater characteristics, and site conditions.

A. Alternative treatment technologies
B. Wastewater flow and pollutant content
C. The application and sizing of treatment units
D. None of the above

Performance-Based Standards

155. The move toward site-appropriate, risk-based system design and the growing interest in _____has increased the need for performance-based design guidance.

A. Performance requirements
B. Clustered facilities
C. Primary and secondary processes
D. None of the above

156. _____ approaches have been proposed as a substitute for prescriptive requirements for system design, siting, and operation.

A. Alternative treatment technologies
B. Wastewater flow and pollutant content
C. Performance-based management
D. None of the above

System Design Considerations

157. One of the more common reasons why some individual or cluster systems do not perform properly is inappropriate _____ selection.

A. System/technology
B. Subsurface drainfield(s)
C. System compatibility
D. None of the above

158. A wastewater system should be matched to the volume and_____, and the site, soil, and groundwater/surface water conditions must be known in detail in order to develop an appropriate system design.

A. Alternative treatment technologies
B. Wastewater flow and pollutant content
C. Pollutant profile of wastewater
D. None of the above

(s) means the answer may be plural or singular in nature.

159. _____permitting programs are expanding the options available for providing treatment services, especially for sites with limiting soil conditions and those with threatened or impaired water resources nearby.
A. Regular maintenance C. State and local wastewater system
B. Septic system D. None of the above

Management Considerations
160. All _____systems require management. Management services can be provided by an outside contractor or responsible management entity.
A. System/technology C. Wastewater treatment
B. Subsurface drainfield(s) D. None of the above

161. In general, _____with septic tanks and subsurface drainfields require less management attention; clustered facilities with collection system pumps, mechanized treatment units, and time or demand-dosed infiltration areas require much more.
A. System/technology C. Individual gravity flow systems
B. Subsurface drainfield(s) D. None of the above

162. Factors that influence system management include:
_____, such as very cold or wet climates.
A. Complexity of service C. Operation in extreme conditions
B. All system components D. None of the above

163. _____ and access to repair parts.
A. Soil condition(s) C. Life of system components
B. Subsurface drainfield(s) D. None of the above

164. Maintenance needs, including frequency and _____.
A. Complexity of service C. Very cold or wet climates
B. Final design components D. None of the above

Permitting and Approval Process
165. The source of potable water and distribution lines should be identified as well. If there is an existing wastewater treatment system, the condition of all components, including the reserve area, should be recorded and_____.
A. System location and features C. Minimum setbacks met
B. Installation specifications D. None of the above

Summary
OSSF Maintenance
166. _____ can add years to an older system. Even well-designed and properly installed septic systems can fail earlier than expected if previous homeowners did not perform routine maintenance.
A. Proper maintenance C. Septic tank or ATU
B. Necessary pumping frequency D. None of the above

167. Try to determine how frequently the tank has been pumped from the realty agent or owner. Ask to see maintenance records. Keep in mind the necessary pumping frequency depends on the size of the household and the size of the _____.
A. Sand/media filter(s) C. Onsite system
B. Tank D. None of the above

168. For example, a four-bedroom home with a 1,250 gallon tank should be pumped approximately every _____ years. Modern conveniences such as garbage disposals, hot tubs, or whirlpools will increase the necessary pumping frequency.
A. 3 C. 2.6
B. 4.5 D. None of the above

Permit
169. Several factors should be considered when choosing the type of onsite system for a site including: soil/site limitations, available space, operation and maintenance (O & M) requirements, initial costs as well as_____, landscape disturbance, and the owners' preferences and ability to manage the system.
A. Soil resource C. O & M costs
B. Type of human sewage D. None of the above

170. Of these considerations, often the most limiting is the _____or site and space limitations.
A. Soil resource C. O & M costs
B. Type of human sewage D. None of the above

171. When the soil and site are suited to a _____or to a septic tank and conventional soil absorption system, any registered OWTS installer can assist with the permitting and can install a basic onsite system.
A. Drainfield C. An advanced OWTS
B. Lagoon D. None of the above

172. When site limitations or other factors lead to _____, the installer must be registered as an advanced OWTS installer.
A. Drainfield C. An advanced OWTS
B. Lagoon D. None of the above

SUBSURFACE WASTEWATER INFILTRATION CONSTRUCTION SECTION

Construction Section
173. Correct wastewater treatment system construction and/or installation practices are critical to the performance of individual and _____.
A. Pressure distribution C. Clustered systems
B. Declustered systems D. None of the above

174. Construction actions can affect short-term and long-term system performance by failing to adhere to _____, neglecting proper pipe slope requirements, inadvertently switching tank inlet/outlet orientation, or failing to protect infiltration area soils from equipment compaction.
A. Inlet/outlet orientation C. Uphill dispersal piping
B. Material specifications D. None of the above

175. Which of the following is a key component of good system installation practice, should be carefully considered during site preparation, construction equipment selection and use, and before and during construction?
A. Pressure distribution C. Individual and declustered systems
B. Infiltration area protection D. None of the above

176. The development of a final design plan that includes drawings, narratives, forms, calculations, photos, and other data, including_____, will help ensure a successful outcome. This information must be assembled into a cohesive document to allow the proper installation of the design without the need for any assumptions.
A. Infiltration area
B. Inlet/outlet orientation
C. Detailed equipment and installation specifications
D. None of the above

Background and Use of Onsite Wastewater Treatment Systems
177. Only about _____ of the land area in the United States has soils suited for conventional subsurface soil absorption fields.
A. 10 percent
B. 1/3
C. 1/4
D. None of the above

178. System densities in some areas exceed the capacity of even suitable soils to assimilate wastewater flows and retain and transform their _____.
A. Nitrates
B. Phosphorus compounds
C. Contaminants
D. None of the above

179. Many systems are located too close to ground water or surface waters and others, particularly in rural areas with newly installed public water lines, are not designed to handle increasing _____ flows.
A. Wastewater
B. Phosphorus compounds
C. Contaminants
D. None of the above

180. Conventional onsite system installations might not be adequate for minimizing nitrate contamination of ground water, removing _____, and attenuating pathogenic organisms (e.g., bacteria, viruses).
A. Nitrates and phosphorus
B. Phosphorus compounds
C. Contaminants
D. None of the above

Septic Site Preparation and Excavation Practices
181. Overhead power lines, steep slopes, and excavations at the installation site can all present serious _____.
A. Safety hazard(s)
B. Disturbance(s)
C. Excavation(s)
D. None of the above

182. A brief preconstruction meeting can ensure that _____ and practices to eliminate, minimize, or respond to them are identified.
A. Safety hazard(s)
B. Disturbance
C. Excavation(s)
D. None of the above

183. Site _____ is conducted only when the infiltration surface can be covered the same day to avoid loss of soil permeability from wind-blown silt or raindrop impact.
A. Compaction
B. Plastic limit
C. Excavation
D. None of the above

184. _____ and areas for traffic lanes, material stockpiling, and equipment parking should be designated on the drawings for the contractor.
A. Site access points
B. Disturbance
C. Excavation
D. None of the above

185. Flagging off the _____ area as early as possible is critical to ensure long-term function of the system.
A. Compaction C. Excavation
B. Infiltration D. None of the above

186. Grubbing of the site (mechanically raking away roots) should be avoided. If the site is to be filled, the surface should be moldboard- or chisel-plowed parallel to the contour (usually to a depth of seven to ten inches) when the soil is sufficiently dry to ensure maximum vertical_____.
A. Compaction C. Permeability
B. Infiltration D. None of the above

187. The organic layer should not be removed. Scarifying the surface with the teeth of a backhoe bucket is not sufficient. All efforts should be made to avoid any disturbance to the exposed _____ surface.
A. Moisture C. Infiltration
B. Disturbance D. None of the above

Field Construction Practices
188. Changes in construction practices over the past 25 years have led to improvements in the performance of _____.
A. Individual wastewater system(s) C. Long-term system performance
B. System design D. None of the above

189. _____in infiltration trenches should be scarified and the surface gently raked prior to installing the gravel or gravel-less piping/chambers.
A. Compaction C. Excavation
B. Smeared soil surfaces D. None of the above

190. If gravel or crushed rock is to be used for the system medium, the rock should be placed in the trench by using the backhoe bucket to_____.
A. Individual wastewater system(s) C. Long-term system performance
B. System design D. None of the above

191. For gravel filled trenches, the trench bottom should be left rough and covered with six inches of clean (i.e., no fines) rock. _____ should be carefully placed over the rock, leveled, and bedded in on the sides.
A. Infiltration area C. Distribution pipe(s)
B. System design D. None of the above

192. Post construction activities include accurate documentation of all of the system components and the system location. Flag off the _____ to keep construction and other traffic away.
A. System design C. Onsite management
B. Infiltration area D. None of the above

Management Considerations

193. All _____programs should carefully consider construction and installation elements to ensure the proper operation of onsite systems. These programs should include permits, inspections, and installer training requirements.

A. System design C. Onsite management
B. Infiltration area D. None of the above

Construction/Installation Programs Basic Approach

194. Construction permit based on code-compliant site evaluations and _____.

A. System design C. Onsite management
B. Infiltration area D. None of the above

Construction Phases

Preparation Phase

195. Conduct a pre-construction conference at the site to _____, verify setbacks and other site conditions, check surface elevations, and identify potential problems or safety concerns.

A. Assess changes in conditions C. Identify site component locations
B. Septic system D. None of the above

196. _____ that may have occurred since design work was completed.

A. Assess changes in conditions C. Identify site component locations
B. Septic system D. None of the above

197. If work will be delayed, flag off or otherwise protect the _____.

A. Infiltration area(s) C. Gravity flow pipe(s)
B. Gravity flow system(s) D. None of the above

Project Execution

198. Verify designed treatment system components and materials, such as tank type, size, and material; piping; and gravel (if used) that is free of_____.

A. Gravity flow system(s) C. Pipe slopes
B. Fines D. None of the above

199. Excavate areas for conveyance piping, the tank(s), secondary treatment units, and infiltration or soil dispersal components according to designated depths and required _____.

A. Gravity flow system(s) C. Pipe slopes
B. Treatment system components D. None of the above

200. For_____, all elevations are tied to the building sewer line elevation. Ensure that the proper fall is available from the building to the tank, then to the distribution box(es), and to the infiltration area.

A. Gravity flow system(s) C. Pipe slopes
B. Treatment system components D. None of the above

201. Ensure that the tank is on solid tamped ground, installed level and at the proper elevation, and that _____ is correct. Secure tank covers after hours to prevent accidents. Backfill tanks as soon as possible.

A. Inlet/outlet orientation C. Uphill dispersal piping
B. Distribution pipe effluent D. None of the above

202. Follow manufacturer's recommendations for_____. Plastic and fiberglass tanks usually require special installation techniques (e.g., anchoring, backfilling with sand, tamping backfill in lifts, filling tank with water as its backfilled, etc.)
A. Infiltration area(s) C. Gravity flow pipe(s)
B. Installing tanks D. None of the above

203. Ensure that trench bottoms for _____ are tamped and stable and free of rocks and roots, and that backfilled areas around pipes are tamped to prevent dips and rises that could impede flow.
A. Infiltration area(s) C. Gravity flow pipe(s)
B. Site component location(s) D. None of the above

204. Install _____in key locations (near building sewer, D-box, etc.); this aids in operation/maintenance later on.
A. Infiltration area C. Cleanouts and inspection ports
B. Inlet/outlet orientation D. None of the above

Soil Texture
Identify the missing term.

205. Consists of a moderate amount of clay, a large amount of silt, and a small amount of sand. It breaks into moderately hard clods or lumps when dry.
A. Sandy Loam C. Soil Texture
B. Silty Clay Loam D. None of the above

206. When moist, a thin ribbon or 1/8-inch wire can be formed between thumb and finger that will sustain its weight and will withstand gentle movement.
A. Sandy Loam C. Soil Texture
B. Silty Clay Loam D. None of the above

207. Consists largely of sand, but has enough silt and clay present to give it a small amount of stability.
A. Sandy Loam C. Soil Texture
B. Silty Clay Loam D. None of the above

208. Individual sand grains can be readily seen and felt. Squeezed in the hand when dry, this soil will readily fall apart when the pressure is released.
A. Sandy Loam C. Soil Texture
B. Silty Clay Loam D. None of the above

209. Squeezed when moist, it forms a cast that will not only hold its shape when the pressure is released but will withstand careful handling without breaking. The stability of the moist cast differentiates this soil from sand.
A. Sandy Loam C. Soil Texture
B. Silty Clay Loam D. None of the above

210. Means the amount of each soil separate in a soil mixture. Field methods for judging the texture of a soil consist of forming a cast of soil, both dry and moist, in the hand and pressing a ball of moist soil between thumb and finger.
A. Sandy Loam C. Soil Texture
B. Silty Clay Loam D. None of the above

211. Individual grains can be seen and felt readily. Squeezed in the hand when dry, this soil will fall apart when the pressure is released.
A. Sand C. Silty Clay
B. Loamy Sand D. None of the above

212. Squeezed when moist, it will form a cast that will hold its shape when the pressure is released but will crumble when touched.
A. Sand C. Silty Clay
B. Loamy Sand D. None of the above

213. Consists primarily of sand, but has enough silt and clay to make it somewhat cohesive. The individual sand grains can readily be seen and felt.
A. Sand C. Silty Clay
B. Loamy Sand D. None of the above

214. Squeezed when dry, the soil will form a cast that will readily fall apart, but if squeezed when moist, a cast can be formed that will withstand careful handling without breaking.
A. Sand C. Silty Clay
B. Loamy Sand D. None of the above

215. Consists of a moderate amount of fine grades of sand, a small amount of clay, and a large quantity of silt particles. Lumps in a dry, undisturbed state appear quite cloddy, but they can be pulverized readily; the soil then feels soft and floury.
A. Silt Loam C. Loam
B. Clay D. None of the above

216. When wet, _____ runs together in puddles. Either dry or moist, casts can be handled freely without breaking. When a ball of moist soil is passing between thumb and finger, it will not press out into a smooth, unbroken ribbon but will have a broken appearance.
A. Silt Loam C. Loam
B. Clay D. None of the above

217. Consists of an even mixture of sand, silt, and clay that breaks into clods or lumps when dry. When a ball of moist soil is pressed between the thumb and finger, it will form a thin ribbon that will readily break, barely sustaining its own weight. The moist soil is plastic and will form a cast that will withstand considerable handling.
A. Clay Loam C. Loam
B. Clay D. None of the above

218. Consists of even amounts of silt and clay and very small amounts of sand. It breaks into hard clods or lumps when dry.
A. Sand C. Silty Clay
B. Loamy Sand D. None of the above

219. Squeezed in the hand when dry, it will form a cast that will withstand careful handling. The cast formed of moist soil can be handled freely without breaking.
A. Silt Loam C. Loam
B. Clay D. None of the above

Percolation Tests

220. A percolation test consists of digging one or more holes in the soil of the proposed dispersal field to a specified depth, presoaking the holes by maintaining a high water level in the holes, then completing the test by filling the holes to a specific level and timing and _____as the water percolates into the surrounding soil.

A. Allowable hydraulic loading rates
B. Measuring the water level drop
C. An inappropriately high loading rate
D. None of the above

221. A percolation test has limitations. The test does not reveal limiting conditions in the soil profile and can provide_____, leading to an inappropriately high loading rate.

A. Allowable hydraulic loading rates
B. Specific level and timing
C. False readings during dry conditions
D. None of the above

222. States and communities once relied solely on these tests to determine _____.

A. Critical factors
B. Percolation test(s)
C. Effluent application rate(s)
D. None of the above

223. The limitations of the test have caused many state and local agencies to either eliminate this test altogether or to require additional tests that must be conducted during a _____ to determine limiting site conditions and to estimate allowable hydraulic loading rates.

A. Allowable hydraulic loading rates
B. Specific level and timing
C. Site evaluation
D. None of the above

Perc Condition Terms Associated with Saturation

224. Mineral soils with a high amount of decomposed organic matter in the saturated zone, a value of 3 or less, and a chroma of 1 or less. Included in this category are organic soils with a minor amount of mineral matter.

A. High Chroma Matrix with Iron Depletions
B. Dark Colored Soils with Organic Matter Accumulation
C. Depleted Matrix without Iron Concentrations
D. None of the above

225. Soil horizons whose matrix color has a value of 4 or more and a chroma of 2 or less as a result of removal of iron and manganese oxides. Some visible zones of iron concentration are present as soft masses or pore linings.

A. High Chroma Matrix with Iron Depletions
B. Depleted Matrix with Iron Concentrations
C. Depleted Matrix without Iron Concentrations
D. None of the above

226. Soil horizons whose color is more or less uniform with a value of 4 or more and a chroma of 2 or less as a result of removing iron and manganese oxides. These horizons lack visible iron concentrations as soft masses or pore linings.

A. High Chroma Matrix with Iron Depletions
B. Depleted Matrix with Iron Concentrations
C. Depleted Matrix without Iron Concentrations
D. None of the above

227. The stripped areas and trans-located oxides or organic matter form a diffuse splotchy pattern of two or more colors.
A. Dark Colored Shrink-Swell Soils
B. Salt-Affected Soils
C. Iron Stripping and Staining in Sandy Soils
D. None of the above

228. Vertisols whose colors have values of 3 or less and chromas of 1 or less. Iron concentrations may be present but are not diagnostic of conditions associated with saturation.
A. Dark Colored Shrink-Swell Soils
B. Salt-Affected Soils
C. Iron Stripping and Staining in Sandy Soils
D. None of the above

229. Means soil morphological properties that may indicate the presence of a water table that persists long enough to impair system function and create a potential health hazard.
A. Conditions Associated with Saturation
B. Dark Colored Soils with Organic Matter Accumulation
C. Depleted Matrix without Iron Concentrations
D. None of the above

230. Soil horizons whose matrix chroma is 3 or more in which there are some visible iron depletions having a value 4 or more and a chroma of 2 or less. Iron-manganese concentrations as soft masses or pore linings may be present but are not diagnostic of conditions associated with saturation.
A. High Chroma Matrix with Iron Depletions
B. Depleted Matrix with Iron Concentrations
C. Depleted Matrix without Iron Concentrations
D. None of the above

231. Soil horizons whose color has a value of 4 or more and a chroma of 2 or less with hues that are often, but not exclusively, on the grey pages of the Munsell Color Book. On exposure to air, yellow colors form within 24 hours as some of the ferrous iron oxidizes.
A. Dark Colored Shrink-Swell Soils
B. Salt-Affected Soils
C. Reduced Matrix
D. None of the above

232. The upper surface layer has a dark color with a value of 3 or less and a chroma of 1 or less immediately underlain by a layer with a chroma of 2 or less.
A. Dark Colored Shrink-Swell Soils
B. Salt-Affected Soils
C. Soils with a Dark Surface
D. None of the above

233. Soil horizons in which iron/manganese oxides or organic matter or both have been stripped from the matrix, exposing the primary base color of soil materials.
A. Dark Colored Shrink-Swell Soils
B. Salt-Affected Soils
C. Iron Stripping and Staining in Sandy Soils
D. None of the above

Septic Tank Construction Considerations

234. Important construction considerations include tank location, bedding and backfilling, watertightness, and_____, especially with non-concrete tanks.

A. Wicking C. Flotation prevention
B. Watertightness D. None of the above

Construction Materials

235. Septic tanks smaller than _____ gallons are typically pre-manufactured; larger tanks are constructed in place.

A. 6,000 C. 10,000
B. 12,000 D. None of the above

236. Tanks constructed of fiberglass/reinforced polyester (FRP) usually have a wall thickness of about 1/4 inch (6 millimeters). Most are gel or resin coated to provide a smooth finish and prevent glass fibers from becoming exposed, which can cause _____.

A. Wicking C. Cracking or collapsing
B. Watertightness D. None of the above

237. Polyethylene tanks are more flexible than FRP tanks and can _____if not properly designed.

A. Deform to a shape of structural weakness C. Deform to cracking or collapsing
B. Deform to watertightness D. None of the above

238. Some plastics (e.g., polyvinyl chloride, polyethylene, but not nylon) are virtually unaffected by_____.

A. Acids and hydrogen sulfide C. Cracking or collapsing
B. Watertightness D. None of the above

239. Tanks must be properly designed, reinforced, and constructed of the proper mix of materials so they can meet_____.

A. Wicking C. Anticipated loads without cracking or collapsing
B. Watertightness D. None of the above

240. All joints must be _____to accommodate soil conditions. For concrete tank manufacturing, a "best practices manual" can be purchased from the National Pre-Cast Concrete Association (NPCA,1998).

A. Sealed properly C. Watertight and flexible
B. Clean and dry D. None of the above

Watertightness

241. Leaks, whether exfiltrating or infiltrating, are serious. _____of clear water to the tank from the building storm sewer or ground water adds to the hydraulic load of the system and can upset subsequent treatment processes.

A. Exfiltration C. Infiltration
B. Watertightness D. None of the above

242. _____ can threaten ground water quality with partially treated wastewater and can lower the
liquid level below the outlet baffle so it and subsequent processes can become fouled with scum. In addition, leaks can cause the tank to collapse.
A. Exfiltration C. Infiltration
B. Watertightness D. None of the above

243. Tank joints should be designed for _____.
A. Properly sealed C. Watertightness
B. Clean and dryness D. None of the above

244. Manway covers should have similar joints. High-quality, preformed joint sealers should be used to achieve a watertight seal. They should be workable over a wide temperature range and should adhere to clean, dry surfaces; they must_____.
A. Be sealed properly C. Be cured, a watertightness test
B. Not shrink, harden, or oxidize D. None of the above

245. Seals should meet the _____and other requirements prescribed by the seal manufacturer. Pipe and inspection port joints should have cast-in rubber boots or compression seals.
A. Minimum compression C. Watertightness
B. Maximum compression D. None of the above

246. Septic tanks should be tested for _____ using hydrostatic or vacuum tests, and manway risers and inspection ports should be included in the test.
A. Minimum compression C. Watertightness
B. Maximum compression D. None of the above

Location
247. The tank should be located where it can be accessed easily for septage removal and sited away from _____ where water can collect. Local codes must be consulted regarding minimum horizontal setback distances from buildings, property boundaries, wells, water lines, and the like.
A. Imported granular material C. Drainage swales or depressions
B. High organic content D. None of the above

Bedding and Backfilling
248. The tank should rest on_____. It is good practice to provide a level, granular base for the tank. The underlying soils must be capable of bearing the weight of the tank and its contents.
A. Tank and its contents C. Shape and material of the tank
B. A uniform bearing surface D. None of the above

249. Soils with a _____ or containing large boulders or massive rock edges are not suitable.
A. Imported granular material C. Drainage swales or depressions
B. High organic content D. None of the above

250. After setting the tank, leveling, and joining the_____, the tank can be backfilled.
A. Tank and its contents C. Building sewer and effluent line
B. Effluent line D. None of the above

251. The backfill material should be free-flowing and free of stones larger than _____ inches in diameter, debris, ice, or snow. It should be added in lifts and each lift compacted.
A. 2 C. 4
B. 3 D. None of the above

252. In fine-textured soils such as silts, silt loams, clay loams, and clay, _____ should be used. This is a must where freeze and thaw cycles are common because the soil movement during such cycles can work tank joints open. This is a significant concern when using plastic and fiberglass tanks.
A. Imported granular material C. Drainage swales or depressions
B. High organic content D. None of the above

253. _____and backfilling requirements vary with the shape and material of the tank. The manufacturer should be consulted for acceptable materials and procedures.
A. Tank and its contents C. The specific bedding
B. Effluent line D. None of the above

Joint Watertightness
254. The joints should be clean and dry before applying the joint sealer. Only _____joint sealers should be used.
A. High-quality C. Cured
B. Clean and dry D. None of the above

Separation Distance from a Limiting Condition
255. Generally, _____ foot separation distances have proven to be adequate in removing most fecal coliforms in septic tank effluent.
A. 8 -12 C. 2 to 4
B. 2 to 8 D. None of the above

256. A few studies have shown that separation distances of _____inches are sufficient to achieve good fecal coliform removal if the wastewater receives additional pretreatment prior to soil application.
A. 12 to 18 C. 12 to 14
B. 12 to 24 D. None of the above

Collection Systems Section

Collection System Defined
257. Homes and other buildings that are not served by public sewer systems depend on _____ septic systems to treat and dispose of wastewater.
A. Decentralized C. Remote
B. Centralized D. None of the above

258. Most decentralized systems are _____ systems (wastewater is treated underground near where it is generated).
A. Decentralized C. Onsite
B. Centralized D. None of the above

259. Which of the following are designed to collect both sanitary wastewater and storm water runoff?
A. Combined sewer systems C. Wastewater management
B. Wastewater collection system D. None of the above

260. Which of the following systems can be a single septic system and drainfield serving one residence or a large soil absorption system serving an entire subdivision?
A. Decentralized C. Onsite
B. Centralized D. None of the above

Collection System Operators' Purpose
261. Collection system operators are charged with protecting public health and the environment, and therefore must have documented proof of their certifications in the respective _____.
A. POTW C. Wastewater management system
B. Wastewater collection system D. None of the above

262. Which of the following are generally broken out into three different categories: sanitary sewers, storm sewers, and combined sewers?
A. Storm water C. Centralized sewer systems
B. Combined sewers D. None of the above

263. Which of the following carry wastewater or sewage from homes and businesses to treatment plants?
A. Sanitary sewers C. Wastewater management
B. Combined sewers D. None of the above

Understanding Gravity Sanitary Sewers
264. Sanitary sewers are planned to transport the wastewater by utilizing the _____ provided by the natural elevation of the earth resulting in a downstream flow.
A. Potential energy C. Flow velocities and design depths of flow
B. Peak flow of population D. None of the above

265. Sewer systems are designed to maintain proper flow velocities with?
A. Stormwater inflow C. Minimum head loss
B. Maximum head lass D. None of the above

266. Which of the following may find it necessary to dissipate excess potential energy?
A. Flow velocities C. Higher elevations in the system
B. Wastewater D. None of the above

Capacity Limitations

267. The next stage in the capacity evaluation is to identify the location of wet weather related _____, surcharged lines, basement backups, and any other areas of known capacity limitations.

A. Peak flow of population
B. Wastewater
C. SSOs
D. None of the above

Flow Monitoring

268. Flow monitoring provides information on dry weather flows as well as areas of the collection system potentially affected by?

A. I/I
B. Flow measurement
C. Flow velocities and design depths of flow
D. None of the above

Flow Measurements

269. Base flow is generally taken to mean the wastewater generated without any?

A. Deposition of solids
B. Infiltration
C. Any I/I component
D. None of the above

Infiltration and Inflow Sub-Section

270. Which of the following occurs when groundwater enters the sewer system through cracks, holes, faulty connections, or other openings?

A. Inflow
B. Infiltration
C. Maximum flow capacity of wastewater
D. None of the above

Determining I/I

271. Flow monitoring and flow modeling provide measurements and data used to determine estimates of?

A. I/I
B. Infiltration
C. Maximum flow capacity of wastewater
D. None of the above

272. Measurements taken before and after a precipitation event indicate the extent that this term is increasing total flow.

A. I/I
B. Infiltration
C. Maximum flow capacity of wastewater
D. None of the above

Identifying sources of I/I

273. Visual inspection - accessible pipes, gutter and plumbing connections, and manholes are visually inspected for?

A. Excessive I/I
B. High wet weather flows
C. Faults
D. None of the above

274. Smoke testing – smoke is pumped into sewer pipes. Its reappearance aboveground indicates points of ?

A. I/I
B. Stormwater and rainwater
C. Illegal plumbing, drains, and roof downspouts
D. None of the above

Repairing I/I Sources

275. Repair techniques include manhole wall spraying, Insituform pipe relining, manhole frame and lid replacement, and disconnecting?

A. High wet weather flows
B. Stormwater and rainwater
C. Illegal plumbing, drains, and roof downspouts
D. None of the above

Efficient Identification of Excessive I/I

276. The owner or operator should have in place a program for the efficient identification of?
A. Excessive I/I C. Faults
B. Sources of I/I D. None of the above

Sewer System Testing

277. Sewer system testing techniques are often used to identify leaks that allows this term into the sewer system and determine the location of illicit connections and other sources of stormwater inflow?
A. Exfiltration C. Unwanted infiltration
B. Sources of I/I D. None of the above

More on Manholes

278. The average daily flow (based on the average utilization) is multiplied by a peak flow factor to obtain the?
A. Design flow C. Water per person in the area to be served
B. Infiltration allowance D. None of the above

279. Which of the following is 500 gallons per inch of pipe diameter per mile of sewer per day?
A. Design flow C. Water per person in the area to be served
B. Infiltration allowance D. None of the above

280. A typical infiltration allowance is _____ gallons per inch of pipe diameter per mile of sewer per day.
A. 500 C. 10
B. 1000 D. None of the above

Lead and Oakum Joint, Compression Joint and No-Hub Joints

281. Which of the following eliminate the use of oakum and mortar joints for sewer mains?
A. Mortar joints C. Speed seal joints
B. Compression joints D. None of the above

282. Which of the following is an assembly tool is used to force the spigot end of the pipe or fitting into the lubricated gasket inside the hub?
A. Mortar joints C. A no-hub joint
B. Compression joints D. None of the above

283. Which of the following uses a gasket on the end of one pipe and a stainless steel shield and clamp assembly on the end of the other pipe?
A. Mortar joints C. A no-hub joint
B. Compression joints D. None of the above

Closed Circuit Television (CCTV) Inspections
Camera Inspection

284. Which of the following involves lowering a still camera into a manhole?
A. Lamping C. Lighting
B. Sonar D. None of the above

285. The benefits of camera inspection include not requiring _____ and little equipment and set-up time is required.
A. Capacity evaluation C. Confined space entry
B. Trench safety D. None of the above

286. Camera inspection is more comprehensive than _____ in that more of the sewer can be viewed.
A. Lamping C. Lighting
B. Sonar D. None of the above

287. This technique also does not fully capture the invert of the pipe and its condition. Sonar is a newer technology deployed similarly to?
A. CCTV cameras C. Camera inspection
B. Radar D. None of the above

Sewer Flow Measurements
288. Which of the following is the water that enters the sewer through direct connections such as roof leaders, direct connections from storm drains or yard, area, and foundation drains, the holes in and around the rim of manhole covers, etc?
A. RII C. Infiltration
B. Inflow D. None of the above

Sewer Flow Capacity
289. The minimum velocity is necessary to prevent the?
A. Deposition of solids C. Stoppages
B. Infiltration D. None of the above

Sewer Line Mapping
290. Which of the following and repairs are unlikely if mapping is not adequate?
A. Introduction of flows C. Efficient collection system maintenance
B. Inspection D. None of the above

Collection Systems O&M Section
291. Which of the following of wastewater collection systems activities on a trouble or emergency basis has been the usual procedure and policy in many systems?
A. Routine preventative requirements C. Operation and maintenance
B. Routine weather operations D. None of the above

292. Which of the following activities of the collection system has been delayed or omitted, primarily for political or financial reasons?
A. Routine preventative C. Planned operation and preventive maintenance
B. Routine operations D. None of the above

Sewer Cleaning and Inspection
293. As sewer system networks age, the risk of deterioration, _____, and collapses becomes a major concern.
A. Sanitary sewer overflow(s) C. Blockages
B. Rehabilitation D. None of the above

294. Which of the following are essential to maintaining a properly functioning system; these activities further a community's reinvestment into its wastewater infrastructure?
A. CCTV cleaning C. Cleaning and inspecting sewer lines
B. Rod straitening program(s) D. None of the above

Inspection Techniques
295. Which of the following are required to determine current sewer conditions and to aid in planning a maintenance strategy?
A. Documentation of inspections C. Cleaning and inspecting sewer lines
B. Inspection programs D. None of the above

Most sewer lines are inspected using one or more of the following techniques:
296. Which of the following are the most frequently used most cost efficient in the long term, and most effective method to inspect the internal condition of a sewer?
A. Television (TV) inspections C. Inspection program(s)
B. Lamping D. None of the above

Smoke Testing of Sewers is Done to Determine:
297. Location of _____ due to settling of foundations, manholes and other structures
A. Broken sewers C. Illegal connections
B. Diversion points D. None of the above

298. Location of uncharted manholes and _____
A. Broken sewers C. Illegal connections
B. Diversion points D. None of the above

Identify the Cleaning Method
299. Directs high velocities of water against pipe walls. Removes debris and grease build-up, clears blockages, and cuts roots within small diameter pipes. Efficient for routine cleaning of small diameter, low flow sewers.
A. Jetting C. Kites, Bags, and Poly Pigs
B. Flushing D. None of the above

300. Round, rubber-rimmed, hinged metal shield that is mounted on a steel framework on small wheels. The shield works as a plug to build a head of water. Scours the inner walls of the pipe lines. Effective in removing heavy debris and cleaning grease from line.
A. Scooter C. Mechanical Rodding
B. Hydraulic Balling D. None of the above

301. Similar in function to the ball. Rigid rims on bag and kite induce a scouring action. Effective in moving accumulations of decayed debris and grease downstream.
A. Jetting C. Kites, Bags, and Poly Pigs
B. Flushing D. None of the above

302. Most effective in lines up to 12 inches in diameter. Uses an engine and a drive unit with continuous rods or sectional rods. As blades rotate they break up grease deposits, cut roots, and loosen debris.
A. Scooter C. Mechanical Rodding
B. Hydraulic Balling D. None of the above

More on Sewer Cleaning Procedures
A maintenance plan attempts to develop a strategy and priority for maintaining pipes based on several of the following factors:

303. _____- frequency and location; 80 percent of problems occur in 25 percent of the system.
A. Problems C. Cleaning and repairs
B. Location D. None of the above

304. _____- pipes located on shallow slopes or in flood prone areas have a higher priority.
A. Problems C. Cleaning and repairs
B. Location D. None of the above

305. Force main vs. gravity-force mains have a higher priority than gravity, size for size, due to the complexity of the _____.
A. Problems C. Cleaning and repairs
B. Location D. None of the above

Limitations of Cleaning Methods
306. Which of the following will normally utilize a variety of cleaning methods including jetting, high velocity cleaning, rodding, bucket machining, and using stop trucks?
A. Backups into residences C. The collection system
B. Variety of cleaning methods D. None of the above

307. The cleaning and inspection crews will usually consist of two members to operate each of the?
A. Flush and vacuum systems C Combination trucks and TV trucks
B. Chemicals' effectiveness D. None of the above

Detailed Cleaning Methods
The purpose of sewer cleaning is to remove foreign material from the sewer and generally is undertaken to alleviate one of the following conditions:

308. Which of the following is caused by either the premature operation of combined wastewater overflows because of downstream restrictions to hydraulic capacity or pollution caused by the washing through and discharge of debris from overflows during storms?
A. Odor C. Blockages
B. Pollution D. None of the above

309. Which of the following is where it is necessary to clean the sewers immediately before the sewer being rehabilitated?
A. Sewer rehabilitation C. Hydraulic capacity
B. Sewer inspections D. None of the above

310. Traditionally used in larger-diameter sewers, which method involves manually excavating the material and placing it in buckets for removal? As the sewer system can be hazardous, the technique now is used infrequently. High-pressure jet equipment also can be used manually in larger sewers.
A. Cutting C. Manual or Mechanical Digging
B. Rodding D. None of the above

Sewer – Hydraulic Cleaning Sub-Section

311. The purpose of sewer cleaning is to remove accumulated material from the sewer. Cleaning helps to prevent?
A. Velocity C. Blockage(s)
B. Infiltration D. None of the above

312. Which of the following in gravity sewers are usually caused by a structural defect, poor design, poor construction, an accumulation of material in the pipe?
A. Stoppages C. Inflow
B. Infiltration D. None of the above

Sewer Cleaning Methods

313. Chemical cleaning can facilitate the control of odors, grease buildup, root growth, corrosion, and insect and?
A. Deposition of solids C. Rodent infestation
B. Infiltration D. None of the above

Sewer Cleaning Records

314. Which of the following identified should include those due to grease or industrial discharges, hydraulic bottlenecks in the collection system, areas of poor design?
A. Non-structural repairs C. Normal flowing drainage system
B. Potential problem areas D. None of the above

Problems Caused by Roots Inside Sewers

315. Homeowners will notice the first signs of this term by hearing gurgling noises from toilet bowls and observing wet areas around floor drains after completing the laundry.
A. A significant source of infiltration C. Slow flowing drainage system
B. Non-structural repairs D. None of the above

316. As roots continue to grow, they expand and exert considerable pressure _____ where they entered the pipe.
A. Sanitary sewer service line C. At the crack or joint
B. Cracks or loose joints in the sewer pipe D. None of the above

317. Which of the following term and pipes that are structurally damaged will require replacement?
A. A significant source of infiltration C. Severe root intrusion
B. Non-structural repairs D. None of the above

Tree Roots in Sewer

318. Roots from trees growing on private property and on parkways throughout the City are responsible for many of the sanitary sewer service backups and?
A. Drought conditions C. Damaged sewer pipes
B. Inflow and infiltration (I&I) D. None of the above

319. The replacement cost of a sanitary sewer service line as a result of _____ may be very expensive.
A. Damage from tree roots C. The common method of removing roots
B. Tree roots D. None of the above

Pipes Susceptible to Root Damage
320. Clay tile pipe that was commonly installed by developers and private contractors until the late 1980's is easily penetrated and?
A. Root intrusion C. Sanitary sewer service backup(s)
B. Damaged by tree roots D. None of the above

Root Growth Control
321. The common method of removing roots from _____ involves the use of augers, root saws, and high-pressure flushers.
A. Root intrusion C. Sanitary sewer service backup(s)
B. Sanitary sewer service pipes D. None of the above

322. The use of products such as copper sulfate and sodium hydroxide are not recommended because of negative environmental impacts on the?
A. Root intrusion C. Downstream receiving water
B. Sewer service D. None of the above

Smoking out Sewer Leaks
323. Which of the following is an effective method of documenting sources of inflow and should be part of any CMOM program?
A. Taste testing C. Video techniques
B. Smoke testing D. None of the above

324. Which of the following is a relatively simple process, which consists of blowing smoke mixed with larger volumes of air into the sanitary sewer line, usually induced through the manhole?
A. Smoke testing C. Inflow
B. Dye D. None of the above

325. The smoke travels the path of least resistance and quickly shows up at sites that allow?
A. Surface water inflow C. Sources of exfiltration
B. CFM D. None of the above

326. Which of the following will identify broken manholes, illegal connections, uncapped lines, and will even shows cracked mains and laterals providing there is a passageway for the smoke to travel to the surface?
A. Smoke C. Video inspection
B. Dye D. None of the above

327. Although video inspection and other techniques are certainly important components of _____, research has shown that approximately 65% of all extraneous stormwater inflow enters the system from somewhere other than the main line.
A. An I&I survey C. Video inspection and other techniques
B. Smoke testing D. None of the above

Pumps and Lift Stations Section

328. Pumping Station is a relatively large sewage pumping installation designed not only to lift sewage to a higher elevation, but also to convey it through force mains to gravity flow points located relatively long distances from the?
A. Submersible pump(s) C. Pumping Station
B. Dry well D. None of the above

Lift Stations
329. Which of the following are designed to operate continuously to keep sewerage from backing up through the system?
A. Lift Station C. Submersible pump(s)
B. Dry well D. None of the above

330. Which of the following identifies potential problems instantaneously and take the proper steps to rectify the situation before it becomes a public health risk?
A. Telemetry C. Pumping valve
B. Checker D. None of the above

A Lift Station contains 4 main Components:
331. A wet well - usually _____+ ft. in depth and _____ ft. in diameter - that houses two submersible pumps of varying horsepower, discharging piping and floats that operate the pumps and keep a set level in the well.
A. 8 & 15 C. 4 & 15
B. 15 & 8 D. None of the above

332. Which of the following houses the piping and valves that prevent backflow in the station, and can lock connection used to bypass the submersibles in an emergency situation?
A. Pumping station panel C. Supervisory panel
B. Dry well D. None of the above

333. A “Log Book” or “Station Book” which contains the records and maps of the?
A. Lift Station’s area C. Pumping Station location
B. Dry well area D. None of the above

Collection Systems, Lift Stations
334. Which of the following include a wastewater receiving well, often equipped with a screen or grinding to remove coarse materials?
A. Key elements of lift stations C. Dry-pit or dry-well
B. Key elements of dry well D. None of the above

335. Which of the following are often installed in an enclosed structure?
A. Lift station equipment and systems C. Submersible station(s)
B. Key elements of dry well D. None of the above

336. Centrifugal pumps are commonly used in?
A. Wet-well C. Pump station control
B. Lift station(s) D. None of the above

337. A more sophisticated control operation involves the use of?
A. Squirrel motors C. Variable speed drives
B. Non-adjustable speed drives D. None of the above

338. Which of the following houses pumps and valves are housed in a pump room (dry pit or dry-well), that are easily accessible?
A. Dry-well lift stations C. Trapped air column, or bubbler system
B. Submersible lift station(s) D. None of the above

339. Which of the following is a separate chamber attached or located adjacent to the dry-well structure?
A. Wet-well C. Dry-pit or dry-well and submersible lift stations
B. Lift station(s) D. None of the above

340. Which of the following do not have a separate pump room; the lift station header piping, associated valves, and flow meters are located in a separate dry vault at grade for easy access?
A. Lift station(s) C. Dry-pit or dry-well and submersible lift stations
B. Submersible lift station(s) D. None of the above

341. Which of the following include sealed pumps that operate submerged in the wet-well?
A. Submersible lift station(s) C. Dry-pit
B. Lift station(s) D. None of the above

342. Which of the following allow easy access for routine visual inspection and maintenance?
A. Submersible pump(s) C. Dry-well lift stations
B. Submersible lift station(s) D. None of the above

343. Which of the following do not usually include large aboveground structures and tend to blend in with their surrounding environment in residential areas?
A. Submersible lift station(s) C. Operation and maintenance building
B. Dry-well lift stations D. None of the above

Wastewater Pumps

344. In small stations, with maximum inflows of less than _____ gallons per minute, two pumps are customarily installed, with each unit able to meet the maximum influent rate.
A. 1500 C. 700
B. 500 D. None of the above

345. Large lift stations, the size and number of pumps should be selected so that the range of this _____ can be met without starting and stopping pumps too frequently and without excessive wet-well storage.
A. Head-losses C. Influent flow rates
B. Head capacity D. None of the above

346. Additional pumps may provide intermediate capacities better matched to typical daily flows, an alternative option is to provide?
A. Flexibility C. Maximum influent rate
B. Flow flexibility with variable speed pumps D. None of the above

347. For pump stations with _____, the single pump flow approach is usually the most suitable.
A. Head-losses C. High head-losses
B. Wet-well storage D. None of the above

348. Parallel pumping is not as effective for such stations because two pumps operating together yield only?
A. Slightly higher flows than one pump C. An alternative option
B. Wear and tear D. None of the above

349. Which of the following is to be achieved with multiple pumps in parallel?
A. Peak flow C. Low-flow/high head conditions
B. Head-losses D. None of the above

350. Parallel peak pumping is typically used in large lift stations with relatively?
A. Low or moderate head(s) C. Flat system head curve(s)
B. Wear and tear D. None of the above

Ventilation
351. Ventilation and heating are required if this _____ includes an area routinely entered by personnel.
A. Lift station C. Motor control center (MCC) rooms
B. Ventilation systems D. None of the above

352. Which of the following is particularly important to prevent the collection of toxic and/or explosive gases?
A. Ventilation C. Motor control center (MCC) rooms
B. Dry-well ventilation codes D. None of the above

353. Dry-well ventilation codes typically require _____ continuous air changes per hour or 30 intermittent air changes per hour.
A. 12 C. 10
B. 6 D. None of the above

354. Motor control center (MCC) rooms should have a ventilation system adequate to provide six air changes per hour and should be air conditioned to between _____ degrees F.
A. 55-75 C. 75-90
B. 55 to 90 D. None of the above

Odor Control
355. Odor control is frequently required for lift stations, a relatively simple and widely used odor control alternative is minimizing?
A. Chemical flatulence C. Wet-well turbulence
B. Ventilation turbulence D. None of the above

Confined Space Section

Definitions

Confined space:

356. A confined space is large enough or so configured that an employee can _____.
A. Have sufficient oxygen C. Recognize serious safety or health hazards
B. Bodily enter and perform work D. None of the above

357. A confined space has limited or restricted means for _____.
A. An internal configuration C. Hazardous atmosphere
B. Entry or exit D. None of the above

358. A confined space is not designed for _____.
A. An internal configuration C. Continuous employee occupancy
B. Hazardous atmospheres D. None of the above

359. A permit required confined space (permit space) contains or has a potential to contain a _____.
A. Recognized configuration C. Have sufficient oxygen
B. Hazardous atmosphere D. None of the above

360. A permit required confined space (permit space) contains a material that has _____.
A. Authorized entrants C. The potential for engulfing an entrant
B. Hazardous atmospheres D. None of the above

361. A permit required confined space (permit space) has an internal configuration such that _____ could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
A. An entrant C. An internal configuration
B. Hazardous atmosphere D. None of the above

362. A permit required confined space (permit space) contains any other recognized serious safety or _____.
A. Engulfing problems C. Health hazard
B. Strange atmospheres D. None of the above

363. Each _____ must be marked "Confined Space - Entry Permit Required".
A. Permit-Required Confined Space C. Entry or exit
B. Hazardous atmosphere D. None of the above

Confined Space Hazards

364. Fatalities and injuries constantly occur among construction workers who are required to enter _____.
A. An internal configuration C. Confined spaces
B. Hazardous atmosphere D. None of the above

365. Workers encounter both inherent and _____ within confined workspaces.
A. An internal configuration C. Hazardous atmosphere
B. Induced hazards D. None of the above

Inherent Hazards

366. _____ are associated with specific types of equipment and the interactions among them. These hazards can be electrical, thermal, chemical, mechanical, etc.

A. Inherent hazards
B. Hazardous atmospheres
C. Recognized serious safety or health hazards
D. None of the above

367. Inherent hazards include high voltage, radiation generated by equipment, _____, omission of protective features, high or low temperatures, high noise levels, and high-pressure vessels and lines.

A. Defective design
B. Hazardous atmosphere
C. An internal configuration
D. None of the above

368. Inherent hazards usually cannot be eliminated without degrading or shutting down the system or equipment. Therefore, emphasis must be placed on _____.

A. Hazard control methods
B. Hazardous atmospheres
C. Continuous employee occupancy
D. None of the above

Induced Hazards

369. _____ result from a multitude of incorrect decisions and actions that occur during the actual construction process.

A. Induced hazards
B. Below-grade locations
C. Build-up of explosive gases
D. None of the above

370. Some examples of induced hazards are: omission of protective features, physical arrangements that may cause unintentional worker contact with electrical energy sources, oxygen-deficient atmospheres created at the bottom of pits or shafts, lack of safety factors in structural strength, and _____.

A. Common confined spaces
B. Flammable atmospheres
C. Extreme temperatures
D. None of the above

Permitted Confined Space Entry Program

371. Subpart P (of OSHA's Construction Regulations) applies to all _____ in the earth's surface.

A. Open excavations
B. Vaults
C. Pits
D. None of the above

372. According to the text, all trenches are _____.

A. Too narrow for work
B. Excavations
C. Safe for short-term work
D. None of the above

373. According to the text, all excavations are _____.

A. Permit-required
B. Not trenches
C. Access passages
D. None of the above

Permit Required Confined Space Entry General Rules

374. According to the text, only authorized and trained employees may enter a _____ or act as safety watchmen/attendants.

A. Hazard
B. Pipe
C. Confined space
D. None of the above

375. Employees are not permitted to smoke _____ or near the entrance/exit area.
A. Near air and oxygen monitors C. In a confined space
B. During a side entry D. None of the above

376. A watchmen or attendant must be present at all times during _____.
A. Confined space entries C. Air monitoring
B. Access passages D. None of the above

377. According to the text, constant visual or voice communication will be maintained between the safety watchmen and employees entering _____.
A. Inner spaces C. A confined space
B. Access passages D. None of the Above

378. According to the text, no _____ will be made or work conducted below the level of any hanging material or material that could cause engulfment.
A. Monitoring of entrant status C. Identification of authorized entrants
B. Bottom or side entry D. None of the above

379. _____ is required before workers are allowed to enter any permit-required confined space. Oxygen levels in the confined space must be between 19.5 and 23.5 percent.
A. Air and oxygen monitoring C. Communication
B. A supervisor D. None of the above

380. Air and oxygen monitoring will check the levels of oxygen, explosive gasses, and carbon monoxide. Entry will not be permitted if explosive gas is detected above one-half the _____.
A. Nitrogen level C. Lower Explosive Limit (LEL)
B. Argon level D. None of the above

381. When covers are removed, all _____ will be protected by a barricade to prevent injuries to others.
A. Air and oxygen monitoring C. Openings to confined spaces
B. Side entries D. None of the above

Confined Space Duties and Responsibilities
Employees
382. Employees must not _____ that have not been evaluated for safety concerns.
A. Follow program requirements C. Enter any confined spaces
B. Report hazards D. None of the above

Entry Supervisor
383. Entry supervisors must coordinate all entry procedures, tests, _____, equipment, and other activities related to the permit space entry.
A. Publicity C. Permits
B. News media D. None of the above

384. Before endorsing the permit and allowing entry to begin, the _____ must check that all appropriate entries have been made on the permit, all tests specified by the permit have been conducted, and that all procedures and equipment specified by the permit are in place.
A. Entry supervisor C. Unauthorized persons
B. Attendant D. None of the above

Entry Attendants

385. A responsibility of the entry attendant is to be aware of _____ of hazard exposure on entrants.
A. The attendants' primary duty C. Possible behavioral effects
B. Worker training D. None of the above

386. A responsibility of the entry attendant is to continuously maintain an accurate count of entrants in the permit space and ensure a means to _____.
A. Timely complete the work C. Accurately identify authorized entrants
B. Add workers when needed D. None of the above

387. A responsibility of the entry attendant is to remain outside the permit space during entry operations until _____.
A. Assistance is requested C. Relieved by another attendant
B. Safety equipment arrives D. None of the above

388. A responsibility of the entry attendant is to _____ as necessary to monitor entrant status and alert entrants of the need to evacuate.
A. Communicate with entrants C. Check the work progress
B. Encourage entrants D. None of the above

389. A responsibility of the entry attendant is to summon rescue and other emergency services as soon as the attendant _____ to escape the permit space hazards.
A. Identifies entrant status C. Determines the entrants need assistance
B. Gets approval to summon rescue D. Accurately unauthorized entrants

Unauthorized Persons

390. Actions must be taken when _____ approach or enter a permit space while entry is under way.
A. Authorized workers C. Unauthorized persons
B. Rescue Workers D. None of the above

391. _____ must be warned to stay away from the permit space,
A. Authorized workers C. Entrants
B. Unauthorized persons D. None of the above

392. If _____ have entered the space, they must be advised to exit immediately.
A. Authorized workers C. Unauthorized persons
B. Entrants D. None of the above

393. If unauthorized persons have entered the permit space, inform the _____ and the entry supervisor.
A. Authorized entrants C. Unauthorized persons
B. Attendant D. None of the above

Entrants

394. According to the text, all _____ must be authorized by the entry supervisor to enter permit spaces, have received the required training, have used the proper equipment, and observed the entry procedures and permit requirements

A. Workers C. Unauthorized persons
B. Entrants D. None of the above

395. Entrants are required to know the _____ that may be faced during entry.

A. Spaces C. Unauthorized persons
B. Hazards D. None of the above

396. Entrants are required to communicate with the _____ as necessary to enable the attendant to monitor their status and alert them of the need to evacuate the space if necessary.

A. Inspectors C. Unauthorized persons
B. Attendant D. None of the above

Permit Required Confined Space Entry General Rules

Confined Space Entry Permits

397. According to the text, Confined Space Entry Permits must be completed before any employee _____.

A. Begins work C. Enters a permit-required confined space
B. Leaves the permit space D. None of the above

398. _____ will expire before the shift is completed or if any pre-entry conditions change.

A. Air and oxygen monitoring C. Confined Space Entry Permits
B. Project schedules D. None of the above

399. _____ will be maintained on file for 12 months.

A. Air and oxygen monitoring data C. Confined Space Entry Permits
B. Project schedules D. None of the above

Contractor Entry

400. According to the text, all work by _____ that involves the entry into confined spaces will follow the procedures of this program.

A. Management C. Non-company employees
B. Supervisors D. None of the above