Registration form

DISTRIBUTION 202 $150.00
48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL $50.00

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

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

Name_____Signature_____
I have read and understood the disclaimer notice on page 2. Digitally sign XXX

Address_____

City_____State_____Zip_____

Email_____ Fax (_____) _____

Phone:
Home (_____) _____ Work (_____) _____

Operator ID #_____Exp. Date_____

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

Please circle/check which certification you are applying the course CEU's.
Water Treatment ___ Water Distribution ___ Other _____

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

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

Please invoice me, my PO#_____

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

We will stop mailing the certificate of completion we need your e-mail address. We will e-mail the certificate to you, if no e-mail address; we will mail 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.

Rush Grading Service

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

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

Do not solely depend on TLC's Approval list for it may be outdated.

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

All downloads are electronically tracked and monitored for security purposes.

Distribution 202 Answer Key **Name**_____

Phone _____

You are solely responsible to ensure this course is accepted for credit. 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
Do not solely depend on TLC's Approval list for it may be outdated.

Website __ Telephone Call___ Email____ Spoke to_____

Did you receive the approval number, if applicable? _____

What is the course approval number, if applicable? _____

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

You can utilize Adobe Acrobat DC to electronically complete your assignment

Please Circle, Bold, Underline or X, one answer per question.

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

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

Please fax the answer key to TLC Western Campus
Fax (928) 272-0747
Backup Fax (928) 468-0675

Always call us after faxing the paperwork to ensure that we've received it.

Additional certificate for another Agency – additional fee $50

Rush Grading Service
If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of $50.00.

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

WATER DISTRIBUTION 202 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.

_____

_____

Water Distribution 202 CEU Training Course Assignment

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

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

We would prefer that you utilize the enclosed answer sheet in the front, but if you are unable to do so, type out your own answer key. Please include your name and address on your Answer Key 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.**

Microbial Regulations

1. The EPA established a MCL of 0.0010 for all public water systems and a 99% removal requirement for Cryptosporidium in filtered public water systems that serve at least 100,000 people.
A. True B. False

2. Color is an indicator of the physical removal of particulates, including pathogens.
A. True B. False

3. One of the key regulations developed and implemented by the United States Environmental Protection Agency (USEPA) to counter pathogens in drinking water is the Surface Water Treatment Rule requires that a public water system, using surface water (or ground water under the direct influence of surface water) as its source, have sufficient treatment to reduce the source water concentration of Giardia and viruses by at least 99.9% and 99.99%, respectively.
A. True B. False

4. Which rule specifies treatment criteria to assure that these performance requirements are met; they include turbidity limits, disinfectant residual, and disinfectant contact time conditions?
A. Long Term 1 Rule
B. Maximum Contaminant Level Goal (MCLG)
C. Stage 1 Byproducts Rule
D. Surface Water Treatment Rule
E. Interim Enhanced Surface Water
F. None of the Above

5. Which rule was established to maintain control of pathogens while systems lower disinfection byproduct levels to comply with the Stage 1 Disinfectants/Disinfection Byproducts Rule and to control Cryptosporidium?
A. Long Term 1 Enhanced Surface Water Treatment Rule
B. Maximum Contaminant Level Goal (MCLG)
C. Stage 1 Disinfectants/Disinfection Byproducts Rule
D. Surface Water Treatment Rule
E. Interim Enhanced Surface Water Treatment Rule
F. None of the Above

Water Sampling Terms and Definitions

6. Coliform bacteria are common in the environment and are harmful.
A. True B. False

7. The presence of these bacteria in drinking water indicates that the water may be contaminated with germs that can cause disease.
A. True B. False

8. Giardia lamblia is a parasite that enters lakes and rivers through sewage and animal waste. It causes?
A. Fecal Coliform and E coli
B. Gastrointestinal illness
C. Microorganisms
D. Cryptosporidiosis
E. Coliform bacteria
F. None of the Above

9. Microbes in human wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms and are caused by?
A. Fecal Coliform and E coli
B. Giardia lamblia
C. Microorganisms
D. Cryptosporidiosis
E. Coliform bacteria
F. None of the Above

10. What is the bacteria whose presence indicates that the water may be contaminated with human or animal wastes?
A. Fecal Coliform and E coli
B. Protozoa
C. Thermophilic
D. Bac-T
E. Coliforinia bacteria
F. None of the Above

11. What is the parasite that enters lakes and rivers through sewage and animal waste? It causes cryptosporidiosis, a mild gastrointestinal disease?
A. Fecal Coliform and E coli
B. Giardia lamblia
C. Microorganisms
D. Cryptosporidiosis
E. Cryptosporidium
F. None of the Above

Waterborne Pathogens and Disease Section
12. Bacteria, viruses and protozoan that cause disease are known as pathogens.
A. True B. False

13. Most pathogens are generally associated with diseases that _____and affect people in a relatively short amount of time, generally a few days to two weeks.
A. Limits the treatment process
B. Are mild in nature
C. Cause intestinal illness
D. Will cause fatalities
E. Limit the travel of pathogens
F. None of the Above

How Diseases are Transmitted.
14. Waterborne pathogens are primarily spread by the?
A. Fecal-oral, or feces-to-mouth, route
B. Dermal to fecal route
C. Oral to fecal route
D. Influenza route
E. Waterborne mishaps
F. None of the Above

15. When infected humans or animals pass the bacteria, viruses, and _____in their stool, pathogens may get into water and spread disease.
A. Fecal Coliform and E coli
B. Protozoa
C. Macroorganisms
D. Cryptosporidiosis
E. Bioslime
F. None of the Above

16. For another person to become infected, he or she must take the pathogen in through the mouth.
A. True B. False

17. This term means that in nature, it is different from other types of pathogens such as the viruses that cause influenza (the flu) or the bacteria that cause tuberculosis.
A. Fecal Coliform and E coli D. Waterborne Pathogen(s)
B. Giardia lamblia E. Coliform bacteria
C. Microorganism(s) F. None of the Above

18. According to the text, _____are spread by secretions that are coughed or sneezed into the air by an infected person.
A. Fecal Coliform and E coli D. Influenza virus and tuberculosis bacteria
B. Giardia lamblia E. Coliform bacteria
C. Microorganisms F. None of the Above

Bacteriological Monitoring Section
19. Which of the following are usually harmless, occur in high densities in their natural environment and are easily cultured in relatively simple bacteriological media?
A. Indicator bacteria D. Microbiological analysis
B. Bacteria tests E. Presence of an indicator
C. Contaminate F. None of the Above

20. Indicators in common use today for routine monitoring of drinking water include total coliforms, fecal coliforms, and?
A. Sample container D. Escherichia coli (E. coli)
B. Bacteria tests E. Iron bacteria
C. Coliform bacteria F. None of the Above

21. According to the text, the routine microbiological analysis of your water is for?
A. Indicator bacteria D. Coliform bacteria
B. Bacteria tests E. Presence of an indicator
C. Contamination F. None of the Above

22. Which of the following terms is used as an indicator organism to determine the biological quality of your water?
A. Microbiological analysis D. Escherichia coli (E. coli)
B. Bac-T E. Presence of an indicator
C. Coliform bacteria F. None of the Above

23. The presence of an indicator or _____in your drinking water is an important health concern.
A. Indicator bacteria D. Microbiological analysis
B. Pathogenic bacteria E. Presence of an indicator
C. Contaminate F. None of the Above

24. Which of the following terms is used to signal possible fecal contamination, and therefore, the potential presence of pathogens?
A. Indicator bacteria D. Microbiological analysis
B. Pathogenic bacteria E. Presence of an indicator
C. Contaminate F. None of the Above

Bacteria Sampling

25. Water samples for _____ must always be collected in a sterile container.

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

26. Refrigerate the sample and transport it to the testing laboratory within eight hours (in an ice chest). Many labs will accept bacteria samples on Friday. Mailing Indicator bacteria is not recommended because laboratory analysis results are not as reliable.

A. True B. False

27. Which bug forms an obvious slime on the inside of pipes and fixtures? A water test is not needed for identification. Check for a reddish-brown slime inside a toilet tank or where water stands for several days.

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

28. Which of the following are common in the environment and are generally not harmful, but the presence of these bacteria in drinking water is usually a result of a problem with the treatment system or the pipes that distribute water, and indicates that the water may be contaminated with germs that can cause disease?

A. Diseases
B. Germs
C. Coliform bacteria
D. Escherichia coli (E. coli)
E. Iron bacteria
F. None of the Above

Laboratory Procedures

29. The laboratory may perform the _____ in one of four methods approved by the U.S. EPA and your local environmental or health division.

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

Methods

30. The MMO-MUG test, a product marketed as _____, is the most common. The sample results will be reported by the laboratories as simply coliforms present or absent.

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

31. If coliforms are present, the laboratory will analyze the sample further to determine if these are _____and _____and report their presence or absence.

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

Types of Water Samples

32. It is important to properly identify the type of _____ you are collecting.

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

The three (3) types of samples are:

33. Samples collected following a coliform present' routine sample. The number of repeat samples to be collected is based on the number of _____ samples you normally collect.

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

34. What type of samples can be collected for other reasons? Examples would be a sample collected after repairs to the system.

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

35. What type of samples can be collected on a routine basis to monitor for contamination? Collection should be in accordance with an approved sampling plan.

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

Repeat Sampling

36. Which of the following terms is total coliform or fecal coliform present, a set of repeat samples must be collected within 24 hours after being notified by the laboratory?

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

The follow-up for repeat sampling is:

37. If only one _____per month or quarter is required, four (4) repeat samples must be collected.

A. Special Sample D. Coliform present
B. Routine sample E. Original sampling location
C. Repeat sample(s) F. None of the Above

38. For systems collecting two (2) or more routine samples per month, three (3) _____ must be collected.

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

39. Repeat samples must be collected from: Within five (5) service connections upstream from the?

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

40. Repeat samples must be collected from: Within five (5) service connections downstream from the?
A. Special Sample D. Coliform present
B. Routine sample E. Original sampling location
C. Repeat sample(s) F. None of the Above

41. Repeat samples must be collected from: If the system has only one service connection, the _____ must be collected from the same sampling location over a four-day period or on the same day.
A. Special Sample D. Coliform present
B. Routine sample E. Original sampling location
C. Repeat sample(s) F. None of the Above

42. Repeat samples must be collected from: All _____ are included in the MCL compliance calculation.
A. Special Sample D. Coliform present
B. Routine sample E. Original sampling location
C. Repeat sample(s) F. None of the Above

Sampling Procedures
43. Which of the terms must be followed and all operating staff must be clear on how to follow the sampling plan?
A. Seal individual samples D. Sample siting plan
B. Chain of custody E. Positive for total coliform
C. Distribution system F. None of the Above

44. Staff must be aware of how often sampling must be done, the _____to be used for collecting the samples, and the proper procedures for identification, storage and transport of the samples to an approved laboratory.
A. Multiple sources D. Proper procedures and sampling containers
B. Sample siting plan E. Sampling containers
C. Total coliform F. None of the Above

45. In addition, proper procedures must be followed for repeat sampling whenever a routine sample result is?
A. Seal individual samples D. Sample siting plan
B. Chain of custody E. Positive for total coliform
C. Distribution system F. None of the Above

Maximum Contaminant Levels (MCLs)
46. State and federal laws establish standards for drinking water quality. Under normal circumstances when these guidelines are being met, the water is somewhat safe to drink with little threat to human health.
A. True B. False

47. EPA had developed standards which are known as maximum contaminant levels (MCL). When a particular contaminant exceeds this term a potential health threat may occur.
A. Coliform bacteria count D. HPC
B. MCL E. CFU
C. Standards F. None of the Above

48. This acronym generally expresses properties of the contaminants, risk assessments and factors, short-term (acute) exposure and long-term (chronic) exposure.
A. Coliform bacteria D. HPC
B. MCLs E. CFU
C. Standards F. None of the Above

49. When you as the operator take samples to ensure your water is in compliance with the MCL, there are two types of _____for coliform bacteria.
A. Coliform bacteria D. MCL violations
B. MCLs E. CFU
C. Standards F. None of the Above

50. Which of the following terms is for total coliform; the second is an acute risk to health violation characterized by the confirmed presence of fecal coliform or E. coli?
A. Coliform bacteria D. MCL violations
B. MCLs E. CFU
C. Standards F. None of the Above

Chain of Custody Procedures
51. Which of the following terms begins when the sample containers are obtained from the laboratory? From this point on, a chain of custody record will accompany the sample containers.
A. Multiple sources D. Chain of custody record
B. Sample siting plan E. Sampling containers
C. Total coliform F. None of the Above

52. Each custody sample requires a _____ record and may require a seal. If you do not seal individual samples, then seal the containers in which the samples are shipped.
A. Seal individual samples D. Sample siting plan
B. Chain of custody E. Positive for total coliform
C. Distribution system F. None of the Above

53. Because a sample is physical evidence, _____ procedures are used to maintain and document sample possession from the time the sample is collected until it is introduced as evidence.
A. Multiple sources D. TCR
B. Sample siting plan E. Chain of custody
C. Total coliform F. None of the Above

54. If both parties involved in the transfer must sign, date and note the time on the chain of custody record, this is known as?
A. Multiple sources D. Samples transfer possession
B. Sample siting plan E. Sampling containers
C. Total coliform F. None of the Above

55. The recipient will then attach the _____showing the transfer dates and times to the custody sheets. If the samples are split and sent to more than one laboratory, prepare a separate chain of custody record for each sample.
A. Seal individual samples D. Sample siting plan
B. Chain of custody E. Positive for total coliform
C. Shipping invoices F. None of the Above

56. If the samples are delivered to after-hours night drop-off boxes, the custody record should note such _____and be locked with the sealed samples inside sealed boxes.
A. Multiple sources
B. Sample siting plan
C. Total coliform
D. TCR
E. A transfer
F. None of the Above

Positive or Coliform Present Results
57. According to the text, if you are notified of a positive test result you need to contact either the Drinking Water Program or your local county health department within 24 hours, or by the next business day after the?
A. Results are reported to you
B. Positive violation
C. Repeat sampling immediately
D. Sample violation
E. MCL compliance violation
F. None of the Above

58. Ideally speaking, your Drinking Water Program Agency should contract with health departments to provide _____to water systems.
A. Assistance
B. Harassment
C. Hostility
D. Sample help
E. Compliance calculation
F. None of the Above

59. Hopefully after you have contacted an agency for assistance, you will be instructed as to the proper repeat sampling procedures and possible corrective measures for solving the problem. It is very important to initiate the _____as the corrective measures will be based on those results.
A. Storage and distribution
B. Repeat sampling immediately
C. Upgrading of the wellhead area
D. Perform routine procedures
E. Corrective measures
F. None of the Above

Heterotrophic Plate Count HPC
60. Heterotrophic Plate Count (HPC) --- formerly known as the Standard plate count, is a procedure for estimating the number of live heterotrophic bacteria and measuring changes during water treatment and distribution in water or in swimming pools.
A. True
B. False

61. Colonies may arise from pairs, chains, clusters, or single cells, all of which are included in the term?
A. Coliform bacteria units
B. MCLs units
C. Standards
D. HPC units
E. Colony-forming units
F. None of the Above

Spread Plate Method
62. During this method, colonies are on the _____where they can be distinguished readily from particles and bubbles.
A. Agar surface
B. Surface growth area
C. Top
D. Bottom
E. Material
F. None of the Above

63. During the Spread Plate Method, colonies can be transferred quickly, and _____easily can be discerned and compared to published descriptions.

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

Membrane Filter Method

64. Which method permits testing large volumes of _____ and is the method of choice for low-count waters?

A. Colonies
B. Surface water
C. Low-turbidity water
D. Heterotrophic organisms
E. MCL
F. None of the Above

Heterotrophic Plate Count (Spread Plate Method)

65. Which of the following terms use inorganic carbon sources, this is in contrast to Heterotrophic organisms utilize organic compounds as their carbon source?

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

66. Which of the following terms provides a technique to quantify the bacteriological activity of a sample?

A. Colonies
B. Heat
C. Agar
D. Heterotrophic Plate Count
E. MCL
F. None of the Above

67. The R2A agar provides a medium that will support a large variety of?

A. Colonies
B. Bugs
C. Germs
D. Heterotrophic bacteria
E. MCL
F. None of the Above

Total Coliforms

68. This MCL is based on the presence of total coliforms, and compliance is on a daily or weekly basis, depending on your water system type and state rule.

A. True
B. False

69. For systems that collect fewer than _____ samples per month, no more than one sample per month may be positive. In other words, the second positive result (repeat or routine) in a month or quarter results in a MCL violation.

A. 5
B. 10
C. 100
D. 200
E. 40
F. None of the Above

70. For systems that collect _____ or more samples per month, no more than five (5) percent may be Positive?

A. 5
B. 10
C. 100
D. 200
E. 40
F. None of the Above

Acute Risk to Health (Fecal coliforms and E. coli)

71. A(n) _____to human health violation occurs if either one of the following happens?

A. Routine analysis
B. Drinking violation
C. Acute risk
D. Human health violation
E. Fecal coliform or E. coli is present
F. None of the Above

72. A routine analysis shows total coliform present and is followed by a repeat analysis that indicates _____.

A. Routine analysis
B. Drinking violation
C. Water penalty
D. Human health violation
E. Fecal coliform or E. coli present
F. None of the Above

73. A routine analysis shows total and _____ is followed by a repeat analysis that indicates total coliform present.

A. Routine analysis
B. Drinking water violation
C. MCL violation
D. Human health violations
E. Fecal coliform or E. coli present
F. None of the Above

74. Which of the following terms requires the water system to provide public notice via radio and television stations in the area?

A. Routine analysis violation
B. Drinking water rule violation
C. MCL violation
D. Human health violation
E. Acute health risk violation
F. None of the Above

75. According to the text, the type of contamination can pose an immediate threat to human health and notice must be given as soon as possible, but no later than 24 hours after notification from your laboratory of the test results.

A. True
B. False

The following are acute violations:

76. Which is violation of nitrate?

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

77. Concerning total coliforms - when fecal coliforms or E. coli are present in the distribution system and is a violation of the?

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

Chlorine Section

78. What is the term that best describes the amount of chlorine needed to react with contamination species and it must be satisfied before active HOCl is available to provide a free chlorine residual?

A. Chlorine demand
B. HOCl
C. High chlorine concentration
D. Total residual
E. The hypochlorite ion (OCl-)
F. None of the Above

Pathophysiology

79. As far as chlorine safety and respiratory protection, the intermediate _____of chlorine accounts for its effect on the upper airway and the lower respiratory tract.

A. Generation of free oxygen radicals
B. Vapor from Chlorine gas
C. Effects of Hydrochloric acid
D. Water solubility
E. The odor threshold for chlorine
F. None of the Above

80. According to the text, respiratory exposure to _____ may be prolonged because its moderate water solubility may not cause upper airway symptoms for several minutes.

A. Hydrochloric acid
B. Chlorine gas
C. The gas
D. The chemical species produced
E. Plasma exudation
F. None of the Above

81. Because chlorine gas is so dangerous, the odor threshold for chlorine is approximately?

A. 1 parts per million (ppm)
B. 3 parts per million (ppm)
C. 10 parts per million (ppm)
D. 3-5 parts per million (ppm)
E. 0.3-0.5 parts per million (ppm)
F. None of the Above

Mechanism of Activity

82. The mechanisms of cellular injury are believed to result from the oxidation of functional groups in cell components, from reactions with tissue water to form_____, and from the generation of free oxygen radicals.

A. Generation of free oxygen radicals
B. Chlorine acid
C. Hydrochloric acid
D. A caustic effect
E. Hypochlorous and hydrochloric acid
F. None of the Above

83. Chlorine gas feeds out of the cylinder through a gas regulator. The cylinders are on a scale that operators use to measure the amount used each day. The chains are used to prevent the tanks from falling over.

A. True B. False

84. Chlorine gas should be stored in vented rooms that have panic bar equipped doors.

A. True B. False

Solubility Effects

85. Which of the following terms is highly soluble in water?

A. Hydrochloric acid
B. H2SO4
C. Hypochloric acid
D. Sodium hypochlorite solution
E. Sulfuric Acid
F. None of the Above

86. Because it is highly water soluble, Hypochlorous acid has an injury pattern similar to?

A. Hydrochloric acid
B. H2SO4
C. Hypochloric acid
D. Sodium hypochlorite solution
E. Sulfuric Acid
F. None of the Above

87. Which of the following terms may account for the toxicity of elemental chlorine and hydrochloric acid to the human body?

A. Hydrochloric acid
B. H2SO4
C. Hypochloric acid
D. Hypochlorous acid
E. Sulfuric Acid
F. None of the Above

Early Response to Chlorine Gas

88. If you mix ammonia with chlorine gas, this compound reacts to form?

A. Hypochlorous acid
B. Chlorine gas
C. Hydrochloric acid
D. Sulfuric acid
E. Chloramine gas
F. None of the Above

89. The early response to the odor threshold for chlorine depends on the (1) concentration of chlorine gas, (2) duration of exposure, (3) water content of the tissues exposed, and (4) individual susceptibility.

A. True B. False

Immediate Effects

90. Which of the following answers is the best choice for the immediate effects of this substance's toxicity include acute inflammation of the conjunctivae, nose, pharynx, larynx, trachea, and bronchi?

A. Hydrochloric acid
B. Chlorine gas
C. Hypochlorous gas
D. Sulfuric acid
E. HOCL
F. None of the Above

Pathological Findings

91. Chlorine is a highly reactive gas.

A. True B. False

92. According to the text, treatment plants use _____to reduce water levels of microorganisms that can spread disease to humans.

A. HCl
B. HOCl
C. High chlorine concentrations
D. Chlorine
E. The hypochlorite ion (OCl-)
F. None of the Above

93. Chlorine gas is greenish yellow in color and very toxic. It is heavier than air and will therefore sink to the ground if released from its container. It is the toxic effect of Chlorine gas that makes it a good disinfectant, but it is toxic to more than just waterborne pathogens; it is also toxic to humans. It is a respiratory irritant and it can also irritate skin and mucus membranes.

A. True B. False

94. Chlorine gas is sold as a compressed liquid, which is amber in color. Chlorine, as a solid, is heavier (less dense) than water. If the chlorine liquid is released from its container, it will quickly return back to its liquid state.

A. True B. False

95. Chlorine gas is the most expensive form of chlorine to use. The typical amount of chlorine gas required for water treatment is 1-16 mg/L of water. Different amounts of chlorine gas are used depending on the quality of water that needs to be treated. If the water quality is good, a higher concentration of chlorine gas will be required to disinfect the water if the contact time cannot be increased.

A. True B. False

Exposure

96. People are exposed to sodium hypochlorite by inhalation of aerosols. This causes coughing and a sore throat. After swallowing sodium hypochlorite, the effects are stomach ache, a burning sensation, coughing, diarrhea, a sore throat and vomiting. Sodium hypochlorite on skin or eyes causes redness and pain.

A. True B. False

97. After prolonged exposure, the skin can become sensitive. Sodium hypochlorite is poisonous for water organisms. It is mutagenic and very toxic when it comes in contact with Ammonium salts.

A. True B. False

Chemistry of Chlorination

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

A. True B. False

99. According to the text, pH and temperature affect the ratio of hypochlorous acid to hypochlorite ions. As the temperature is decreased, the _____increases.

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

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

A. True B. False

101. Temperature plays a small part in the acid ratio. Although the ratio of _____is greater at lower temperatures, pathogenic organisms are actually harder to kill.

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

102. If all other things were equal, _____ and a lower pH are more conducive to chlorine disinfection.

A. Lower pH
B. Hypochlorous acid
C. Higher water temperatures
D. Lower water temperature
E. The hypochlorite ion
F. None of the Above

Types of Residual

103. _____ is all chlorine that is available for disinfection.

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

104. Total chlorine residual = free +_____.

A. Chlorine residual
B. Chlorine demand
C. Free chlorine
D. Combined chlorine residual
E. Total chlorine residual
F. None of the Above

105. In water, there are always other substances (interfering agents) such as iron, manganese, turbidity, etc., which will combine chemically with the chlorine, these substances are called the?
A. Chlorine residual D. Break-point chlorination
B. Chlorine demand E. Total chlorine residual
C. Pathogen reduction F. None of the Above

106. According to the text, once chlorine molecules are combined with these interfering agents, they are not capable of disinfection. _____ is much more effective as a disinfecting agent.
A. Chlorine residual D. Break-point chlorination
B. Chlorine demand E. Total chlorine residual
C. Free chlorine F. None of the Above

107. Either a total or a _____can be read when a chlorine residual test is taken,
A. Chlorine residual D. Break-point chlorination
B. Chlorine demand E. Total chlorine residual
C. Free chlorine residual F. None of the Above

108. Which of the following terms is a much stronger disinfecting agent, therefore, most water regulating agencies will require that your daily chlorine residual readings be of free chlorine residual?
A. Free chlorine D. "CT" disinfection concept
B. Total residual E. T10 of the process unit
C. Free chlorine residual F. None of the Above

109. _____ is where the chlorine demand has been satisfied, and any additional chlorine will be considered free chlorine.
A. Chlorine residual D. Break-point chlorination
B. Chlorine demand E. Total chlorine residual
C. Free chlorine F. None of the Above

Residual Concentration/Contact Time (CT) Requirements
110. Since monitoring for very low levels of pathogens in treated water is analytically very difficult, utilizing the _____ is recommended to demonstrate satisfactory treatment.
A. Free chlorine D. "CT" disinfection concept
B. Total residual E. T10 of the process unit
C. Free chlorine residual F. None of the Above

111._____ = Concentration (mg/L) x Time (minutes)
A. CT D. Total chlorine
B. The amount of chlorine E. pH value and temperature
C. Chlorine Demand F. None of the Above

112. The effective reduction in pathogens can be calculated by reference to standard tables of required?
A. Free chlorine D. "CT" s
B. Total residual E. T10 of the process unit
C. Free chlorine residual F. None of the Above

113. The CT concept as developed by the United States Environmental Protection Agency (uses the combination of disinfectant residual concentration (mg/L) and the effective disinfection contact time (in minutes) to measure effective pathogen reduction.
A. True B. False

Calculation and Reporting of CT Data
114. Reduction Ratio should be reported, along with the appropriate pH, temperature, and?
A. Reduction Ratio D. Disinfectant residual
B. CT actual E. T10 of the process unit
C. Free chlorine residual F. None of the Above

Chlorine (DDBP)
115. While testing chlorine disinfection process, you will need to understand one especially important feature is the ease of overdosing to create a "_____" concentration.
A. Free available chlorine and Total D. Free available chlorine and Combined Chlorine
B. Residual E. Combined chlorine and readily available
C. Break point and Free F. None of the Above

116. According to the text, this type of chlorine residual concentration residuals from 0.1 to 0.5 ppm.
A. Free available chlorine and Total D. Free available
B. Residual E. Combined chlorine and readily available
C. Break point and Free F. None of the Above

117. A typical chlorine residual is 2 ppm for this type of chlorine residual?
A. Free available chlorine and Total D. Combined Chlorine
B. Residual E. Readily available
C. Break point and Free F. None of the Above

Chlorine By-Products
118. The most common chlorination by-products found in U.S. drinking water supplies are?
A. Chlorate and Chlorite D. Ammonia and THMS
B. CO2 and H2SO4 E. Chloramines
C. Trihalomethanes (THMs) F. None of the Above

The Principal Trihalomethanes are:
119. Chloroform, bromodichloromethane, chlorodibromomethane, and bromoform. Other less common chlorination by-products include the haloacetic acids and haloacetonitriles. The amount of THMs formed in drinking water can be influenced by a number of factors, including the season and the source of the water.
A. True B. False

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

Risks and Benefits of Chlorine

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

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

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

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

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

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

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

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

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

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

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

A. True B. False

Ozone

127. Which compound is obtained by passing a flow of air or oxygen between two electrodes that are subjected to an alternating current in the order of 10,000 to 20,000 volts?

A. Chloramine
B. Liquid Ozone
C. Ozone
D. Oxygen and nascent oxygen
E. O2
F. None of the Above

128. Which compound is a light blue gas at room temperature?

A. Chloramine
B. Liquid Ozone
C. Ozone
D. Oxygen and nascent oxygen
E. O2
F. None of the Above

129. Ozone has a _____similar to that sometimes noticed during and after heavy electrical storms. In use, ozone breaks down into oxygen and nascent oxygen.

A. Self-policing pungent odor
B. THMs
C. Light blue gas
D. Oxygen and nascent oxygen
E. Strongest oxidizing agent
F. None of the Above

130. Ozone does not form chloramines or _____, and while it may destroy some THMs, it may produce others when followed by chlorination.

A. Carcinogens
B. THMs
C. Complete disinfectant
D. Oxygen and nascent oxygen
E. Flocculation and coagulation
F. None of the Above

131. Ozone falls into the same category as other disinfectants in that it can produce_____.

A. Carcinogens
B. THMs
C. DBPs
D. Oxygen and nascent oxygen
E. Strongest oxidizing agent
F. None of the Above

132. Which compound is very unstable and can readily explode, as a result, it is not shipped and must be manufactured on-site?

A. Chloramine
B. Liquid Ozone
C. Ozone
D. Oxygen and nascent oxygen
E. O2
F. None of the Above

133. Each water has its own_____, in the order of 0.5 ppm to 5.0 ppm. Contact time, temperature, and pH of the water are factors to be determined.

A. Carcinogens
B. THMs
C. Ozone demand
D. Oxygen and nascent oxygen
E. Strongest oxidizing agent
F. None of the Above

Alternate Disinfectants Section Summary

Chloramines

134. Which compound is a very weak disinfectant for Giardia and virus reduction? It is recommended that it be used in conjunction with a stronger disinfectant. It is best utilized as a stable distribution system disinfectant.

A. Chlorine
B. Chloramine
C. Ozone
D. Oxygen and nascent oxygen
E. Strongest oxidizing agent
F. None of the Above

135. In the production of chloramines, the ammonia residuals in the finished water, when fed in excess of stoichiometric amount needed, should be limited to inhibit growth of?

A. Cryptosporidium
B. Chlorine-based disinfectants
C. Giardia lamblia
D. An emerging parasitic protozoan pathogen
E. Nitrifying bacteria
F. None of the Above

Chlorine Dioxide

136. Chlorine dioxide may be used for either taste and odor control or as?

A. Post disinfectant
B. ClO_2/chlorite/chlorate
C. An oxidant
D. Total residual oxidants
E. A pre-disinfectant
F. None of the Above

Water Distribution Section
System Elements

137. Distribution mains function is to carry water from the water source or treatment works to users, these are the pipelines that make up the?

A. Increase water pressure
B. Distribution tree
C. Complete gridiron system
D. Distribution system
E. Arterial system
F. None of the Above

138. Arterial mains are interconnected with smaller distribution mains to form a complete gridiron system and are mains for?

A. Increasing water pressure
B. Tree system
C. Complete gridiron system
D. Distribution mains of large size
E. Fire protection
F. None of the Above

139. Storage reservoirs are structures used to store water and _____ the supply or pressure in the distribution system.

A. Increase water pressure
B. Equalize
C. Complete gridiron system
D. Main line isolation
E. Provide a reserve pressure
F. None of the Above

140. Booster stations are used to _____ from storage tanks for low-pressure mains.

A. Increase water pressure
B. Equalize
C. Complete gridiron system
D. Boost flow
E. Provide a reserve pressure
F. None of the Above

141. Valves control the flow of water in the distribution system by isolating areas for repair or by?

A. Increase water pressure
B. Bypasses
C. Complete gridiron system
D. Main line isolation
E. Regulating system flow or pressure.
F. None of the Above

142. According to the text, gate valves should be used in the _____for main line isolation.

A. Increase water pressure
B. Distribution tree
C. Complete gridiron system
D. Distribution system
E. Arterial system
F. None of the Above

Butterfly Valve

143. Butterfly valves are rotary type of valves usually found on large transmission lines, and may also have an additional valve beside it known as a_____ to prevent water hammer.

A. Regulator
B. Bypass
C. Complete gridiron system
D. Main line isolation
E. PRV
F. None of the Above

Water Distribution Valves

144. One purpose of installing shutoff valves in water mains at various locations within the distribution system is to allow sections of the system to be _____ or provide maintenance without significantly curtailing service over large areas.

A. Feeders as practical
B. Adjust the pressure
C. Open or close the valve
D. Curtail the service
E. Taken out of service for repairs
F. None of the Above

145. According to the text, at intersections of distribution mains, the number of valves required is normally one less than the number of?
A. Ties D. Throttling purposes
B. Depends E. Standardizes
C. Radiating mains F. None of the Above

146. All buried small- and medium-sized valves should be installed in the sidewalk.
A. True B. False

147. For large shutoff valves, it may be necessary to surround the valve operator or entire valve within a vault or manhole to allow?
A. Principally D. Minimum flow restriction
B. Dependability E. Stops or allows
C. Repair or replacement F. None of the Above

Gate Valves
148. In the distribution system, gate valves are used when a straight-line flow of fluid and?
A. Principally D. Minimum flow restriction
B. Dependability E. Stops or allows
C. Repair or replacement F. None of the Above

149. In the distribution system, or on a residential job, gate valves are so-named because the part that either _____ flow through the valve acts somewhat like a gate.
A. Fully drawn up D. Minimum flow restriction
B. Dependability E. Stops or allows
C. Repair or replacement F. None of the Above

150. If the valve is wide open, the gate is _____ into the valve bonnet.
A. Fully drawn up D. Minimum flow restriction
B. Dependable E. Stops or allows
C. Repair or replacement F. None of the Above

151. Gate valves are not suitable for?
A. Copper lines D. Throttling purposes
B. Dependability E. Pressure drops
C. PRV F. None of the Above

152. The control of flow is easy because of the valve's design, and the flow of fluid
A. True B. False

Ball Valves
153. Most ball valves require only a 180-degree turn to either completely open or close the valve.
A. True B. False

154. According to the text, some ball valves are operated by planetary gears.
A. True B. False

155. Ball valves should be either fully-on or fully-off, some ball valves also contain a swing check located within the ball to give the valve a check valve feature.
A. True B. False

Valve Exercising

156. Valve exercising should be done to locate inoperable due to freezing or build-up of rust or corrosion and done once per year to detect _____ and to prevent valves from becoming

A. Malfunctioning valves
B. Dependability
C. Repair or replacement
D. Minimum flow restriction
E. Stops or allows
F. None of the Above

157. A valve inspection should include drawing valve location maps to show distances to the _____ from specific reference.

A. Valve(s)
B. Stonelines
C. Monument
D. House
E. Telephone pole
F. None of the Above

158. Service connections are used to _____ or other plumbing systems to the distribution system mains.

A. Be isolated
B. Connect individual buildings
C. By laying out
D. Limits the expansion
E. Decreases in size
F. None of the Above

If Excessive Torque is Needed to Work the Valve

159. One cause of a valve failing to open are variations in the temperature and/or pressure of the?

A. High pressure side
B. Working fluid
C. Closing torque applied
D. Valve sealing surfaces
E. Length of exposure
F. None of the Above

160. Depending on the seat and wedge material, _____ and closing torque applied, thermal binding can also occur in high temperature situations.

A. High pressure side
B. Working fluid
C. Closing torque applied
D. Valve sealing surfaces
E. Length of exposure
F. None of the Above

161. Over-pressurization is when a valve can _____ when high pressure enters the cavity and has no way to escape.

A. Over-pressurization
B. Positive pressure differential
C. Lock in the closed position
D. Lock in the open position
E. Break
F. None of the Above

162. According to the text, a single direction sealing gate valve has a nameplate on the side of the valve that has a relief hole or pressure equalizer.

A. True B. False

163. Tuberculation corrosion is caused by chemical changes produced by?

A. Closed position
B. Hard water
C. Chemical changes
D. Electricity or electrolysis
E. Positive pressure differential
F. None of the Above

164. Corrosion will increase the C-Factor and the carrying capacity in a pipe.

A. True B. False

System Layouts
Tree System
165. Newer water systems are frequently expanded with planning and developed into a tree-like system.
A. True B. False

166. The Tree system consists of a single main that _____ as it leaves the source and progresses through the area originally served.
A. Be isolated
B. Connect individual buildings
C. By laying out
D. Limits the expansion
E. Decreases in size
F. None of the Above

167. Smaller pipelines _____the main and divide again, much like the trunk and branches of a tree.
A. Branch off
B. Are manifolded to
C. Connect
D. Limit the expansion
E. Decrease
F. None of the Above

168. According to the text, there are several advantages gained by laying out water mains in a loop or grid, with feeder and distributor mains interconnecting at roadway intersections and other regular intervals.
A. True B. False

Friction Loss
169. The damaged section can be isolated and the remainder of the system will still carry pressure, water will not be distributed if a single section fails.
A. True B. False

170. During periods of peak fire flow demand, there will be less impact from _____ in water mains as the velocity within any given section of main.
A. Carrying capacity
B. Friction loss
C. Pressure
D. Static pressure
E. Total pressure
F. None of the Above

Types of Pipes Used in the Water Distribution Field
Plastic Pipe (PVC)
171. Plastic pipe has seen extensive use available in different lengths and sizes; it is lighter than steel or copper and requires no special tools to install.
A. True B. False

172. Plastic pipe has complete resistance to corrosion; and, in addition, it can be installed aboveground or below ground. Has several advantages over metal pipe: it is flexible; it has superior resistance to?
A. Ease of installation
B. An excellent combination
C. Chemical resistance
D. Rupture from freezing
E. Complete resistance to corrosion
F. None of the Above

173. PVC pipes are made of tough, strong thermoplastic material that has _____ of physical and chemical properties.

A. Ease of installation
B. An excellent combination
C. Chemical resistance
D. Array
E. Complete resistance to corrosion
F. None of the Above

174. PVC's chemical resistance and _____ make it an excellent material for application in various mechanical systems.

A. Ease of installation
B. Greater resistance
C. Chemical resistance
D. Design strength
E. Complete resistance to corrosion
F. None of the Above

Cast Iron (CIP)

175. CIP can be found in diameters from 3" to 48".

A. True B. False

176. Advantages of CIP are its long life, ability to withstand shock loads and to withstand working pressures up to 120 psi.

A. True B. False

Ductile Iron Pipe (DIP)

177. DIP can be purchased in 4" to 45" diameters and lengths of 18' to 20'.

A. True B. False

178. DIP was developed to _____ associated with cast iron pipe.

A. Overcome the breakage problems
B. Withstand shock loads
C. Extend the life
D. Provide a High C Factor
E. Be nearly indestructible
F. None of the Above

179. DIP's main advantage is that it is _____by internal or external pressures.

A. Overcome the breakage problems
B. Withstand shock loads
C. Extend the life
D. Provide a High C Factor
E. Nearly indestructible
F. None of the Above

180. DIP is sometimes protected from highly corrosive soils by wrapping the pipe in plastic sheeting prior to installation, this practice can greatly _____of this type of pipe.

A. Overcome the breakage problems
B. Withstand shock loads
C. Extend the life
D. Provide a High C Factor
E. Be nearly indestructible
F. None of the Above

Steel Pipe

181. Steel pipe is available in various diameters and in 20' or 21' lengths; its main advantage is the ability to form it into a variety of shapes.

A. True B. False

182. Steel pipe's advantage is that it is able withstand corrosion by both soil and water.

A. True B. False

183. Steel pipe is usually galvanized or dipped in coal-tar enamel and wrapped with coal-tar impregnated felt to reduce?
A. Corrosion problems
B. Bending
C. Costs
D. Good yielding
E. Confusion with other pipes
F. None of the Above

184. From a health standpoint coal-tar products are undergoing scrutiny and it is recommended that the appropriate regulatory agencies be contacted prior to use of this material.
A. True B. False

Excavation and Trenching Chapter
185. Anyone who has done excavation work will tell you that once the first bucket of dirt is out of the ground, you never know what surprises await. Tales of unmarked utilities, unexpected rock and other nightmares are common. The greatest variable, however, is the type of excavation or trenching will be done and how to protect yourself for a cave-in.
A. True B. False

186. Which of the following terms was revised because excavating is the most dangerous of all construction operations?
A. Competent Rule
B. OSHA excavation standard
C. Inspections
D. Protective equipment, trench conditions standard
E. Emergency rule
F. None of the Above

187. The second reason that OSHA revised the _____was to clarify the requirements.
A. Competent person
B. Existing standard
C. Inspections
D. Protective equipment, trench conditions
E. Emergency contact methods
F. None of the Above

188. The new standard uses performance criteria that provides employers with options when classifying soil and when selecting methods to protect the _____ from cave-ins.
A. Competent person
B. Employee
C. Inspections
D. Protective equipment, trench conditions
E. Emergency
F. None of the Above

189. Although the standard has been clarified and _____have options when meeting some of the requirements, employers must realize that the employee must be protected at all times.
A. Competent person
B. Everyone
C. Inspections
D. Protective equipment, trench conditions
E. Employers
F. None of the Above

Competent Person
190. Which of the following terms means one who is capable of identifying existing hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and has authorization to take prompt corrective measures to eliminate them?
A. Competent person
B. Everyone
C. Inspection inspector
D. Watchman
E. Authorized person
F. None of the Above

191. Which of the following terms for the purpose of this standard, one must have specific training in and be knowledgeable about soils analysis, the use of protective systems and the requirements of 29 CFR Part 1926.650-652 Subpart P.

A. Competent person
B. Everyone
C. Inspection inspector
D. Watchman
E. Authorized person
F. None of the Above

192. Which of the following terms are essential. Everyone is required to practice once a year. Yes, once a year.

A. Competent person
B. Rescue training exercises
C. Inspections
D. Protective equipment
E. Emergency
F. None of the Above

Competent Person Duties

193. Performs daily inspections of the _____ and adjacent areas.

A. Competent person
B. Everyone
C. Inspections
D. Protective equipment and trench conditions
E. Emergency contact methods
F. None of the Above

194. Which of the following terms shall be made prior to the start of work and as needed throughout the shift?

A. Competent person
B. Examinations
C. Inspections
D. Protective equipment
E. Emergency contact methods
F. None of the Above

195. Which of the following terms shall be made after every rainstorm or other hazard occurrence?

A. Competent person
B. Examinations
C. Inspections
D. Protective equipment
E. Emergency contact methods
F. None of the Above

196. Knowledge of _____, telephone or radio dispatch.

A. Competent person
B. Everything
C. Inspections
D. Protective equipment, trench conditions
E. Emergency contact methods
F. None of the Above

197. Removes employees and _____from hazardous conditions and makes all changes necessary to ensure their safety.

A. Competent person
B. All other personnel
C. Inspections
D. Protective equipment, trench conditions
E. Emergency contact methods
F. None of the Above

198. Which of the following terms – have to have proper protective equipment, hard-hats, reflective vests, steel-toed boots, harnesses, eye protection, hearing protection and drinking water?

A. Competent person
B. Everyone
C. Inspections
D. All employees
E. Emergency contact methods
F. None of the Above

Scope of Work

199. During excavation work a competent person shall be on the job site at all times when personnel are working within or around the?

A. Competent person
B. Employees
C. Inspections
D. Ladder(s)
E. Excavation
F. None of the Above

200. Which of the following safety terms reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation?

A. Competent person
B. Employees
C. Inspections
D. Any other underground installation
E. Excavation work
F. None of the Above

201. Which of the following safety terms shall be taken to protect employees working in excavations, against the hazards posed by water accumulation?

A. Competent person
B. Adequate precautions
C. Inspections
D. Ladder(s)
E. Excavation work
F. None of the Above

202. A stairway, ladder, or ramp shall be used as a _____in trench excavations that are four (4') feet or more in depth.

A. Competent person
B. Means of access or egress
C. Inspections
D. Ladder(s)
E. Excavation work
F. None of the Above

Excavation Protection Systems

203. The three basic protective systems for excavations and trenches are?

A. Table
B. Tabulated data
C. Trench excavation
D. Protective systems
E. Sloping and benching systems, shoring, and shields
F. None of the Above

204. Every employee in an excavation shall be protected from _____ by an adequate protective system.

A. Table
B. Tabulated data
C. Trench excavation
D. Protective systems
E. Cave-ins
F. None of the Above

Sloping and Benching Systems

205. There are four options for?

A. Sloping
B. Tabulated data
C. Trench excavation
D. Protective systems
E. Cave-ins
F. None of the Above

206. The table provided in _____of the standard may be used to determine the maximum allowable angle.

A. Appendix B
B. Tabulated data
C. Trench excavation data
D. Protective system Appendix
E. Soil section
F. None of the Above

207. Which of the following safety terms may be prepared by a registered professional engineer can be utilized?

A. Table
B. Tabulated data
C. Trench excavation
D. Protective systems
E. Cave-ins
F. None of the Above

208. A registered professional engineer can design a _____for a specific job.

A. Table
B. Sloping plan
C. Trench excavation
D. Protective systems
E. Cave-ins
F. None of the Above

Shoring Systems

209. Which of the following safety terms utilizes a framework of vertical members, horizontal members, and cross braces to support the sides of the excavation?

A. Shoring
B. Tabulated data
C. Trench excavation
D. Protective systems
E. Cave-ins
F. None of the Above

Excavation Safety Plan

210. An excavation safety plan is required in written form. This plan is to be developed to the level necessary to insure complete compliance with the _____and state and local safety standards.

A. An excavation safety plan
B. Adequate measures
C. Protective systems
D. Simplified Soil Classification Systems
E. OSHA Excavation Safety Standard
F. None of the Above

Soil Classification and Identification

211. The OSHA Standards define soil classifications consist of four categories: _____, Type A, Type B, and Type C.

A. Type A
B. Soil classifications
C. Competent person
D. Trench or excavation
E. Stable rock
F. None of the Above

Backflow/Cross-Connection Section

What is backflow? Reverse flow condition

212. Backflow is the undesirable reversal of flow of nonpotable water or other substances through a _____and into the piping of a public water system or consumer's potable water system.

A. Backflow
B. Backpressure
C. Backsiphonage
D. Cross-connection
E. Indirect connection
F. None of the Above

213. Which of the following terms can result from an increase in downstream pressure, a reduction in the potable water supply pressure, or a combination of both?

A. Backflow
B. Backpressure
C. Backsiphonage
D. Cross-connection
E. Indirect connection
F. None of the Above

214. Which of the following terms can have two forms-backpressure and backsiphonage?
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

215. The principal types of mechanical backflow preventers are the reduced-pressure principle assembly, the _____, and the double check valve assembly.
A. High hazard installations D. Backflow
B. Air gap E. Device or method
C. Vacuum breaker F. None of the Above

216. Which of the following terms can occur when there is a stoppage of water supply due to nearby firefighting, a break in a water main?
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

217. Which of the following terms is a type of backflow caused by a downstream pressure that is greater than the upstream or supply pressure in a public water system or consumer's potable water system?
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

218. Which of the following terms is the means or mechanism to prevent backflow?
A. High hazard installations D. Backflow
B. Air gap E. Device or method
C. Backflow preventer F. None of the Above

219. According to the text, basic means of preventing backflow is an _____, which either eliminates a cross-connection or provides a barrier to backflow.
A. High hazard installations D. Backflow
B. Air gap E. Device or method
C. Backflow preventer F. None of the Above

220. Which of the following terms is any temporary or permanent connection between a public water system or consumer's potable water system and any source or system containing nonpotable water or other substances?
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

221. Which of the following terms is a form of backflow caused by a negative pressure (i.e., a vacuum or partial vacuum) in a public water system or consumer's potable water system?
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

Types of Backflow Prevention Methods and Assemblies

222. Which of the following terms must either be physically disconnected or have an approved backflow prevention device installed to protect the public water system?

A. Backflow
B. Backpressure
C. Backsiphonage
D. Cross-connection
E. Indirect connection
F. None of the Above

223. The type of device selected for a particular installation depends on several factors.

A. True B. False

224. When the airflow is restricted, such as the case of an air gap located near a wall, the _____separation must be increased.

A. Open receiving vessel
B. Backflow preventer
C. Barrier to backflow
D. Air gap
E. Air break
F. None of the Above

225. An air gap is a physical disconnection between the free flowing discharge end of a potable water pipeline and the top of an?

A. Open receiving vessel
B. Backflow preventer
C. Barrier to backflow
D. Air gap
E. Air break
F. None of the Above

226. Which of the following terms must be at least two times the diameter of the supply pipe and not less than one inch?

A. Open receiving vessel
B. Backflow preventer
C. Barrier to backflow
D. Air gap
E. Air break
F. None of the Above

227. According to the text, an air break is a physical separation between the free flowing discharge end of a potable water supply pipeline, and the overflow rim of an open or non-pressure receiving vessel.

A. True B. False

228. According to the text, air gap separations must be vertically orientated a distance of at least twice the inside diameter of the supply, but never less than?

A. 1 inch
B. 2 inches
C. 3 inches
D. Backflow
E. Depends
F. None of the Above

229. An obstruction around or near an _____ may restrict the flow of air into the outlet pipe and nullify the effectiveness of the air gap to prevent backsiphonage.

A. High hazard installations
B. Backflow preventer
C. Barrier to backflow
D. Air gap
E. Air break
F. None of the Above

230. An air gap is acceptable for _____ and is theoretically the most effective protection.

A. High hazard installations
B. Backflow preventer
C. Barrier to backflow
D. Low pollutional hazards
E. High pollutional concerns
F. None of the Above

Groundwater Production and Treatment System
Groundwater and Wells
231. According to the text, toxic material spilled or dumped near a well can leach into which of the following terms and contaminate the groundwater drawn from that well?
A. Unconfined aquifer(s) D. Well(s)
B. Groundwater E. Aquifer
C. Water table F. None of the Above

Contaminated Wells
232. Which of the following terms can be tested to see what chemicals may be in the well and if they are present in dangerous quantities?
A. Wells D. Soil moisture
B. Drinking water E. Karst
C. Water table F. None of the Above

233. Groundwater is withdrawn from wells to provide water when water is pumped from the ground, which of the following terms change in response to this withdrawal?
A. Dynamics of groundwater flow D. Well(s)
B. Groundwater E. Aquifer
C. Water table F. None of the Above

234. Which of the following terms flows slowly through water-bearing formations at different rates?
A. Well D. Soil moisture
B. Drinking water E. Groundwater
C. Water table F. None of the Above

Aquifer
235. Many terms are used to describe the nature and extent of the groundwater resource, the level below which all the spaces are filled with water is called the?
A. Unconfined aquifer(s) D. Well(s)
B. Groundwater E. Aquifer
C. Water table F. None of the Above

236. Above the water table lies the?
A. Unsaturated zone D. Soil moisture
B. Drinking water E. Karst
C. Water table F. None of the Above

237. The entire region below the water table is called the saturated zone and water in this saturated zone is called?
A. Unconfined aquifer(s) D. Well(s)
B. Groundwater E. Aquifer
C. Water table F. None of the Above

238. _____ are cracks, joints, or fractures in solid rock, through which groundwater moves.
A. Fractured aquifer(s) D. Soil moisture
B. Drinking water E. Karst
C. Water table F. None of the Above

239. Limestone is often located in which of the following terms?
A. Unconfined aquifer(s) D. Fractured aquifer(s)
B. Groundwater E. Aquifer
C. Water table F. None of the Above

240. Which of the following terms such as sandstone may become so highly cemented or recrystalized that all of the original space is filled, in this case, the rock is no longer a porous medium?
A. Unconfined aquifer(s) D. Fractured aquifer(s)
B. Groundwater E. Aquifer
C. Porous media F. None of the Above

241. Clay has many spaces between its grains, but the spaces are not large enough to permit free movement of water.
A. True B. False

242. Which of the following terms usually flows downhill with the slope of the water table?
A. Well D. Soil moisture
B. Drinking water E. Groundwater
C. Water table F. None of the Above

243. Which of the following terms flow in the aquifers underlying springs or surface drainage basins, and does not always mirror the flow of water on the surface?
A. Well D. Soil moisture
B. Drinking water E. Groundwater
C. Water table F. None of the Above

244. Which of the following terms may move in different directions below the ground than the water flowing on the surface?
A. Well D. Soil moisture
B. Drinking water E. Groundwater
C. Water table F. None of the Above

245. Unconfined aquifers are those that are bounded by the water table. Some aquifers lie beneath layers of impermeable materials.
A. True B. False

246. A well in such an aquifer is called an artesian well.
A. True B. False

247. Which of the following terms is the level to which the water in an artesian aquifer will rise?
A. Unconfined aquifer(s) D. Well(s)
B. Piezometric surface E. Aquifer
C. Water table F. None of the Above

Cone of Depression
248. When pumping begins, water begins to flow towards the well in contrast to the natural direction of groundwater movement.
A. True B. False

249. The water level in the well falls below the water table in the?
A. Water table D. Cone of depression
B. Groundwater E. Well
C. Surrounding aquifer F. None of the Above

250. The movement of water from this term into a well results in the formation of a cone of depression.
A. Confined aquifer D. Water table
B. An aquifer E. Unconfined aquifer
C. Hydrologic cycle F. None of the Above

251. Which of the following terms describes a three-dimensional inverted cone surrounding the well that represents the volume of water removed as a result of pumping?
A. Water table D. Cone of depression
B. Groundwater E. Well
C. Gravity F. None of the Above

252. Which of the following terms is the vertical drop in the height between the water level in the well prior to pumping and the water level in the well during pumping?
A. Water table D. Cone of depression
B. Groundwater E. Well
C. Drawdown F. None of the Above

253. When a well is installed in this missing term, water moves from the aquifer into the well through small holes or slits in the well casing or, in some types of wells, through the open bottom of the well?
A. Confined aquifer D. Water table
B. Aquifer(s) E. An unconfined aquifer
C. Hydrologic cycle F. None of the Above

Where Is Ground Water Stored?
254. Areas where ground water exists in sufficient quantities to supply wells or springs are called aquifers, a term that literally means?
A. Water table D. Cone of depression
B. Groundwater E. Well
C. Water bearer F. None of the Above

255. Which of the following terms store water in the spaces between particles of sand, gravel, soil, and rock as well as cracks, pores, and channels in relatively solid rocks?
A. Confined aquifer D. Water table
B. Aquifer(s) E. Unconfined aquifer
C. Hydrologic cycle F. None of the Above

256. Which of the following terms is controlled largely by its porosity, or the relative amount of open space present to hold water?
A. Water table D. Cone of depression
B. Groundwater E. Well
C. An aquifer's storage capacity F. None of the Above

257. There are two kinds of aquifers: confined and unconfined.
A. True B. False

258. If the aquifer is sandwiched between layers of relatively impermeable materials, it is called?
A. Confined aquifer D. Water table
B. Aquifer(s) E. Unconfined aquifer
C. Hydrologic cycle F. None of the Above

259. Confined aquifers are not sandwiched between layers of relatively impermeable materials, and their upper boundaries are generally closer to the surface of the land.
A. True B. False

260. Which of the following terms are frequently found at greater depths than unconfined aquifers?
A. Confined aquifer(s) D. Water table
B. Aquifer(s) E. Unconfined aquifer
C. Hydrologic cycle F. None of the Above

Does Ground Water Move?
261. Ground water can move sideways as well as up or down. This movement is in response to gravity, differences in elevation, and?
A. Synthetic organic chemical(s) D. Ground-water contamination
B. Differences in pressure E. Septic tanks, cesspools, and privies
C. Permeable zones F. None of the Above

262. Ground water can move even more rapidly in karst aquifers, which are areas in which missing term and similar rocks where fractures or cracks have been widened by the action of the ground water to form sinkholes, tunnels, or even caves?
A. Contaminant(s) D. Water soluble limestone
B. Saturated zone E. Serious contamination source(s)
C. Karst aquifer(s) F. None of the Above

Ground-Water Quality
263. The layers of soil and particles of sand, gravel, crushed rocks, and larger rocks were thought to act as filters, trapping contaminants before they could reach the ground water.
A. True B. False

264. We know that some contaminants can pass through all of these filtering layers into this term to contaminate ground water.
A. Contaminant(s) D. Saturated zone
B. Saturated zone E. Water table
C. Karst aquifer(s) F. None of the Above

How Does Ground Water Become Contaminated?
265. Ground-water contamination can originate on the surface of the ground, in the ground above the water table, or in the ground below the?
A. Synthetic organic chemical(s) D. Ground-water contamination
B. Ground water E. Water table
C. Permeable zones F. None of the Above

266. If the contaminant is introduced directly into the area below this term, the primary process that can affect the impact of the contaminant is dilution by the surrounding ground water.
A. Contaminant(s) D. Saturated zone
B. Saturated zone E. Water table
C. Karst aquifer(s) F. None of the Above

What Kinds of Substances Can Contaminate Groundwater, and Where Do They Come from?
267. Substances that can contaminate this missing term can be divided into two basic categories: substances that occur naturally and substances produced or introduced by man's activities.
A. Synthetic organic chemical(s) D. Ground-water contamination
B. Ground water E. Septic tanks, cesspools, and privies
C. Permeable zones F. None of the Above

268. A significant number of today's ground-water contamination problems stem from man's activities and can be introduced into ground water from?
A. Contaminant(s) D. Iron, calcium, and selenium
B. Saturated zone E. Serious contamination source(s)
C. A variety of sources F. None of the Above

Pump, Motor and Hydraulic Section
Hydraulic Principles Section
269. Hydraulics can be divided into two areas, _____ and hydrokinetics.
A. Fluids D. Mechanical properties of water
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

270. Which of the following terms includes the study of liquids in motion, is concerned with such matters as friction and turbulence generated in pipes by flowing liquids?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

271. Which of the following terms is about pressures exerted by a fluid at rest?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

272. _____ is an excellent example of deductive mathematical physics, and in which the predictions agree closely with experiment.
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

273. Which of the following terms can be stated that a fluid is a substance that cannot resist a shearing stress, so that pressures are normal to confining surfaces?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

274. According to the text, hydraulics may be the physical property that varies over the largest numerical range, competing with electrical resistivity.
A. True B. False

275. Which of the following terms includes the behavior of all liquids, although it is primarily concerned with the motion of liquids.
A. Fluids D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

276. _____ includes the manner in which liquids act in tanks and pipes, deals with their properties, and explores ways to take advantage of these properties.
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

277. Which of the following terms includes the consideration of liquids at rest, involves problems of buoyancy and flotation?
A. Pressure D. Hydraulics
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

Barometric Loop
278. According to the text, the barometric loop, will provide protection against backsiphonage, is based upon the principle that a water column, at sea level pressure, will not rise above 33.9 feet. In general, barometric loops are locally fabricated, and are 35 feet high.
A. True B. False

279. Which of the following terms could be measured an absolute scale, pounds per square inch absolute (psia), or gauge scale, (psiag).
A. Static pressure D. Sea level
B. Pressure E. Atmospheric pressure
C. Gauge pressure F. None of the Above

280. Absolute pressure is equal to gauge pressure plus the atmospheric pressure.
A. True B. False

281. The barometric loop consists of a continuous section of supply piping that abruptly rises to a height of approximately 233 feet and then returns back down to the originating level.
A. True B. False

282. The barometric loop is a loop in the piping system that effectively protects against backpressure.
A. True B. False

283. The barometric loop may not be used to protect against backsiphonage.
A. True B. False

284. According to the text, absolute pressure and gauge pressure?
A. Are the same
B. Referred to using pressure
C. Are related
D. That effectively protects
E. Permanent forces tangential
F. None of the Above

285. Which of the following terms at sea level is 14.7 psai?
A. Static pressure
B. Pressure
C. Gauge pressure
D. Sea level
E. Atmospheric pressure
F. None of the Above

286. Which of the following terms is the total pressure?
A. Static pressure
B. Absolute pressure
C. Gauge pressure
D. Sea level
E. Atmospheric pressure
F. None of the Above

287. Gauge pressure is simply the pressure read on the gauge. If there is no pressure on the gauge other than atmospheric, the gauge will read zero.
A. True B. False

Pump Categories

288. The key to understanding a pumps operation is that a pump is to move water and generate the _____ we call pressure.
A. Centrifugal pump(s)
B. Impeller blade(s)
C. Delivery force
D. Diaphragm pump(s)
E. Cylindrical pump housing
F. None of the Above

289. Pump operation like with a centrifugal pump — pressure is not referred to in pounds per square inch but rather as the equivalent in elevation, is called?
A. Inward force
B. Head
C. Viscous drag pump
D. Center of the impeller
E. Incompressible fluid
F. None of the Above

290. According to the text, pumps may be classified based on the application they serve.
A. True B. False

291. According to the text, all pumps may be divided into two major categories: (1) dynamic and (2)?
A. Centrifugal
B. Impeller
C. Displacement
D. Diaphragm
E. Rotary
F. None of the Above

Basic Water Pump

292. According to the text, the centrifugal pumps work by spinning water around in a circle inside a?
A. Vortex
B. Cylinder
C. Viscous drag pump
D. Center of the impeller
E. Cylindrical pump housing
F. None of the Above

293. The pump makes the water spin by pulling it with an impeller.
A. True B. False

294. In the operation of the pump, the water at the edge of the _____ inward on the water between the impeller blades and makes it possible for that water to travel in a circle.
A. Inward force
B. Pump pushes
C. Viscous drag pump
D. Center of the impeller
E. Incompressible fluid
F. None of the Above

295. In the operation of the pump, when water is actively flowing through the pump, arriving through a hole near the center of the impeller and leaving through a _____ near the outer edge of the pump housing, the pressure rise between center and edge of the pump is not as large.
A. Centrifugal pump(s)
B. Impeller blade(s)
C. Hole
D. Diaphragm pump(s)
E. Cylindrical pump housing
F. None of the Above

Types of Water Pumps

296. The water production well industry almost exclusively uses Turbine pumps, which are a type of centrifugal pump.
A. True
B. False

297. Which of the following terms are variable displacement pumps that are by far used the most?
A. Axial flow
B. Submersible
C. Rotary pump
D. Turbine pump(s)
E. Centrifugal pumps
F. None of the Above

298. According to the text, column pipe sections can be threaded or coupled together while the drive shaft is coupled and suspended within the column by?
A. Oil tube
B. Spider bearings
C. Column pipe
D. Single or multiple bowls
E. Pump's lifting capacity
F. None of the Above

299. Some vertical turbines are lubricated by oil rather than water. These pumps are essentially the same as_____; only the drive shaft is enclosed within an oil tube.
A. Oil tube
B. Water lubricated units
C. Column pipe
D. Single or multiple bowls
E. Pump's lifting capacity
F. None of the Above

300. _____ water flowing back down the column, turning the impellers in a reverse direction.
A. Vapor bubbles are created
B. Chamber pressure
C. Drive shaft is off
D. Volumetric positive displacement is turned off
E. Line shaft turbine is turned off
F. None of the Above