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List hours worked on assignment must match State Requirement. _____

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

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Basic Plumbing Answer Key

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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.**

Hydraulics

1. Hydraulics can be divided into two areas, which term and hydrokinetics?
A. Fluids D. Mechanical properties of water
B. Hydrostatics E. Flow
C. Hydrokinetics F. None of the Above

2. 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

3. Which of the following terms 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

4. 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

5. 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

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

7. Which of the following terms 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

8. Which of the following terms states 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

9. 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

Barometric Loop
10. 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

11. 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

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

13. 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

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

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

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

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

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

19. 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

Water Supply System

20. According to the text, the house's water supply may come from a private well or a _____ that connects to a city water main.
A. Hot water heater D. Service pipe
B. City water main E. Distribution line
C. City-owned lines F. None of the Above

21. Which of the following terms is usually the dividing point between the city-owned lines and the homeowner's lines?
A. Meter C. City-owned lines
B. City water main 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. Hot water heater D. Incoming line
B. City water main E. Corp
C. Shut-off valve F. None of the Above

23. According to the text, which of the following terms are made of copper, CPVC plastic, or in older homes possibly galvanized steel.
A. Hot water heater D. Water supply lines
B. City water main E. DVW
C. City-owned lines F. 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. Increase water pressure D. Distribution system
B. Distribution tree E. Arterial system
C. Complete gridiron system F. None of the Above

25. Arterial mains are interconnected with smaller distribution mains to form a complete gridiron system and are used for?
A. Increasing water pressure D. Distribution mains of large size
B. Tree system E. Fire protection
C. Complete gridiron system F. 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. Complete gridiron system
D. Main line isolation
E. Provide a reserve pressure
F. None of the Above

27. 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

28. 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

29. 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

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. Regulator
B. Bypass
C. Complete gridiron system
D. Main line isolation
E. PRV
F. 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 to 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

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
B. Depends
C. Radiating mains
D. Throttling purposes
E. Standardizes
F. None of the Above

33. All buried small- and medium-sized valves should be installed in the sidewalk.

A. True B. False

34. 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
35. 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

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

37. 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

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

39. The control of flow is easy because of the valve's design.
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. According to the text, 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 D. Minimum flow restriction
B. Dependability E. Stops or allows
C. Repair or replacement F. 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)
B. Stoneline
C. Monument
D. House
E. Telephone pole
F. None of the Above

45. 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

46. 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

47. 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

48. 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

49. 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

50. 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

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. Handwheel pointing up
C. Connect individual buildings
D. Direction of the service
E. Bonnet
F. 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. Which of the following valves are used to deliver water from a high pressure to a low-pressure system?
A. Pressure relief D. Pressure sustaining valve
B. Check valve E. Pressure regulating valve
C. Gate valve F. None of the Above

59. Which of the following valves is the simplest type of surge pressure relief is a pressure relief valve?
A. Pressure relief D. Pressure sustaining valve
B. Check valve E. Pressure regulating valve
C. Gate valve F. None of the Above

60. Which of the following valves respond to pressure variations at their inlets?
A. Pressure relief D. Pressure sustaining valve
B. Check valve E. Pressure regulating valve
C. Gate valve F. None of the Above

61. Air and Vacuum relief valve: Both of these functions are in one valve.
A. True B. False

62. Distribution system water quality can be adversely affected by improperly constructed or poorly located blowoffs of vacuum or?
A. Air relief valves D. Altitude-Control Valve
B. Butterfly valve E. PRVs
C. Air and Vacuum relief valve F. None of the Above

63. Which of the following are used on supply lines to elevated tanks or standpipes.
A. Air relief valves
B. Butterfly valve
C. Air and Vacuum relief valve
D. Altitude Valve
E. PRVs
F. 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
B. Butterfly valve
C. Air and Vacuum relief valve
D. Altitude-Control Valve
E. PRVs
F. None of the Above

65. According to the text, which of the following valves are often used on the discharge side of pumps to prevent backflow?
A. Pressure relief
B. Check valve
C. Gate valve
D. Pressure sustaining valve
E. Automatic flow-control valve
F. None of the Above

66. To prevent water contamination this valve in the distribution system lines must be placed in locations that cannot be flooded.
A. Air relief valves
B. Butterfly valve
C. Air and Vacuum relief valve
D. Altitude-Control Valve
E. PRVs
F. None of the Above

67. The common complaint of Milky Water is sometimes solved by the installation of?
A. Air relief valves
B. Butterfly valve
C. Air and Vacuum relief valve
D. Altitude-Control Valve
E. PRVs
F. 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
B. Check valve
C. Gate valve
D. Pressure sustaining valve
E. Automatic flow-control valve
F. None of the Above

69. Which of the following valves control the high water level and prevent overflow?
A. Air relief valves
B. Butterfly valve
C. Air and Vacuum relief valve
D. Altitude-Control Valve
E. PRVs
F. 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
B. Butterfly valve
C. Air and Vacuum relief valve
D. Altitude-Control Valve
E. PRVs
F. None of the Above

71. Which of the following valves' purpose is to maintain a constant water level as long as water pressure in the distribution system is adequate?
A. Air relief valves
B. Butterfly valve
C. Air and Vacuum relief valve
D. Altitude-Control Valve
E. PRVs
F. 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. Air relief valves
B. Butterfly valve
C. Air and Vacuum relief valve
D. Altitude-Control Valve
E. PRVs
F. None of the Above

73. Which of the following valves maintains constant downstream pressure regardless of fluctuating demand?
A. Pressure relief
B. Check valve
C. Gate valve
D. Pressure sustaining valve
E. Automatic flow-control valve
F. 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. Check valve
C. Gate valve
D. Pressure sustaining valve
E. Pressure regulating valve
F. None of the Above

75. Which of the following valves are of the globe valve design?
A. Pressure relief
B. Check valve
C. Gate valve
D. Pressure sustaining valve
E. Pressure regulating valve
F. None of the Above

76. Which of the following valves control water pressure and operate by restricting flows?
A. Pressure relief
B. Check valve
C. Gate valve
D. Pressure sustaining valve
E. Pressure regulating valve
F. None of the Above

Tree System

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

78. 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

79. 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

80. 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

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 D. Static pressure
B. Friction loss E. Total pressure
C. Pressure F. 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. 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 D. Rupture from freezing
B. An excellent combination E. Complete resistance to corrosion
C. Chemical resistance F. None of the Above

85. PVC pipes are made of tough, strong thermoplastic material that has _____ of physical and chemical properties.
A. Ease of installation D. Array
B. An excellent combination E. Complete resistance to corrosion
C. Chemical resistance F. None of the Above

86. PVC's chemical resistance and _____ make it an excellent material for application in various mechanical systems.
A. Ease of installation D. Design strength
B. Greater resistance E. Complete resistance to corrosion
C. Chemical resistance F. None of the Above

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

88. A CPVC pipe can be used only in cold-water systems with temperatures up to 110°F.
A. True B. False

89. Which of the following terms and economy makes plastic pipe popular for use in either water distribution and supply systems or sewer drainage systems?
A. Ease of installation D. Stamped on the outside
B. Working pressure E. Complete resistance to corrosion
C. Chemical resistance F. 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. Ease of installation D. Measure the shock load
B. Measure the corrosion E. Determine the C Factor
C. Chemical resistance F. None of the Above

Plastic Pipe (PVC)
91. A main advantage of PVC piping is its lightweight, allowing for?
A. Easy installation D. Measure the shock load
B. Measure the corrosion E. Determine the C Factor
C. Chemical resistance F. None of the Above

92. 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

93. 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. Ease of installation D. Date and time
B. Working pressure E. Expiration
C. Chemical resistance F. None of the Above

94. PVC pipe will have the highest C Factor of all the above pipes, the higher the C factor the?
A. Long life D. Smoother the pipe
B. Rougher the interior E. Ability to withstand shock loads
C. Been in use for a long time F. None of the Above

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

99. DIP's main advantage is that it is _____by internal or external pressures.
A. Overcome the breakage problems D. Provide a High C Factor
B. Withstand shock loads E. Nearly indestructible
C. Extend the life F. 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
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
101. 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

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

103. 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

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. Withstand corrosion
D. Transfer less friction
E. Brittle and is easily broken
F. None of the Above

107. ACP main disadvantage is that it is _____ during construction or by shock loading.
A. Very light weight
B. Lower C factor
C. Unable to withstand corrosion
D. Transfer less friction
E. Brittle and is easily broken
F. 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 commonly used for the water distributing pipes inside a building to supply hot and cold water to?

A. The fixtures
B. Water distributing pipes
C. Inside and outside
D. To copper fittings
E. The water heater
F. None of the Above

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

A. True B. False

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

A. True B. False

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

A. Hooked to Cpex
B. Flanged
C. Connected to Sharkbites
D. Soldered to copper fittings
E. Threaded for standard fittings
F. None of the Above

Copper

114. According to the text, 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. Type K copper tubing is available in either rigid or flexible and is primarily used for _____in the water distribution systems.

A. Exposed lines
B. Underground service
C. Rigid (hard temper)
D. Straight lengths
E. DVW
F. None of the Above

119. 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

120. Type L copper tubing is also available in either hard or soft temper and either in coils or?

A. Exposed lines
B. Widely used
C. Easier installation
D. Straight lengths
E. Water distribution systems
F. None of the Above

121. According to the text, soft temper tubing is often used as replacement plumbing because of the tube's flexibility, which allows?
A. Exposed lines D. Straight lengths
B. Widely used E. Water distribution systems
C. Easier installation F. None of the Above

122. Type L copper tubing is widely used in?
A. Exposed lines D. Straight lengths
B. Widely used E. Water distribution systems
C. Easier installation F. 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 D. Straight lengths
B. Widely used E. Water distribution systems
C. Easier installation F. 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. Branch supplies D. Straight lengths
B. Widely used E. Drainage piping
C. Easier installation F. None of the Above

Backflow Introduction
125. Cross-Connection control 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 D. Cross-Connection Control
B. Federal laws E. Local level laws
C. State program regulations F. 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 D. Cross-Connection
B. Backflow E. Air break
C. Direct connection F. None of the Above

129. Which of the following definition terms, also referred to as Cross-Connection Control, addresses a serious health issue?
A. Direct piping D. Cross-Connection
B. Backflow prevention E. Water purveyor rules
C. Direct connection F. 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. Certainly not usually intentional
E. Certainly intentional
F. None of the Above

131. Sources of pollution that may result in a danger to health are not always obvious and such cross-connections are?
A. Internal or external piping
B. Public and the second is protection
C. Residential environment the pollutant source
D. Certainly not usually intentional
E. Certainly intentional
F. 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. Direct piping
B. Backflow
C. Direct connection
D. Internal or external piping
E. Air break
F. 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. Internal or external piping
B. Public and the second is protection
C. Residential environment the pollutant source
D. Certainly not usually intentional
E. Indirect connection
F. None of the Above

134. 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

135. 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. Backwater
C. Without a direct connection
D. Involving a water well located on the property.
E. Air break
F. None of the Above

136. 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. Residential environment is always the pollutant source
D. Certainly not usually intentional
F. None of the Above

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

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

140. Which of the following terms is there two forms-backpressure and backsiphonage?
A. Backflow D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. 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 D. Backflow
B. Air gap E. Device or method
C. Backflow preventer F. None of the Above

142. 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

143. 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

144. 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

145. 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

146. 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

147. 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

148. Which of the following terms is a type of backflow caused by a negative 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

Types of Backflow Prevention Methods and Assemblies
149. 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 D. Cross-connection
B. Backpressure E. Indirect connection
C. Backsiphonage F. None of the Above

150. The type of device selected for a particular installation depends on several factors.
A. True B. False

151. 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 D. Air gap
B. Backflow preventer E. Air break
C. Barrier to backflow F. None of the Above

152. 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 D. Air gap
B. Backflow preventer E. Air break
C. Barrier to backflow F. None of the Above

153. 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 D. Air gap
B. Backflow preventer E. Air break
C. Barrier to backflow F. None of the Above

154. 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

155. 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 D. Backflow
B. 2 inches E. Depends
C. 3 inches F. None of the Above

156. 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 D. Air gap
B. Backflow preventer E. Air break
C. Barrier to backflow F. None of the Above

157. An air gap is acceptable for _____ and is theoretically the most effective protection.
A. High hazard installations D. Low pollutional hazards
B. Backflow preventer E. High pollutional concerns
C. Barrier to backflow F. None of the Above

Vacuum Breakers
158. Which of the following terms can have two types: atmospheric and pressure.
A. Downstream piping D. Hazard application(s)
B. Atmospheric vacuum breakers E. Backflow preventor(s)
C. Vacuum breaker(s) F. None of the Above

159. 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

160. 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

161. Both vacuum breakers devices open the pipeline to atmosphere in the event of backsiphonage only.
A. True B. False

162. Both vacuum breakers devices are approved for backpressure conditions.
A. True B. False

163. Both vacuum breakers devices are only suitable for?
A. High hazard installations D. Low hazard conditions
B. Backflow preventer E. High pollutional concerns
C. Barrier to backflow F. None of the Above

164. Which of the following terms may not be installed downstream of atmospheric vacuum breakers but are allowed on pressure vacuum breakers?
A. Valve assembly
B. Test cocks
C. Air inlet valve
D. Internally weighted
E. Shut offs
F. None of the Above

165. The devices must be installed above the highest?
A. Downstream piping
B. Atmospheric vacuum breakers
C. Vacuum breakers
D. Hazard applications
E. Mountain
F. None of the Above

166. Which of the following terms contains a float check, a check seat, and an air inlet port?
A. Double check
B. Atmospheric vacuum breaker
C. Breaker(s)
D. RP
E. Backflow preventor(s)
F. 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. Which of the following terms is not internally loaded?
A. Air inlet valve
B. Check valve
C. Device
D. Test cock
E. Atmospheric vacuum breakers
F. None of the Above

169. 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

170. Which of the following terms are designed to prevent backflow caused by backsiphonage only from low health hazards?
A. Downstream piping
B. Atmospheric vacuum breakers
C. RPs
D. Hazard application(s)
E. Backflow preventor(s)
F. None of the Above

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. Confined space D. In a pit
B. Accessible location E. Is maintained at a lower pressure
C. Above the ground F. None of the Above

177. The DC needs to be installed 12 inches _____for testing purposes only.
A. in a Confined space D. In a pit
B. Accessible location E. Above the highest downstream outlet
C. Above the ground F. 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 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. Limits the treatment process D. Will cause fatalities
B. Are mild in nature E. Limit the travel of pathogens
C. Cause intestinal illness F. None of the Above

How Diseases Are Transmitted.
188. Waterborne pathogens are primarily spread by the?
A. Fecal-oral, or feces-to-mouth, route D. Influenza route
B. Dermal to fecal route E. Waterborne mishaps
C. Oral to fecal route F. 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. Fecal Coliform and E coli D. Cryptosporidiosis
B. Protozoa E. Bioslime
C. Macroorganisms F. 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. Fecal Coliform and E coli D. Waterborne Pathogen(s)
B. Giardia lamblia E. Coliform bacteria
C. Microorganism(s) F. 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. Fecal Coliform and E coli D. Influenza virus and tuberculosis bacteria
B. Giardia lamblia E. Coliform bacteria
C. Microorganisms F. None of the Above

Chain of Transmission
193. Water must have feces and must contain _____ to cause a waterborne disease.
A. Campylobacteriosis D. Fecal-oral material
B. Pathogens E. Contaminated water
C. Waterborne illness(es) F. None of the Above

194. The pathogens must survive in the water, which will depend on the temperature of the water and the length of time the _____are in the water.
A. Stomach bugs D. Germs
B. Turbidity E. Pathogens
C. Microscopic particles F. None of the Above

195. Which pathogen may survive for months such as Giardia or?
A. Illness D. Campylobacteriosis
B. Cryptosporidium E. Tampylobacteriosis
C. Bacteria F. None of the Above

196. This 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 terms 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. Pathogen D. Campylobacteriosis
B. Yersiniosis E. Incubation period
C. Hepatitis A F. 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. Pathogen D. Campylobacteriosis
B. Yersiniosis E. Beaver fever
C. Hepatitis A F. 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

You are finished with the assignment. Please fax or e-mail the answer key and registration form to TLC. Always call and ensure we've received your paperwork.

God bless and thank you.