Registration Form

Sewer and Septic CEU Training Course $200.00

48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL $50.00

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

List number of hours worked on assignment must match State Requirement. _____

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

Address_____

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

Email_____ **Fax (____)** _____

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

Operator ID #_____**Exp. Date**_____

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

Please circle/check which certification you are applying the course CEU's.
Wastewater Collection____ Wastewater Treatment____ Onsite Installer ____

Other _____ Oregon CCB ($50 additional fee) _____

Technical Learning College TLC PO Box 3060, Chino Valley, AZ 86323
Toll Free (866) 557-1746 Fax (928) 272-0747 info@tlch2o.com

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

Please invoice me, my PO#_____

Please pay with your credit card on our website under Bookstore or Buy Now. Or call us and provide your credit card information.

We will stop mailing the certificate of completion so we need either your fax number or e-mail address. We will e-mail the certificate to you, if no e-mail address; we will fax it to you.

DISCLAIMER NOTICE

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

State Approval Listing Link, check to see if your State accepts or has pre-approved this course. Not all States are listed. Not all courses are listed. If the course is not accepted for CEU credit, we will give you the course free if you ask your State to accept it for credit.

State Approval Listing URL…

http://www.abctlc.com/downloads/PDF/CEU%20State%20Approvals.pdf

You can obtain a printed version of the course manual from TLC for an additional $99.95 plus shipping charges.

AFFIDAVIT OF EXAM COMPLETION

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

Grading Information

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

For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity.

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

Some States and many employers require the final exam to be proctored.
http://www.abctlc.com/downloads/PDF/PROCTORFORM.pdf

All downloads are electronically tracked and monitored for security purposes.

Sewer and Septic Answer Key

Name _____ Phone_____

Did you check with your State agency to ensure this course is accepted for credit?

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.

1. A B	18. A B C D	35. A B C D	52. A B C D
2. A B	19. A B	36. A B	53. A B C D
3. A B	20. A B	37. A B C D	54. A B C D
4. A B	21. A B	38. A B C D	55. A B C D
5. A B	22. A B	39. A B C D	56. A B C D
6. A B	23. A B	40. A B C D	57. A B C D
7. A B	24. A B	41. A B C D	58. A B C D
8. A B C D	25. A B	42. A B C D	59. A B C D
9. A B C D	26. A B	43. A B C D	60. A B C D
10. A B C D	27. A B C D	44. A B C D	61. A B C D
11. A B C D	28. A B C D	45. A B C D	62. A B C D
12. A B C D	29. A B C D	46. A B C D	63. A B C D
13. A B C D	30. A B C D	47. A B C D	64. A B C D
14. A B C D	31. A B C D	48. A B C D	65. A B C D
15. A B C D	32. A B	49. A B C D	66. A B C D
16. A B C D	33. A B	50. A B C D	67. A B C D
17. A B C D	34. A B C D	51. A B C D	68. A B

69. A B C D
70. A B C D
71. A B C D
72. A B C D
73. A B C D
74. A B C D
75. A B C D
76. A B C D
77. A B C D
78. A B C D
79. A B C D
80. A B C D
81. A B C D
82. A B C D
83. A B C D
84. A B C D
85. A B C D
86. A B C D
87. A B C D
88. A B C D
89. A B C D
90. A B C D
91. A B C D
92. A B C D
93. A B C D
94. A B C D
95. A B C D
96. A B C D
97. A B C D
98. A B C D
99. A B C D
100. A B C D
101. A B C D
102. A B C D
103. A B C D
104. A B C D
105. A B C D
106. A B C D
107. A B C D
108. A B C D
109. A B C D
110. A B C D
111. A B C D
112. A B C D
113. A B C D
114. A B C D
115. A B C D
116. A B C D
117. A B C D
118. A B C D
119. A B C D
120. A B C D
121. A B C D
122. A B C D
123. A B C D
124. A B C D
125. A B C D
126. A B C D
127. A B C D
128. A B C D
129. A B C D
130. A B C D
131. A B C D
132. A B C D
133. A B C D
134. A B C D
135. A B C D
136. A B C D
137. A B C D
138. A B C D
139. A B C D
140. A B C D
141. A B C D
142. A B C D
143. A B C D
144. A B C D
145. A B C D
146. A B C D
147. A B C D
148. A B C D
149. A B C D
150. A B C D
151. A B C D
152. A B C D
153. A B C D
154. A B C D
155. A B C D
156. A B C D
157. A B C D
158. A B C D
159. A B C D
160. A B C D
161. A B C D
162. A B C D
163. A B C D
164. A B C D
165. A B C D
166. A B C D
167. A B C D
168. A B C D
169. A B C D
170. A B C D
171. A B C D
172. A B C D
173. A B C D
174. A B C D
175. A B C D
176. A B C D
177. A B C D
178. A B C D
179. A B C D
180. A B C D
181. A B C D
182. A B C D
183. A B C D
184. A B C D
185. A B C D
186. A B C D
187. A B C D
188. A B C D
189. A B C D
190. A B C D
191. A B C D
192. A B C D
193. A B C D
194. A B C D
195. A B C D
196. A B
197. A B C D
198. A B C D
199. A B C D
200. A B C D

201. A B C D
202. A B C D
203. A B C D
204. A B C D
205. A B C D
206. A B C D
207. A B C D
208. A B C D
209. A B C D
210. A B C D
211. A B C D
212. A B C D
213. A B C D
214. A B C D
215. A B C D
216. A B C D
217. A B C D
218. A B C D
219. A B C D
220. A B C D
221. A B C D
222. A B C D
223. A B C D
224. A B C D
225. A B C D
226. A B C D
227. A B C D
228. A B C D
229. A B C D
230. A B C D
231. A B C D
232. A B C D
233. A B C D
234. A B C D
235. A B C D
236. A B C D
237. A B C D
238. A B C D
239. A B C D
240. A B C D
241. A B C D
242. A B C D
243. A B C D
244. A B C D
245. A B C D
246. A B C D
247. A B C D
248. A B C D
249. A B C D
250. A B C D
251. A B C D
252. A B C D
253. A B C D
254. A B C D
255. A B C D
256. A B C D
257. A B C D
258. A B C D
259. A B C D
260. A B C D
261. A B C D
262. A B C D
263. A B C D
264. A B C D
265. A B C D
266. A B C D
267. A B C D
268. A B C D
269. A B C D
270. A B C D
271. A B C D
272. A B C D
273. A B C D
274. A B C D
275. A B C D
276. A B C D
277. A B C D
278. A B C D
279. A B C D
280. A B C D
281. A B C D
282. A B C D
283. A B C D
284. A B C D
285. A B C D
286. A B C D
287. A B C D
288. A B C D
289. A B C D
290. A B C D
291. A B C D
292. A B C D
293. A B C D
294. A B C D
295. A B C D
296. A B C D
297. A B C D
298. A B C D
299. A B C D
300. A B C D
301. A B C D
302. A B C D
303. A B C D
304. A B C D
305. A B C D
306. A B C D
307. A B C D
308. A B C D
309. A B C D
310. A B C D
311. A B C D
312. A B C D
313. A B C D
314. A B C D
315. A B C D
316. A B C D
317. A B C D
318. A B C D
319. A B C D
320. A B C D
321. A B C D
322. A B C D
323. A B C D
324. A B C D
325. A B C D
326. A B C D
327. A B C D
328. A B C D
329. A B C D
330. A B C D
331. A B C D
332. A B C D

333. A B C D	350. A B C D	367. A B C D	384. A B C D
334. A B C D	351. A B C D	368. A B C D	385. A B C D
335. A B C D	352. A B C D	369. A B C D	386. A B C D
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

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

SEWER AND SEPTIC CEU TRAINING COURSE

CUSTOMER SERVICE RESPONSE CARD

NAME: _____

E-MAIL_____PHONE_____

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

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

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

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

How did you hear about this Course? _____

What would you do to improve the Course? _____

_____

_____

How about the price of the course?

Poor_____ Fair ____ Average ____ Good____ Great_____

How was your customer service?

Poor___ Fair ____ Average ____ Good _____ Great_____

Any other concerns or comments.

_____

_____

This course contains general EPA's CWA federal rule and state onsite requirements. Please be aware that each state implements onsite / 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
Fax (928) 272-0747.
Always call us to confirm we received the paperwork.

Rush Grading Service
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…*

Sewer and Septic Construction 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.

Collection Systems Section

Collection System and its Purpose

1. In accumulation to what homes and businesses flush down the drain, the system also collects excess groundwater, infiltration liquids, and inflow water.
A. True B. False

2. Wastewater collection is an incomplete liquid waste removal system.
A. True B. False

3. The fluid waste distributed through this system is about 78% water. The waste floats on, is carried along by, and goes into suspension or solution in water.
A. True B. False

4. "Wastewater" is a more precise description and has become the standard term for this fluid waste because it encompasses the total slurry of wastes in water that is gathered from homes and businesses.
A. True B. False

Collection System Defined

5. Decentralized systems are public sewer systems that serve established towns and cities and transport wastewater to a central location for treatment.
A. True B. False

6. Centralized systems do not connect to a public sewer system. Wastewater may be treated on site or may be discharged to a private treatment plant.
A. True B. False

7. Large-scale public sewer systems (municipal wastewater treatment plants) are centralized systems.
A. True B. False

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

8. 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

Understanding Gravity Sanitary Sewers

9. 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

10. 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

11. 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

Flow Measurements

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

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

Infiltration and Inflow Sub-Section

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

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

Determining I/I

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

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

Identifying sources of I/I

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

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

Sewer System Testing

16. 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

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

17. Two commonly implemented sewer testing techniques include?
A. I/I
B. Stormwater and rainwater
C. Smoke testing and dyed water testing
D. None of the above

Dye Testing
18. Dyed water testing may be used to establish this term to the sewer.
A. Potential problem areas
B. I/I problems
C. Connection of a fixture or appurtenance
D. None of the above

Manhole Sub-Section
19. Manholes should undergo routine inspection typically every one to three years.
A. True B. False

20. There should be a baseline for manhole inspections (e.g., once every year) with problematic manholes being inspected more frequently.
A. True B. False

21. The reviewer should conduct visual observation at a small but representative number of manholes for the items listed: various pipeline inspection techniques, the most common include: lamping, camera inspection, sonar, and CCTV.
A. True B. False

Sewer System Inspection Techniques
22. There are a number of inspection techniques that may be employed to inspect a sewer system. The reviewer should determine if an inspection program includes frequency and schedule of inspections and procedures to record the results.
A. True B. False

23. Sewer system cleaning should always be considered before inspection is performed in order to provide adequate clearance and inspection results.
A. True B. False

More on Manholes
24. When designing a wastewater system, the design engineer begins by first determining the amount of money that is available.
A. True B. False

25. The design engineer bases his design on the average daily use of solids per person in the area to be served.
A. True B. False

Lead and Oakum Joint, Compression Joint and No-Hub Joints
26. In lead and oakum joints, oakum is packed into the hub completely around the joint, and melted lead is poured over it.
A. True B. False

27. Which of the following may be made of grout?
A. Mortar joints
B. Compression joints
C. A no-hub joint
D. None of the above

28. 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

Closed Circuit Television (CCTV) Inspections
Camera Inspection
29. Which of the following involves lowering a still camera into a manhole?
A. Lamping C. Lighting
B. Sonar D. None of the above

Closed Circuit Television (CCTV) Inspections
30. Which of the following may be done on a routine basis as part of the preventive maintenance program, as well as part of an investigation into the cause of I/I?
A. Lamping C. CCTV inspections
B. Sonar D. None of the above

Sewer Flow Measurements
31. 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

32. Normal illegal connections found are roof drains tied directly into the system, abandoned customer sewer lines that were not properly capped, as well as an occasional broken sewer line.
A. True B. False

Sewer Flow Capacity
33. Most sewers are designed with the capacity to flow quarter full for less than 15 inches in diameter; larger sewers are designed to flow at half flow.
A. True B. False

Sewer Line Mapping
34. 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

New Sewer Construction
35. Which of the following keep costs and problems associated with operations, maintenance, and construction to a minimum?
A. Engineering endeavors C. Sanitary sewer designs
B. Sewer cleanouts D. None of the above

36. The owner or operator should have standards for new construction, procedures for reviewing designs and protocols for inspection, start-up, testing, and approval of new construction. The procedures should provide documentation of all activities, especially inspection.
A. True B. False

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

Collection Systems O&M Section

37. Which of the following activities of wastewater collection systems on a trouble or emergency basis has been the usual procedure and policy in many systems?
A. Routine preventative C. Operation and maintenance
B. Routine operations D. None of the above

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

Inspection Techniques
39. 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:
40. 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:
41. 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

Identify the Cleaning Method
42. 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

43. 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

44. 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

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:

45. _____- 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

46. _____- 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

47. 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

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:

48. 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

49. 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

50. The distance from the access point is limited to approximately 60 ft in this method.
A. Cutting C. Manual or Mechanical Digging
B. Rodding D. None of the above

51. Which method is generally a manual push-pull technique used to clear blockages in smaller-diameter, shallow sewer systems typically not exceeding 10 in. in diameter or 6 ft. in depth?
A. Jet Rodding C. Rodding
B. Dragging D. None of the above

52. Which method generally is used for removing roots from sewers? High-pressure water jet cutters have been developed for removing even more solid intrusions, such as intruding connections. Care is required to eliminate damage to the existing sewer structure.
A. Jet Rodding C. Cutting
B. Dragging D. None of the above

53. Which of the following uses water under high pressure is fed through a hose to a nozzle containing a rosette of jets sited so the majority of flow is ejected in the opposite direction of the flow in the hose?

A. Cutting C. Manual or Mechanical Digging
B. Jet Rodding D. None of the above

Sewer – Hydraulic Cleaning Sub-Section

54. 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

Sewer Cleaning Methods

55. Mechanical cleaning uses physical devices to scrape, cut, or pull?

A. Infiltration C. Sewer cleaning
B. Material from the sewer D. None of the above

Sewer Cleaning Records

56. 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. Both infiltration and inflow or I/I C. General I/I source areas
B. Potential problem areas D. None of the above

Parts and Equipment Inventory

57. Without such an inventory, the collection system may experience long down times or periods of inefficient operation in the event of a?

A. Problem collection system areas C. Breakdown or malfunction
B. Infiltration D. None of the above

Sewer Maintenance - Advantages and Disadvantages
Advantages and Disadvantages

58. According to the text, one benefit of implementing a sewer maintenance program is the reduction of?

A. SSOs C. Fire hazard
B. Rehabilitation D. None of the above

Visual Inspection

59. In smaller sewers, the scope of problems does provide information needed to make decisions on?

A. SSOs C. Sewer line cleaning
B. Rehabilitation D. None of the above

Sewer System Rehabilitation

60. The collection system owner or operator should have a?

A. Sewer system program C. Sewer rehabilitation program
B. Problem solving program D. None of the above

61. There are many rehabilitation methods; the choice of methods depends on pipe size, type, location, dimensional changes, sewer flow, material deposition, surface conditions, and?

A. A serious source of I/I C. Severity of I/I
B. Non-structural repairs D. None of the above

Root Growth in Pipes

62. Roots require oxygen to grow, they do not grow in this term or where high ground water conditions prevail.

A. Debris discharged
B. Pipes that are full of water
C. Cracks or loose joints in the sewer pipe
D. None of the above

Problems Caused by Roots Inside Sewers

63. 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
B. Non-structural repairs
C. Slow flowing drainage system
D. None of the above

Tree Roots in Sewer

64. 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
B. Inflow and infiltration (I&I)
C. Damaged sewer pipes
D. None of the above

Root Growth Control

65. The common method of removing roots from _____ involves the use of augers, root saws, and high-pressure flushers.

A. Root intrusion
B. Sanitary sewer service pipes
C. Sanitary sewer service backup(s)
D. None of the above

66. The use of products such as copper sulfate and sodium hydroxide are not recommended because of negative environmental impacts on the?

A. Root intrusion
B. Sewer service
C. Downstream receiving water
D. None of the above

Smoking out Sewer Leaks

67. The smoke travels the path of least resistance and quickly shows up at sites that allow?

A. Surface water inflow
B. CFM
C. Sources of exfiltration
D. None of the above

Fats, Oils and Grease Section

68. Sewer backups and overflows will occur on streets, properties and even in customers' homes and/or businesses are caused because of improper disposal of fats, oils and grease.

A. True
B. False

69. Ponds, streams or rivers will be contaminated due to _____ and will also impact the environment negatively.

A. Sewer backup(s)
B. Overflow(s)
C. Management Practices (MPs)
D. None of the above

Food Service Establishments (FSEs)

70. Because of the amount of grease used in cooking, _____are a significant source of fats, oil and grease (FOG).

A. Sewer system infiltration
B. Customer(s) Inflow
C. Food Service Establishments (FSEs)
D. None of the above

71. To assist improper handling and disposal of FOG _____ are generally developed to assist restaurants and other FSEs with instruction and compliance.
A. CSO/SSO C. POTW Commercial FOG Program
B. POTWs D. None of the above

72. According to the text, the _____ can handle properly disposed wastes, but to work effectively, sewer systems need to be properly maintained, from the drain to the treatment plant.
A. Vactor C. POTW's sewer system
B. Honey pumpers D. None of the above

pH Section

73. Pure water has a pH very close to?
A. 7 C. 7.7
B. 7.5 D. None of the Above

74. pH is defined as the decimal logarithm of the reciprocal of the_____, a_H+, in a solution.
A. Hydrogen ion activity C. Brønsted–Lowry acid–base theory
B. Acid-base behavior D. None of the Above

75. Which of the following terms may be used to measure pH, by making use of the fact that their color changes with pH?
A. Indicators C. A set of non-linear simultaneous equations
B. Spectrophotometer D. None of the Above

Pumps and Lift Stations Section

Lift Stations

76. 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

77. 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:

78. 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

79. 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

80. 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

81. 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

82. 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

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

84. 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

85. 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

86. 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

87. 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

88. 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

89. 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

90. 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

Applicability

91. Which of the following are used to move wastewater from lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow and/or when the use of gravity conveyance will result in excessive excavation depths and high sewer construction costs?

A. Lift station(s)
B. Submersible lift station(s)
C. Dry-pit or dry-well and submersible lift stations
D. None of the above

Current Status

92. Which of the following are widely used in wastewater conveyance systems?

A. Wet-well
B. Lift station(s)
C. Pump station control
D. None of the above

93. Which of the following is often used to optimize pump performance and minimize power use?

A. Variable speed pumping
B. D-C Motors
C. A-C Motors
D. None of the above

Advantages

94. Which of the following are used to reduce the capital cost of sewer system construction?

A. Wet-well
B. Lift station(s)
C. Pump station control
D. None of the above

95. Which of the following size is dependent on the minimum pipe slope and flow?

A. Lift station configuration
B. Gravity sewer lines
C. Wet-well maximum detention time
D. None of the above

Disadvantages

96. Which of the following also require a significant amount of power, are sometimes expensive to upgrade, and may create public concerns and negative public reaction?

A. Gravity wastewater conveyance
B. Lift station(s)
C. Dry well
D. None of the above

97. Which of the following can be eliminated or reduced by selecting alternative sewer routes or extending a gravity sewer using direction drilling or other state-of-the-art deep excavation methods?

A. Gravity sewer
B. Wastewater pumping
C. Gravity wastewater conveyance
D. None of the above

Wet-Well

98. Which of the following depends on the type of lift station configuration and the type of pump controls?

A. Lift station configuration
B. Wet-well design
C. Wet-well maximum detention time
D. None of the above

99. Wet-wells are typically designed large enough to prevent rapid pump cycling but small enough to prevent a long detention time and associated?

A. Wastewater quality
B. Odor release
C. Drainage
D. None of the above

Wastewater Pumps

100. 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

101. 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

102. 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

103. 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

104. 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

105. 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

106. Several types of centrifugal pumps are used in wastewater lift stations, these pumps are well suited for?

A. Head capacity C. Low-flow/high head conditions
B. Wet-well storage D. None of the above

107. In angle-flow pump is appropriate for pumping against?

A. Low or moderate head(s) C. Maximum influent rate
B. Wear and tear D. None of the above

108. Mixed flow pumps are most viable for pumping large quantities of wastewater at?

A. Head-losses C. Low head
B. Head capacity D. None of the above

Ventilation

109. 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

110. Which of the following is particularly important to prevent the collection of toxic and/or explosive gases?

A. Ventilation
B. Dry-well ventilation codes
C. Motor control center (MCC) rooms
D. None of the above

Odor Control

111. Odor control is frequently required for lift stations, a relatively simple and widely used odor control alternative is minimizing?

A. Chemical flatulence
B. Ventilation turbulence
C. Wet-well turbulence
D. None of the above

Performance

112. The overall performance of a lift station depends on the?

A. Overall efficiency
B. Efficiency
C. Performance of the pump(s)
D. None of the above

113. Which of the following is the quantity of liquid pumped per unit of time, typically measured as gallons per minute or million gallons per day?

A. Capacity (flow rate)
B. Efficiency
C. Head
D. None of the above

Operation and Maintenance

114. Which of the following includes observation of pumps, motors and drives for unusual noise, vibration, heating and leakage, check of pump suction?

A. Lift station inspection
B. Lift station operation
C. Scrubber system
D. None of the above

ONSITE SEWAGE FACILITIES (OSSF) ONSITE SYSTEMS SECTION

115. 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)

116. 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

117. 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

118. 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

119. OSSFs account for approximately _____% of all domestic wastewater treatment in the United States.
A. 25 C. 50
B. 15 D. None of the above

Types of Sewer Systems
120. Centralized sewer systems are generally broken out into three different categories: sanitary sewers, storm sewers, and_____.
A. Septic system(s) C. Onsite wastewater management program(s)
B. Combined sewers D. None of the above

121. Which of the following are designed to quickly get rainwater off the streets during rain events?
A. Septic system(s) C. Storm sewers
B. Combined sewers D. None of the above

122. Most _____do not connect with a treatment plant, but instead drain directly into nearby rivers, lakes, or oceans.
A. Septic system(s) C. Storm sewers
B. Combined sewers D. None of the above

123. Leaking, overflowing, and insufficient _____can release untreated wastewater into receiving waters.
A. Wastewater collection systems C. Storm sewers
B. Combined sewers D. None of the above

What is EPA doing to help manage onsite systems?
124. EPA develops _____ for onsite wastewater management program(s).
A. Homeowner awareness C. State-of-the-art research
B. Voluntary policies and guidance D. None of the above

125. EPA sponsors _____ on onsite and clustered wastewater system technologies through demonstration projects.
A. Homeowner awareness C. State-of-the-art research
B. Voluntary policies and guidance D. None of the above

126. EPA promotes _____ to strengthen onsite wastewater management
A. Homeowner awareness C. State-of-the-art research
B. Voluntary policies and guidance D. None of the above

Key Terms
127. Which of following the 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 C. Aerobic Sewage Treatment Facility
B. Aerobic System D. None of the above

128. Which of following the 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 C. Aerobic Sewage Treatment Facility
B. Aerobic System D. None of the above

129. Which of following the means any onsite wastewater treatment system DEQ or the Commission approves for use in lieu of the standard subsurface system?
A. Alternative System C. Aerobic Sewage Treatment Facility
B. Aerobic System D. None of the above

130. Which of following the means may include anaerobic processes as part of the treatment system?
A. Alternative System C. Aerobic Sewage Treatment Facility
B. Aerobic System D. None of the above

Onsite Treatment Processes Options

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

Key Considerations

132. 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 C. Centralized wastewater treatment
B. Septic system D. None of the above

Basic Onsite Treatment Processes

133. 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 C. Collection system(s)
B. Centralized wastewater system(s) D. None of the above

Primary Treatment

134. 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) C. Septic tank effluent filters
B. The tank effluent D. None of the above

Secondary Treatment

135. Which of the following designed to remove organic matter, mostly through digestion and decomposition, often aided by introduction of or exposure to atmospheric oxygen?
A. Wastewater C. Biological and chemical processes
B. Onsite sewage treatment D. None of the above

Key Septic Terms

Identify the missing term.

136. Means any onsite wastewater treatment system DEQ or the Commission approves for use in lieu of the standard subsurface system.
A. Alternative System C. Effective Seepage Area
B. Cesspool D. None of the above

137. 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 C. Intermittent Sand Filter
B. Holding Tank System D. None of the above

138. 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 C. Privy
B. Cesspool D. None of the above

139. 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 C. Swamp
B. Cesspool D. None of the above

Septic System Basics Described
140. Most tanks are split into two compartments and have pipe baffles and an outlet filter to ensure the _____ stay in the tank.
A. Solids C. Biologic process
B. Liquids D. None of the above

141. The _____ process begins in the tank where the effluent separates into layers and begins the process of decomposition.
A. Physical C. Biologic
B. Natural D. None of the above

Types of Systems – General
142. 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

143. 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.
144. 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

145. 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

Pressure Distribution

146. 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
B. Septic system design
C. A pressure distribution system
D. None of the above

147. A minimum of _____ feet of properly drained soil is required under the trenches.

A. Three
B. Two
C. Five
D. None of the above

148. Which of the following are normally the same as a standard gravity system, but the method by which the effluent is distributed to the soil is different?

A. A gravity system
B. The tank and drainfield size
C. A pressure distribution system
D. None of the above

Conventional Septic Systems

149. Which of the following are the most commonly used wastewater treatment technologies, combining primary and secondary treatment?

A. The tank effluent
B. The quantity of contaminants
C. Conventional treatment systems
D. None of the above

150. Conventional treatment systems are the least expensive in terms of total cost but require specific conditions (e.g., at least _____ inches of unsaturated soil) and maintenance to perform adequately.

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

151. A conventional wastewater treatment system consists of a septic tank and _____that allows primary treatment effluent to infiltrate into unsaturated soil.

A. A gravity system
B. A soil absorption field
C. Volumes of treated wastewater
D. None of the above

152. _____facilitates aerobic treatment and filtration of the remaining contaminants.

A. The tank effluent
B. The soil absorption system
C. Effluent to the entire drainfield
D. None of the above

153. Subsurface discharge of effluent to the soil can be configured to optimize treatment via pressurized time-dosing of preset volumes of treated wastewater, which facilitates oxygenation of the soil matrix between doses, promotes film flow of wastewater over soil particles, and ensures a uniform and consistent application of_____.

A. The tank effluent
B. The soil absorption system
C. Effluent to the entire drainfield
D. None of the above

Basic Onsite Wastewater Treatment Systems and Components

154. 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
B. Pressure manifolds
C. Lateral trenches
D. None of the above

Septic Tanks

155. 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

156. 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

157. _____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

158. A septic tank removes many of the settleable solids, oils, greases, and floating debris in the raw wastewater, achieving 60 to 80 percent removal.

A. 50 to 80 C. 60 to 90
B. 60 to 80 D. None of the above

159. Gases that form from the microbial action in the tank rise in the wastewater column. The rising gas bubbles disturb the_____, which can reduce the settling efficiency of the tank.

A. Organic suspended solid(s) C. Quiescent wastewater column
B. Volatile fatty acid(s) D. None of the above

160. Gases dislodge _____in the sludge blanket so they can escape in the water column.

A. Organic suspended solid(s) C. BOD
B. Colloidal particles D. None of the above

Typical SWIS Performance

161. 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

162. 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

163. Which of the following and metals are removed by adsorption, ion exchange and precipitation?

A. Nitrogen C. Phosphorous
B. Nitrate(s) D. None of the above

164. The retention capacity of the soil is finite and will vary with different types of soil mineralogy, _____, Redox potential and cation exchange capacity.
A. Nitrogen C. pH
B. Nitrate(s) D. None of the above

Septic Pretreatment Components
165. 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

166. Which of the following overcome a variety of site limitations?
A. Advanced system(s) C. Final treatment and dispersal components
B. Pressurized distribution methods D. None of the above

Submerged-Flow Wetland or Vegetative Submerged-Bed (VSB)
167. 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

Cluster System Applications
168. 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

169. 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

170. Treatment facilities serving clustered buildings may range from a communal septic tank and _____ to a more advanced treatment system.
A. Soil dispersal system C. Individual and clustered systems
B. Infiltration area protection D. None of the above

Septic System Failures
171. Which of the following failures are a major source of groundwater pollution?
A. Soil dispersal system C. Individual and clustered systems
B. Septic system D. None of the above

172. Layers of soil act as a natural filter, removing microbes and other particles as water seeps through. Improperly treated water can carry _____that can cause gastroenteritis, fever, common cold, respiratory infections and hepatitis.
A. All sewage E. Waterborne pollution
B. Bacteria and viruses D. None of the above

Advanced (Tertiary) Systems Introduction

173. Advanced systems can be designed and built on-site or can consist of prefabricated units designed to overcome some site and soil limitations including:
When the aerated (unsaturated) soil depth below the infiltrative surface in the drainfield is less than the minimum required, advanced treatment processes or components (e.g.,_____) can be added to increase pollutant removal prior to soil discharge.

A. Fixed film treatment units C. Infiltrative surface
B. Septic tank effluent D. None of the above

174. In environmentally sensitive areas, _____ can be used to meet effluent standards for oxygen-demanding wastes, bacteria, nitrogen, and phosphorus.

A. Gravity flow systems C. Advanced systems
B. Septic tank effluent D. None of the above

175. 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

176. _____ 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

177. Wastewater with high organic strength (e.g., from a restaurant) can employ _____to improve aeration, biological decomposition, and treatment of organic wastes.

A. Gravity flow systems C. Advanced treatment units/processes
B. Septic tank effluent D. None of the above

178. Which of the following provide timed dosing of septic tank or treatment unit effluent to the soil can sometimes be used where soil infiltration areas are limited, except in cases of high-clay content soils?

A. Advanced system(s) C. Pressurized distribution methods
B. The dose/rest cycle D. None of the above

179. Advanced systems employ _____can reduce bacteria and nutrient loading to groundwater by applying wastewater high in the soil profile, improving bacteria predation and uptake of nutrients by plants and providing a carbon source for denitrification.

A. Nutrient loading C. Pressure drip dispersal of the effluent
B. Modified dispersal area D. None of the above

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

180. 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

181. 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. At-grade systems C. Modified dispersal area
B. Sand dispersal field D. None of the above

182. 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
183. 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

184. _____ 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

185. The mound should have inspection ports, so wastewater distribution across the infiltration area can be monitored. _____ should have cleanouts so they can be flushed at least twice a year.
A. Media filter(s) C. Distribution lines
B. ATU(s) D. None of the above

Aerobic Treatment Units
186. _____) 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

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

188. 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

189. _____ 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
190. _____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

191. A number of these so-called "_____" are available to treat wastewater.
A. Media filter(s) C. Septic tank effluent
B. ATU(s) D. None of the above

192. Sand is the most commonly used _____, but clean gravel, crushed glass, textile strips, peat, and tire crumbs are also used, depending on site restrictions and state/local regulations.
A. Media C. Soil dispersal field
B. Septic tank effluent D. None of the above

193. In single-pass or intermittent filter (ISF) design, _____is pump-dosed uniformly onto the media at regular intervals 12 to 48 times per day.
A. Media C. Sand
B. Septic tank effluent D. None of the above

194. As the effluent trickles through the _____, suspended and some colloidal particles are filtered, and bacteria growing on the media aerobically treat organic wastewater.
A. Media C. Sand
B. Septic tank effluent D. None of the above

195. Effluent that percolates through the media bed is discharged to the _____.
A. Septic tank effluent C. Aerobic treatment units (ATUs)
B. Soil dispersal field D. None of the above

ONSITE OPERATION AND MAINTENANCE SECTION

System Operation and Maintenance Requirements
196. 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

197. When _____exist, adjustments to the upstream treatment train may be needed to reduce biochemical oxygen demand, total suspended solids, bacteria levels, nutrients, or other pollutants.
A. Groundwater pollution C. Soil limitations
B. Hydraulic failures D. None of the above

198. 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
199. Septic system failures are a major source of _____.
A. Groundwater pollution C. Failure(s)
B. Hydraulic failures D. None of the above

200. _____ 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

Regular Maintenance
201. 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:
202. 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. 50 C. 20
B. 30 D. None of the above

203. Size is important because graywater (laundry water, sink water) and blackwater (toilet water) need to be retained in the tank for at least a _____ to allow solids to separate from the liquids and begin breaking down. If wastewater is pushed through without proper settling, the solids can clog the drainfield, stressing and possibly damaging the system.
A. Day or more C. Week or more
B. 12 hours or more D. None of the above

Individual Wastewater Systems
204. 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

205. Mechanical systems, such as activated sludge-based units, require servicing three to four times a year, while conventional systems need service or pumping every _____ years, depending on occupancy and use.
A. 1 to 5 C. 5 to 10
B. 3 to 5 D. None of the above

Septic System Evaluation Guideline
Enhanced Treatment Systems
206. _____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
207. Advanced or innovative technologies that provide a _____beyond conventional systems. Generally, these systems have mechanical or moving parts that require periodic operation and maintenance, inspections, and eventual replacement.
A. Clustered system(s) C. Higher level of treatment
B. O&M requirement(s) D. None of the above

208. 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
209. 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 seasonally high-saturated zone.
A. Low-saturated zone C. Seasonally high-saturated zone
B. An outfall for the drain D. None of the above

210. The porous medium intercepts the ground water and conveys it to the drainage pipe. To provide an outfall for the drain, one or both ends of the pipe are extended downslope to a point where it intercepts_____.
A. The ground surface C. Drainage enhancements
B. An outfall for the drain D. None of the above

211. 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

212. 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

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

214. 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

215. If not done, ground water that seeps around the _____can render the drain ineffective.
A. End of the drain C. Plume and ground water
B. Outlet locations D. None of the above

Inspections and Maintenance Requirements
216. 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

217. 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
218. 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

219. 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

220. _____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

Maintenance Inspections
221. 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

222. Some local agencies have adopted a sewage management program that requires the annual inspection of systems with newly issued or modified permits and proof of _____ for all systems (old and new).
A. Septic tank pumping C. Operation and maintenance inspection programs
B. Advances in technology D. None of the above

223. _____ are usually coupled with a mandatory septic tank pumping program. The local agency notifies the system owner when pumping is due. Verification of pumping is provided to the regulating agency.
A. Septic tank pumping C. Operation and maintenance inspection programs
B. Advances in technology D. None of the above

Maintenance of Systems
224. 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

225. 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
226. 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

227. 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

228. Up to _____% of the solids retained in the tank will decompose over time.
A. 25 C. 40
B. 50 D. None of the above

229. _____ measure the rate at which clean water disperses through a disposal trench into the soil.
A. Groundwater levels C. Percolation tests
B. Gravitational force D. None of the above

230. Several factors may reduce observed percolation rates when the drain field receives _____.
A. Groundwater levels C. Anoxic septic tank effluent
B. Gravitational force D. None of the above

231. Microbial colonies catabolizing _____from the septic tank effluent will adhere to soil particles and reduce the interstitial area available for water flow between soil particles. These colonies tend to form a low-permeability biofilm of gelatinous slime at the soil interface of the disposal trench
A. Soluble organic compounds C. Insoluble particles small enough
B. Wastewater D. None of the above

232. 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

Septic Management Considerations

233. 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

Aerobic Treatment Units (ATUs)

234. 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

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

Gravity Laterals

236. 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) C. Onsite system
B. Septic tank or ATU D. None of the above

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

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

Dosed Gravity Systems

238._____ can be used to more equally divide effluent between gravity lateral trenches or to proportion effluent to unequal length trenches; however, effluent is still moved along the length of a trench by gravity.

A. Necessary pumping frequency C. Pressure manifold(s)
B. An advanced OWTS D. None of the above

Impacts of Effluent on Groundwater

239. 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 C. Soil treatment trench
B. Distribution media D. None of the above

Soil Treatment Processes

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

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

Biomat

241. 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

Sewage Treatment Utilizing Soil

242. 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

243. 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

Site Evaluations

244. 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

Assure System Performance

245. Wastewater systems depend on the soil for 1) final treatment of effluent from the tank or unit process components, and 2)_____.

A. Final treatment of effluent C. Upstream processes in the treatment train
B. Dispersal of the effluent to the soil D. None of the above

246. The soil component of the system receives, stores, and treats_____.

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

247. The subsurface “ponding” and slow release of effluent to the soil through the biomat facilitates treatment via chemical, physical, and biological processes such as_____, adsorption of potential pollutants (e.g., phosphorus), filtration of solids, and decomposition of organic constituents.

A. Clustered wastewater system(s) C. Aerobic nitrification of ammonia
B. Equilibrium D. None of the above

Improving OSSF Treatment through Performance Requirements

248. 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

249. _____ 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

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

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

Performance-Based Standards

251. 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 C. Primary and secondary processes
B. Clustered facilities D. None of the above

System Design Considerations

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

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

Management Considerations

253. 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

254. 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

255. 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

Permitting and Approval Process

256. State and local governments vary considerably in their approach to approving _____and issuing installation and operation permits.
Consultation with the property owner regarding final design components.

A. Complexity of service C. System types and components
B. Final design components D. None of the above

257. It is important that the application include_____, narratives, forms, calculations, catalog cuts, photos, and other data, including detailed equipment and installation specifications to make siting the system components easier.
A. System drawings C. System maintenance
B. Installation specifications D. None of the above

258. If the site has been developed, all structures, utilities, and _____should be identified.
A. Regular maintenance C. Ingress and egress pathways
B. Septic system D. None of the above

259. 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
260. _____ 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

261. 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

262. 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
263. 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

264. 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

265. 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

SUBSURFACE WASTEWATER INFILTRATION CONSTRUCTION SECTION

Construction Section
266. 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

267. 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

268. 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

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

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

271. Which of the following that leach into ground water used as a drinking water source can cause methemoglobinemia, or blue baby syndrome, and other health problems for pregnant women?
A. Nitrates C. Contaminants
B. Phosphorus D. None of the above

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

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

274. Site preparation requires a number of activities including clearing and surface preparation for filling. Use of lightweight tracked equipment will minimize soil _____.
A. Compaction C. Excavation
B Infiltration D. None of the above

275. Soil _____ should be determined to ensure that it is dry, and care should be taken to avoid soil disturbance as much as possible.
A. Compaction C. Excavation
B. Moisture D. None of the above

276. 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

277. 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
278. 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

279. _____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

280. 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

281. It might be necessary to remove as much as four inches of soil to regain the natural soil porosity and _____.
A. Permeability C. Horizon
B. Disturbance D. None of the above

282. Consequences of the removal of this amount of soil over the entire infiltration surface can be significant. It will reduce the separation distance to the restrictive horizon and could place the infiltration surface in an unacceptable soil_____.
A. Permeability C. Horizon
B. Disturbance D. None of the above

283. 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

Management Considerations
284. 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 Phases
Preparation Phase
285. 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

286. _____ 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

287. 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
288. 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

289. 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

290. 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

291. 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

292. Install access _____to the surface, install outlet filters/screens, and complete installation of pumps, wiring, control panels, and other components.
A. Port risers C. Gravity flow pipe(s)
B. Gravity flow system(s) D. None of the above

293. 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.

294. When moist, a thin ribbon or 1/8 inch or smaller wire formed between thumb and finger will withstand considerable movement and deformation.
A. Sand C. Silty Clay
B. Loamy Sand D. None of the above

295. Consists of large amounts of clay and moderate to small amounts of sand and silt. It breaks into very hard clods or lumps when dry. When moist, a thin, long ribbon or 1/16-inch wire can be molded with ease. Fingerprints will show on the soil, and a dull to bright polish is made on the soil by a shovel.
A. Silt Loam C. Loam
B. Clay D. None of the above

296. Consists of an even mixture of the different sizes of sand and of silt and clay. It is easily crumbled when dry and has a slightly gritty, yet fairly smooth feel. It is slightly plastic.
A. Silt Loam C. Loam
B. Clay D. None of the above

297. 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

298. 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

299. 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

300. 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

301. 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

302. 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

303. 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

304. 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

305. 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

306. When wet, silt loam 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

307. 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

308. 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

309. 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
310. 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 C. An inappropriately high loading rate
B. Measuring the water level drop D. None of the above

311. Maryland and a number of other states also require the use of percolation tests and _____for repairs to existing septic systems that are malfunctioning.
A. Critical factors C. Effluent application rate(s)
B. Site evaluations D. None of the above

312. 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 C. False readings during dry conditions
B. Specific level and timing D. None of the above

313. States and communities once relied solely on these tests to determine _____.
A. Critical factors C. Effluent application rate(s)
B. Percolation test(s) D. None of the above

314. 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 C. Site evaluation
B. Specific level and timing D. None of the above

Fixed Film and Suspended Growth Advanced Treatment Systems
315. Fixed film and suspended growth advanced treatment systems provide an effluent of higher quality than_____.
A. Conventional septic tank discharges C. Effluent application rate(s)
B. Percolation test(s) D. None of the above

316. _____ allow marginal soils to more easily absorb and treat wastewater.
A. Allowable hydraulic loading rates C. An inappropriately high loading rate
B. Higher levels of treatment D. None of the above

317. Regular operation and maintenance attention for these systems is critical to maintaining performance and _____over the long term.
A. Critical factors C. Effluent application rate(s)
B. Ensuring system operation D. None of the above

318. The site evaluator needs to understand and analyze all of these critical factors when recommending_____.
A. Allowable hydraulic loading rates
B. An alternative or advanced treatment system
C. An inappropriately high loading rate
D. None of the above

319. _____may also need to be considered when planning large wastewater treatment systems or clustered facilities.
A. Critical factors
B. Several additional site evaluation factors
C. Effluent application rate(s)
D. None of the above

Perc Condition Terms Associated with Saturation

320. 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

321. 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

322. 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

323. 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

324. Soils in arid and semi-arid areas that have visible accumulations of soluble salts at or near the ground surface.
A. Dark Colored Shrink-Swell Soils
B. Salt-Affected Soils
C. Iron Stripping and Staining in Sandy Soils
D. None of the above

325. 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

326. 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

327. 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

328. 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

329. 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

330. 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

331. Important construction considerations include tank location, bedding and backfilling, watertightness, and_____, especially with non-concrete tanks.
A. Wicking
B. Watertightness
C. Flotation prevention
D. None of the above

Construction Materials

332. 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

333. 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

334. 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

335. 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

336. 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

337. 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

338. 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

339. _____ 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

340. Tank joints should be designed for _____.

A. Properly sealed C. Watertightness
B. Clean and dryness D. None of the above

341. 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
B. Not shrink, harden, or oxidize
C. Be cured, a watertightness test
D. None of the above

342. 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
B. Maximum compression
C. Watertightness
D. None of the above

Location

343. 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
B. High organic content
C. Drainage swales or depressions
D. None of the above

Bedding and Backfilling

344. 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
B. A uniform bearing surface
C. Shape and material of the tank
D. None of the above

345. 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
B. 3
C. 4
D. None of the above

346. 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
B. High organic content
C. Drainage swales or depressions
D. None of the above

Joint Watertightness

347. The joints should be clean and dry before applying the joint sealer. Only _____joint sealers should be used.

A. High-quality
B. Clean and dry
C. Cured
D. None of the above

Flotation Prevention

348. If the tank is set where the soil can be saturated, tank flotation may occur, particularly when the tank is empty (e.g., recently pumped dose tanks or septic tank after septage removal). Tank manufacturers should be consulted for_____.

A. Tank and its contents
B. Appropriate anti-flotation devices
C. Shape and material of the tank
D. None of the above

Placement of the Infiltration Surface

349. Placement of a SWIS infiltration surface may be below, at, or _____ (in an in-ground trench, at grade, or elevated in a mound system).

A. Original soil profile C. Above the existing ground surface
B. SWIS infiltration surface D. None of the above

350. 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

351. 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

Confined Space Section

Confined Space Entry Program

Scope

352. According to the text, you are required to recognize _____ associated with confined spaces.

A. Internal configurations C. The dangers and hazards
B. Permit-Required Confined Spaces D. None of the above

Definitions

Confined space:

353. 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

354. 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

355. A confined space is not designed for _____.

A. An internal configuration C. Continuous employee occupancy
B. Hazardous atmospheres D. None of the above

356. A permit required confined space (permit space) contains or has a potential to contain a _____.

A. Recognized internal configuration C. Entry or exit
B. Hazardous atmosphere D. None of the above

357. 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

358. 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

Confined Space Hazards
359. 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

360. 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
361. _____ are associated with specific types of equipment and the interactions among them. These hazards can be electrical, thermal, chemical, mechanical, etc.
A. Inherent hazards C. Recognized serious safety or health hazards
B. Hazardous atmospheres D. None of the above

362. 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 C. An internal configuration
B. Hazardous atmosphere D. None of the above

363. 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 C. Continuous employee occupancy
B. Hazardous atmospheres D. None of the above

Induced Hazards
364. _____ result from a multitude of incorrect decisions and actions that occur during the actual construction process.
A. Induced hazards C. Build-up of explosive gases
B. Below-grade locations D. None of the above

365. 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 C. Extreme temperatures
B. Flammable atmospheres D. None of the above

Manholes

366. Manholes are necessary to provide a means of entry into and exit from vaults, tanks, and pits, but these confined spaces may present _____ which could cause injuries and fatalities.

A. Serious hazards
B. Ventilation ducts
C. Sumps
D. None of the above

Pipe Assemblies

367. The pipe assembly is one of the _____ encountered throughout the construction site,

A. Electrical shock risks
B. Ventilation ducts
C. Most frequently unrecognized types of confined spaces
D. None of the above

Ventilation Ducts

368. Ventilation ducts create a _____ which moves heated and cooled air and exhaust fumes to desired locations in the plant.

A. Collection place
B. Complex network
C. Shortcut to other areas
D. None of the above

Tanks

369. Tanks are _____ that are used for a variety of purposes, including the storage of water and chemicals.

A. Nitrogen purge locations
B. Collection places
C. Another type of confined workspace
D. None of the above

Sumps

370. Workers may encounter _____ when entering sumps.

A. Nitrogen purge or dry air
B. Problems with pumps
C. An oxygen-deficient atmosphere
D. None of the above

Unusual Conditions

371. The _____ associated with the outer confined space and those of the inner confined space both require testing, monitoring, and control.

A. Potential hazards
B. Access passages
C. Manholes
D. None of the above

372. Often, only the outer space is evaluated for potential hazards. Workers are also faced with _____ when they enter the inner space.

A. Poor lighting
B. Excavations
C. Potentially hazardous conditions
D. None of the above

373. Workers entering a vessel inside an access pit should do so only after both spaces have been evaluated and _____.

A. Purged
B. Accessed
C. Proper control measures established
D. None of the above

Hazards in One Space Entering another Space

374. According to the text, during an examination of _____, situations are often encountered which are not always easy to evaluate or control.

A. Tanks
B. Excavations
C. Confined spaces in construction
D. None of the above

375. A room that classifies as a confined space may be relatively safe for work. However, access passages from other areas outside or adjacent to the room could, at some point, allow the transfer of _____ into the "safe" room.
A. Hazardous agents C. Unauthorized workers
B. Equipment and tools D. None of the above

Permitted Confined Space Entry Program
376. Subpart P (of OSHA's Construction Regulations) applies to all _____ in the earth's surface.
A. Open excavations C. Pits
B. Vaults D. None of the above

Permit Required Confined Space Entry General Rules
377. According to the text, only authorized and trained employees may enter a _____ or act as safety watchmen/attendants.
A. Hazard C. Confined space
B. Pipe D. None of the above

378. 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

379. 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

380. 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
381. 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
382. 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

383. 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

384. A responsibility of the entry attendant is to remain outside the permit space during entry operations until _____.

A. Assistance is requested
B. Safety equipment arrives
C. Relieved by another attendant
D. None of the above

385. 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
B. Encourage entrants
C. Check the work progress
D. None of the above

386. 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
B. Gets approval to summon rescue
C. Determines the entrants need assistance
D. Accurately unauthorized entrants

Special Considerations During A Permit Required Entry

387. If the _____ leave the confined space for any significant period of time, the atmosphere of the confined space must be retested before the workers are allowed to reenter the confined space.

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

Unauthorized Persons

388. Actions must be taken when _____ approach or enter a permit space while entry is under way.

A. Authorized workers
B. Rescue Workers
C. Unauthorized persons
D. None of the above

389. _____ must be warned to stay away from the permit space,

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

Entrants

390. 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
B. Entrants
C. Unauthorized persons
D. None of the above

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

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

392. 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
B. Attendant
C. Unauthorized persons
D. None of the above

Permit Required Confined Space Entry General Rules
Confined Space Entry Permits

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

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

Other Hazards
Flammable Atmospheres

394. Enriched oxygen atmospheres, vaporization of flammable liquids, byproducts of work, and chemical reactions can all create _____.

A. Confined spaces
B. Chemical reactions
C. A flammable atmosphere
D. None of the above

395. Lighter than air gases may rise and develop a _____ if trapped above the opening in a closed top tank.

A. Toxic cloud
B. Toxic atmosphere
C. Flammable concentration
D. None of the above

396. Flammable or explosive conditions within a confined space can be generated from the _____.

A. Atmosphere
B. Chemical reactions
C. Byproducts of work procedures
D. None of the above

397. In a dry state, compounds such as acetylene-metal compounds, peroxides, and nitrates have the potential to explode upon percussion or exposure to _____.

A. Toxic fumes
B. Increased temperature
C. High charges of static electricity
D. None of the above

Toxic Atmospheres

398. The entire spectrum of gases, vapors, and finely-divided airborne dust in industry can be regarded as _____.

A. High charges of static electricity
B. Toxic in a confined space
C. Spontaneous chemical reactions
D. None of the above

399. The sources of toxic atmospheres encountered may arise from: 1. The manufacturing process; 2. The product stored; or 3. The _____ in the confined space.

A. Toxic fumes
B. Operation performed
C. Decomposition of organic matter
D. None of the above

400. Carbon monoxide results as a product of _____ when silo gas forms in grain storage elevators.

A. Organic materials
B. CO_2
C. Decomposition
D. None of the above