Registration form

WASTEWATER TREATMENT SURVEY 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

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_____

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

Collection___ Wastewater Treatment ___ Pretreatment____ Other _____

Your certificate will be mailed to you in about two weeks unless you pay for the rush service.

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

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

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

AFFIDAVIT OF EXAM COMPLETION

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

Grading Information

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

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

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

All downloads are electronically tracked and monitored for security purposes.

No refunds.

Wastewater Treatment Survey Answer Key

Name_____

Phone _____

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

Method of Course acceptance confirmation. Please fill this section

Website __ Telephone Call___ Email____ Spoke to_____

Do not solely depend on TLC's Approval list for it may be outdated.

What is the 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.

You can use Adobe Acrobat DC Program to complete the assignment.

Multiple Choice. Pick only one answer per question. Circle, Mark off, underline or Bold the answer.

1.	A B C D E F	15.	A B C D E F	29.	A B C D E F
2.	A B C D E F	16.	A B C D E F	30.	A B C D E F
3.	A B C D E F	17.	A B C D E F	31.	A B C D E F
4.	A B C D E F	18.	A B C D E F	32.	A B C D E F
5.	A B C D E F	19.	A B C D E F	33.	A B C D E F
6.	A B C D E F	20.	A B C D E F	34.	A B C D E F
7.	A B C D E F	21.	A B C D E F	35.	A B C D E F
8.	A B C D E F	22.	A B C D E F	36.	A B C D E F
9.	A B C D E F	23.	A B C D E F	37.	A B C D E F
10.	A B C D E F	24.	A B C D E F	38.	A B C D E F
11.	A B C D E F	25.	A B C D E F	39.	A B C D E F
12.	A B C D E F	26.	A B C D E F	40.	A B C D E F
13.	A B C D E F	27.	A B C D E F	41.	A B C D E F
14.	A B C D E F	28.	A B C D E F	42.	A B C D E F

43. A B C D E F
44. A B C D E F
45. A B C D E F
46. A B C D E F
47. A B C D E F
48. A B C D E F
49. A B C D E F
50. A B C D E F
51. A B C D E F
52. A B C D E F
53. A B C D E F
54. A B C D E F
55. A B C D E F
56. A B C D E F
57. A B C D E F
58. A B C D E F
59. A B C D E F
60. A B C D E F
61. A B C D E F
62. A B C D E F
63. A B C D E F
64. A B C D E F
65. A B C D E F
66. A B C D E F
67. A B C D E F
68. A B C D E F
69. A B C D E F
70. A B C D E F
71. A B C D E F
72. A B C D E F
73. A B C D E F
74. A B C D E F
75. A B C D E F
76. A B C D E F
77. A B C D E F
78. A B C D E F
79. A B C D E F
80. A B C D E F
81. A B C D E F
82. A B C D E F
83. A B C D E F
84. A B C D E F
85. A B C D E F
86. A B C D E F
87. A B C D E F
88. A B C D E F
89. A B C D E F
90. A B C D E F
91. A B C D E F
92. A B C D E F
93. A B C D E F
94. A B C D E F
95. A B C D E F
96. A B C D E F
97. A B C D E F
98. A B C D E F
99. A B C D E F
100. A B C D E F
101. A B C D E F
102. A B C D E F
103. A B C D E F
104. A B C D E F
105. A B C D E F
106. A B C D E F
107. A B C D E F
108. A B C D E F
109. A B C D E F
110. A B C D E F
111. A B C D E F
112. A B C D E F
113. A B C D E F
114. A B C D E F
115. A B C D E F
116. A B C D E F
117. A B C D E F
118. A B C D E F
119. A B C D E F
120. A B C D E F
121. A B C D E F
122. A B C D E F
123. A B C D E F
124. A B C D E F
125. A B C D E F
126. A B C D E F
127. A B C D E F
128. A B C D E F
129. A B C D E F
130. A B C D E F
131. A B C D E F
132. A B C D E F
133. A B C D E F
134. A B C D E F
135. A B C D E F
136. A B C D E F
137. A B C D E F
138. A B C D E F

139. A B C D E F
140. A B C D E F
141. A B C D E F
142. A B C D E F
143. A B C D E F
144. A B C D E F
145. A B C D E F
146. A B C D E F
147. A B C D E F
148. A B C D E F
149. A B C D E F
150. A B C D E F
151. A B C D E F
152. A B C D E F
153. A B C D E F
154. A B C D E F
155. A B C D E F
156. A B C D E F
157. A B C D E F
158. A B C D E F
159. A B C D E F
160. A B C D E F
161. A B C D E F
162. A B C D E F
163. A B C D E F
164. A B C D E F
165. A B C D E F
166. A B C D E F
167. A B C D E F
168. A B C D E F
169. A B C D E F
170. A B C D E F
171. A B C D E F
172. A B C D E F
173. A B C D E F
174. A B C D E F
175. A B C D E F
176. A B C D E F
177. A B C D E F
178. A B C D E F
179. A B C D E F
180. A B C D E F
181. A B C D E F
182. A B C D E F
183. A B C D E F
184. A B C D E F
185. A B C D E F
186. A B C D E F
187. A B C D E F
188. A B C D E F
189. A B C D E F
190. A B C D E F
191. A B C D E F
192. A B C D E F
193. A B C D E F
194. A B C D E F
195. A B C D E F
196. A B C D E F
197. A B C D E F
198. A B C D E F
199. A B C D E F
200. A B C D E F
201. A B C D E F
202. A B C D E F
203. A B C D E F
204. A B C D E F
205. A B C D E F
206. A B C D E F
207. A B C D E F
208. A B C D E F
209. A B C D E F
210. A B C D E F
211. A B C D E F
212. A B C D E F
213. A B C D E F
214. A B C D E F
215. A B C D E F
216. A B C D E F
217. A B C D E F
218. A B C D E F
219. A B C D E F
220. A B C D E F
221. A B C D E F
222. A B C D E F
223. A B C D E F
224. A B C D E F
225. A B C D E F
226. A B C D E F
227. A B C D E F
228. A B C D E F
229. A B C D E F
230. A B C D E F
231. A B C D E F
232. A B C D E F
233. A B C D E F
234. A B C D E F

235. A B C D E F
236. A B C D E F
237. A B C D E F
238. A B C D E F
239. A B C D E F
240. A B C D E F
241. A B C D E F
242. A B C D E F
243. A B C D E F
244. A B C D E F
245. A B C D E F
246. A B C D E F
247. A B C D E F
248. A B C D E F
249. A B C D E F
250. A B C D E F
251. A B C D E F
252. A B C D E F
253. A B C D E F
254. A B C D E F
255. A B C D E F
256. A B C D E F
257. A B C D E F
258. A B C D E F
259. A B C D E F
260. A B C D E F
261. A B C D E F
262. A B C D E F
263. A B C D E F
264. A B C D E F
265. A B C D E F
266. A B C D E F
267. A B C D E F
268. A B C D E F
269. A B C D E F
270. A B C D E F
271. A B C D E F
272. A B C D E F
273. A B C D E F
274. A B C D E F
275. A B C D E F
276. A B C D E F
277. A B C D E F
278. A B C D E F
279. A B C D E F
280. A B C D E F
281. A B C D E F
282. A B C D E F
283. A B C D E F
284. A B C D E F
285. A B C D E F
286. A B C D E F
287. A B C D E F
288. A B C D E F
289. A B C D E F
290. A B C D E F
291. A B C D E F
292. A B C D E F
293. A B C D E F
294. A B C D E F
295. A B C D E F
296. A B C D E F
297. A B C D E F
298. A B C D E F
299. A B C D E F
300. A B C D E F
301. A B C D E F
302. A B C D E F
303. A B C D E F
304. A B C D E F
305. A B C D E F
306. A B C D E F
307. A B C D E F
308. A B C D E F
309. A B C D E F
310. A B C D E F
311. A B C D E F
312. A B C D E F
313. A B C D E F
314. A B C D E F
315. A B C D E F
316. A B C D E F
317. A B C D E F
318. A B C D E F
319. A B C D E F
320. A B C D E F
321. A B C D E F
322. A B C D E F
323. A B C D E F
324. A B C D E F
325. A B C D E F
326. A B C D E F
327. A B C D E F
328. A B C D E F
329. A B C D E F
330. A B C D E F

331. A B C D E F
332. A B C D E F
333. A B C D E F
334. A B C D E F
335. A B C D E F
336. A B C D E F
337. A B C D E F
338. A B C D E F
339. A B C D E F
340. A B C D E F
341. A B C D E F
342. A B C D E F
343. A B C D E F
344. A B C D E F
345. A B C D E F
346. A B C D E F
347. A B C D E F
348. A B C D E F
349. A B C D E F
350. A B C D E F
351. A B C D E F
352. A B C D E F
353. A B C D E F
354. A B C D E F
355. A B C D E F
356. A B C D E F
357. A B C D E F
358. A B C D E F
359. A B C D E F
360. A B C D E F
361. A B C D E F
362. A B C D E F
363. A B C D E F
364. A B C D E F
365. A B C D E F
366. A B C D E F
367. A B C D E F
368. A B C D E F
369. A B C D E F
370. A B C D E F
371. A B C D E F
372. A B C D E F
373. A B C D E F
374. A B C D E F
375. A B C D E F
376. A B C D E F
377. A B C D E F
378. A B C D E F
379. A B C D E F
380. A B C D E F
381. A B C D E F
382. A B C D E F
383. A B C D E F
384. A B C D E F
385. A B C D E F
386. A B C D E F
387. A B C D E F
388. A B C D E F
389. A B C D E F
390. A B C D E F
391. A B C D E F
392. A B C D E F
393. A B C D E F
394. A B C D E F
395. A B C D E F
396. A B C D E F
397. A B C D E F
398. A B C D E F
399. A B C D E F
400. A B C D E F
401. A B C D E F
402. A B C D E F
403. A B C D E F
404. A B C D E F
405. A B C D E F
406. A B C D E F
407. A B C D E F
408. A B C D E F
409. A B C D E F
410. A B C D E F
411. A B C D E F
412. A B C D E F
413. A B C D E F
414. A B C D E F
415. A B C D E F
416. A B C D E F
417. A B C D E F
418. A B C D E F
419. A B C D E F
420. A B C D E F
421. A B C D E F
422. A B C D E F
423. A B C D E F
424. A B C D E F
425. A B C D E F
426. A B C D E F

427. A B C D E F
428. A B C D E F
429. A B C D E F
430. A B C D E F
431. A B C D E F
432. A B C D E F
433. A B C D E F
434. A B C D E F
435. A B C D E F
436. A B C D E F
437. A B C D E F
438. A B C D E F
439. A B C D E F
440. A B C D E F
441. A B C D E F
442. A B C D E F
443. A B C D E F
444. A B C D E F
445. A B C D E F
446. A B C D E F
447. A B C D E F
448. A B C D E F
449. A B C D E F
450. A B C D E F
451. A B C D E F
452. A B C D E F
453. A B C D E F
454. A B C D E F
455. A B C D E F
456. A B C D E F
457. A B C D E F
458. A B C D E F
459. A B C D E F
460. A B C D E F
461. A B C D E F
462. A B C D E F
463. A B C D E F
464. A B C D E F
465. A B C D E F
466. A B C D E F
467. A B C D E F
468. A B C D E F
469. A B C D E F
470. A B C D E F
471. A B C D E F
472. A B C D E F
473. A B C D E F
474. A B C D E F
475. A B C D E F
476. A B C D E F
477. A B C D E F
478. A B C D E F
479. A B C D E F
480. A B C D E F
481. A B C D E F
482. A B C D E F
483. A B C D E F
484. A B C D E F
485. A B C D E F
486. A B C D E F
487. A B C D E F
488. A B C D E F
489. A B C D E F
490. A B C D E F
491. A B C D E F
492. A B C D E F
493. A B C D E F
494. A B C D E F
495. A B C D E F
496. A B C D E F
497. A B C D E F
498. A B C D E F
499. A B C D E F
500. A B C D E F

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

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

WASTEWATER TREATMENT SURVEY CEU 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.

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

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

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

4. How did you hear about this Course? _____

5. What would you do to improve the Course?

_____

_____

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.

_____

_____

Wastewater Treatment Survey Training Course Assignment

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

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

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

Basic Wastewater Treatment Processes- Physical

1. In wastewater treatment, particles with which of the following terms, float to the top of water and can also be removed.

A. Biosolid(s)
B. Activated Sludge
C. Chemical(s)
D. Organic material
E. Entrapped air
F. None of the Above

Biological

2. The bacteria normally present in wastewater must have oxygen to do their part in breaking down the sewage.

A. True B. False

3. Which of the following wastewater terms means - is a suspended growth process for removing organic matter from sewage by saturating it with air and microorganisms that can break down the organic matter?

A. Biosolid(s)
B. Activated Sludge
C. Chemical(s)
D. Organic material
E. Entrapped air
F. None of the Above

Chemical

4. Which of the following wastewater terms are often used at the later stages of treatment to improve the settling of excess microbiological growth or biosolids?

A. Biosolid(s)
B. Activated Sludge
C. Chemical(s)
D. Organic material
E. Polymers
F. None of the Above

Organic Matter

5. Two toxic _____ like benzene and toluene are found in some solvents, pesticides, and other products.

A. Nutrients from wastewater
B. Inorganic materials
C. Inorganic minerals
D. Excessive grease
E. Organic compounds
F. None of the Above

Oil and Grease

6. Which of the following wastewater terms also adds to the septic tank scum layer, causing more frequent tank pumping to be required?

A. Nutrients from wastewater
B. Inorganic materials
C. Inorganic minerals
D. Excessive grease
E. Nitrogen and phosphorus
F. None of the Above

Inorganics

7. According to the text, heavy metals can be discharged with many types of industrial wastewaters are difficult to remove by conventional treatment methods.

A. True b. False

8. Which of the following wastewater terms - metals, and compounds, such as sodium, potassium, calcium, magnesium, cadmium, copper, lead, nickel, and zinc are common in wastewater from both residential and nonresidential sources?

A. Nutrients from wastewater
B. Inorganic materials
C. Inorganic minerals
D. Excessive grease
E. Pesticides and herbicide(s)
F. None of the Above

Nutrients

9. Normally, excessive nutrients in receiving waters cause algae and other plants to grow quickly adding oxygen in the water, because of this additional of oxygen, fish and other aquatic life thrive.

A. True B. False

Solids

10. Which of the following terms must be treated, or they will clog soil absorption systems or reduce the effectiveness of disinfection systems?

A. BOD
B. Organic material
C. The solids
D. Microorganisms
E. Suspended solids in wastewater
F. None of the Above

Gases

11. Methane gas, is a byproduct of this wastewater term and is highly combustible.

A. Dissolved oxygen
B. Oxygen-demanding
C. Magnesium hydroxide
D. Biochemical oxygen demand, or BOD
E. Anaerobic biological treatment
F. None of the Above

Hydrogen Sulfide and Ammonia

12. The gases hydrogen sulfide and along with this substance can be toxic and pose asphyxiation hazards.

A. Ammonia
B. Wastewater odor(s)
C. Hydrogen sulfide or H_2S problem(s)
D. The lack of oxygen
E. Less oxygen
F. None of the Above

13. Ammonia as a dissolved gas in wastewater also is not dangerous to fish.

A. True B. False

Pollutants, Oxygen-Demanding Substances

14. Oxygen-demanding substances are usually destroyed or converted to other compounds by this term if there is sufficient oxygen present in the water.

A. Dissolved oxygen
B. Oxygen-demanding
C. Magnesium hydroxide
D. Biochemical oxygen demand, or BOD
E. Bacteria
F. None of the Above

Pathogens

15. According to the text, modern disinfection techniques have greatly reduced the danger of waterborne disease.

A. True B. False

Nutrients

16. Which of the following wastewater terms - are essential to living organisms and are the chief nutrients present in natural water?

A. Oxygen
B. Ecology
C. Nutrient enrichment
D. Carbon, nitrogen, and phosphorus
E. Phosphorus and nitrogen
F. None of the Above

17. Uncontrolled algae growth blocks out sunlight and chokes aquatic plants and animals by depleting _____in the water at night.

A. Pathogen(s)
B. Dissolved oxygen
C. Nutrient enrichment
D. Excessive growth of algae
E. Phosphorus and nitrogen
F. None of the Above

18. According to the text, the release of nutrients in quantities that exceed the affected waterbody's ability to assimilate them results in a condition called?

A. Toxic
B. Ecology
C. Nutrient enrichment
D. Eutrophication or cultural enrichment
E. Oxygen and organic waste
F. None of the Above

19. Which of the following wastewater terms - do not remove the phosphorus and nitrogen to any substantial extent?

A. Biofilm
B. Some contaminants
C. Secondary treatment
D. Conventional secondary biological treatment processes
E. Oxygen and organic waste
F. None of the Above

20. According to the text, nutrients may convert the organic forms of these substances into mineral form, making them more usable by plant life.

A. True B. False

21. An excess of these nutrients over-stimulates the growth of water plants, the result causes unsightly conditions, interferes with drinking water treatment processes, and causes unpleasant and disagreeable tastes and odors in drinking water.

A. True B. False

22. Primarily _____but occasionally nitrogen, causes nutrient enrichment which results in excessive growth of algae.

A. Phosphorus
B. Heavy metals
C. Nutrient enrichment
D. Excessive growth of algae
E. Phosphorus and nitrogen
F. None of the Above

Inorganic and Synthetic Organic Chemicals

23. Inorganic and Synthetic Organic Chemicals can cause _____problems, and many are not effectively removed by conventional wastewater treatment.

A. Toxic
B. Ecology
C. Nutrient enrichment
D. Excessive growth of algae
E. Taste and odor
F. None of the Above

Thermal

24. Which of the following terms - reduces the capacity of water to retain oxygen?

A. Heat
B. Heavy metals
C. Nutrient enrichment
D. Excessive growth of algae
E. Phosphorus and nitrogen
F. None of the Above

25. Unchecked discharges of this term can seriously alter the ecology of a lake, a stream, or estuary.

A. Toxic
B. Waste heat
C. Nutrient enrichment
D. Eutrophication or cultural enrichment
E. Phosphorus and nitrogen
F. None of the Above

26. According to the text, even discharges from wastewater treatment plants and storm water retention ponds affected by winter can be released at temperatures below that of the receiving water, and lower the stream temperature.

A. True B. False

Primary Treatment

27. The secondary stage uses this term to further purify wastewater.

A. Very fine solids
B. Biological processes
C. Pollutant(s)
D. Primary sludge
E. Grit and screenings
F. None of the Above

Preliminary Treatment

28. The Preliminary Treatment is purely physical stage consisting of Coarse Screening, Raw Influent Pumping, Static Fine Screening, Grit Removal, and Selector Tanks.

A. True B. False

29. The _____enters from the collection system into the Coarse Screening process.

A. Solid(s)
B. Finer debris
C. Grit and gravel
D. Raw wastewater
E. Dissolved organic and inorganic constituents
F. None of the Above

30. After the wastewater has been screened, it may flow into a grit chamber where sand, grit, cinders, and small stones settle to the bottom

A. True B. False

31. Especially in cities with combined sewer systems, removing the _____that washes off streets or land during storms is very important.

A. Very fine solids
B. Grit and gravel
C. Pollutant(s)
D. Primary sludge
E. Grit and screenings
F. None of the Above

32. Large amounts of this term entering a treatment plant can cause serious operating problems, such as excessive wear of pumps and other equipment.

A. Solid(s)
B. Finer debris
C. Grit and gravel
D. Grit and sand
E. Dissolved organic and inorganic constituents
F. None of the Above

33. In some plants, another finer screen is placed after the grit chamber to remove any additional material that might damage equipment or interfere with later processes.

A. True B. False

34. Which of the following terms - then passes into the Static Fine Screening process which consists of two stationary (or static) screens?

A. Solid(s)
B. Finer debris
C. Grit and gravel
D. Flow
E. Dissolved organic and inorganic constituents
F. None of the Above

35. The wastewater passes into the _____process which consists of two vortex grit separators which produce a whirlpool action to force the finest debris to the outside perimeter.

A. Very fine solids
B. De-gritted wastewater
C. Grit Removal
D. Primary sludge
E. Grit and screenings
F. None of the Above

36. Which of the following terms - removed by these processes must be periodically collected and trucked to a landfill for disposal or are incinerated?

A. Very fine solids
B. Wastewater
C. Pollutant(s)
D. Primary sludge
E. Grit and screenings
F. None of the Above

37. The Coarse Screening consists of a basket shaped bar screen which collects larger debris (several inches in diameter) prior to the Raw Influent Pumping.

A. True B. False

38. Which of the following terms - is removed and placed into a dumpster for disposal into the landfill?

A. Liquids
B. Finer debris
C. Compounds
D. Debris
E. Dissolved organic and inorganic constituents
F. None of the Above

39. Which of the following terms - passes into the Raw Influent Pumping process that consists of submersible centrifugal pumps?

A. Wastewater
B. Split samples
C. Duplicate samples
D. Dissolved organic and inorganic constituents
E. Grit and gravel
F. None of the Above

Primary Sedimentation

40. Pollutants that are dissolved or are very fine and remain suspended in the wastewater are easily removed effectively by gravity settling.
A. True B. False

41. When the wastewater enters a sedimentation tank, it slows down and the suspended solids gradually sink to the bottom, this mass of solids is called?
A. Very fine solids D. Primary sludge
B. Wastewater E. Grit and screenings
C. Pollutant(s) F. None of the Above

42. When the screening completed and the grit removed, wastewater is clear of dissolved organic and inorganic constituents along with suspended solids.
A. True B. False

43. Which of the following wastewater treatment terms - consist of minute particles of matter that can be removed from the wastewater with further treatment such as sedimentation or gravity settling, chemical coagulation, or filtration?
A. Solid(s) D. Suspended growth process(es)
B. Suspended solids E. Dissolved organic and inorganic constituents
C. Grit and gravel F. None of the Above

Secondary Treatment

44. The wastewater enters from Preliminary Treatment into the clarifier process which is a biological process consisting of large oval shaped basins which are capable of removing these finer solids.
A. True B. False

45. Maintaining a population of microorganisms within the oxidation basins which consumes the _____and also adhere to the solids themselves.
A. Total Solids D. Elevated Hardness, Salty Taste, or Corrosiveness
B. TDS E. Wastewater temperature
C. Very fine solids F. None of the Above

46. Which of the following terms - form larger and heavier aggregates that can by physically separated?
A. Solid(s) D. Finer solids
B. Finer debris E. Dissolved organic and inorganic constituents
C. Grit and gravel F. None of the Above

47. After this term has been through Primary Treatment processes, it flows into the next stage of treatment called secondary.
A. Very fine solids D. Primary sludge
B. Wastewater E. Grit and screenings
C. Pollutant(s) F. None of the Above

48. The two most common conventional methods used to achieve secondary treatment are: this term and suspended growth processes.
A. Solid(s) D. Unsuspended growth process(es)
B. Finer debris E. Organic matter
C. Attached growth processes F. None of the Above

49. The Secondary Treatment stage consists of a biological process such as this term and a physical process, Secondary Clarification.

A. Wildlife habitat
B. Oxidation Ditches
C. Denitrification
D. Phosphorus-reduction system(s)
E. Excessive sludge production
F. None of the Above

50. The Preliminary Treatment stage removes as much _____ as possible using physical processes.

A. Solid(s)
B. Finer debris
C. Grit and gravel
D. Suspended growth process(es)
E. Dissolved organic and inorganic constituents
F. None of the Above

Nutrient Removal Technologies

Fixed-film systems - Aerobic/anaerobic trickling filter package plant

51. Which of the following terms - are biological treatment processes that employ a medium such as rock, plastic, wood, or other natural or synthetic solid material that will support biomass on its surface?

A. Trickling filter(s)
B. Fixed-film systems (FFSs)
C. Nitrogen removal system(s)
D. Aerobic nitrification processes
E. Recirculating sand filters (RSFs)
F. None of the Above

52. Which of the following terms - returns to the anoxic zone to mix with either septic tank contents or incoming septic tank effluent for denitrification?

A. Filamentous organisms
B. Floc particles
C. Organic material
D. Nitrified effluent
E. Biosurfactant trehalose
F. None of the Above

53. Which of the following terms is discharged for disposal or further treatment?

A. Ammonia oxidation
B. Phosphorus removal
C. Nitrate removal
D. Denitrified effluent
E. Oxygen demand of wastewater
F. None of the Above

54. According to the text, currently typical trickling filters systems are capable of producing effluent _____ concentrations of 5 to 40 mg/L.

A. Nitrified effluent
B. Nitrogen
C. Total Nitrogen (TN)
D. Nitrogen and phosphorus levels
E. BOD and TSS
F. None of the Above

Sequencing batch reactor (SBR)

55. Which of the following terms - can be designed and operated to enhance removal of nitrogen, phosphorus, and ammonia, in addition to removing TSS and BOD?

A. Trickling filter(s)
B. Oxidation Ditches
C. Nitrogen removal system(s)
D. SBRs
E. Recirculating sand filters (RSFs)
F. None of the Above

56. Which of the following terms - are suitable for areas with little land, stringent treatment requirements, and mall wastewater flows such as RV parks, and other small applications?

A. Package plant SBRs
B. Sand filter(s)
C. Chemical adsorption
D. Fixed-film bioreactor(s)
E. Diffused air or mechanical devices
F. None of the Above

57. The SBR system can typically be found in packaged configurations for onsite and small community or?

A. Decanter
B. Underdrain system
C. Sand filter(s)
D. Cluster applications
E. Process control timer(s)
F. None of the Above

58. Which of the following terms - are often sized to provide mixing as well and are operated by the process control timers?

A. Underdrain system
B. Free water surface (FWS) systems
C. SBRs
D. Conventional recirculation tank
E. Anaerobic septic tank effluent
F. None of the Above

59. Several decanter configurations are available, including?

A. Fixed and floating units
B. Recirculating filter(s)
C. Available adsorption sites
D. Septic tank effluent
E. Distribution network
F. None of the Above

Intermittent sand filters (ISF)

60. Intermittent sand filters (ISF) is used to describe a variety of Packed-bed filters of sand or other granular materials available on the market.

A. True B. False

61. Which of the following terms - provide advanced secondary treatment of settled wastewater or septic tank effluent?

A. Trickling filter(s)
B. Oxidation Ditches
C. Sand filters
D. Aerobic nitrification filters
E. Recirculating sand filters (RSFs)
F. None of the Above

62. Which of the following terms - collects the filter effluent for further processing or discharge?

A. SBR process
B. Underdrain system
C. Sand filter(s)
D. Distribution network
E. Process control timer(s)
F. None of the Above

63. Which of the following terms - are aerobic, fixed-film bioreactors?

A. Decanter
B. Sand filter(s)
C. Chemical adsorption
D. Fixed-film bioreactor(s)
E. Diffused air or mechanical devices
F. None of the Above

64. Bioslimes from the growth of microorganisms develop as films on the sand particle surfaces. The microorganisms in the slimes capture soluble and colloidal waste materials in the wastewater as it percolates over the sand surfaces.

A. True B. False

65. Which of the following terms - are strained out at the filter surface?

A. Total Solids
B. TDS
C. Most suspended solids
D. Elevated Hardness, Salty Taste, or Corrosiveness
E. Wastewater temperature
F. None of the Above

66. Which of the following terms - are usually limited, the capacity of the media to retain ions depends on the target constituent, the pH, and the mineralogy of the media?

A. Decanter
B. Sand filter(s)
C. Chemical adsorption
D. Fixed-film bioreactor(s)
E. Adsorption sites in the media
F. None of the Above

67. Phosphorous is one element of concern in wastewater that can be removed in this manner, but the number of available adsorption sites is limited by the?

A. Characteristics of the media
B. Recirculating filter(s)
C. Available adsorption sites
D. Septic tank effluent
E. Distribution network
F. None of the Above

Recirculating sand filters (RSF)

68. Recirculating filters using _____provide advanced secondary treatment of settled wastewater or septic tank effluent.

A. Sand, gravel, or other media
B. Wastewater
C. Denitrification
D. Phosphorus-reduction system(s)
E. Excessive sludge production
F. None of the Above

69. Which of the following terms - collects and recycles the filter effluent to the recirculation tank for further processing or discharge?

A. Underdrain system
B. Free water surface (FWS) systems
C. Oxygen
D. Conventional recirculation tank
E. Anaerobic septic tank effluent
F. None of the Above

70. The basic components of recirculating filters include a recirculation/dosing tank, pump and controls, distribution network, filter bed with an underdrain system, and a return line.

A. True B. False

71. The returned aerobic filtrate in the recirculation tank, mixes with the anaerobic septic tank effluent before being reapplied to the?

A. Underdrain system
B. Free water surface (FWS) systems
C. Filter
D. Conventional recirculation tank
E. Anaerobic septic tank effluent
F. None of the Above

72. Which of the following terms - can be used for a broad range of applications, including single-family residences, large commercial establishments, and small communities?

A. Trickling filter(s)
B. Oxidation Ditches
C. Nitrogen removal system(s)
D. Aerobic nitrification processes
E. RSFs
F. None of the Above

73. Denitrification also has not been shown to occur in RSFs.

A. True B. False

Natural Systems

74. According to the text, wetland systems are typically described in terms of the position of the water surface and/or the type of vegetation grown.

A. True B. False

75. FWS wetlands with long detention times can remove minor amounts of _____ through plant uptake, adsorption, complexation, and precipitation.
A. Total Solids
B. TDS
C. pH
D. Elevated Hardness, Salty Taste, or Corrosiveness
E. Phosphorus
F. None of the Above

76. Which of the following terms is typically greater in the first year or two because of soil absorption?
A. Ammonia oxidation
B. Phosphorus removal
C. Nitrate removal
D. An aerobic wastewater treatment facility
E. Oxygen demand of wastewater
F. None of the Above

77. Which of the following terms is also possible with the use of an addition process, such as chemical addition and mixing prior to a final deep settling pond?
A. Ammonia oxidation
B. Phosphorus removal
C. Nitrate removal
D. An aerobic wastewater treatment facility
E. Oxygen demand of wastewater
F. None of the Above

78. Subsurface flow (SF) wetlands are specifically designed to treat or polish this missing term and are typically constructed as a bed or channel containing appropriate media.
A. Ammonia oxidation
B. Phosphorus removal
C. Nitrate removal
D. Wastewater
E. Oxygen demand of wastewater
F. None of the Above

79. Duckweed fronds can double their mass in two days under ideal conditions of nutrient availability, sunlight, and temperature. Although duckweed can be found in most regions, the rate of growth is optimal at 20 to 30^{o} C and they grow best in a pH range of 3.5 to 8.5.
A. True B. False

80. The wetland, effluent after two weeks is usually discharged by gravity to an unlined wetland bed, if these systems discharge effluent to oxidation ditches, they do not require a NPDES permit.
A. True B. False

81. Solids are filtered and finally settle out of the wastewater within the?
A. Underdrain system
B. Free water surface (FWS) systems
C. Wetland
D. Conventional recirculation tank
E. Anaerobic septic tank effluent
F. None of the Above

82. The emergent macrophytes can transmit the amount of oxygen from the leaves to their roots is negligible compared to the oxygen demand of wastewater, therefore _____are devoid of oxygen.
A. Ammonia oxidation
B. Phosphorus removal
C. Nitrate removal
D. An aerobic wastewater treatment facility
E. Subsurface flow wetlands
F. None of the Above

83. Which of the following terms are a modification of subsurface flow wetlands which contain gravel or coarse sand and are loaded intermittently at the top surface?
A. Trickling filter(s)
B. Oxidation Ditches
C. Nitrogen removal system(s)
D. Vertical flow wetland beds
E. Recirculating sand filters (RSFs)
F. None of the Above

84. Which of the following terms in a subsurface flow wetland can be rapid and effective because the anoxic conditions and carbon sources?

A. Wastewater temperature
B. Phosphorus removal
C. Nitrate removal
D. An aerobic wastewater treatment facility
E. Oxygen demand of wastewater
F. None of the Above

85. Which of the following terms have been used for a number of years to treat wastewater for various purposes?

A. Duckweed
B. Free water surface (FWS) systems
C. Oxygen
D. Conventional recirculation tank
E. Anaerobic septic tank effluent
F. None of the Above

86. Duckweed can grow about six months per year in most U.S. climates. High levels of BOD and _____removal have been observed from duckweed systems. To achieve secondary treatment most duckweed systems are coupled with either facultative or aerated ponds.

A. Total Solids
B. TDS
C. pH
D. Elevated Hardness, Salty Taste, or Corrosiveness
E. TSS
F. None of the Above

87. Nitrogen is removed by plant uptake and?

A. Filamentous organisms
B. Floc particles
C. Organic material
D. Harvesting, by denitrification
E. Biosurfactant trehalose
F. None of the Above

88. A disadvantage of duckweed systems is the large amount of biomass produced by the rapidly growing plants, which creates a _____requirement.

A. Ammonia oxidation
B. Phosphorus removal
C. Nitrate removal
D. Solids handling
E. Oxygen demand of wastewater
F. None of the Above

Proprietary Filters/Improved and Emerging Technologies
Sustainable Nutrient Recovery

89. Studies have shown that about 80 percent of the _____ and 50 percent of the phosphorus in wastewater are derived from urine?

A. Total Solids
B. TDS
C. pH
D. Nitrogen
E. Wastewater temperature
F. None of the Above

90. Which of the following wastewater terms – and pollution, nutrients could be recycled for agricultural use, and could be removed before being mixed with wastewater and released to the environment?

A. Total Solids
B. TDS
C. pH
D. Nitrogen
E. Nitrogen and phosphorus
F. None of the Above

91. If you could separate 50 to 60 percent of urine, this could reduce in-plant carbon dioxide gas discharges and result in fewer impurities in methane captured from sludge digestion.

A. True B. False

92. According to the text, one benefit would be reduced energy consumption at WWTPs as a result of reduced treatment requirements for?

A. Total Solids
B. TDS
C. pH
D. Nitrogen
E. Nitrogen and phosphorus
F. None of the Above

Nutrient Removal for Small Communities and Decentralized Wastewater Treatment Systems

93. Which of the following wastewater terms – treat and dispose of effluent on the same property that produces the wastewater?

A. Groundwater recharge
B. Community drainfield(s)
C. High-aluminum mud(s)
D. Onsite septic systems
E. Small volumes of wastewater
F. None of the Above

94. According to the text, wastewater from several homes is pretreated onsite by individual septic tanks before being transported through alternative sewers to _____treatment unit that is relatively simple to operate and maintain.

A. An offsite decentralized
B. Wastewater
C. Denitrification
D. Phosphorus-reduction system(s)
E. Excessive sludge production
F. None of the Above

95. Wastewater systems such as community drainfields, irrigation systems, and _____ are being installed to reduce infrastructure investment and minimize adverse environmental impacts.

A. Wildlife habitat
B. Package plants
C. Denitrification
D. Phosphorus-reduction system(s)
E. Excessive sludge production
F. None of the Above

96. Additional alternatives that include_____, sand filters, and constructed wetlands can be used to reduce nutrient pollution?

A. Groundwater recharge
B. Community drainfield(s)
C. High-aluminum mud(s)
D. Aerobic tanks
E. Small volumes of wastewater
F. None of the Above

Phosphorus Removal

97. Few phosphorus removal processes are well developed for _____application.

A. Onsite wastewater systems
B. Wastewater
C. Denitrification
D. Phosphorus-reduction system(s)
E. Excessive sludge production
F. None of the Above

98. The controlled addition of chemicals such as aluminum, iron, and calcium compounds with subsequent flocculation and sedimentation has had only limited success because of inadequate operation and maintenance of mechanical equipment and excessive sludge production.

A. True B. False

99. Studies of high-iron sands and _____ indicate that 50 to 95 percent of the phosphorus can be removed?

A. Groundwater recharge
B. Community drainfield(s)
C. High-aluminum mud(s)
D. Nitrogen and phosphorus pollution
E. Small volumes of wastewater
F. None of the Above

Nitrogen Removal

100. There are systems that utilize membrane solids separation following _____ are capable of removing total nitrogen down to very low concentrations (i.e. 3 – 4 mg/L TN).

A. Nitrogen removal system(s)
B. Tertiary process
C. Biological nitrification and denitrification
D. Suspended film system(s)
E. Recirculating sand filters (RSFs
F. None of the Above

101. Which of the following terms are located last in the treatment train prior to subsurface wastewater infiltration system (SWIS) disposal or surface water disposal?

A. Trickling filter(s)
B. Oxidation Ditches
C. Nitrogen removal system(s)
D. Aerobic nitrification processes
E. Recirculating sand filters (RSFs)
F. None of the Above

Secondary Clarification Process

102. The SCP provides quiescent (or calm) conditions which allow the larger aggregates of solids and microorganisms to settle out for collection.

A. True B. False

103. In the SCP, the majority of microorganism-rich underflow (or lower layer) is re-circulated to Tanks as Return Sludge to help sustain the microorganism population in the?

A. Trickling filter(s)
B. Oxidation Ditches
C. Nitrogen removal system(s)
D. Aerobic nitrification processes
E. Recirculating sand filters (RSFs)
F. None of the Above

Fixed Film Systems

104. Which of the following wastewater terms grow microorganisms on substrates such as rocks, sand or plastic?

A. Mature biofilm
B. Activated sludge system
C. Advanced treatment technologies
D. Application-specific microbiology
E. Fixed film systems
F. None of the Above

105. The wastewater is spread over the substrate, allowing the wastewater to flow past the film of microorganisms fixed to the substrate.

A. True B. False

106. Which of the following wastewater terms and rotating biological contactors, and sand filters are examples of fixed film systems?

A. Trickling filter(s)
B. Oxidation Ditches
C. Nitrogen removal system(s)
D. Aerobic nitrification processes
E. Recirculating sand filters (RSFs)
F. None of the Above

Suspended Film Systems

107. As the microorganisms absorb organic matter and nutrients from the wastewater, they grow in size and number. After the microorganisms have been suspended in the wastewater for several hours, they are settled out as sludge.

A. True B. False

108. Which of the following wastewater terms stir and suspend microorganisms in wastewater?

A. Nitrogen removal system(s)
B. Tertiary process
C. Microorganism(s)
D. Suspended film system(s)
E. Recirculating sand filters (RSFs
F. None of the Above

109. Activated sludge, _____, oxidation ditch, and sequential batch reactor systems are all examples of suspended film systems.

A. Trickling filter(s)
B. Extended aeration
C. Nitrogen removal system(s)
D. Aerobic nitrification processes
E. Recirculating sand filters (RSFs)
F. None of the Above

Lagoon Systems

110. Lagoon systems are shallow basins which hold the waste-water for several months to allow for the natural degradation of sewage.

A. True B. False

111. Lagoon systems take advantage of _____and microorganisms in the wastewater to renovate sewage.

A. Nitrogen removal system(s)
B. Tertiary process
C. Natural aeration
D. Suspended film system(s)
E. Recirculating sand filters (RSFs
F. None of the Above

Other Important Wastewater Characteristics

112. One important wastewater characteristic that can affect public health and the environment, as well as the design, cost, and?

A. Treatment processes
B. Total dissolved solids (TDS)
C. Quality of the water
D. The environment
E. Effectiveness of treatment
F. None of the Above

Temperature

113. The best temperatures for wastewater treatment probably range from 77 to 95 degrees Fahrenheit.

A. True B. False

114. Biological treatment activity accelerates in warm temperatures and slows in cool temperatures, but _____can stop treatment processes altogether.

A. Oxygen
B. High TSS
C. Settling sediments
D. Total Suspended Solids (TSS)
E. Extreme hot or cold
F. None of the Above

115. Hot water is a byproduct of many manufacturing processes, is not a pollutant. When discharged in large quantities, it can raise the temperature of receiving streams inproving the natural balance of aquatic life.

A. True B. False

pH

116. The acidity or alkalinity of wastewater affects both treatment and the environment. Low

A. True B. False

117. pH indicates increasing acidity while a low pH indicates increasing alkalinity.
A. True B. False

118. Which of the following terms of wastewater needs to remain between 6 and 9 to protect organism?
A. Total Solids D. Elevated Hardness, Salty Taste, or Corrosiveness
B. TDS E. Wastewater temperature
C. pH F. None of the Above

119. Other substances and some acids can alter _____ can inactivate treatment processes when they enter wastewater from industrial or commercial sources.
A. Total Solids D. Elevated Hardness, Salty Taste, or Corrosiveness
B. TDS E. Wastewater temperature
C. pH F. None of the Above

Total Dissolved Solids
120. Pure water is tasteless, colorless, and odorless and is often called the universal solvent.
A. True B. False

121. Which of the following wastewater terms - is a good solvent and picks up impurities easily?
A. Treatment processes D. Wastewater
B. Total dissolved solids (TDS) E. Water
C. Quality of the water F. None of the Above

122. Which of the following wastewater terms - refer to any minerals, salts, metals, cations or anions dissolved in water?
A. Total Solids D. Elevated Hardness, Salty Taste, or Corrosiveness
B. TDS E. Dissolved solids
C. pH F. None of the Above

123. Which of the following wastewater terms - comprise inorganic salts and some small amounts of organic matter that are dissolved in water?
A. Treatment processes D. Both treatment and the environment
B. Total dissolved solids (TDS) E. Universal solvent
C. Quality of the water F. None of the Above

124. TDS in drinking-water originate from natural sources, sewage, urban run-off, industrial wastewater, and chemicals used in the water treatment process.
A. True B. False

125. The total dissolved solids test provides a qualitative measure of the amount of dissolved ions, but does not tell us the nature or ion relationships.
A. True B. False

126. Which of the following wastewater terms - has been due to natural environmental features such as: mineral springs, carbonate deposits, salt deposits, and sea water intrusion?
A. Total Solids D. Elevated Hardness, Salty Taste, or Corrosiveness
B. TDS E. Wastewater temperature
C. pH F. None of the Above

127. Which of the following wastewater terms – is the concentration is the sum of the cations (positively charged) and anions (negatively charged) ions in the water?
A. Treatment processes D. Both treatment and the environment
B. Total dissolved solids (TDS) E. Universal solvent
C. Quality of the water F. None of the Above

128. The TDS test does not provide us insight into the specific water quality issues, such as: Elevated Hardness, Salty Taste, or?
A. Total Solids D. Corrosiveness
B. TDS E. Wastewater temperature
C. pH F. None of the Above

Total Solids
129. Which of the following wastewater terms –refers to matter suspended or dissolved in water or wastewater, and is related to both specific conductance and turbidity?
A. Total Solids D. Elevated Hardness, Salty Taste, or Corrosiveness
B. TDS E. Wastewater temperature
C. pH F. None of the Above

130. Which of the following wastewater terms –are the term used for material left in a container after evaporation and drying of a water sample?
A. Treatment processes D. Total solids
B. Total dissolved solids (TDS) E. pH
C. Quality of the water F. None of the Above

131. Which of the following wastewater terms –includes both total suspended solids, the portion of total solids retained by a filter and total dissolved solids?
A. Total Solids D. Elevated Hardness, Salty Taste, or Corrosiveness
B. TDS E. Wastewater
C. pH F. None of the Above

132. Which of the following wastewater terms – can be measured by evaporating a water sample in a weighed dish, and then drying the residue in an oven at 103 to 105° C?
A. Treatment processes D. Total Suspended solids
B. Total dissolved solids (TDS) E. Wastewater
C. Quality of the water F. None of the Above

133. The increase in weight of the dish represents the total solids. Instead of total solids, laboratories often measure total suspended solids and/or total dissolved solids.
A. True B. False

Total Suspended Solids (TSS)

134. Total Suspended Solids (TSS) are solids in water that can be trapped by a filter.
A. True B. False

135. Which of the following wastewater terms – can also cause an increase in surface water temperature, because the suspended particles absorb heat from sunlight?
A. Oxygen D. Total Suspended Solids (TSS)
B. High TSS E. Suspended sediment
C. Settling sediments F. None of the Above

136. When suspended solids settle to the bottom of a water body, they can smother the eggs of fish and aquatic insects, as well as suffocate newly hatched insect larvae.
A. True B. False

137. Which of the following wastewater terms – can fill in spaces between rocks which could have been used by aquatic organisms for homes?
A. Oxygen D. Total Suspended Solids (TSS)
B. High TSS E. Suspended sediment
C. Settling sediments F. None of the Above

138. Engineers must allow for this term during wet weather due to inflow and infiltration of extra water into sewers.
A. Peak flow(s) D. This can increase flow(s)
B. Flow volume(s) E. Original design load
C. Additional flows F. None of the Above

139. Which of the following terms - can enter sewers through leaky manhole covers and cracked pipes and pipe joints, diluting wastewater?
A. Peak flow(s) D. Excess water
B. Flow volume(s) E. Original design load
C. Additional flows F. None of the Above

140. The main focus of wastewater treatment plants is to reduce this term in the effluent discharged to natural waters, meeting state and federal discharge criteria.
A. BOD and COD D. Soluble nutrients
B. Some contaminants E. Oxygen and organic waste
C. Secondary treatment effluent F. None of the Above

141. Treatment of wastewater usually involves this term such as the activated sludge system in the secondary stage after preliminary screening.
A. Biological processes D. Application-specific microbiology
B. Activated sludge system E. Pretreatment and pollution prevention
C. Advanced treatment technologies F. None of the Above

142. These secondary treatment steps that harness natural self-purification processes contained in bioreactors for the biodegradation of organic matter and bioconversion of _____ in the wastewater.
A. Biofilm D. Soluble nutrients
B. Some contaminants E. Oxygen and organic waste
C. Secondary treatment effluent F. None of the Above

Application Specific Microbiology

143. Which of the following terms is the preferred methodology in wastewater treatment affecting the efficiency of biological nutrient removal?

A. Mature biofilm
B. Activated sludge system
C. Advanced treatment technologies
D. Application-specific microbiology
E. Pretreatment and pollution prevention
F. None of the Above

144. Laboratory prepared bugs are more efficient in organics removal if they have the right growth environment, this efficiency is multiplied if microorganisms are allowed to grow as temperatures allow.

A. True B. False

145. To reduce the start-up phase for growing a mature biofilm one can also purchase this term from appropriate microbiology vendors.

A. Mature biofilm
B. Activated sludge system
C. Advanced treatment technologies
D. Application-specific microbiology culture
E. Pretreatment and pollution prevention
F. None of the Above

Advanced Methods of Wastewater Treatment

146. As our country and the demand for clean water have grown, it has become more important to produce cleaner wastewater effluents, yet _____ are more difficult to remove than others.

A. Biofilm
B. Some contaminants
C. Secondary treatment effluent
D. Soluble nutrients
E. Oxygen and organic waste
F. None of the Above

147. Pretreatment and pollution prevention which helps limit _____discharged to the sanitary sewer system.

A. Types of wastes
B. Activated sludge system
C. Advanced treatment technologies
D. Application-specific microbiology
E. Pretreatment and pollution prevention
F. None of the Above

148. All WWTPs provide a minimum of?

A. Biofilm
B. Secondary treatment
C. Secondary treatment effluent
D. Pretreatment and pollution prevention
E. Oxygen and organic waste
F. None of the Above

Advanced Treatment Technologies

149. Treatment levels beyond secondary are called advanced treatment.

A. True B. False

150. Which of the following terms - can be extensions of conventional secondary biological treatment to further stabilize oxygen-demanding substances?

A. Mature biofilm
B. Activated sludge system
C. Advanced treatment technologies
D. Application-specific microbiology
E. Pretreatment and pollution prevention
F. None of the Above

151. Advanced treatment may include physical-chemical separation techniques such as adsorption, flocculation/precipitation, membranes for advanced filtration, _____, and reverse osmosis.

A. Denitrification process
B. Organic material
C. Ion exchange
D. Aeration in the reactor
E. Application-specific microbiology
F. None of the Above

Nitrogen Control

152. Nitrogen in one form or another is present in municipal wastewater and is usually not removed by secondary treatment.

A. True B. False

153. Ammonia in wastewater effluent is safe to aquatic life.

A. True B. False

154. Nitrogen in the form of _____can exert a direct demand on oxygen or stimulate the excessive growth of algae.

A. Nitrification
B. Ammonia
C. Nitrogen
D. Nitrogen in the nitrate form
E. Ammonia to the non-toxic nitrate
F. None of the Above

155. Which of the following wastewater treatment terms - beyond the secondary stage, nitrifying bacteria present in wastewater treatment can biologically convert ammonia to the non-toxic nitrate through a process known as nitrification?

A. Nitrification
B. Denitrification
C. Nitrogen
D. Nitrogen in the nitrate form
E. Biological treatment
F. None of the Above

156. Which of the following wastewater treatment terms - process can be added to the system to convert the nitrate to nitrogen gas.

A. Nitrification
B. Denitrification
C. Nitrogen
D. Nitrogen in the nitrate form
E. Additional biological
F. None of the Above

Coagulation-Sedimentation Process

157. Which of the following wastewater treatment terms -added to the wastewater to remove phosphorus?

A. Other alkaline materials
B. A form of stabilization
C. Sewage solids, or sludge
D. Alum, lime, or iron salts are chemicals
E. Phosphate
F. None of the Above

158. Which of the following wastewater treatment terms -is considered an advanced process because it is not routinely applied to the treatment of municipal wastewater?

A. Carbon adsorption
B. An advanced process
C. Coagulation-sedimentation
D. A form of stabilization
E. Processed wastewater solids (“sewage sludge”)
F. None of the Above

Carbon Adsorption

159. Carbon adsorption technology can remove organic materials from wastewater that resist removal by?

A. Denitrification process
B. Biological treatment
C. Bulking sludge
D. Insufficient aeration in the reactor
E. Anaerobic sludge
F. None of the Above

160. Which of the following wastewater treatment terms - consists of passing the wastewater effluent through of activated carbon granules or powder?

A. Carbon adsorption
B. An advanced process
C. Carbonic dioxide
D. A form of stabilization
E. Super treatment
F. None of the Above

The Use or Disposal of Wastewater Residuals and Biosolids

161. When pollutants are removed from water, there may be the _____ that settle to the bottom of sedimentation tanks.

A. Other alkaline materials
B. Solids
C. Sewage solids, or sludge
D. Biosolids
E. Rags and sticks
F. None of the Above

162. The utilization and disposal of the residual process solids is addressed by the CWA, Resource Conservation and Recovery Act (RCRA), and other federal laws.

A. True B. False

Processed Wastewater Solids

163. Which of the following wastewater treatment terms - are considered biosolids and need to meet rigorous standards allowing safe reuse for beneficial purposes?

A. Other alkaline materials
B. A form of stabilization
C. Sewage solids, or sludge
D. Processed wastewater solids
E. Rags and sticks
F. None of the Above

Biosolids Stabilization

164. Prior to utilization or disposal, _____ are stabilized to control odors and reduce the number of disease-causing organisms.

A. Biosolids
B. An advanced process
C. Sewage solids, or sludge
D. Other alkaline materials
E. Processed wastewater solids (“sewage sludge”)
F. None of the Above

165. Which of the following wastewater treatment terms - when separated from the wastewater, contain around 98 percent water?

A. Biosolids
B. An advanced process
C. Sewage solids, or sludge
D. Other alkaline materials
E. Processed wastewater solids (“sewage sludge”)
F. None of the Above

Dewatering Processes

166. To improve dewatering effectiveness, the solids can be pretreated with chemicals such as lime, ferric chloride, or polymers to produce larger particles which are easier to remove.

A. True B. False

167. Which of the following wastewater treatment terms - include drying beds, belt filter presses, plate and frame presses, and centrifuges?
A. Dewatering processes
B. A form of stabilization
C. Sewage solids, or sludge
D. Stabilization of solids
E. Digestion
F. None of the Above

Digestion
168. Digestion is a form of _____where the volatile material can decompose naturally and the potential for odor production is reduced.
A. Dewatering processes
B. Release
C. Sewage solids, or sludge
D. Stabilization of solids
E. Stabilization
F. None of the Above

169. Which of the following wastewater treatment terms - in an enclosed tank has the added benefit of producing methane gas which can be recovered and used as a source of energy?
A. Dewatering processes
B. Digestion without air
C. Sewage solids, or sludge
D. Stabilization of solids
E. Digestion
F. None of the Above

170. Which of the following wastewater treatment terms - may also be accomplished by composting, heat treatments, drying or the addition of lime or other alkaline materials?
A. Dewatering processes
B. A form of stabilization
C. Sewage solids, or sludge
D. Stabilization of solids
E. Digestion
F. None of the Above

Water Quality Criteria
171. The Clean Water Act directs the EPA to develop criteria for water quality that accurately reflect the latest scientific knowledge about the effects of pollutants on aquatic life and human health.
A. True B. False

172. The Clean Water Act and the EPA includes specific information on the concentration and dispersal of pollutants through biological, physical, and chemical processes as well as the effects of pollutants on biological communities as a whole.
A. True B. False

Human Health Criteria
173. EPA scientists research information to determine the levels at which specific chemicals are not likely to adversely affect water quality standard(s).
A. True B. False

Aquatic Life Criteria
174. Allowable concentrations provide protection for plants and animals that are found in surface waters.
A. True B. False

175. Allowable concentrations are designed to provide protection for both freshwater and saltwater aquatic organisms from the effects of acute (short term) and chronic (long term) exposure to potentially harmful chemicals.
A. True B. False

176. Which of the following wastewater treatment terms - are based on toxicity information and are developed to protect aquatic organisms from death, slower growth, reduced reproduction, and the accumulation of harmful levels of toxic chemicals in their tissues that may adversely affect consumers of such organisms?
A. Aquatic life criteria
B. Water pollutant(s)
C. Water quality standard(s)
D. Concentration of pollutant(s)
E. A pollutant level
F. None of the Above

Sediment Quality Criteria Guidance
177. Which of the following wastewater treatment terms - provide a habitat for many living organisms?
A. Allowable concentrations
B. Water quality
C. Sediments
D. Acute (short term) and chronic (long term)
E. Human health and aquatic life criteria
F. None of the Above

Pollutants in the Sediment
178. Which of the following wastewater treatment terms - helps to protect bottom dwelling species and prevents harmful toxins from moving up the food chain?
A. Pollutants in the sediment
B. Water pollutant(s)
C. Water quality standard(s)
D. Concentration of pollutant(s)
E. A pollutant level
F. None of the Above

179. Which of the following wastewater treatment terms - in the sediment that does not harm snails of small fish may bioaccumulate in the food chain?
A. Aquatic life criteria
B. Water pollutant(s)
C. Water quality standard(s)
D. Concentration of pollutant(s)
E. A pollutant level
F. None of the Above

180. Which of the following wastewater treatment terms - The EPA develops on the concentrations or amounts of individual chemicals that can be present in river, lake, or stream sediments
A. Toxic quality criteria guidance
B. Food chain quality guidance
C. Biological integrity guidance
D. Biological treatment(s) quality criteria guidance
E. Sediment quality criteria guidance
F. None of the Above

Biological Criteria
181. A water body in its natural condition is free from this term, habitat loss, and other negative stressors.
A. Allowable concentrations
B. Harmful effects of pollution
C. In a healthy aquatic community
D. Acute (short term) and chronic (long term)
E. Human health and aquatic life criteria
F. None of the Above

182. The EPA is developing methodologies that states can use to assess the biological integrity of their waters and, in so doing, set protective?
A. Toxic pollutant(s) D. Biological treatment(s)
B. Food chain E. Water quality standards
C. Biological integrity F. None of the Above

183. These methodologies will describe scientific methods for determining a particular aquatic community's health and for maintaining optimal conditions in?
A. Allowable concentrations D. Various bodies of water
B. Water quality E. Human health and aquatic life criteria
C. A healthy aquatic community F. None of the Above

Summary
184. Biological wastewater treatment goals are to remove the non-settling solids and the dissolved organic load from the effluents by using microbial populations.
A. True B. False

185. Biological treatments are generally part of secondary treatment systems.
A. True B. False

186. The microorganisms used are responsible for the degradation of ths term and the stabilization of organic wastes.
A. Allowable concentrations D. Organic matter
B. Water quality E. Human health and aquatic life criteria
C. In a healthy aquatic community F. None of the Above

187. Some of the micro-organisms present in wastewater treatment systems use the _____ of the wastewater as an energy source to grow?
A. Toxic pollutant(s) D. Biological treatment(s)
B. Food chain E. Organic content
C. Biological integrity F. None of the Above

Genera
188. In a single aerobic system, members of the genera Pseudomonas, Nocardia, Flavobacterium, Achromobacter and Zooglea may be present, together with filamentous organisms.
A. True B. False

189. In a well-functioning system, protozoas and rotifers are usually present and are useful in consuming dispersed _____ or non-settling particles.
A. Bacteria D. Suspended growth processes
B. Attached growth processes E. Food-to-microorganism ratio, F/M
C. Protozoas and rotifers F. None of the Above

190. The organic load present is incorporated in part as represented by this term by the microbial populations, and almost all the rest is liberated as gas.
A. Biological denitrification D. Biomass
B. Organic load E. Aerobic and facultative micro-organisms
C. Bacteria F. None of the Above

191. Unless the cell mass formed during the biological treatment is removed from the wastewater the treatment is largely incomplete, because the biomass itself will appear as organic load in the effluent and the only pollution reduction accomplished is that fraction liberated as gases.
A. True B. False

192. The biological treatment processes used for wastewater treatment are broadly classified as aerobic in which aerobic and facultative micro-organisms predominate or anaerobic which use?
A. Biological denitrification
B. Organic load
C. Anaerobic micro-organism
D. Nitrogen and phosphorus
E. Aerobic and facultative micro-organisms
F. None of the Above

193. Which of the following terms means the microorganisms that are attached to a surface over which they grow are called "attached growth processes"?
A. Carbonaceous BOD
B. Attached growth processes
C. Protozoans and rotifers
D. Suspended growth processes
E. Food-to-microorganism ratio, F/M
F. None of the Above

Aerobic Processes
194. Which of the following terms are usually designed from pilot plant and laboratory studies?
A. Biological denitrification
B. Organic load
C. Bacteria
D. Nitrogen and phosphorus
E. Activated sludge plants
F. None of the Above

195. Which of the following terms is the amount of food provided to the bacteria in the aeration tank (the food-to-microorganism ratio, F/M)?
A. Carbonaceous BOD
B. Attached growth processes
C. Mean cell residence time (MCRT)
D. Suspended growth processes
E. Food-to-microorganism ratio, F/M
F. None of the Above

Aerobic Bacteria
196. Three bacteria groups occur: freely dispersed, single bacteria; floc-forming bacteria; and filamentous bacteria. All function similarly to oxidize organic carbon to produce CO_2 and new bacteria.
A. True B. False

197. Which of the following bugs or terms which occur are similar to those found in other treatment processes such as activated sludge?
A. Treatment organism(s)
B. Aerobic bacteria
C. Stalked ciliate(s)
D. Floc-forming bacteria
E. Filamentous bacteria
F. None of the Above

198. Which of the following bugs or terms that degrade wastes grow as single bacteria dispersed in the wastewater?
A. Strict aerobes
B. Predators
C. Bacteria
D. Heterotrophic bacteria
E. Many bacterial species
F. None of the Above

199. Which of the following bugs or terms, grow in a large aggregate due to exocellular polymer production?

A. Treatment organism(s)
B. Aerobic bacteria
C. Stalked ciliate(s)
D. Floc-forming bacteria
E. Filamentous bacteria
F. None of the Above

200. Growth form is important as these flocs degrade _____and settle at the end of the process, producing a low TSS effluent.

A. Anaerobic action
B. Absence of free oxygen
C. BOD
D. Aerobic bacteria
E. Application-specific bacteria
F. None of the Above

201. Which of the following bugs or terms occur in lagoons, usually at specific growth environments?

A. Anaerobic action
B. Absence of free oxygen
C. A number of filamentous bacteria
D. Aerobic bacteria
E. Application-specific bacteria
F. None of the Above

202. Which of the following bugs or terms have a wide range in environmental tolerance and can function effectively in BOD removal over a wide range in pH and temperature?

A. Strict aerobes
B. Predators
C. Bacteria
D. Most heterotrophic bacteria
E. Many bacterial species
F. None of the Above

203. Anaerobic BOD removal generally proceeds well from pH 6.5 to 9.0 and at temperatures from 3-4°C to 60-70°C (Aerobic bacteria are replaced by Mesophilic bacteria at temperatures above 35°C).

A. True B. False

204. BOD removal increases rapidly below 3-4°C and ceases at 1-2°C.

A. True B. False

205. A very specialized group of bacteria occurs to some extent in lagoons (and other wastewater treatment systems) that can oxidize ammonia via nitrite to nitrate, termed?

A. Strict aerobes
B. Predators
C. Nitrifying bacteria
D. Heterotrophic bacteria
E. Many bacterial species
F. None of the Above

Aerated lagoons

206. The aerated lagoons are basins, normally excavated in earth and operated without Solids recycling into the system. This is the major difference with respect to activated sludge systems.

A. True B. False

207. Two types are the most common: The Aerobic-anaerobic or partially suspended lagoon in which the concentration of solids and dissolved oxygen are maintained fairly uniform and neither the incoming solids nor the biomass of microorganisms' settle, and the completely mixed lagoon.

A. True B. False

208. In the facultative lagoons, the power input is reduced causing accumulation of solids in the bottom which undergo_____, while the upper portions are maintained aerobic.

A. Facultative lagoon(s)
B. Anaerobic decomposition
C. Aerated lagoon(s)
D. Odors
E. Complete nitrification
F. None of the Above

209. Lagoons are exposed to low temperatures which can cause _____ and eventually the formation of ice.

A. Non-biodegradable fraction
B. Substantial alkalinity
C. Completely mixed lagoon
D. Reduced biological activity
E. Suspended solids in the effluent
F. None of the Above

210. If excavated basins are used for settling, care should be taken to provide a residence time long enough for the?

A. Facultative lagoon(s)
B. Sludge
C. Solids to settle
D. Odors
E. Complete nitrification
F. None of the Above

Nitrification

211. Nitrosomonas europaea, which oxidizes ammonia to nitrite, and Nitrobacter winogradskyi, which oxidizes nitrite to nitrate.

A. True B. False

212. Nitrification, is a major pathway for nitrogen removal in lagoons.

A. True B. False

213. Nitrifying bacteria exists in low numbers in lagoons,tthey prefer attached growth systems and/or?

A. Nitrifying bacteria
B. Methane forming bacteria
C. High MLSS sludge systems
D. Aerobic bacteria
E. Anaerobic, heterotrophic bacteria
F. None of the Above

Anaerobic Bacteria

214. Which of the following bugs or related terms commonly occur in lagoons are involved in methane formation and in sulfate reduction?

A. Nitrifying bacteria
B. Methane forming bacteria
C. Only two bacteria
D. Aerobic bacteria
E. Anaerobic, heterotrophic bacteria
F. None of the Above

215. Anaerobic methane formation involves _____bacteria.

A. Three different groups of anaerobic
B. Methane fermentation
C. Methane bacteria
D. Organic overloading conditions
E. Acid-forming bacteria
F. None of the Above

215. Which of the following bugs or related terms many genera of anaerobic bacteria hydrolyze proteins, fats, and poly saccharides present in wastewater to amino acids?

A. Nitrifying bacteria
B. Methane forming bacteria
C. General anaerobic degraders
D. Aerobic bacteria
E. Anaerobic, heterotrophic bacteria
F. None of the Above

Photosynthetic Organisms

216. Which of the following bugs or related terms that the products of these bugs become the substrate for the methane producers?

A. Nitrifying bacteria
B. Methane forming bacteria
C. Acid formers (principally acetic acid)
D. Aerobic bacteria
E. Anaerobic, heterotrophic bacteria
F. None of the Above

217. Which of the following bugs or related terms ceases at cold temperature?

A. BOD and sulfate
B. Methane fermentation
C. Methane bacteria
D. Organic overloading and anaerobic conditions
E. Acid-forming bacteria
F. None of the Above

218. Which of the following bugs or related terms can use sulfate as an electron acceptor, reducing sulfate to hydrogen sulfide?

A. Nitrifying bacteria
B. Methane forming bacteria
C. Sulfate reducing bacteria
D. Aerobic bacteria
E. Anaerobic, heterotrophic bacteria
F. None of the Above

219. Which of the following bugs or related terms is a major cause of odors in ponds?

A. Sulfate reduction
B. Methane fermentation
C. Methane bacteria
D. Organic overloading and anaerobic conditions
E. Acid-forming bacteria
F. None of the Above

220. Which of the following bugs or related terms and represented by about 28 genera, oxidize reduced sulfur compounds using light energy to produce sulfur and sulfate?

A. Nitrifying bacteria
B. Methane forming bacteria
C. Red and green sulfur bacteria
D. Aerobic bacteria
E. Anaerobic, heterotrophic bacteria
F. None of the Above

221. Which of the following bugs or related terms which can grow in profusion and give a lagoon a pink or red color?

A. Chromatium, Thiocystis, and Thiopedia
B. Methane fermentation
C. Methane bacteria
D. Organic overloading
E. Acid-forming bacteria
F. None of the Above

222. According to the text, conversion of odorous sulfides to sulfur and sulfate by these bugs is a significant odor control mechanism in facultative and anaerobic lagoons.

A. BOD and sulfate
B. Sulfur bacteria
C. Methane bacteria
D. Organic overloading and anaerobic conditions
E. Acid-forming bacteria
F. None of the Above

Treatment Lagoon

223. Bacterial growth on BOD releases CO_2 which subsequently dissolves in water to yield?.

A. Bicarbonate ion (HCO_3)
B. CO_2
C. Carbonate ion (CO_2^3)
D. Carbonic acid (H_2CO_3)
E. Phosphorus
F. None of the Above

224. According to the text, algal growth in lagoons has the opposite effect on lagoon_____, raising the pH due to algal use for growth of inorganic carbon (CO_2 and HCO_3).
A. Alkalinity and Ph
B. CO_2
C. BOD
D. pH
E. Phosphorus
F. None of the Above

225. Algal growth reduces the lagoon alkalinity which may cause the _____ to increase if the lagoon alkalinity (pH buffer capacity) is low.
A. Bicarbonate ion (HCO_3)
B. CO_2
C. Carbonate ion (CO_2^3)
D. pH
E. Phosphorus
F. None of the Above

226. Algae can grow to such an extent in lagoons that they consume?
A. Alkalinity and Ph
B. CO_2
C. BOD
D. All of the CO_2 and HCO_3
E. Phosphorus
F. None of the Above

227. pH caused by _____ can be beneficial.
A. Bicarbonate ion (HCO_3)
B. CO_2
C. Carbonate ion (CO_2^3)
D. Algal growth
E. Phosphorus
F. None of the Above

228. Which of the following related terms, removal by natural chemical precipitation is greatly enhanced at pH values greater than pH = 8.5?
A. Alkalinity and Ph
B. CO_2
C. BOD
D. Algal growth
E. Phosphorus
F. None of the Above

Protozoans and Microinvertebrates

229. Many higher life forms (animals) develop in lagoons. These include protozoans and microinvertebrates such as rotifers, daphnia, annelids, chironomids, and mosquito larvae.
A. True B. False

230. Which of the following bugs or related terms best describe the most common higher life forms in lagoons with about 250 species identified in lagoons to date?
A. Mosquitoes
B. Bacteria and algae
C. Protozoans
D. Rotifers and daphnia
E. Culex tarsalis
F. None of the Above

231. Which of the following bugs or related terms best describe important at controlling algal overgrowth and these often "bloom" when algal concentrations are high?
A. Mosquitoes
B. Bacteria and algae
C. Protozoans
D. Rotifers and daphnia
E. Culex tarsalis
F. None of the Above

232. Which of the following bugs or related terms best describe relatively slow growing and only occur in systems with a detention time of >10 days?
A. Mosquitoes
B. Bacteria and algae
C. Protozoans
D. Rotifers and daphnia
E. Microinvertebrates
F. None of the Above

233. The requirement for a minimum lagoon bank slope and removal of shoreline vegetation by most regulatory agencies is based on the public health need to reduce mosquito vectors.
A. True B. False

Activated Sludge Methods
Organic Load
234. The organic load (generally coming from primary treatment operations such as settling, screening or flotation) enters the reactor where the active microbial population is present. The reactor must be continuously aerated.
A. True B. False

235. The mixture then passes to a settling tank where the cells are settled. The treated wastewater is disinfected while the secondary settling and is recycled in part to the aeration basin.
A. True B. False

236. According to the text, as the cells are retained longer in the system, the flocculating characteristics of the cells improve since they start to produce extra cellular slime which favors?
A. Secondary settling D. Organic load
B. High degradation rate E. Settled biomass
C. Flocculating F. None of the Above

Common Types
237. The most common types of activated sludge are the conventional and the continuous flow stiffed tank, in which the contents are completely mixed. In the conventional process, the wastewater is circulated along the aeration tank, with the flow being arranged by baffles in plug flow mode. The oxygen demand for this arrangement is maximum at the inlet as is the organic load concentration.
A. True B. False

238. In the completely mixed process the inflow streams are usually introduced at several points to facilitate the homogeneity of the mixing; if the mixing is complete, the properties are constant throughout the reactor.
A. True B. False

Paramecium sp.
239. Which of the following bugs is a medium to large size (100-300 µm) swimming ciliate, commonly observed in activated sludge, sometimes in abundant numbers?
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

240. Which of the following bugs is uniformly ciliated over the entire body surface with longer cilia tufts at the rear of the cell.
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

241. Paramecium may also be seen paired up with another _____ which makes a good diagnostic key.
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

242. Which of the following bugs is described as a filter-feeding ciliate because its cilia move and filter bacteria from the water?
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

Vorticella sp.
243. Which of the following bugs feeds by producing a vortex with its feeding cilia?
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

244. According to the text, if treatment conditions are bad, for example low DO or toxicity, _____ will leave their stalks.
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Ciliate
C. Vorticella F. None of the Above

245. Which of the following bugs are present when the plant effluent quality is high?
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

246. According to the text, Vorticella is a?
A. Mixed liquor D. Free-swimming and stalked ciliate(s)
B. Bacteria E. Contracting stalk
C. Stalked ciliate F. None of the Above

247. According to the text, Vorticella are oval to round shaped, have a contractile stalk, a domed feeding zone, and a water vacuole located near the terminal end of the false foot.
A. True B. False

248. After reproducing, the offspring develops a band of swimming cilia and goes off to form its own stalk, the evicted organism is called a?
A. Shelled amoeba(s) D. Swarmer
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

Euglypha sp.
249. Which of the following bugs spines may be single or in groups of two or three?
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

250. The shell of this bug is often transparent, allowing the hyaline (watery) body to be seen inside the shell.
A. Euglypha D. Euchlanis
B. Shelled amoeba(s) E. Spirochaetes
C. Rotifer(s) F. None of the Above

251. Which of the following bugs are common in soil, treatment plants, and stream bottoms where decaying organic matter is present?
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

252. Which of the following bugs is a shelled (testate) amoeba?
A. Shelled amoeba(s) D. Stalked ciliate
B. Euglypha E. Paramecium
C. Vorticella F. None of the Above

253. Which of the following bugs have a rigid covering which is either secreted or built from sand grains or other extraneous materials?
A. Euglypha D. Euchlanis
B. Shelled amoeba(s) E. Spirochaetes
C. Rotifer(s) F. None of the Above

Euchlanis sp.
254. Euchlanis is a swimmer, using its foot and cilia for locomotion. In common with other rotifers, it has a head rimmed with cilia, a transparent body, and a foot with two strong swimming toes.
A. True B. False

255. This microscopic animal is a typical?
A. Euglypha D. Euchlanis
B. Shelled amoeba(s) E. Spirochaetes
C. Rotifer(s) F. None of the Above

256. Which of the following bugs is an omnivore, meaning that its varied diet includes detritus, bacteria, and small protozoa?
A. Euglypha D. Euchlanis
B. Shelled amoeba(s) E. Spirochaetes
C. Rotifer(s) F. None of the Above

257. Which of the following bugs has a glassy shell secreted by its outer skin?
A. Euglypha D. Euchlanis
B. Shelled amoeba(s) E. Spirochaetes
C. Rotifer(s) F. None of the Above

258. A characteristic of this creature is their mastax?
A. Euglypha D. Euchlanis
B. Shelled amoeba(s) E. Spirochaetes
C. Rotifer(s) F. None of the Above

259. According to the text, Euchlanis is commonly found in?
A. Biofilm bacteria D. Activated sludge
B. Filamentous bacteria E. An omnivore
C. Some bacteria F. None of the Above

Bacteria Section
260. Which of the following terms is tightly coiled up bacteria?
A. Cocci D. Spiral
B. Rods E. Spirochaetes
C. Balls F. None of the Above

261. When bacteria live in chains, one after the other, they are called _____ - these often have long thin cells.
A. Biofilm bacteria D. Activated sludge
B. Filamentous bacteria E. An omnivore
C. Some bacteria F. None of the Above

262. Many bacteria exist as this term and the study of biofilms is very important.
A. Filamentous Bacteria D. Either anaerobic or aerobic conditions
B. A biofilm E. Anaerobic to aerobic state
C. Application-specific bacteria F. None of the Above

263. Which of the following terms secrete sticky substances that form a sort of gel in which they live?
A. Biofilm bacteria D. Activated sludge
B. Filamentous bacteria E. An omnivore
C. Some bacteria F. None of the Above

Filamentous Bacteria
264. Which of the following terms are a type of bacteria that can be found in a wastewater treatment system?
A. Filamentous Bacteria D. Either anaerobic or aerobic conditions
B. Facultative E. Anaerobic to aerobic state
C. Application-specific bacteria F. None of the Above

265. According to the text, filamentous Bacteria function similar to _____since they degrade BOD quite well.
A. Biofilm bacteria D. Activated sludge
B. Filamentous bacteria E. Floc forming bacteria
C. Some bacteria F. None of the Above

266. According to the text, filaments are _____that grow in long thread-like strands or colonies.
A. Bacteria D. Bacteria and fungi
B. Facultative Bacteria E. Anaerobic to aerobic state Bacteria
C. Application-specific bacteria F. None of the Above

Site Specific Bacteria
267. Aeration and biofilm building are the key operational parameters that contribute to the efficient degradation of organic matter (BOD/COD removal).
A. True B. False

268. Which of the following terms become site-specific as the biofilm develops and matures and is even more efficient in treating the site-specific waste stream?
A. Anaerobic action
B. Absence of free oxygen
C. Facultative bacteria
D. Aerobic bacteria
E. Application-specific bacteria
F. None of the Above

Facultative Bacteria
269. Most of the bacteria absorbing the organic material in a wastewater treatment system are facultative in nature, meaning they are adaptable to survive and multiply in either anaerobic or aerobic conditions.
A. True B. False

270. According to the text, usually, facultative bacteria will be _____ unless there is some type of mechanical or biochemical process used to add oxygen to the wastewater.
A. Anaerobic
B. Absence of free oxygen
C. Facultative bacteria
D. Aerobic
E. Application-specific bacteria
F. None of the Above

271. According to the text, when bacteria are in the process of being transferred from one environment to another, the metamorphosis from _____ (and vice versa) takes place within a couple of hours.
A. Filamentous Bacteria
B. Facultative
C. Application-specific bacteria
D. Either anaerobic or aerobic conditions
E. Anaerobic to aerobic state
F. None of the Above

Anaerobic Bacteria
272. Which of the following terms live and reproduce in the absence of free oxygen?
A. Anaerobic action
B. Anaerobic bacteria
C. Facultative bacteria
D. Aerobic bacteria
E. Application-specific bacteria
F. None of the Above

273. In order to remove a given amount of organic material in an anaerobic treatment system, the organic material must be exposed to a _____ and/or detained for a much longer period of time.
A. Anaerobic action
B. Absence of free oxygen
C. Facultative bacteria
D. Aerobic bacteria
E. Significantly higher quantity of bacteria
F. None of the Above

274. A typical use for these bugs would be in a septic tank.
A. Filamentous organisms
B. Floc particles
C. Organic material
D. Anaerobic bacteria
E. Biosurfactant trehalose
F. None of the Above

275. Which of the following terms or bugs release hydrogen sulfide as well as methane gas, both of which can create hazardous conditions?
A. Filamentous Bacteria
B. Anaerobic bacteria
C. Application-specific bacteria
D. Either anaerobic or aerobic conditions
E. Anaerobic to aerobic state
F. None of the Above

276. Which of the following terms begins in the collection lines of a sewer system, deadly hydrogen sulfide or explosive methane gas can accumulate and be life threatening?
A. Anaerobic action
B. Absence of free oxygen
C. Facultative bacteria
D. Aerobic bacteria
E. Application-specific bacteria
F. None of the Above

Aerobic Bacteria
277. Aerobic bacteria live and multiply in the presence of free oxygen.
A. True B. False

278. Facultative bacteria always achieve an aerobic state when oxygen is present.
A. True B. False

279. The metabolism of aerobes is much higher than?
A. Anaerobic action
B. Anaerobes
C. Facultative bacteria
D. Aerobic bacteria
E. Application-specific bacteria
F. None of the Above

280. The by-products of _____ are carbon dioxide and water.
A. Anaerobic action
B. Absence of free oxygen
C. Facultative bacteria
D. Aerobic bacteria
E. Application-specific bacteria
F. None of the Above

281. Which of the following terms or bugs live in colonial structures called floc?
A. Anaerobic action
B. Absence of free oxygen
C. Facultative bacteria
D. Aerobic bacteria
E. Application-specific bacteria
F. None of the Above

282. With the mechanical nature of the_____, maintenance and operator oversight are required.
A. Aerobic digestion process
B. Facultative
C. Application-specific bacteria
D. Either anaerobic or aerobic conditions
E. Anaerobic to aerobic state
F. None of the Above

Protozoans and Metazoans
283. Which of the following terms or bugs are also indicators of biomass health and effluent quality?
A. Organic material
B. Protozoans
C. Macroinvertebrates
D. Biomass health and effluent quality
E. Aerobic flocs
F. None of the Above

284. Which of the following terms or bugs are very similar to protozoans except that they are usually multi-celled animals?
A. Nematodes and rotifers
B. Metazoan(s)
C. Protozoan(s)
D. Protozoan and metazoan
E. Aerobic floc
F. None of the Above

285. Which of the following terms or bugs are typically found only in a well-developed biomass?

A. Nematodes and rotifers
B. Metazoan(s)
C. Protozoan(s)
D. Protozoan and metazoan
E. Macroinvertebrates
F. None of the Above

286. Which of the following terms or bugs and the relative abundance of certain species can be a predictor of operational changes within a treatment plant?

A. Nematodes and rotifers
B. Metazoan(s)
C. Protozoan(s)
D. Protozoans and metazoans
E. Macroinvertebrates
F. None of the Above

Dispersed Growth

287. Dispersed growth is material suspended within the activated sludge process that has not been adsorbed into the floc particles. This material consists of very small quantities of colloidal (too small to settle out) bacteria as well as organic and inorganic particulate material.

A. True B. False

288. According to the text, while a small amount of _____between the floc particles is normal, excessive amounts can be carried through a secondary clarifier.

A. Denitrification process
B. Organic material
C. Bulking sludge
D. Dispersed growth
E. Anaerobic sludge
F. None of the Above

Activated Sludge Aerobic Flocs

289. Aerobic flocs in a healthy state are referred to as activated sludge. While aerobic floc has a metabolic rate approximately 10 times higher than anaerobic sludge, it can be increased even further by exposing the bacteria to an abundance of oxygen.

A. True B. False

290. Wastewater treatment efficiencies and removal levels are so much improved that additional downstream treatment components are?

A. Denitrification process
B. Organic material
C. Bulking sludge
D. Insufficient aeration in the reactor
E. Dramatically reduced or totally eliminated
F. None of the Above

Activated Sludge Aerobic Flocs

Problems may appear during the operation of activated sludge systems, including:

291. Which of the following terms' content in clarified effluent, which may be due to too high or too low solids retention time and to growth of filamentous microorganisms?

A. Organic material
B. High solids
C. Macroinvertebrates
D. Biomass health and effluent quality
E. Aerobic flocs
F. None of the Above

292. Odors, caused by _____in the settling tanks or insufficient aeration in the reactor.

A. Denitrification process
B. Organic material
C. Bulking sludge
D. Insufficient aeration in the reactor
E. Anaerobic conditions
F. None of the Above

Filamentous Organisms

293. Which of the following wastewater treatment related terms reach too high a concentration, they can extend dramatically from the floc particles?

A. Filamentous organisms
B. Floc particles
C. Organic material
D. Process control variation
E. Biosurfactant trehalose
F. None of the Above

294. Which of the following wastewater treatment related terms, because ofthe increased surface area and without a corresponding increase in mass, this will not settle well?

A. Larger floc particles
B. Activated sludge
C. Floating scum mat
D. Biomass
E. Filaments
F. None of the Above

295. Which of the following wastewater treatment related terms, due to the high surface area of this term will reach an excess concentration?

A. Filamentous organisms
B. Floc particles
C. Organic material
D. Process control variation
E. Filamentous bacteria
F. None of the Above

296. The majority of filamentous organisms are bacteria, although some of them are classified as algae, fungi or other life forms. There are a number of types of filamentous bacteria which proliferate in the Activated sludge process.

A. True B. False

297. Filamentous organisms serve to strengthen the?

A. Filamentous organisms
B. Floc particles
C. Organic material
D. Process control variation
E. Biosurfactant trehalose
F. None of the Above

298. Which of the following wastewater treatment related terms that settling in the clarifier also tends to accumulate smaller particulates?

A. Larger floc particles
B. Activated sludge process
C. Floating scum mat
D. Biomass
E. Filaments
F. None of the Above

Filamentous Bacteria Identification

299. Filamentous Identification should be used as a tool to monitor the health of the biomass when a floating scum mat is suspected.

A. True B. False

300. Filamentous Identification is used to determine the type of filaments present so that a cause can be found and corrections can be made to the system to alleviate future problems.

A. True B. False

301. Which of the following wastewater treatment related terms usually have a process control variation associated with the type of filament present that can be implemented to change the environment present?

A. Filamentous organisms
B. Floc particles
C. Organic material
D. All filamentous bacteria
E. Biosurfactant trehalose
F. None of the Above

302. Which of the following wastewater treatment related terms change must be made or the filaments will return with time eventually?

A. Larger floc particles
B. Activated sludge process
C. Floating scum mat
D. Biomass
E. A process
F. None of the Above

Nocardia amarae

303. Nocardia amarae, a common cause of Gram-positive, chemoautotrophic, filamentous in waste treatment plants, is a slow growing, usually gram-positive, chemoautotrophic, filamentous, strict aerobe that produces the biosurfactant trehalose.

A. True B. False

304. Colonies can be_____, so color alone is not a key to identifying this species.

A. Stain gram-negative
B. Not casease
C. Slower growing filaments
D. Disruptive foaming
E. Brown, pink, orange, red, purple, gray or white
F. None of the Above

305. N. amarae, member of the Actinomycetes family, is very motile, so it doesn't rely on movement of the water to carry it through the system.

A. True B. False

306. The foam from Nocardia amarae is usually a _____ unless algae are entrapped in it, in which case it appears green and brown.

A. Viscous brown color
B. Staining gram-positive
C. Mixotrophic
D. Gram-positive, chemoautotrophic, filamentous
E. Disruptive foaming
F. None of the Above

Nostocoida limicola

307. Nostocoida limicola is yet another common cause of disruptive foaming in waste treatment plants, motile in its Hormogonia and sometimes Trichome phases. This oxygenic phototrophic species often forms multicellular rigid filaments, forming non-symbiotic relationships with other species.

A. True B. False

308. Nostocoida can also be dentified by their starburst effect formations using phase contrast microscopy at 400 to 1000x magnification. After chlorination, a few dead cells sticking out identify stress to this species.

A. True B. False

309. Which of the following terms, Nostocoida produces round cells within tight coil formations.

A. Viscous brown color
B. Staining gram-positive
C. Staining gram-negative
D. Gram-positive, chemoautotrophic, filamentous
E. Disruptive foaming
F. None of the Above

Thiothrix

310. Thiothrix spp., the primary cause of disruptive foaming in wastewater treatment plants appears as straight to slightly curved cells with rectangular shape form filaments up to 1000 microns in length, in multicellular rigid filaments Staining gram-positive, with obligately aerobic respiration.

A. True B. False

311. Thiothrix are considered this term, using several small organic carbons and reduced inorganic sulfur sources for growth and energy.

A. Viscous brown color
B. Staining gram-positive
C. Mixotrophic
D. Gram-positive, chemoautotrophic, filamentous
E. Disruptive foaming
F. None of the Above

312. According to the text, Thiothrix II produces rectangular filaments up to 200 microns in length and is easily identified by their _____using phase contrast microscopy at 400 to 1000x magnification.

A. Stain gram-negative
B. Not casease
C. Slower growing filaments
D. Starburst effect formations
E. Multicellular rigid filaments
F. None of the Above

Microthrix parvicella

313. Microthrix parvicella is another common cause of?

A. Viscous brown color
B. Staining gram-positive
C. Mixotrophic
D. Gram-positive, chemoautotrophic, filamentous
E. Disruptive foaming
F. None of the Above

Sphaeroliticus natans

314. Sphaeroliticus natans is another filamentous species, and yet it is reputed to increase settleability by branching between flocs, increasing surface area.

A. True B. False

315. Cells are straight to slightly curved, up to 1000 microns in length and?

A. Stain gram-negative
B. Not casease
C. Slower growing filaments
D. Disruptive foaming
E. Multicellular rigid filaments
F. None of the Above

316. A low F/M ratio favors filamentous organisms, because their higher ratio of surface area to volume provides them with a selective advantage for?

A. Viscous brown color
B. Staining gram-positive
C. Mixotrophic
D. Gram-positive, chemoautotrophic, filamentous
E. Securing nutrients in nutrient limited environments
F. None of the Above

317. Which of the following terms requires high levels of oxygen are necessary?

A. Stain gram-negative
B. A strict aerobe
C. Slower growing filaments
D. Disruptive foaming
E. Multicellular rigid filaments
F. None of the Above

Filamentous Bacteria

318. A problem that often frustrates the performance of activated sludge is bulking sludge due to the growth of filamentous bacteria. Sludge bulking can often be solved by careful process modifications.

A. True B. False

319. Different filamentous bacteria such as Microthrix, Sphaerotilus, Nostocoida, Thiothrix or ”Type 021N” and others cause?

A. Bulking for very different reasons
B. Dissolved oxygen decrease
C. Sludge bulking
D. Bacteria and other microbes
E. Oxygen-demanding pollutants
F. None of the Above

320. There is a potential for instability with _____is an acute problem when strict demands on treatment performance are in place.

A. Organic carbon
B. Activated sludge
C. Domestic wastewater
D. High BOD
E. Growth of filamentous bacteria
F. None of the Above

Other Wastewater Treatment Components

Biochemical Oxygen Demand

321. Biochemical Oxygen Demand (BOD or BOD5) is an indirect measure of Biodegradable organic compounds in water, and is determined by measuring the dissolved oxygen decrease in a controlled water sample over a five-day period.

A. True B. False

322. During this five-day period, aerobic (oxygen-consuming) bacteria decompose organic matter in the sample and consume dissolved oxygen in proportion to the amount of organic material that is present.

A. True B. False

323. Which of the following terms reflects high concentrations of substances that can be biologically degraded, thereby consuming oxygen?

A. Organic carbon
B. Human sources
C. Domestic wastewater
D. High BOD
E. Growth of filamentous bacteria
F. None of the Above

324. The BOD test has merit as a pollution parameter continues to be debated, _____has the advantage of a long period of record.

A. BOD
B. Dissolved oxygen decrease
C. Sludge bulking
D. Bacteria and other microbes
E. Oxygen-demanding pollutants
F. None of the Above

Organic Carbon

325. Most organic carbon in water occurs as partly degraded plant and animal materials, some of which are resistant to microbial degradation.

A. True B. False

326. Dead tissue containing carbon is decomposed as _____by bacteria and other microbes.

A. An essential nutrient
B. Dissolved oxygen decrease
C. Sludge bulking
D. Detritus
E. Oxygen-demanding pollutants
F. None of the Above

Total Organic Carbon

327. (TOC) bears a direct relationship with biological and chemical oxygen demand; high levels of TOC can result from human sources, this term being the main concern.

A. Organic carbon
B. High oxygen demand
C. Domestic wastewater
D. High BOD
E. Growth of filamentous bacteria
F. None of the Above

Nutrient Constituents in Wastewater and Measurement Methods
Nitrogen

328. The major contributors of nitrogen to wastewater are _____ such as food preparation, showering, and waste excretion.

A. Human activities
B. Dissolved oxygen decrease
C. Sludge bulking
D. Bacteria and other microbes
E. Oxygen-demanding pollutants
F. None of the Above

329. The per capita contribution of nitrogen in domestic wastewater is about 1/10th of that for BOD.

A. True B. False

330. Which of the following terms in domestic wastewater typically ranges from 20 to 70 mg/L for low to high strength wastewater?

A. Organic carbon
B. Total nitrogen
C. Domestic wastewater
D. High BOD
E. Growth of filamentous bacteria
F. None of the Above

331. Influent concentration varies during the day and can vary significantly during rainfall events, as a result of?

A. An essential nutrient
B. Dissolved oxygen decrease
C. Sludge bulking
D. Inflow and infiltration to the collection system
E. Oxygen-demanding pollutants
F. None of the Above

Nutrient Constituents in Wastewater and Measurement Methods
The TKN method has three major steps:

332. Digestion to convert organic nitrogen to?

A. TKN
B. Organic nitrogen
C. Aliphatic N compounds
D. Ammonium sulfate
E. Dissolved, biodegradable compounds
F. None of the Above

333. Conversion of this term into condensed ammonia gas through addition of a strong base and boiling.

A. Ammonia gas
B. Effluent limits
C. DON
D. Ammonium sulfate
E. Domestic wastewater organic nitrogen
F. None of the Above

334. Measuring the concentration includes ammonia, with this term being subtracted from the TKN to determine organic nitrogen.

A. TKN
B. Organic nitrogen
C. Aliphatic N compounds
D. Ammonium sulfate
E. Ammonia-nitrogen concentration
F. None of the Above

335. Nitrogen components in wastewater are typically reported on an "_____" basis?

A. Ammonia gas
B. Effluent limits
C. DON
D. As nitrogen
E. Domestic wastewater organic nitrogen
F. None of the Above

336. Wastewater treatment plants are designed for nitrification and denitrification and these can remove 80 to 95 percent of _____, but the removal of organic nitrogen is typically much less efficient.

A. TKN
B. Organic nitrogen
C. Aliphatic N compounds
D. Ammonium sulfate
E. Inorganic nitrogen
F. None of the Above

337. According to the text, domestic wastewater organic nitrogen may be present in particulate, colloidal or dissolved forms and consist of proteins, amino acids, _____, refractory natural compounds in drinking water.

A. Ammonia gas
B. Effluent limits
C. DON
D. Aliphatic N compounds
E. Domestic wastewater organic nitrogen
F. None of the Above

338. Which of the following terms may be released in secondary treatment by microorganisms either through metabolism or upon death and lysis?

A. TKN
B. Organic nitrogen
C. Aliphatic N compounds
D. Ammonium sulfate
E. Dissolved, biodegradable compounds
F. None of the Above

339. Which of the following terms happens by microorganisms releases some organic nitrogen as dissolved, biodegradable compounds?

A. Ammonia gas
B. Effluent limits
C. DON
D. Hydrolysis of particulate and colloidal material
E. Domestic wastewater organic nitrogen
F. None of the Above

340. Other forms of _____ may be more persistent in wastewater treatment processes.

A. TKN
B. Organic nitrogen
C. Aliphatic N compounds
D. Ammonium sulfate
E. Dissolved, biodegradable compounds
F. None of the Above

341. Which of the following terms has increased as effluent limits on nitrogen have become more stringent?

A. Ammonia gas
B. Effluent limits
C. DON
D. Organic nitrogen
E. Domestic wastewater organic nitrogen
F. None of the Above

Phosphorus

342. Which of the following terms in domestic wastewater typically ranges between 4 and 8 mg/L but can be higher depending on sources?

A. Phosphorus as phosphate
B. Phosphorus
C. Orthophosphate
D. Pyrophosphate and trimetaphosphate
E. Total phosphorus (TP)
F. None of the Above

343. Sources of phosphorus are varied. Some phosphorus is present in all biological material, as it is an essential nutrient and part of a cell's energy cycle.

A. True B. False

344. Which of the following terms is used in fertilizers, detergents, and cleaning agents and is present in human and animal waste.

A. Phosphorus as phosphate
B. Phosphorus
C. Orthophosphate
D. Pyrophosphate and trimetaphosphate
E. Total phosphorus (TP)
F. None of the Above

345. Polyphosphates are high-energy, condensed phosphates such as?

A. Phosphorus as phosphate
B. Phosphorus
C. Orthophosphate
D. Pyrophosphate and trimetaphosphate
E. All biological material
F. None of the Above

Wastewater and Pretreatment Compliance Monitoring

346. There are two types of _____that are performed as part of compliance monitoring for permitted industries: unscheduled and demand.

A. Discharge concentrations
B. Pollutants of concern
C. Plant sampling activity
D. Sampling activities
E. Manual collection of grab samples
F. None of the Above

347. Which of the following terms - is used to determine the compliance status of the user?

A. Flow-proportional sampling
B. POTW samples
C. Unscheduled sampling
D. Composite and grab samples
E. Unannounced monitoring visits
F. None of the Above

348. Instances of noncompliance are often identified during unannounced monitoring visits. No notice is given for this type of sampling. This type of sampling is performed two to four times a year, at each industrial user site, over a two to five-day period to obtain sampling data

A. True B. False

349. Which of the following terms - is usually initiated in response to a known or suspected violation?

A. An analysis
B. Split samples
C. Duplicate samples
D. Taste test
E. Demand sampling
F. None of the Above

350. The length of the sampling program depends on the flow, nature of the wastes, and type of samples, typically, _____ are collected at each user site.
A. Flow-proportional sampling
B. POTW samples
C. BOD and SS levels
D. Composite and grab samples
E. Unannounced smell tests
F. None of the Above

Nonpermitted Industrial Users (User Rate Charge Program) Policy Example
351. On a periodic basis (i.e., once every two to three years), commercial and minor industrial users are sampled to determine?
A. Discharge concentrations
B. Pollutants of concern
C. Plant sampling activity
D. Discharge concentrations of various pollutants
E. Manual collection of grab samples
F. None of the Above

352. Typical types of users which may be sampled include: restaurants, photo processing laboratories, laundries, car washes, and printing shops. A three- to four-day sampling program is usually conducted at each assigned site.
A. True B. False

Wastewater Treatment Plant Sampling
353. POTW samples are collected in accordance with the National Pollutant Discharge Elimination System (NPDES) permit which sets discharge limits for certain pollutants and specifies sampling frequencies and?
A. An analysis
B. Split samples
C. Duplicate samples
D. Taste test
E. Sample types
F. None of the Above

354. The POTW is responsible for coordinating the plant sampling activity with laboratory personnel who prepare any special sampling bottles and laboratory appurtenances necessary to complete the?
A. Flow-proportional sampling
B. POTW samples
C. BOD and SS levels
D. Composite and grab samples
E. Sampling objectives
F. None of the Above

355. Control Authorities should estimate flow to allow for collection of grab samples, which are required, unless flow-proportional sampling is not feasible.
A. True B. False

356. Which of the following terms - are preferred over time composite samples particularly where the monitored discharge is intermittent or variable?
A. Flow-proportional sampling
B. POTW samples
C. BOD and SS levels
D. Composite and grab samples
E. Flow-proportional composite samples
F. None of the Above

357. Desired analyses dictate the preparation protocols, equipment, and collection bottles to use to avoid contamination of samples or loss of pollutants through improper collection.
A. True B. False

358. Sampling for such pollutants as_____, flashpoint, and volatile organic compounds require manual collection of grab samples.

A. The sampling point(s)
B. Sample preservation
C. Duplicate samples
D. Routine QA/QC measures
E. pH, cyanide, oil and grease
F. None of the Above

359. Which of the following terms is similar to composite samples, and must be representative of the monitored discharge and are to be collected from actively flowing wastestreams?

A. Discharge concentrations
B. Pollutants of concern
C. Plant sampling activity
D. Grab samples
E. Manual collection of grab samples
F. None of the Above

360. Fluctuations in flow or the nature of the discharge may require collection of and hand-compositing of this term to accurately access compliance.

A. Flow-proportional sampling
B. POTW samples
C. BOD and SS levels
D. Composite and grab samples
E. More than one grab sample
F. None of the Above

Background on Emerging Contaminants

361. Two groups of emerging poluutants that are not a threat to the systems are Endocrine disrupting chemicals (EDCs) and pharmaceutical and personal care products (PPCPs).

A. True B. False

362. Which of the following terms - may interfere with the endocrine systems by damaging hormone-producing tissues?

A. PPCPs
B. EDCs
C. Ammonia oxidizing bacteria
D. Longer activated sludge SRTs
E. Slower growing bacteria
F. None of the Above

363. Which of the following terms - comprise a diverse collection of thousands of chemical substances, including prescriptions?

A. SRTs
B. PPCPs
C. Nitrifying bacteria
D. Any microbiological organisms
E. Endocrine disrupting chemicals (EDCs)
F. None of the Above

364. Which of the following terms refers broadly to those synthetic or naturally occurring chemicals, or to any microbiological organisms?

A. SRTs
B. PPCPs
C. Nitrifying bacteria
D. Emerging contaminants
E. Endocrine disrupting chemicals (EDCs)
F. None of the Above

365. Which of the following terms can fall into a wide range of groups defined by their effects, uses, or by their key chemical or microbiological characteristics?

A. PPCPs
B. Emerging contaminants
C. Ammonia oxidizing bacteria
D. Longer activated sludge SRTs
E. Slower growing bacteria
F. None of the Above

Removal of Emerging Contaminants by Nutrient Removal Technologies

366. Removal efficiencies were enhanced for several investigated contaminants at longer SRTs, with critical _____ for some beyond which removal rates did not improve.

A. SRTs
B. PPCPs
C. Nitrifying bacteria
D. Any microbiological organisms
E. Endocrine disrupting chemicals (EDCs)
F. None of the Above

367. Which of the following terms - allow for the establishment of slower growing bacteria, which in turn provide a more diverse community of microorganisms with broader physiological capabilities?

A. PPCPs
B. Longer SRTs
C. Ammonia oxidizing bacteria
D. Longer activated sludge SRTs
E. Slower growing bacteria
F. None of the Above

368. Which of the following terms - may play a key role in biodegradation but the role of heterotrophic bacteria may also play a significant role?

A. SRTs
B. PPCPs
C. Nitrifying bacteria
D. Any microbiological organisms
E. Endocrine disrupting chemicals (EDCs)
F. None of the Above

369. Reverse osmosis has been found to effectively remove _____ below detection limits including those that that were not consistently removed at longer SRTs.

A. PPCPs
B. Nitrification
C. Ammonia oxidizing bacteria
D. Longer activated sludge SRTs
E. Slower growing bacteria
F. None of the Above

Role of Solids Retention Time in Removal Efficiency

370. Which of the following terms - allow for the establishment of slower growing bacteria which in turn provide a more diverse community of microorganisms with broader physiological capabilities?

A. Ammonia oxidation
B. Phosphorus removal
C. Longer activated sludge SRTs
D. An aerobic wastewater treatment facility
E. Oxygen demand of wastewater
F. None of the Above

371. Which of the following terms - that are routinely detected in influent were not well removed by secondary treatment?

A. SRTs
B. PPCPs
C. Six compounds
D. Any microbiological organisms
E. Endocrine disrupting chemicals (EDCs)
F. None of the Above

General

372. Generally, there are four types of samples that are collected by the POTW's Sampling Section: grab, time proportional composites, flow proportional composites, and hand composites.

A. True B. False

373. Which of the following terms - used depends largely on the types of analyses to be run, and the nature of the wastestream being sampled?

A. An analysis
B. The sampling method
C. Duplicate samples
D. Taste test
E. Blanks
F. None of the Above

374. Which of the following sampling terms - is an individual sample collected in less than 15 minutes without regard for flow or time of day.
A. Entire batch discharge D. An individual sample
B. The volume of sample E. Proportional composite sampling
C. A grab sample F. None of the Above

375. pH, cyanide, oil and grease, sulfide, and volatile organics must be collected as composite samples.
A. True B. False

376. Which of the following sampling terms - would then be taken by means of time proportional composite sampling methods or by hand composite will provide a representative sample of the effluent being discharged?
A. An analysis D. Samples
B. Split samples E. Blanks
C. Duplicate samples F. None of the Above

377. Which of the following sampling terms - to be collected by any of these methods is dependent on the number and types of analyses that must be performed.
A. Entire batch discharge D. An individual sample
B. The volume of sample E. Proportional composite sampling
C. Concentration of pollutants F. None of the Above

Wastewater Grab Samples
378. Grab samples are individual samples collected in less than 3 minutes without regard to flow or time of day.
A. True B. False

379. Which of the following sampling terms - are normally taken manually, but can be pumped?
A. Quantify the pollutants D. Time proportional composite sampling methods
B. Grab samples E. Flow proportional composites
C. Hand composites F. None of the Above

A grab sample is usually taken when a sample is needed to:
380. According the text, quantify the _____in a non-continuous discharge?
A. Pollutants D. Taste test
B. Split samples E. Blanks
C. Duplicate samples F. None of the Above

381. According the text, corroborate _____ if the waste is not highly variable.
A. Entire batch discharge D. An individual sample
B. The volume of sample E. Proportional composite sampling
C. Composite samples F. None of the Above

382. Which of the following sampling terms - not amenable to compositing such as pH, temperature, dissolved oxygen, chlorine, purgeable organics and sulfides, oil and grease, coliform bacteria, and sulfites?
A. Quantify the pollutants D. Monitor parameters
B. Grab samples E. Flow proportional composites
C. Hand composites F. None of the Above

Timed Composites
383. Which of the following sampling terms - are usually taken in instances where the intention is to characterize the wastes over a period of time without regard to flow?
A. Timed samples D. Time proportional composite sampling methods
B. Grab samples E. Flow proportional composites
C. Hand composites F. None of the Above

384. Which of the following sampling terms - consist of a series of equal volume grab samples taken at regular intervals?
A. Timed composite samples D. Time proportional composite sampling methods
B. Grab samples E. Flow proportional composites
C. Hand composites F. None of the Above

Flow Proportional Composites
385. Which of the following sampling terms - consist of: a series of grab samples whose volumes are equal in size and proportion to the flow at the time of sampling?
A. The sampling point(s) D. Routine QA/QC measures
B. Sample preservation E. Flow proportional composite samples
C. Duplicate samples F. None of the Above

386. Which of the following sampling terms - are taken at varying time intervals, or continuous samples taken over a period of time based on the flow?
A. Entire batch discharge D. An individual sample
B. The volume of sample E. Samples
C. Concentration of pollutants F. None of the Above

387. Wherever possible, grab sampling is recommended because it most accurately reflects the nature of the wastestream.
A. True B. False

388. Which of the following sampling terms - taken at varying time intervals are most often collected by the sampling inspectors?
A. Entire batch discharge D. An individual sample
B. The volume of sample E. Proportional composite sampling
C. Equal volume samples F. None of the Above

Industrial Users - Permitted/Non-permitted Example
389. Which of the following sampling terms - within an industry vary with each industry depending on the nature of the process and location of pretreatment facilities?
A. The sampling point(s) D. Routine QA/QC measures
B. Sample preservation E. Blanks
C. Duplicate samples F. None of the Above

390. Exact sampling locations must be identified on a case by case basis. The following general principles apply in all cases: A permanent sampling location(s) must be identified for use by the collection system.
A. True B. False

Wastewater Sample Preservation
391. One or more unstable pollutants that require immediate analysis or preservation until _____ can be made.
A. An analysis D. Taste test
B. Split samples E. Blanks
C. Duplicate samples F. None of the Above

392. According the text, sample preservation is needed for_____, for example, which may be stored for as long as 24 hours prior to transferring them to the laboratory.
A. Nitrified effluent D. Nitrogen and phosphorus levels
B. Composite samples E. Activated sludge
C. Total Nitrogen (TN) F. None of the Above

Quality Assurance/Quality Control Policy Example
393. According the text, Quality Assurance/Quality Control (QA/QC) measures taken by the sampling crew include equipment blanks, trip blanks, split samples and duplicate samples.
A. True B. False

394. Equipment blanks and _____are routine QA/QC measures.
A. The sampling point(s) D. Routine QA/QC measures
B. Sample preservation E. Trip blanks
C. Duplicate samples F. None of the Above

395. Which of the following sampling terms - are taken for Local Limits (pretreatment) sampling and when requested by an industry or laboratory?
A. An analysis D. Taste test
B. Split samples E. Blanks
C. Duplicate samples F. None of the Above

396. Which of the following sampling terms -should be run when requested by a Supervisor or Project Leader?
A. An analysis D. Taste test
B. Split samples E. Blanks
C. Duplicate samples F. None of the Above

397. The laboratory needs to prepare _____used by the sampling crews.
A. The sampling point(s) D. Routine QA/QC measures
B. Sample preservation E. All trip blanks/travel blanks
C. Duplicate samples F. None of the Above

398. Any contamination detected in the _____ would result from field exposure which could in turn affect collected samples.

A. An analysis
B. Split samples
C. Duplicate samples
D. Taste test
E. Blanks
F. None of the Above

Chain-of-Custody

399. The collection, preservation and transportation of _____ and all documentation is critical to the overall success of the Wastewater Sampling Program.

400. If sampling is performed for the Pretreatment program, any sampling data may be used as evidence in court proceedings in this case _____ becomes critical.

A. Sampling crew
B. Duplicate samples
C. Pre-preserved bottles
D. Documentation
E. Noncompliant industrial user
F. None of the Above

401. Laboratory personnel sign and date the chain of custody form, and return it to the sampling crew who makes two copies of the form. One copy is for the sampling crew files and the other is for data entry.

A. True B. False

Proper Sample Handling

402. The proper handling of _____also includes wearing gloves.

A. Other parameters
B. Pre-preserved bottles
C. Preservatives
D. Some samples
E. Water quality samples
F. None of the Above

403. When the missing term are received from the laboratory, check to see that none have leaked.

A. Other parameters
B. Pre-preserved bottles
C. Preservatives
D. Some samples
E. Containers and preservatives
F. None of the Above

404. Which of the following wastewater sampling terms – should be labeled with type of preservative used, type of analysis to be done and be accompanied by a Safety Data Sheet (SDS).

A. Sampling crew
B. Duplicate samples
C. Pre-preserved bottles
D. Sampling bottles
E. Noncompliant industrial user
F. None of the Above

405. Make sure you can tell if containers are pre-preserved, because you do not to overfill them when collecting samples in the field.

A. True B. False

406. Check with the laboratory about _____when using pre-preserved bottles.

A. Other parameters
B. Quality control procedures
C. Preservatives
D. Some samples
E. Organics
F. None of the Above

407. If necessary, obtain extra coolersand never store coolers and containers near solvents, fuels or other sources of contamination or combustion. In warm weather, keep coolers and samples in the shade.
A. True B. False

408. Which of the following wastewater sampling terms – use this procedure when coolers and containers are prepared, sealed and shipped?
A. Chain-of-custody
B. Duplicate samples
C. Pre-preserved bottles
D. Safety Data Sheet (SDS)
E. Noncompliant industrial user
F. None of the Above

409. The most common term are hydrochloric, nitric, sulfuric and ascorbic acids, sodium hydroxide, sodium thiosulfate, and biocides.
A. Other parameters
B. Pre-preserved bottles
C. Preservatives
D. Some samples
E. Organics
F. None of the Above

410. Many laboratories provide this term filled with measured amounts of preservatives.
A. Sampling crew
B. Duplicate samples
C. Pre-preserved bottles
D. Safety Data Sheet (**SDS**)
E. Noncompliant industrial user
F. None of the Above

Field Parameters
411. Be sure to measure and record the field parameters of temperature, electrical conductivity, pH and _____ in an undisturbed section of stream flow.
A. Nitrified effluent
B. Nitrogen
C. Total Nitrogen (TN)
D. Dissolved oxygen
E. Activated sludge
F. None of the Above

Dissolved Oxygen
412. Aerobic means without air and some bacteria thrive under these conditions and utilize the nutrients and chemicals available to exist.
A. True B. False

413. Aerobes decompose inorganics in the water, the result is carbon dioxide and H2SO4.
A. True B. False

414. Dissolved oxygen (DO) in water is considered a contaminant.
A. True B. False

415. Dissolved oxygen level is important because too much or not enough dissolved oxygen can create?
A. Unfavorable conditions
B. DO analysis
C. Carbon dioxide
D. Frequent dissolved oxygen measurement
E. Aerobic conditions
F. None of the Above

416. A lack of Dissolved oxygen in natural waters creates?
A. Anaerobic conditions
B. Methane fermenters
C. Denitrification
D. Phosphorus-reduction system(s)
E. Excessive sludge production
F. None of the Above

417. Which of the following wastewater terms – live on the volatile acids produced by these saprophytes?
A. Wildlife habitat D. Phosphorus-reduction system(s)
B. Methane fermenters E. Excessive sludge production
C. Denitrification F. None of the Above

418. Which of the following wastewater terms – indicate that dissolved oxygen is present.
A. Sample(s) D. Frequent dissolved oxygen measurement
B. DO analysis E. Aerobic conditions
C. Carbon dioxide F. None of the Above

419. Which of the following wastewater terms – in a water sample can be detrimental to metal pipes in high concentrations because oxygen helps accelerate corrosion?
A. Winkler Method D. Anaerobic conditions
B. Dissolved Oxygen E. The iodometric (titration) test
C. Only molecular oxygen F. None of the Above

420. Oxygen's primary value is to oxidize iron and manganese into forms that will precipitate out of the water, it also removes excess carbon dioxide.
A. True B. False

421. Which of the following wastewater terms – in a water sample will affect the taste of drinking water?
A. Sample(s) D. Dissolved oxygen
B. DO analysis E. Aerobic conditions
C. Carbon dioxide F. None of the Above

Methods of Determination
422. Temperature, atmospheric pressure, salinity, biological activity and pH all have an effect on the (DO) content.
A. True B. False

423. Which of the following wastewater terms – procedure is based on the rate of diffusion of molecular oxygen across a membrane?
A. Membrane electrode method D. Anaerobic conditions
B. Dissolved Oxygen E. Iodometric (titration) test
C. Only molecular oxygen F. None of the Above

424. Many factors determine the _____in a water sample.
A. Solubility of oxygen D. Frequent dissolved oxygen measurement
B. DO analysis E. Aerobic conditions
C. Carbon dioxide F. None of the Above

Iodometric Test
425. The iodometric (titration) test is not a very precise and reliable for (DO) analysis of samples.
A. True B. False

426. Reactions take place with the addition of certain chemicals that liberate iodine equivalent to the?

A. Original (DO) content
B. Dissolved Oxygen
C. Only molecular oxygen
D. Anaerobic conditions
E. Iodometric (titration) test
F. None of the Above

427. Which of the following wastewater terms – can liberate iodine from iodides, and some reducing agents reduce iodine to iodide?

A. Ammonia oxidation
B. Phosphorus removal
C. Certain oxidizing agents
D. An aerobic wastewater treatment facility
E. Oxygen demand of wastewater
F. None of the Above

428. Which of the following wastewater terms – effectively removes interference caused by nitrates in the water sample, so a more accurate determination of (DO) can be made?

A. Winkler Method
B. Dissolved Oxygen
C. Only molecular oxygen
D. The alkaline Iodide-Azide reagent
E. The iodometric (titration) test
F. None of the Above

429. Which of the following wastewater terms – are highly dependent on the source and characteristics of the sample?

A. Methods of analysis
B. DO analysis
C. Carbon dioxide
D. Frequent dissolved oxygen measurement
E. Aerobic conditions
F. None of the Above

430. The magnetic method involves an oxygen permeable plastic membrane that serves as a diffusion barrier against impurities.

A. True B. False

431. The effect of oxidation wastes on streams, the suitability of water for fish and other organisms and the progress of self-purification can all be measured or estimated from the dissolved oxygen content.

A. True B. False

432. Which of the following wastewater terms – passes through the membrane and is measured by the meter?

A. Carbon dioxide
B. Dissolved Oxygen
C. Only molecular oxygen
D. H_2S
E. Carbon
F. None of the Above

433. According to the text, membrane electrodes provide an excellent method for _____in polluted, highly colored turbid waters and strong waste effluents.

A. Sample(s)
B. DO analysis
C. Carbon dioxide
D. Frequent dissolved oxygen measurement
E. Aerobic conditions
F. None of the Above

434. Proper samples must be taken in _____bottles where agitation or contact with air is at a minimum.

A. Sample(s)
B. DO analysis
C. BOD
D. Frequent dissolved oxygen measurement
E. Aerobic conditions
F. None of the Above

435. Which of the following wastewater terms –is the one of the most important analyses in determining the quality of natural waters?

A. Winkler Method
B. Dissolved Oxygen
C. The dissolved oxygen test
D. Anaerobic conditions
E. The iodometric (titration) test
F. None of the Above

436. Which of the following wastewater terms –measurement is essential for adequate process control?

A. Sample(s)
B. DO analysis
C. Carbon dioxide
D. Dissolved oxygen
E. Aerobic conditions
F. None of the Above

Sludge Volume Index (SVI)

437. The higher the (SVI), the better is the settling quality of the aerated mixed liquor, low (SVI) of 50 or less is considered a good settling sludge.

A. True B. False

438. The Sludge Volume Index (SVI) of activated sludge is defined as the volume in milliliters occupied by _____ after settling for 30 minutes.

A. A closed loop
B. 1g of activated sludge
C. Optimal DO levels
D. Trickling filter FFSs
E. A portion of the denitrified effluent
F. None of the Above

Chlorine Exposure Limits

439. OSHA PEL _____

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

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

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

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

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

442. Solid chlorine is about _____ times heavier than water and gaseous chlorine is about 2.5 times heavier than air.

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

443. Cl2 IDLH ?

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

444. Cl2 Fatal Exposure Limit?
A. 10 PPM D. 1,000 PPM
B. 1 PPM E. 100 PPM
C. 00.1 PPM F. None of the Above

445. The current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for chlorine is 10 PPM (3 milligrams per cubic meter (mg/m (3))) as a ceiling limit. A worker's exposure to chlorine shall at no time exceed this ceiling level.
A. True B. False

446. HOCl and OCl-: The OCL- is the hypochlorite ion and both of these species are known as free available chlorine, they are the two main chemical species formed by chlorine in water and they are known collectively as _____and the_____.
A. Hypochlorous acid, Cl2 D. Combined Available Chlorine, Total
B. Hypochlorous acid, Hypochlorite ion E. Monochloramine, Cl2
C. HOCl2 and OCl2 F. None of the Above

447. Which of the following terms when added to water, rapidly hydrolyzes, the chemical equations best describe this reaction is Cl2 + H2O --> H+ + Cl- + HOCl?
A. Chlorine gas D. Combined Available Chlorine
B. Cl E. Monochloramine
C. HOCl and OCl- F. None of the Above

448. Which of the following substances is the most germicidal of the chlorine compounds with the possible exception of chlorine dioxide?
A. Hydrochlorous acid D. Combined Available Chlorine
B. Sulfuric acid E. Monochloramine
C. Hypochlorous acid F. None of the Above

449. What is the Atomic number of chlorine?
A. 17 7 D. 17 PPM
B. 17 E. 23
C. 0.17 F. None of the Above

450. _____is the elemental symbol and _____ is the chemical formula.
A. Cl, Cl2 D. Chlorine, Cl2
B. Cl2, Cl E. Cl2, ClH4
C. HOCl and OCl- F. None of the Above

451. Monochloramine, _____, and trichloramine are also known as Combined Available Chlorine. Cl2 + NH4.
A. Cl2 D. Combined Available Chlorine
B. Dichloramine E. Monochloramine
C. HOCl and OCl- F. None of the Above

452. Always follow your manufacturer’s instructions when changing the connection from a _____ to a chlorinator.
A. Chlorine exposure D. Protective bonnet
B. Connection E. Several safety precautions
C. Chlorine cylinder F. None of the Above

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

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

455. When storing a 150 - 200-pound chlorine cylinder: secure each cylinder in an upright position, attach the _____ over the valve and firmly secure each cylinder.
A. Chlorine regulator
B. Connection
C. Leak area
D. Protective bonnet
E. Flange
F. None of the Above

Confined Space Entry Program
Purpose
456. The Confined Space Entry Program is provided to protect authorized employees that will enter confined spaces and may be Exposed to hazardous atmosphere, engulfment in materials, conditions which may trap or asphyxiate due to converging or sloping walls, or contains any other safety or health hazards.
A. True B. False

Scope
457. According to the text, you are required to recognize this term associated with confined spaces.
A. An internal configuration
B. Hazardous atmosphere
C. Permit-Required Confined Space
D. Dangers and hazards
E. Atmospheric factors and physical agents
F. None of the Above

Definitions
Confined space:
458. Is large enough or so configured that an employee can?
A. Engulfing an entrant
B. Bodily enter and perform work
C. An internal configuration
D. Recognized serious safety or health hazard
E. Continuous employee occupancy
F. None of the Above

459. Is not designed for?
A. Engulfing an entrant
B. Hazardous atmospheres
C. An internal configuration
D. Recognized serious safety or health hazard
E. Continuous employee occupancy
F. None of the Above

460. Has limited or restricted means for entry or exit (i.e. tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have?
A. An internal configuration
B. Hazardous atmosphere
C. Limited means of entry
D. Entry or exit
E. Atmospheric factors and physical agents
F. None of the Above

461. Which of the following terms -will be marked "Confined Space - Entry Permit Required"?

A. An internal configuration
B. Hazardous atmosphere
C. Permit-Required Confined Space
D. Entry or exit
E. Atmospheric factors and physical agents
F. None of the Above

Confined Space Hazards

462. Fatalities and injuries constantly occur among construction workers who, during the course of their jobs, are required to enter?

A. An internal configuration
B. Hazardous atmosphere
C. Ventilation ducts
D. Entry or exit
E. Confined spaces
F. None of the Above

463. Throughout the construction jobsite, contractors and workers encounter both inherent and _____within confined workspaces.

A. An internal configuration
B. Hazardous atmosphere
C. Permit-Required Confined Space
D. Induced hazards
E. Atmospheric factors and physical agents
F. None of the Above

Inherent Hazards

464. Which of the following terms - such as electrical, thermal, chemical, mechanical, etc., are associated with specific types of equipment and the interactions among them?

A. Inherent hazards
B. Hazardous atmospheres
C. An internal configuration
D. Recognized serious safety or health hazard
E. Continuous employee occupancy
F. None of the Above

Microorganism Appendix

Protozoa

465. When protozoa are in the form of _____, they actively feed and grow.

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

466. Protozoa occupy a range of trophic levels, as predators, they prey upon unicellular or filamentous algae, bacteria, and?

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

467. Most protozoa exist in 5 stages of life which are in the form of _____.

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

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

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

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

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

Classification

470. Protozoa were commonly grouped in the kingdom of Protista together with the plant-like algae and fungus-like water molds and slime molds. In the 21st-century systematics, protozoans, along with ciliates, mastigophorans, and apicomplexans, are arranged as animal-like protists. However, protozoans are neither Animalia nor Metazoa (with the possible exception of the enigmatic, moldy Myxozoa).

A. True B. False

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

A. True B. False

Protozoa Section

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

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

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

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

Free-living Protozoa

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

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

Amoebas

How does an amoeba locomote?

475. Which bug/creature/organism/species locomote by way of cytoplasmic movement. (cytoplasm is the cell content around the nucleus of the cell)

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

Protozoa Information

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

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

Environmental Quality Indicators

477. Polluted waters often have a rich and characteristic?

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

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

A. True b. False

479. Not all laboratory animals are susceptible to all?

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

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

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

Metabolism

481. Which of the following is a term that describes all the chemical reactions by which food is transformed for use by the cells?

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

Entamoeba histolytica

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

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

Peritrichous Bacteria

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

A. True B. False

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

A. True B. False

Bacterial Cell
Mitochondria

485. Which terms means that the bacterial cell is surrounded by a lipid membrane, or cell membrane, which encloses the contents of the cell and acts as a barrier to hold nutrients?

A. Ciliate group
B. Unicellular ciliate protozoa
C. Endoplasmic reticulum
D. Prokaryotes
E. Cytoplasm
F. None of the Above

486. Which bug/creature/organism/species/disease do not tend to have membrane-bound organelles in their cytoplasm and thus contain few large intracellular structures?

A. Ciliate group
B. Unicellular ciliate protozoa
C. Endoplasmic reticulum
D. Prokaryotes
E. Bacterial cell
F. None of the Above

Paramecia

487. According to the text, Paramecia are a group of unicellular ciliate protozoa formerly known as _____ from their slipper shape.

A. Ciliate group
B. Unicellular ciliate protozoa
C. Slipper animalcules
D. Prokaryotes
E. Bacterial cell
F. None of the Above

Amoeba

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

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

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

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

Escherichia Coli Section
Fecal Coliform Bacteria

490. Fecal coliform bacteria are _____ that live in the intestines of warm-blooded animals.

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

Reasons for Natural Variation

491. Unlike the other conventional water quality parameters, _____ are living organisms.

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

Expected Impact of Pollution

492. The primary sources of _____ to fresh water are wastewater treatment plant discharges, failing septic systems, and animal waste.

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

Indicator Connection Varies

493. General coliforms, E. Coli, and Enterococcus bacteria are the "_____" organisms generally measured to assess microbiological quality of water.

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

What are these Indicators?

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

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

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

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

E. coli O157:H7

496. Symptoms of E. coli O157:H7 (bacterium) vary with type caused ____.

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

497. Which bug/creature/organism/species is an emerging cause of foodborne illness?

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

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

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

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

A. True B. False

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

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