

Registration form

**BASIC PLUMBING CEU Training Course \$100.00
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 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** _____

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

Water Treatment _____ Distribution _____ Collection _____ Wastewater Treatment _____

Onsite Installer _____ Other _____

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

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

Please invoice me, my PO# _____

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

We will stop mailing the certificate of completion 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.

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

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.

State Approval Listing URL...

<http://www.ABCTLC.com/downloads/PDF/CEU%20State%20Approvals.pdf>

You can obtain a printed version of the course manual from TLC for an additional \$129.95 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.

Basic Plumbing Answer Key

Name _____

Phone # _____

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

Method of Course acceptance confirmation. Please fill this section

Website ___ Telephone Call ___ Email ___ Spoke to _____

Did you receive the approval number, if applicable? _____

What is the course approval number, if applicable? _____

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

Please write down any questions that cannot be found or has problems

***Please circle, underline, bold or X only one correct answer
A felt tipped pen works best.***

- | | | | |
|------------|-------------|-------------|-------------|
| 1. A B C D | 14. A B | 27. A B C D | 40. A B |
| 2. A B C D | 15. A B | 28. A B C D | 41. A B |
| 3. A B C D | 16. A B C D | 29. A B C D | 42. A B |
| 4. A B C D | 17. A B C D | 30. A B C D | 43. A B C D |
| 5. A B C D | 18. A B C D | 31. A B C D | 44. A B C D |
| 6. A B C D | 19. A B C D | 32. A B C D | 45. A B C D |
| 7. A B C D | 20. A B C D | 33. A B C D | 46. A B C D |
| 8. A B C D | 21. A B C D | 34. A B | 47. A B C D |
| 9. A B | 22. A B C D | 35. A B C D | 48. A B C D |
| 10. A B | 23. A B C D | 36. A B C D | 49. A B C D |
| 11. A B | 24. A B C D | 37. A B C D | 50. A B |
| 12. A B | 25. A B C D | 38. A B C D | 51. A B |
| 13. A B | 26. A B C D | 39. A B | 52. A B C D |

53. A B
54. A B
55. A B
56. A B
57. A B
58. A B
59. A B C D
60. A B C D
61. A B C D
62. A B C D
63. A B C D
64. A B C D
65. A B C D
66. A B C D
67. A B C D
68. A B C D
69. A B C D
70. A B C D
71. A B C D
72. A B C D
73. A B C D
74. A B C D
75. A B C D
76. A B C D
77. A B C D
78. A B C D
79. A B
80. A B
81. A B
82. A B C D
83. A B
84. A B

85. A B C D
86. A B C D
87. A B C D
88. A B C D
89. A B C D
90. A B C D
91. A B C D
92. A B C D
93. A B C D
94. A B
95. A B
96. A B
97. A B
98. A B C D
99. A B C D
100. A B C D
101. A B C D
102. A B
103. A B
104. A B
105. A B
106. A B C D
107. A B C D
108. A B
109. A B
110. A B
111. A B
112. A B C D
113. A B C D
114. A B
115. A B
116. A B

117. A B
118. A B
119. A B C D
120. A B C D
121. A B C D
122. A B C D
123. A B C D
124. A B C D
125. A B
126. A B
127. A B C D
128. A B C D
129. A B C D
130. A B C D
131. A B C D
132. A B C D
133. A B C D
134. A B C D
135. A B C D
136. A B
137. A B
138. A B C D
139. A B C D
140. A B C D
141. A B C D
142. A B C D
143. A B C D
144. A B C D
145. A B C D
146. A B C D
147. A B C D
148. A B C D

149. A B C D
150. A B C D
151. A B C D
152. A B C D
153. A B C D
154. A B C D
155. A B C D
156. A B
157. A B
158. A B
159. A B
160. A B
161. A B
162. A B C D
163. A B C D
164. A B C D
165. A B C D
166. A B C D
167. A B
168. A B
169. A B C D
170. A B
171. A B
172. A B
173. A B
174. A B
175. A B
176. A B C D
177. A B C D
178. A B
179. A B
180. A B

- | | | | |
|----------|--------------|--------------|--------------|
| 181. A B | 186. A B | 191. A B C D | 196. A B |
| 182. A B | 187. A B C D | 192. A B C D | 197. A B C D |
| 183. A B | 188. A B C D | 193. A B C D | 198. A B C D |
| 184. A B | 189. A B C D | 194. A B C D | 199. A B |
| 185. A B | 190. A B | 195. A B C D | 200. A B |

Amount of Time for Course Completion – How many hours you spent on course?

Must match State Hour Requirement _____ (Hours)

I understand that I am 100 percent responsible to ensure that TLC receives the Assignment and Registration Key and that it is accepted for credit by my State or Providence. I understand that TLC has a zero tolerance towards not following their rules, cheating or hostility towards staff or instructors. I need to complete the entire assignment for credit. There is no credit for partial assignment completion. My exam was proctored. I will contact TLC if I do not hear back from them within 2 days of assignment submission. I will forfeit my purchase costs and will not receive credit or a refund if I do not abide with TLC's rules.

Please Sign that you understand and will abide with TLC's Rules.

Signature

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

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

**BASIC PLUMBING 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.**

Please rate the difficulty of your course.

Very Easy 0 1 2 3 4 5 Very Difficult

Please rate the difficulty of the testing process.

Very Easy 0 1 2 3 4 5 Very Difficult

Please rate the subject matter on the exam to your actual field or work.

Very Similar 0 1 2 3 4 5 Very Different

How did you hear about this Course? _____

What would you do to improve the Course?

How about the price of the course?

Poor _____ Fair _____ Average _____ Good _____ Great _____

How was your customer service?

Poor _____ Fair _____ Average _____ Good _____ Great _____

Any other concerns or comments.

Please fax the answer key to

**TLC Western Campus Fax (928) 272-0747
Backup Fax (928) 468-0675**

You are responsible to ensure that TLC receives the Assignment and Registration Key.

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

Rush Grading Service

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

BASIC PLUMBING CEU Training Course Assignment

The Basic Plumbing CEU course assignment is 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 receipt of this manual to complete it in order to receive your Professional Development Hours (**PDHs**) or Continuing Education Unit (**CEU**). A score of 70 % or better is necessary to pass this course. If you should need any assistance, please email or fax all concerns and the completed **ANSWER KEY** to info@tlch2o.com.

Select one answer per question.

Hydraulics

- Hydraulics can be separated into two areas, _____ and hydrokinetics.
A. Fluid Mechanics C. Mechanical properties of water
B. Hydrostatics D. None of the above
- Which of the following terms includes the behavior of all liquids, although it is primarily concerned with the motion of liquids?
A. Fluid Mechanics C. Hydraulics
B. Hydrokinetics D. None of the above
- Which of the following 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 C. Hydraulics
B. Hydrokinetics D. None of the above
- Which of the following terms includes the consideration of liquids at rest, involves problems of buoyancy and flotation?
A. Hydrostatics C. Flow
B. Hydrokinetics D. None of the above
- Which of the following includes the study of liquids in motion, is concerned with such matters as friction and turbulence generated in pipes by flowing liquids?
A. Pressure C. Hydraulics
B. Hydrokinetics D. None of the above
- Which of the following is about the pressures exerted by a fluid at rest?
A. Hydrostatics C. Flow
B. Hydrokinetics D. None of the above
- Which of the following terms is an excellent example of deductive mathematical physics, and in which the predictions agree closely with experiment?
A. Hydrostatics C. Flow
B. Hydrokinetics D. None of the above
- Which of the following terms is usually stated that a fluid is a substance that cannot resist a shearing stress, so that pressures are normal to confining surfaces?
A. Hydrostatics C. Flow
B. Hydrokinetics D. None of the above

9. Hydraulics may be the physical property that varies over the largest numerical range, competing with electrical resistivity.

- A. True B. False

Barometric Loop

10. 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

11. Absolute pressure is equal to gauge pressure plus the atmospheric pressure.

- A. True B. False

12. 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

13. The barometric loop is a loop in the piping system that effectively protects against backpressure.

- A. True B. False

14. The barometric loop may not be used to protect against backsiphonage.

- A. True B. False

15. 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

16. Which of the following terms could be measured on an absolute scale, pounds per square inch absolute (psia), or gauge scale, (psig)?

- A. Pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

17. According to the text, absolute pressure and gauge pressure?

- A. Referred to using pressure C. Permanent forces tangential
B. Are related D. None of the above

18. Which of the following terms at sea level is 14.7 psia?

- A. Pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

19. Which of the following terms is the total pressure?

- A. Absolute pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

Water Supply System

20. The house's water supply may come from a private well or a _____ that connects to a city water main.

- A. Hot water heater C. Service pipe
B. City-owned lines D. None of the above

21. Which of the following is usually the dividing point between the city-owned lines and the homeowner's lines?

- A. Meter
- B. City water main
- C. City-owned lines
- D. None of the Above

22. The water line or service line should have a _____ located near the beginning of the incoming line so the water supply can be stopped in case of repairs or an emergency.

- A. City water main
- B. Shut-off valve
- C. Corp
- D. None of the above

23. Which of the following are made of copper, CPVC plastic, or in older homes possibly galvanized steel?

- A. Water supply lines
- B. City-owned lines
- C. DVW
- D. None of the above

System Elements

24. 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. Complete gridiron system
- B. Distribution tree
- C. Distribution system
- D. None of the above

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

- A. Increasing water pressure
- B. Fire protection
- C. Distribution mains of large size
- D. None of the above

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

- A. Increase water pressure
- B. Equalize
- C. Main line isolation
- D. None of the above

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

- A. Increase water pressure
- B. Equalize
- C. Boost flow
- D. None of the above

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

- A. Bypasses
- B. Complete gridiron system
- C. Regulating system flow or pressure.
- D. None of the above

29. Gate valves should be used in the _____ for main line isolation.

- A. Curtailing the service
- B. Complete gridiron system
- C. Distribution system
- D. None of the above

Butterfly Valve

30. 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. Bypass
- B. Complete gridiron system
- C. PRV
- D. None of the above

Water Distribution Valves

31. 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 maintenance without significantly curtailing service over large areas.
- A. Adjusting the pressure C. Taken of service for repairs
B. Open or close the valve D. None of the above
32. According to the text, at intersections of distribution mains, the number of valves required is normally one less than the number of?
- A. Ties C. Throttling purposes
B. Radiating mains D. None of the above
33. For large shutoff valves, it may be necessary to surround the valve operator or entire valve within a vault or manhole to allow?
- A. Minimum flow restriction C. Dependability
B. Repair or replacement D. None of the above
34. All buried small- and medium-sized valves should be installed in the sidewalk.
- A. True B. False

Gate Valves

35. In the distribution system, gate valves are used when a straight-line flow of fluid and?
- A. Throttling purposes C. Minimum flow restriction
B. Repair or replacement D. None of the above
36. 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 C. Stops or allows
B. Repair or replacement D. None of the above
37. If the valve is wide open, the gate is _____ into the valve bonnet.
- A. Fully drawn up C. Throttled
B. Repaired or replaced D. None of the above
38. There is little pressure drop or flow restriction through the valve. Gate valves are not suitable for?
- A. Throttling purposes C. Dependability
B. PRV D. None of the above
39. The control of flow is easy because of the valve's design, and the flow of fluid
- A. True B. False

Ball Valves

40. Most ball valves require only a 180-degree turn to either completely open or close the valve.
- A. True B. False
41. Some ball valves are operated by planetary gears.
- A. True B. False

42. 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

43. 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 C. Connecting individual buildings
B. Working fluid D. None of the above

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

- A. Valve(s) C. House
B. Stoneline D. None of the above

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

- A. Malfunctioning valves C. Connect individual buildings
B. Working fluid D. None of the above

If Excessive Torque is Needed to Work the Valve

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

- A. Working fluid C. Length of exposure
B. Closing torque applied D. None of the above

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

- A. High pressure side C. Valve sealing surfaces
B. Length of exposure D. None of the above

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

- A. Over-pressurization C. Lock in the open position
B. Lock in the closed position D. None of the above

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

- A. Closed position C. Electricity or electrolysis
B. Chemical changes D. None of the above

50. 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

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

- A. True B. False

Knife Gate Valve

52. Install the Knife Gate valve so that the arrows on both sides of the body are in the direction of?
- A. Positive pressure differential
 - B. Bonnet
 - C. Direction of the service
 - D. None of the above

Common Rotary Valves

53. Globe valve, a rotary valve are rare to find in most distribution systems, but can be found at treatment plants.
- A. True
 - B. False
54. Most Globes have compact OS & Y type, bolted bonnet, rising stems, with renewable seat rings.
- A. True
 - B. False
55. According to the text, Globe valves should usually be installed with the inlet below the bonnet.
- A. True
 - B. False
56. For light throttling service, the valve may be installed so that the flow enters over the bottom of the seat and goes up through it.
- A. True
 - B. False
57. The globe valve may be installed in other orientations, but any deviation from vertical is a compromise.
- A. True
 - B. False

Valve Glossary

58. Air and Vacuum relief valve: Both of these functions are in one valve.
- A. True
 - B. False
59. Which of the following valves are used to deliver water from a high pressure to a low-pressure system?
- A. Pressure relief
 - B. Pressure regulating valve
 - C. Pressure sustaining valve
 - D. None of the above
60. Which of the following valves is the simplest type of surge pressure relief is a pressure relief valve?
- A. Pressure relief
 - B. Pressure regulating valve
 - C. Pressure sustaining valve
 - D. None of the above
61. Which of the following valves respond to pressure variations at their inlets?
- A. Pressure relief
 - B. Pressure regulating valve
 - C. Pressure sustaining valve
 - D. None of the above
62. Distribution system water quality can be adversely affected by improperly constructed or poorly located blowoffs of vacuum or?
- A. Air relief valves
 - B. Butterfly valve
 - C. Altitude-Control Valve
 - D. None of the above

63. Which of the following are often used on supply lines to elevated tanks or standpipes.
- A. Air relief valves C. Altitude Valve
B. Butterfly valve D. None of the above
64. Which of the following valves close automatically when the tank is full and open when the pressure on the inlet side is less than that on the tank side of the valve.
- A. Air relief valves C. Altitude-Control Valve
B. Butterfly valve D. None of the above
65. Which of the following valves are often used on the discharge side of pumps to prevent backflow?
- A. Check valve C. Automatic flow-control valve
B. Gate valve D. None of the above
66. To prevent water contamination _____ in the distribution system lines must be placed in locations that cannot be flooded.
- A. Air relief valves C. Altitude-Control Valve
B. Air and Vacuum relief valve D. None of the above
67. The common complaint of Milky Water is sometimes solved by the installation of?
- A. Air relief valves C. Altitude-Control Valve
B. Air and Vacuum relief valve D. None of the above
68. Which of the following valves is a linear valve used to isolate sections of the water main, to permit emergency repairs without interruption of water service to customers?
- A. Pressure relief C. Pressure sustaining valve
B. Gate valve D. None of the above
69. Which of the following valves control the high water level and prevent overflow?
- A. Air relief valves C. Altitude-Control Valve
B. Air and Vacuum relief valve D. None of the above
70. Which of the following valves is designed to, 1. Prevent overflows from the storage tank or reservoir?
- A. Air relief valves C. Altitude-Control Valve
B. Air and Vacuum relief valve D. None of the above
71. Which of the following valves is to maintain a constant water level as long as water pressure in the distribution system is adequate?
- A. Air relief valves C. Altitude-Control Valve
B. Air and Vacuum relief valve D. None of the above
72. Which of the following valves has a movable disc as large as the full-bore opening of the valve.
- A. Butterfly valve C. PRVs
B. Air and Vacuum relief valve D. None of the above
73. Which of the following valves maintains constant downstream pressure regardless of fluctuating demand.
- A. Pressure relief C. Pressure sustaining valve
B. Check valve D. None of the above

74. Which of the following valves controls water pressure by restricting flows, the pressure downstream of the valve regulates the amount of flow?

- A. Pressure relief
- B. Pressure regulating valve
- C. Pressure sustaining valve
- D. None of the above

75. Which of the following valves are of the globe valve design?

- A. Pressure relief
- B. Pressure regulating valve
- C. Pressure sustaining valve
- D. None of the above

76. Which of the following valves control water pressure and operate by restricting flows.

- A. Pressure relief
- B. Pressure regulating valve
- C. Pressure sustaining valve
- D. None of the above

Tree System

77. The Tree system consists of a single main that _____ as it leaves the source and progresses through the area originally served.

- A. Connect individual buildings
- B. By laying out
- C. Decreases in size
- D. None of the above

78. Smaller pipelines _____ the main and divide again, much like the trunk and branches of a tree.

- A. Branch off
- B. Decrease
- C. Limit the expansion
- D. None of the above

79. 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

80. Newer water systems are frequently expanded with planning and developed into a tree-like system.

- A. True
- B. False

Friction Loss

81. 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

82. 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. Static pressure
- D. None of the above

Types of Pipes Used in the Water Distribution Field

Plastic Pipe (PVC)

83. 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

84. A CPVC pipe can be used only in cold-water systems with temperatures up to 110°F.
A. True B. False
85. 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 C. Rupture from freezing
B. Complete resistance to corrosion D. None of the above
86. PVC pipes are made of tough, strong thermoplastic material that has _____ of physical and chemical properties.
A. An excellent combination C. Complete resistance to corrosion
B. Chemical resistance D. None of the above
87. PVC's chemical resistance and _____ make it an excellent material for application in various mechanical systems.
A. Ease of installation C. Design strength
B. Greater resistance D. None of the above
88. According to the text, often polyvinyl chloride is further chlorinated to obtain a stiffer design, a higher level of impact resistance, and a _____ to extremes of temperature.
A. Greater resistance C. Complete resistance to corrosion
B. Chemical resistance D. None of the above
89. Which of the following and economy makes plastic pipe popular for use in either water distribution and supply systems or sewer drainage systems?
A. Ease of installation C. Stamped on the outside
B. Working pressure D. None of the above
90. You will want to date and collect coupons or tap cut-outs to determine the condition of the pipe or?
A. Measure the corrosion C. Determine the C Factor
B. Chemical resistance D. None of the above

Plastic Pipe (PVC)

91. A main advantage of PVC piping is its lightweight, allowing for?
A. Easy installation C. Measuring the shock load
B. Measuring the corrosion D. None of the above
92. The National Sanitation Foundation currently lists most brands of PVC pipe as being acceptable for potable water use, this information should be stamped on the outside of the pipe, along with _____ and temperature, diameter and pipe manufacturer.
A. Working pressure C. Expiration
B. Chemical resistance D. None of the above
93. PVC pipe will have the highest C Factor of all the above pipes, the higher the C factor the?
A. Smoother the pipe C. Rougher the interior
B. Ability to withstand shock loads D. None of the above

94. Since PVC is non-metallic, a tracer wire must be installed with the PVC water main so that it can be located after burial.
A. True B. False

Cast Iron (CIP)

95. CIP can be found in diameters from 3" to 48".
A. True B. False

96. 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)

97. DIP can be purchased in 4" to 45" diameters and lengths of 18' to 20'.
A. True B. False

98. DIP was developed to _____ associated with cast iron pipe.
A. Overcome the breakage problems C. Provide a High C Factor
B. Be nearly indestructible D. None of the above

99. DIP's main advantage is that it is _____ by internal or external pressures.
A. Overcome the breakage problems C. Provide a High C Factor
B. Nearly indestructible D. None of the above

100. It 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 C. Provide a High C Factor
B. Extend the life D. None of the above

Steel Pipe

101. Steel pipe is usually galvanized or dipped in coal-tar enamel and wrapped with coal-tar impregnated felt to reduce?
A. Corrosion problems C. Good yielding
B. Costs D. None of the above

102. 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

103. Steel pipe's advantage is that it is able withstand corrosion by both soil and water.
A. True B. False

104. 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

Asbestos Cement Pipe (ACP)

105. ACP is available in diameters from 3" to 36" and in 13' lengths.
A. True B. False

106. ACP main advantages are its ability to _____ and its excellent hydraulic flow characteristics due to its smoothness.

- A. Withstand corrosion
- B. Lower C factor
- C. Transfer less friction
- D. None of the above

107. ACP main disadvantage is that it is _____ during construction or by shock loading.

- A. Very light weight
- B. Brittle and is easily broken
- C. Transfer less friction
- D. None of the above

108. According to the text, ACP has some concern regarding the possible release of asbestos fibers in corrosive water and there has much debate over the health effects of ingested asbestos.

- A. True
- B. False

109. Precautionary measures must be taken to protect water utility workers when cutting, tapping or otherwise handling this type of pipe.

- A. True
- B. False

Galvanized Pipe

110. Galvanized pipe is manufactured in 21-ft lengths and is coated with zinc the outside only.

- A. True
- B. False

111. Pipe sizes are based on nominal inside diameters, these diameters vary with the thickness of the pipe.

- A. True
- B. False

112. According to the text, outside pipe diameters remain constant so that pipe can be?

- A. Flanged
- B. Connected to Sharkbites
- C. Threaded for standard fittings
- D. None of the above

113. Galvanized pipe is commonly used for the water distributing pipes inside a building to supply hot and cold water to?

- A. The fixtures
- B. The water heater
- C. Copper fittings
- D. None of the above

Copper

114. Copper is one of the least widely used materials for tubing, this is because it does not rust and is highly resistant to any bending.

- A. True
- B. False

115. K pipe has the thickest walls.

- A. True
- B. False

116. Copper pipe M has the thinnest walls.

- A. True
- B. False

117. Soldering allows all the tubing and fittings to be set in place before the joints are finished.

- A. True
- B. False

118. Hard temper tubing is available in 40- or 60-ft coils, while soft tubing comes in 12- and 20-ft straight lengths.

- A. True B. False

119. Type K copper tubing is available in either rigid or flexible and is primarily used for _____ in the water distribution systems.

- A. Exposed lines C. Straight lengths
B. Underground service D. None of the above

120. Type _____ copper tubing is also available in either hard or soft temper and either in coils or straight lengths.

- A. L C. K
B. M D. None of the above

121. Soft temper tubing is often used as replacement plumbing because of the tube's flexibility, which allows?

- A. Exposed lines C. Straight lengths
B. Easier installation D. None of the above

122. Type L copper tubing is widely used in?

- A. Branches C. Water distribution systems
B. Above ground D. None of the above

123. Type M copper tubing is made in hard temper only and is available in straight lengths of 12 and 20 ft. It has a thin wall and is used for?

- A. Branch supplies C. Water distribution systems
B. Above ground D. None of the above

124. Type M copper tubing is also used for chilled water systems, for exposed lines in hot-water heating systems, and for?

- A. Exposed lines C. Drainage piping
B. Above ground D. None of the above

Backflow Introduction

125. Cross-Connection was addressed by passage of the "Federal Safe Drinking Water Act" as developed by the Environmental Protection Agency (E.P.A.).

- A. True B. False

126. The SDWA tasked each state with primary enforcement responsibility for a program to assure access to safe drinking water by all citizens.

- A. True B. False

127. Which of the following rules are required to be at least as stringent as the federal regulations as developed and enforced by the E.P.A.?

- A. Enforcement responsibility C. Cross-Connection Control
B. State program regulations D. None of the above

128. Which of the following definition terms is "the link or channel connecting a source of pollution with a potable water supply?"

- A. Direct piping C. Cross-Connection
B. Backflow D. None of the above

129. Which of the following definition terms, also referred to as Cross-Connection Control, addresses a serious health issue?

- A. Backflow prevention
- B. Direct connection
- C. Water purveyor rules
- D. None of the above

130. The first level of the law is protection of the _____ of persons subject to such risks involving service to a single customer.

- A. Internal or external piping
- B. General public and the second is protection
- C. Residential environment the pollutant source
- D. None of the above

131. Sources of pollution which may result in a danger to health are not always obvious and such cross-connections are?

- A. Residential environment the pollutant source
- B. Certainly not usually intentional
- C. Certainly intentional
- D. None of the above

132. Within a business environment, the pollutant source may involve the unintentional cross-connection of _____ with chemical processes or a heating boiler.

- A. Indirect piping
- B. Air gap connection
- C. Internal or external piping
- D. None of the above

133. Which of the following may be an improper cross-connection with a landscape sprinkler system or reserve tank fire protection system?

- A. Residential environment the pollutant source
- B. Certainly not usually intentional
- C. Indirect connection
- D. None of the above

134. As far as a cross-connection, another potential hazard source within any environment may be a cross-connection of piping?

- A. With an air gap
- B. Without a direct connection
- C. Involving a water well located on the property.
- D. None of the above

135. The proper control of cross-connections is possible but?

- A. Only through knowledge and vigilance
- B. The key is public safety and the second is protection
- C. Certainly not usually intentional
- D. None of the above

136. The following could be a cause of a cross-connection: A Situation as simple as leaving a garden hose nozzle submerged in a bucket of liquid or attached to a chemical sprayer.

- A. True
- B. False

137. According to the text, public education is not essential, for many that are educated in piping and plumbing installations are able to recognize cross-connection dangers.

- A. True
- B. False

What is backflow? Reverse flow condition

138. 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. Cross-connection
- B. Backsiphonage
- C. Indirect connection
- D. None of the above

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

- A. Backpressure
- B. Backsiphonage
- C. Indirect connection
- D. None of the above

140. Which of the following terms is there two forms-backpressure and backsiphonage?

- A. Backflow
- B. Device or method
- C. Cross-connection
- D. None of the above

141. The basic mechanism for preventing backflow is a mechanical _____, which provides a physical barrier to backflow.

- A. High hazard installations
- B. Backflow preventer
- C. Backflow
- D. None of the above

142. The principal types of mechanical backflow preventer are the reduced-pressure principle assembly, the _____, and the double check valve assembly.

- A. Air gap
- B. Vacuum breaker
- C. Device or method
- D. None of the above

143. Which of the following can occur when there is a stoppage of water supply due to nearby firefighting, a break in a water main?

- A. Backpressure
- B. Backsiphonage
- C. Indirect connection
- D. None of the above

144. Which of the following is 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
- B. Backpressure
- C. Cross-connection
- D. None of the above

145. Which of the following is a means or mechanism to prevent backflow?

- A. High hazard installations
- B. Backflow preventer
- C. Air gap
- D. None of the above

146. Basic means of preventing backflow is an _____, which either eliminates a cross-connection or provides a barrier to backflow.

- A. Air gap
- B. Backflow preventer
- C. Device or method
- D. None of the above

147. Which of the following 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
- B. Indirect connection
- C. Cross-connection
- D. None of the above

148. Which of the following 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. Backpressure
- C. Indirect connection
- B. Backsiphonage
- D. None of the above

Types of Backflow Prevention Methods and Assemblies

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

- A. Cross-connection
- C. Backpressure
- B. Indirect connection
- D. None of the above

150. When the air flow is restricted, such as the case of an air gap located near a wall, the _____ separation must be increased.

- A. Open receiving vessel
- C. Air gap
- B. Air break
- D. None of the above

151. 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
- C. Air gap
- B. Barrier to backflow
- D. None of the above

152. 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
- C. Air gap
- B. Air break
- D. None of the above

153. 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
- C. 3 inches
- B. 2 inches
- D. None of the above

154. 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
- C. Air gap
- B. Air break
- D. None of the above

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

- A. High hazard installations
- C. Low polluttional hazards
- B. High polluttional concerns
- D. None of the above

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

- A. True
- B. False

157. 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

Vacuum Breakers

158. Both vacuum breakers devices primary purpose is to protect the water system from cross connections due to submerged inlets, such as irrigation systems and tank applications.

- A. True B. False

159. The difference between the two types them is that the pressure vacuum breaker _is spring loaded to assist the device's opening.

- A. True B. False

160. Both types of vacuum breakers devices open the pipeline to atmosphere in the event of backsiphonage only.

- A. True B. False

161. Both types of vacuum breakers devices are approved for backpressure conditions.

- A. True B. False

162. Which of the following terms can have two types: atmospheric and pressure.

- A. Low hazard conditions C. Hazard application(s)
B. Vacuum breaker(s) D. None of the above

163. Both vacuum breakers devices are only suitable for?

- A. High hazard installations C. Low hazard conditions
B. High polluttional concerns D. None of the above

164. Which of the following may not be installed downstream of atmospheric vacuum breakers but are allowed on pressure vacuum breakers?

- A. Test cocks C. Shut offs
B. Air inlet valve D. None of the above

165. The devices must be installed above the highest?

- A. Downstream piping C. Hazard applications
B. Atmospheric vacuum breakers D. None of the above

166. Which of the following contains a float check, a check seat, and an air inlet port?

- A. Double check C. RP
B. Atmospheric vacuum breaker D. None of the above

167. The Atmospheric vacuum breaker allows air to enter the water line when the line pressure is reduced to a gauge pressure of zero or below.

- A. True B. False

168. To prevent the Air inlet from sticking open, the device must not be installed on the pressure side of a shutoff valve, or wherever it may be under constant pressure more than 2 hours during a 12-hour period.

- A. True B. False

169. Which of the following terms is not internally loaded?

- A. Air inlet valve C. Atmospheric vacuum breakers
B. Check valve D. None of the above

170. RPs are designed to prevent backflow caused by backsiphonage only from low health hazards.

A. True B. False

171. Atmospheric vacuum breakers Uses: Irrigation systems, commercial dishwasher and laundry equipment, chemical tanks and laboratory sinks.

A. True B. False

172. Pressure Vacuum Breaker Assembly (PVB) consists of a weighted check valve, an independently operating relief valve, two resilient seated shutoff valves, and two properly located resilient seated test cocks.

A. True B. False

173. The PVB needs to be installed 12 inches above the service or supply line to work correctly.

A. True B. False

174. Double Check Valve Assembly (DC) consists of two internally loaded check valves, either spring loaded or internally weighted, two resilient seated full ported shutoff valves, and four properly located resilient seated test cocks

A. True B. False

175. The double check valve assembly is designed to prevent backflow caused by backpressure and backsiphonage from high health hazards.

A. True B. False

176. The double check valve should be installed in an _____ and protected from freezing.

A. Accessible location C. Is maintained at a lower pressure
B. Above the ground D. None of the above

177. The DC needs to be installed 12 inches _____ for testing purposes only.

A. Accessible location C. Above the highest downstream outlet
B. Above the ground D. None of the above

178. Reduced Pressure Backflow Assembly (RP) consists of two independently acting spring loaded check valves separated by a Spring loaded differential pressure relief valve, two resilient seated full ported shutoff valves, and four properly located resilient seated test cocks.

A. True B. False

179. During normal operation, the pressure between the two check valves, referred to as the air inlet zone, is maintained at a higher pressure than the supply pressure.

A. True B. False

180. If either reduced pressure backflow assembly check valve leaks, the differential pressure relief valve maintains a differential pressure of at least two (2) psi between the supply pressure and the zone between the two check valves by discharging water to atmosphere.

A. True B. False

181. According to the text, the Reduced pressure backflow assembly or RP is designed to prevent backflow caused by backpressure and backsiphonage from low to high health hazards.
A. True B. False

182. According to the text, the RP needs to be installed 12 inches above the ground for testing purposes only.
A. True B. False

183. The Reduced pressure backflow assembly can be used for high hazard situations under backpressure only. Under normal conditions, the second check valve should never close.
A. True B. False

184. According to the text, if the second check valve fails or becomes fouled and backflow into the reduced pressure zone occurs, the relief port vents the backflow to atmosphere.
A. True B. False

185. According to the text, the Reduced pressure zone port opens anytime pressure in the zone comes within 2 psi of the supply pressure.
A. True B. False

Waterborne Pathogens Section

The reason we disinfect.

186. Bacteria, viruses and protozoan that cause disease are known as pathogens.
A. True B. False

187. 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. Are mild in nature C. Limit the travel of pathogens
B. Cause intestinal illness D. None of the above

How Diseases Are Transmitted.

188. Waterborne pathogens are primarily spread by the?
A. Fecal-oral, or feces-to-mouth, route C. Influenza route
B. Oral to fecal route D. None of the above

189. When infected humans or animals pass the bacteria, viruses, and _____ in their stool, pathogens may get into water and spread disease.
A. Microscopic particles C. Cryptosporidiosis
B. Protozoa D. None of the above

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

191. Which term means when 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. Water bugs C. Waterborne Pathogen(s)
B. Microscopic particles D. None of the above

192. According to the text, _____ are spread by secretions that are coughed or sneezed into the air by an infected person.
- A. Microscopic particles
 - B. Microorganisms
 - C. Influenza virus and tuberculosis bacteria
 - D. None of the above

Chain of Transmission

193. Water must have feces and must contain this term to cause a waterborne disease.
- A. Pathogens
 - B. Microscopic particles
 - C. Contaminated water
 - D. None of the above
194. The pathogens must survive in the water, that will depend on the temperature of the water and the length of time the _____ are in the water.
- A. Turbidity
 - B. Microscopic particles
 - C. Pathogens
 - D. None of the above
195. Which pathogen may survive for months such as Giardia or?
- A. Campylobacteriosis
 - B. Bacteria
 - C. Cryptosporidium
 - D. None of the above
196. The chain lists the events that must occur for the transmission of disease via drinking water. By breaking the chain at any point, the Transmission of disease will be prevented.
- A. True
 - B. False

Bacterial Diseases

197. Which of the following is the most common diarrhea illness caused by bacteria? Symptoms include abdominal pain, malaise, fever, nausea and vomiting, and they usually begin three to five days after exposure.
- A. Beaver fever
 - B. Hepatitis A
 - C. Campylobacteriosis
 - D. None of the above
198. Which of the following terms is been the cause of outbreaks have most often been associated with food, especially chicken and unpasteurized milk, as well as un-chlorinated water.
- A. Beaver fever
 - B. Hepatitis A
 - C. Campylobacteriosis
 - D. None of the above
199. Cholera, Legionellosis, salmonellosis, shigellosis, and yersiniosis, are other bacterial diseases that can be transmitted through water.
- A. True
 - B. False
200. All bacteria in water are readily killed or inactivated with chlorine or other disinfectants.
- A. True
 - B. False