Registration form

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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.

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CERTIFICATION OF COURSE PROCTOR

Technical Learning College requires that our students who takes a correspondence or home study program course must pass a proctored course reading, quiz and final examination. The proctor must complete and provide to the school a certification form approved by the commission for each examination administered by the proctor.

Instructions. When a student completes the course work, fill out the blanks in this section and provide the form to the proctor with the examination.

Name of Course:_____

Name of Licensee:_____

Instructions to Proctor. After an examination is administered, complete and return this certification and examination to the school in a sealed exam packet or in pdf format.

I certify that:

1. I am a disinterested third party in the administration of this examination. I am not related by blood, marriage or any other relationship to the licensee which would influence me from properly administering the examination.
2. The licensee showed me positive photo identification prior to completing the examination.
3. The enclosed examination was administered under my supervision on _____. The licensee received no assistance and had no access to books, notes or reference material.
4. I have not permitted the examination to be compromised, copied, or recorded in any way or by any method.
5. Provide an estimate of the amount of time the student took to complete the assignment.

Time to complete the entire course and final exam. _____

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Signature of Proctor

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You can electronically complete this assignment in Adobe Acrobat DC.

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353. A B C D	368. A B C D	383. A B C D	398. A B
354. A B C D	369. A B C D	384. A B C D	399. A B
355. A B C D	370. A B C D	385. A B	400. A B

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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

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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. Please utilize the answer key. (s) on the answer will indicate either plural and singular tenses.

Hyperlink to the Glossary and Appendix
http://www.abctlc.com/downloads/PDF/WTGlossary.pdf

Cross-Connection Section

What is Backflow?

1. Which of the following 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 C. Indirect connection
B. Backpressure D. None of the above

2. 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. Backflow C. Backsiphonage
B. Backpressure D. None of the above

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

4. 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. Backsiphonage C. Cross-connection
B. Backpressure D. None of the above

5. Which of the following can have two forms-backpressure and backsiphonage?
A. Backflow C. Cross-connection
B. Backpressure D. None of the above

6. The basic mechanism for preventing backflow is a mechanical _____, which provides a physical barrier to backflow.
A. Air gap C. Backflow
B. Backflow preventer D. None of the above

7. 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. Indirect connection C. Cross-connection
B. Jumper D. None of the above

8. Which of the following is a type 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. Backsiphonage C. Cross-connection
B. Backpressure D. None of the above

9. Which of the following can occur whenever the amount of water being used exceeds the amount of water being supplied, such as during water line flushing, firefighting, or breaks in water mains?
A. Backsiphonage C. Cross-connection
B. Backpressure D. None of the above

10. The principal types of mechanical backflow preventer are the reduced-pressure principle assembly, the _____, and the double check valve assembly.
A. Vacuum breaker C. Backflow check
B. Air gaper D. None of the above

11. Which of the following is a means or mechanism to prevent backflow?
A. Check device or method C. Backflow check valve
B. Backflow preventer D. None of the above

12. According to the text, basic means of preventing backflow is a(n) _____, which either eliminates a cross-connection or provides a barrier to backflow.
A. Vacuum breaker C. Backflow check
B. Air gap D. None of the above

Types of Backflow Prevention Methods and Assemblies
13. When the _____is restricted, such as the case of an air gap located near a wall, the air gap separation must be increased.
A. Air break C. Airflow
B. Barrier to backflow D. None of the above

14. An air gap is a physical disconnection between the free flowing discharge end of a potable water pipeline and the top of a(n)?
A. Open receiving vessel C. Barrier to backflow
B. Air break D. None of the above

15. Which of the following must either be physically disconnected or have an approved backflow prevention device installed to protect the public water system?
A. Indirect connection C. Cross-connection
B. Jumper D. None of the above

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

17. Which of the following 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

18. 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

19. 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 C. 12 inches
B. 2 inches D. None of the above

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

21. An air gap is acceptable for _____ and is theoretically the most effective protection.
A. High hazard installations C. Low pollutional hazards
B. High pollutional concerns D. None of the above

Vacuum Breakers
22. Which of the following devices can have two primary types: atmospheric and pressure.
A. Vacuum breaker(s) C. Hazard application(s)
B. Atmospheric vacuum breakers D. None of the above

23. 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

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

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

26. Both vacuum breakers devices are only suitable for?
A. High hazard installations C. Low hazard conditions
B. High pollutional concerns D. None of the above

27. Which of the following may not be installed downstream of atmospheric vacuum breakers but are allowed on pressure vacuum breakers?
A. Valve assembly C. Air inlet valve
B. Shut offs D. None of the above

28. The devices must be installed above the highest?
A. Downstream piping C. Hazard applications
B. Vacuum breakers D. None of the above

29. 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

30. 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

31. 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

32. The double check valve assembly is designed to prevent backflow caused by backpressure and backsiphonage from high health hazards.
A. True B. False

33. The double check valve should be installed in an _____and protected from freezing.
A. Confined space C. Above the ground
B. Accessible location D. None of the above

34. 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

35. 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

36. 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

37. 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

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

39. 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

40. 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

Water Distribution Section

System Elements

41. In the distribution system, storage reservoirs are structures used to store water and _____ the supply or pressure.

A. Increase water pressure C. Provide a reserve pressure for
B. Equalize D. None of the above

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

A. Increase water pressure C. Provide a reserve pressure
B. Equalize D. None of the above

43. Globe valves should only the only valve used in an Arterial system for main line isolation.

A. True B. False

Butterfly Valve

44. 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 C. PRV
B. Bypass D. None of the above

Water Distribution Valves

45. 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. Depends on customers
B. Radiating mains D. None of the above

46. All buried small- and medium-sized valves shall be installed in the sidewalk for safety.

A. True B. False

47. For large shutoff valves, it is necessary to surround the valve operator or entire valve within a vault or manhole to allow?

A. Bluestakes C. Repair or replacement
B. Testing D. None of the above

Gate Valves

48. If the valve is wide open, the gate inside the valve is _____ into the valve bonnet.

A. Fully drawn up C. Fully closed
B. Fully down D. None of the above

49. There is little pressure drop or flow restriction through gate valves; however, gate valves are not suitable for?

A. Pressure drops C. Throttling purposes
B. Isolation D. None of the above

Ball Valves

50. 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

51. Valve exercising should be done once per year to locate inoperable valves due to freezing or build-up of rust or corrosion and to detect minimum flow restriction and to prevent valves from becoming frozen or damaged.
A. True B. False

52. A valve inspection should include drawing valve location maps to show distances to the valve from specific reference.
A. True B. False

53. Over-pressurization of a valve is when a valve can _____ when high pressure enters the cavity and has no way to escape.
A. Positive pressure differential C. Lock in the closed position
B. Lock in the open position D. None of the above

54. Tuberculation corrosion inside a pipe or valve is caused by chemical changes produced by?
A. Hard water C. Electricity or electrolysis
B. Chemical changes D. None of the above

55. Corrosion increases the C-Factor and the carrying capacity in a pipe.
A. True B. False

Common Rotary Valves

56. Globe valve is a rotary valve and is rare to find in most distribution systems, but is found at water treatment plants.
A. True B. False

57. Most Globes are compact OS & Y types, bolted bonnet, rising stems, with renewable seat rings.
A. True B. False

Water Pressure

58. 2.31 feet of water is equal to 1 psi, or 1 foot of water is equal to about a half a pound (.433 pounds to be exact).
A. True B. False

59. For ordinary domestic use, water pressure should be between 25 and 45 psi.
A. True B. False

60. 20 psi is the minimum pressure required at any point in the water system, so that _____ is prevented.
A. Cavitation C. Backflow and infiltration
B. Back pressure D. None of the above

61. Which of the following is provided from the direct force of the water, or by the height of the water?
A. Pressure C. Maximum daily use
B. System integrity D. None of the above

Water Use or Demand

62. Water system demand comes from many sources including residential, commercial, industrial and public consumers as well as waste and some?

A. Pressure C. Unavoidable loss
B. System integrity D. None of the above

63. The quantity of water used in any community varies from 100 to 200 gallons per person per day.

A. True B. False

64. Which of the following is highly desired and represents a rather significant demand upon the system?

A. Fire protection C. Surge protection
B. Cavitation protection D. None of the above

65. A common design usage assumption is to plan for the usage of 100 to 150 gallons per person per day for average domestic use.

A. True B. False

66. The maximum daily use is approximately 3 to 5 times the average daily use.

A. True B. False

67. Which of the following is usually encountered during the summer months and can vary widely depending on irrigation practices?

A. Maximum daily use C. Unavoidable loss and waste
B. Minimum daily use D. None of the above

Water Storage Introduction

68. Which of the following prevents contamination of water as it travels to the customer, finished water storage facilities are an important component of the protective distribution system?

A. Cathodic protection C. Barrier
B. Corrosion protection D. None of the above

Storage and Distribution

69. Proper construction is important in maintaining system integrity and the distribution system must also protect?

A. Cathodic protection C. Water quality
B. Corrosion protection D. None of the above

Water Storage Facilities

70. Water storage facilities and tanks vary in different types that are used in the water distribution systems, such as stand pipes, elevated tanks and reservoirs, hydropneumatic tanks and?

A. Surge tanks C. Storage reservoirs
B. Water distribution systems D. None of the above

71. Which of the following can be converted to pressure potential energy or kinetic energy for delivery to homes?

A. Hydrostatic power C. Hydraulic power
B. Stored energy D. None of the above

Storage Reservoirs

72. The text recommends that _____ be located at a high enough elevation to allow the water to flow by gravity to the distribution system.

A. Storage reservoirs C. Tree systems
B. Levelers D. None of the above

Groundwater Treatment/Production System Section

Groundwater and Wells

73. When toxic substances are spilled or dumped near a well, these can leach into _____and contaminate the groundwater drawn from that well.

A. Karst C. Soil moisture
B. Aquifer D. None of the above

74. Which of the following flows slowly through water-bearing formations at different rates?

A. Groundwater C. Soil moisture
B. Drinking water D. None of the above

75. The level below which all the spaces in the ground are filled with water is called the?

A. Unconfined aquifer(s) C. Well(s)
B. Water table D. None of the above

76. The area above the water table lies the?

A. Unsaturated zone C. Saturated zone
B. Karst D. None of the above

77. The water in the saturated zone is called?

A. Unconfined aquifer(s) C. Water table
B. Groundwater D. None of the above

78. Which of the following terms are cracks, joints, or fractures in solid rock, through which groundwater moves?

A. Fractured aquifer(s) C. Soil moisture
B. Karst D. None of the above

79. Limestone is often located in which of the following?

A. Unconfined aquifer(s) C. Fractured aquifer(s)
B. Soil moisture D. None of the above

80. Which of the following may move in different directions below the ground than the water flowing on the surface?

A. Water table C. Soil moisture
B. Groundwater D. None of the above

81. Unconfined aquifers are those that are bounded by the water table. Some aquifers lie beneath layers of impermeable materials.

A. True B. False

82. A well inside an aquifer is an artesian well.

A. True B. False

83. Which of the following is the level to which the water in an artesian aquifer will rise?
A. Aquifer C. Water table
B. Piezometric surface D. None of the above

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

85. Which of the following usually flows downhill along the slope of the water table?
A. Groundwater C. Soil moisture
B. Water table D. None of the above

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

87. During pumping, the water level in the well falls below the water table in the?
A. Water table C. Unconfined aquifer
B. Surrounding aquifer D. None of the above

88. The movement of water from _____ into a well results in the formation of a cone of depression.
A. Confined aquifer C. Water table
B. An aquifer D. None of the above

89. Which of the following describes a three-dimensional inverted cone surrounding the well that represents the volume of water removed as a result of pumping?
A. Water table C. Cone of depression
B. Groundwater D. None of the above

90. Which of the following is the vertical drop in the height between the water level in the well prior to pumping and the water level in the well during pumping?
A. Drawdown C. Cone of depression
B. Groundwater D. None of the above

91. When a water well is installed in _____, water moves from the aquifer into the well through small holes or slits in the well casing or, in some types of wells, through the open bottom of the well?
A. Confined aquifer C. Water table
B. An unconfined aquifer D. None of the above

Where Is Ground Water Stored?
92. Areas where ground water exists in sufficient quantities to supply wells or springs are called aquifers, that literally means?
A. Water table C. Cone of depression
B. Water bearer D. None of the above

93. Which of the following stores water in the spaces between particles of sand, gravel, soil, and rock as well as cracks, pores, and channels in relatively solid rocks?
A. Water table C. Unconfined aquifer
B. Aquifer(s) D. None of the above

94. Which of the following is regulated largely by its porosity, or the relative amount of open space present to hold water?
A. Water table
B. Groundwater
C. An aquifer's storage capacity
D. None of the above

95. There are two types of aquifers: confined and unconfined.
A. True B. False

96. If the aquifer is sandwiched between layers of comparatively impermeable materials, it is called?
A. Confined aquifer
B. Unconfined aquifer
C. Water table
D. None of the above

97. Which of the following are frequently found at greater depths than unconfined aquifers?
A. Confined aquifer(s)
B. Unconfined aquifer(s)
C. Water table
D. None of the above

Does Groundwater Move?

98. Groundwater can move sideways as well as up or down. This movement is in response to gravity, differences in elevation, and?
A. Permeable zones
B. Differences in pressure
C. Saturated zone
D. None of the above

99. Groundwater can move even more quickly in karst aquifers, which are areas in _____ and similar rocks where fractures or cracks have been widened by the action of the ground water to form sinkholes, tunnels, or even caves?
A. Karst aquifer(s
B. Saturated zone
C. Water soluble limestone
D. None of the above

Groundwater Quality

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

101. It is known that some contaminants can pass through all of these filtering layers into _____ to contaminate ground water.
A. Saturated zone
B. Unsaturated zone
C. Permeable zones
D. None of the above

How Does Ground Water Become Contaminated?

102. Groundwater contamination can begin on the surface of the ground, in the ground above the water table, or in the ground below the?
A. Water table
B. Ground water
C. Permeable zones
D. None of the above

103. If the contaminant is introduced straight into the area below _____, the primary process that can affect the impact of the contaminant is dilution by the surrounding ground water.
A. Water table
B. Saturated zone
C. Unsaturated zone
D. None of the above

What Kinds of Substances Can Contaminate Groundwater, and Where Do They Come from?

104. Substances that can pollute _____ can be divided into two basic categories: substances that occur naturally and substances produced or introduced by man's activities.

A. Groundwater C. Permeable zones
B. Saturated zone D. None of the above

105. A substantial number of today's groundwater contamination problems stem from man's activities and can be introduced into ground water from?

A. Contaminant(s) C. Saturated zone
B. A variety of sources D. None of the above

Abandoned Wells

106. If which of the following if abandoned without being properly sealed, it can act as a direct channel for contaminants to reach ground water?

A. Supplies of clean ground water C. A well
B. Alternative sources of water D. None of the above

What Can Be Done After Contamination Has Occurred?

107. Rehabilitate the _____ by either restaining or detoxifying the contaminants while they are still in the aquifer.

A. Aquifer C. Supplies of clean ground water
B. Contamination D. None of the above

Water Well Reports and Hydrogeology
Hydrogeologic Data

108. For hydrogeologists to make reliable assessments about the current and future status of ground water, they need to know where ground water occurs in the_____, what the properties are of the various geologic units below the surface, and how fast and in what direction ground water is moving.

A. Aquifer C. Subsurface
B. Contamination D. None of the above

Nature of the Aquifer

109. An unconfined aquifer has the _____ as its upper surface; there are no significant low-permeability layers between the water table and the surface.

A. Hydraulic head C. Permeability area
B. Water table D. None of the above

110. According to the text, the top of the aquifer, can rise or fall depending on water use and amount of recharge to the aquifer and is called?

A. Hydraulic head C. Permeability zone
B. Water table D. None of the above

111. Which of the following terms has a low-permeability geologic formation as its upper boundary?

A. Hydraulic head C. A confined aquifer
B. Water table D. None of the above

Hydraulic Head (h)

112. The hydraulic head is a measure of the water at a certain depth possesses because of its elevation and the pressure exerted through the weight of the water above it.

A. True B. False

113. Which of the following has units of feet, and generally parallels to the elevation of water in the well?
A. Hydraulic head C. Permeability zone
B. Water table D. None of the above

Permeability of the Aquifer (K)
114. Which of the following _____ or the permeability of the aquifer is a measure of how fast ground water can move through the aquifer?
A. Hydraulic head C. Storage coefficient of the aquifer
B. Hydraulic conductivity D. None of the above

115. Which of the following terms has units of distance/time, e.g., feet/day, although it does not represent an actual speed?
A. Hydraulic head C. Storage coefficient of the aquifer
B. Hydraulic conductivity D. None of the above

In What Direction Is Groundwater Flowing?
116. The direction of groundwater flow is from higher to lower?
A. Hydraulic head C. Storage coefficient of the aquifer
B. Hydraulic conductivity D. None of the above

117. Which of the following can be measured by lowering a probe through the observation port of a number of wells, all within the same relative time period?
A. Hydraulic head C. Storage coefficient of the aquifer
B. Hydraulic conductivity D. None of the above

What Is the Drawdown Associated with Pumping of a Well?
118. There is a relationship between the pumping rate of the well, the transmissivity of the aquifer, the distance between wells, _____, and the duration of the pumping event.
A. Hydraulic head C. Storage coefficient of the aquifer
B. Hydraulic conductivity D. None of the above

Depth to First Water-Bearing Zone
119. Some report the depth at which water is first encountered in?
A. The drill hole C. Recharge and discharge zone(s)
B. Static water level (SWL) D. None of the above

Static Water Level
120. The driving force for ground water movement is the hydraulic head, and the _____ is a measure of that force.
A. Hydrogeologic investigation(s) C. Recharge and discharge zone(s)
B. Static water level (SWL) D. None of the above

121. Identifying where one aquifer ends and another begins is key to identifying the source of the yield for individual wells. Although this often can be determined by careful review of the lithologic log provided by the well constructor, the transition from one aquifer to the next can be indicated by a marked change in the recharge and discharge zones
A. True B. False

122. Which of the following is a better gauge that a different aquifer has been encountered than the lithologic description?
A. Water-bearing zone(s) C. Recharge and discharge zone(s)
B. SWL D. None of the above

(S) Means the answer can be plural or singular in nature

123. Which of the following have important effects in groundwater protection and identifying the relation between area groundwater and local streams?
A. Water-bearing zone(s) C. Recharge and discharge zone(s)
B. SWL D. None of the above

Water-Bearing Zones
124. In some cases, the screened or perforated portions of cased wells provide a clue, but all too often, the screened interval is either significantly less than the actual static water level.
A. True B. False

125. Arriving at accurate approximations of aquifer parameters or calculating ground water velocity requires us to know the thickness of the?
A. Water-bearing zone(s) C. Recharge and discharge zone(s)
B. SWL D. None of the above

Lithologic Log
126. The well log portion of the well report describes what the driller encountered in the subsurface.
A. True B. False

Contributions of Well Constructors to Hydrogeology
127. The well report document stresses the importance of data that is recorded on well reports and how that data influences hydrogeologic investigations.
A. True B. False

The Rotary Drill String
128. Rotary drilling methods use a drill string, which typically consists of a bit, collar, drill pipe and?
A. The drill collar C. A kelly
B. A Sub D. None of the above

129. Which of the following is a section of heavy walled pipe that can be hexagonal, square, or rounded with grooves?
A. The flighting C. A kelly
B. The plug D. None of the above

130. Which of the following is several feet longer than the drill pipe being used and fits into the table drive much like the splines on a drive shaft fit into a transmission?
A. The drill collar C. The kelly
B. The Sub D. None of the above

131. Some rotary rigs use a top drive to turn _____ and are like a drill press.
A. The drill collar C. The drill string
B. Drag bit(s) D. None of the above

132. Drill pipe can be used in various lengths but are typically 20-foot sections and may be connected to the drive unit with?
A. The drill collar C. A kelly
B. A Sub D. None of the above

133. A sub is a length of pipe used to connect pipes and/or act as shock absorber (between the drill pipes and drive unit, at the end of the drill pipe is?
A. The drill collar C. Shock absorber
B. Drag bit(s) D. None of the above

134. Which of the following or stabilizer is typically very heavy and is often gauged close to the diameter of the bit being used?
A. The drill collar C. Shock absorber
B. Drag bit(s) D. None of the above

135. Which of the following aids in maintaining a consistent borehole diameter and primarily helps to prevent borehole deviation?
A. The drill collar C. Shock absorber
B. Drag bit(s) D. None of the above

136. Several types of bits may be used; such as drag bits or?
A. The flighting C. Roller bits
B. The plug D. None of the above

137. Which of the following are normally used in unconsolidated to semi-consolidated sand, silt, and clay-rich formations?
A. The drill collar C. Roller bit(s)
B. Drag bit(s) D. None of the above

138. Drag bits come in many shapes and sizes and cut with a shearing action aided by the jetting of drilling fluids from?
A. The drill collar C. Shock absorber (floating sub)
B. Nozzles or jets in the bit D. None of the above

139. Roller bits, such as _____, typically utilize interlocking teeth or buttons on individual rotating cones to cut, crush, or chip through the formation.
A. The flighting C. The common tri-cone bit
B. The plug D. None of the above

140. Roller bits can be used in consolidated formations and even hard rock applications if equipped with carbide buttons. These types of bits are often referred to as?
A. Roller button bits C. Reamers
B. The Kelly D. None of the above

141. Which of the following are bits that can be utilized to enlarge, straighten, or clean an existing borehole?
A. Roller button bits C. Reamers
B. The Kelly D. None of the above

142. Which of the following are used to enlarge deeper sections of an existing borehole without requiring the enlargement of the entire upper well bore?
A. Cutting blades C. Reamers
B. Under reamers D. None of the above

143. Under reaming involves the projection of _____ beneath permanently installed casing in loosely consolidated sediments.
A. Cutting blades C. Reamers
B. Under reamers D. None of the above

(S) Means the answer can be plural or singular in nature

Direct Rotary Method
144. Direct rotary drilling methods utilize a rotating bit at the end of a drilling string with drilling fluid that is circulated from the rig through the drill pipe and jets in the bit.
A. True B. False

Direct Mud Rotary Method
145. Mud is circulated down the drill string and through the bit at the bottom of the borehole and the mud then carries the cuttings generated by the bit up to the surface and into the mud recirculating system.
A. True B. False

Air Rotary Method
146. Air rotary methods utilize compressed water and derived rock cuttings as the drilling fluid.
A. True B. False

Drill through Casing Driver Method
147. The drill through casing driver method drives casing into the borehole as the telescoping kelly advances.
A. True B. False

Auger Boring Methods
148. Auger boring methods make use of _____, which may be attached to a pilot bit and cutter head.
A. Auger boring method(s) C. A rotating blade or spiral flange
B. The casing driver method D. None of the above

149. Which of the following along with the rotating action of the blade and cutting action of the pilot and/or cutter bits facilitates the boring process?
A. The flighting C. Down-force applied by the rig
B. The plug D. None of the above

150. Soil samples may be collected as cuttings rise or are brought to the surface, or they may be collected with?
A. Augers C. The solid stem auger boring method
B. Split spoon type sampler(s) D. None of the above

What is a Significant Deficiency?
151. Significant deficiencies cause, or have the potential to cause, the introduction of contamination into water delivered to customers include defects in design, operation, or maintenance of?
A. Well screen C. The source, treatment or distribution systems
B. The aquifer D. None of the above

Selecting an Appropriate Well Site
152. Before a well can be drilled a permit is normally required. The permit helps to ensure that an appropriate location of the well is selected which reduces the possibility of contamination.
A. True B. False

(S) Means the answer can be plural or singular in nature

Pump and Motor Section

Common Hydraulic Terms

153. Which of the following definitions is the engineering science pertaining to liquid pressure and flow?

A. Hydraulics C. Hydrokinetics
B. Hydrology D. None of the above

154. Which of the following definitions is the pressure differential above or below ambient atmospheric pressure?

A. Pressure, Absolute C. Pressure, Gauge
B. Pressure D. None of the above

155. Which of the following definitions is height of a column or body of fluid above a given point expressed in linear units?

A. Head, Friction C. Head
B. Head, Static D. None of the above

156. Which of the following definitions is required to overcome the friction at the interior surface of a conductor and between fluid particles in motion?

A. Head, Friction C. Head
B. Head, Static D. None of the above

157. Which of the following definitions is the pressure in a fluid at rest?

A. Head, Friction C. Head
B. Pressure, Static D. None of the above

158. Which of the following definitions is the height of a column or body of fluid above a given point?

A. Head, Friction C. Head
B. Head, Static D. None of the above

159. Sea level pressure is approximately 2.31 pounds per square inch absolute, 1 bar = .433psi.

A. True B. False

General Pumping Fundamentals

160. Here are the important points to consider about suction piping when the liquid being pumped is below the level of the pump: Sometimes suction lift is also referred to as ‘positive suction head’.

A. True B. False

161. According to the text, suction lift is when the level of water to be pumped is below the?

A. Impeller C. Centerline of the pump
B. Suction D. None of the above

Pumps

162. Pumps are excellent examples of?

A. Hydrostatics C. Multi-stage pumps
B. Quasi-static devices D. None of the above

163. Positive displacement pumps have a piston (or equivalent) moving in a closely-fitting cylinder and forces are exerted on the fluid by motion of the piston.

A. True B. False

164. More complicated pumps have valves check valves that open to allow _____, and close automatically to prevent reverse flow.
A. Pistons C. Passage in one direction
B. Diaphragms D. None of the above

165. Diaphragm pumps are force pumps in which the oscillating diaphragm takes the place of the piston.
A. True B. False

Pump Categories
166. The key to understanding a pump's operation is that a pump is to move water and generate the _____ we call pressure.
A. Delivery force C. Diaphragm pressure
B. Impeller force D. None of the above

167. With a centrifugal pump the pressure is not referred to in pounds per square inch but rather as the equivalent in elevation, called?
A. Inward force C. Delivery force
B. Head D. None of the above

Basic Water Pump
168. The centrifugal pumps work by spinning water around in a circle inside a?
A. Vortex C. Cylindrical pump housing
B. Cylinder D. None of the above

169. As the water slows down and its kinetic energy decreases, that water's pressure potential energy increases.
A. True B. False

170. In a centrifugal pump, the inward force is provided by high-pressure water near the outer edge of the?
A. Pump housing C. Base
B. Impeller blade(s) D. None of the above

171. In the operation of the pump, the water at the edge of the _____ inward on the water between the impeller blades and makes it possible for that water to travel in a circle.
A. Inward force C. Center of the impeller
B. Pump pushes D. None of the above

Venturi (Bernoulli's law):
172. A venturi is a pipe that has a gradual restriction that opens up into a gradual enlargement.
A. True B. False

173. The area of the restriction in a venture will have a _____than the enlarged area ahead of it.
A. Inward force C. Higher pressure
B. Lower pressure D. None of the above

174. Which of the following best describes a pump whose impeller has no vanes but relies on fluid contact with a flat rotating plate turning at high speed to move the liquid?
A. Submersible C. Viscous drag pump
B. Blower D. None of the above

Types of Water Pumps

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

176. The most common type of water pumps used for municipal and domestic water supplies are?
A. Axial flow C. Rotary pumps
B. Variable displacement pumps D. None of the above

177. Which of the following will produce at different rates relative to the amount of pressure or lift the pump is working against?
A. Pump's lifting capacity C. Variable displacement pump
B. Atmospheric pressure D. None of the above

178. Impellers are rotated by the pump motor, which provides the _____ needed to overcome the pumping head.
A. Pump's lifting capacity C. Horsepower
B. Atmospheric pressure D. None of the above

179. The size and number of stages, horsepower of the motor and _____are the key components relating to the pump's lifting capacity.
A. Pumping head C. Horsepower
B. Atmospheric pressure D. None of the above

180. Which of the following are variable displacement pumps that are by far used the most?
A. Axial flow C. Turbine pumps
B. Centrifugal pumps D. None of the above

181. According to the text, the turbine pump utilizes impellers enclosed in single or multiple bowls or stages to?
A. Pump head C. Horsepower
B. Lift water D. None of the above

182. Vertical turbine pumps are commonly used in groundwater wells. These pumps are driven by a shaft rotated by a motor on the surface.
A. True B. False

183. The shaft turns the impellers within the pump housing while the?
A. Desired pumping rate is obtained C. Water moves up the column
B. Horsepower turns the shaft D. None of the above

184. The rotating shaft in a line shaft turbine is actually housed within the column pipe that delivers the water to the surface.
A. True B. False

185. The size of the _____are selected based on the desired pumping rate and lift requirements.
A. Impeller(s) C. Column, impeller, and bowls
B. Lantern ring D. None of the above

186. According to the text, column pipe sections can be threaded or coupled together while the drive shaft is coupled and suspended within the column by?
A. Column pipe C. Lantern ring
B. Spider bearings D. None of the above

187. The water passing through the column pipe serves as the lubricant for the bearings.
A. True B. False

There are three main types of diaphragm pumps:
188. A pair of _____prevents reverse flow of the fluid.
A. Return valves C. Non-return check valves
B. Diaphragms D. None of the above

189. The second type of diaphragm pump works with volumetric positive displacement, but differs in that the prime mover of the diaphragm is neither oil nor air; but is?
A. Electro-mechanical C. Volumetric positive displacement
B. Chamber pressure D. None of the above

190. The third type of diaphragm pump has one or more springs with the fluid to be pumped on both sides.
A. True B. False

191. When the volume of a chamber of either type of pump is increased (the diaphragm moving up), the pressure decreases, and fluid is drawn into the?
A. Chamber C. Keyway
B. Diaphragm D. None of the above

192. Which of the following moving up once again draws fluid into the Chamber, completing the cycle?
A. Spring C. Time delay or ratchet assembly
B. Diaphragm D. None of the above

Safety Section

Confined Space Entry Program
Purpose
193. The Confined Space Entry Program is provided to protect authorized employees that will enter confined spaces from safety or health hazards associated with confined spaces.
A. True B. False

Scope
194. According to the text, you are required to recognize _____ associated with confined spaces.
A. Internal configurations C. The dangers and hazards
B. Permit-Required Confined Spaces D. None of the above

Definitions
Confined space:
195. A confined space is large enough or so configured that an employee can _____.
A. Have sufficient oxygen C. Recognize serious safety or health hazards
B. Bodily enter and perform work D. None of the above

196. A confined space has limited or restricted means for _____.
A. An internal configuration C. Hazardous atmosphere
B. Entry or exit D. None of the above

197. A confined space is not designed for _____.
A. An internal configuration C. Continuous employee occupancy
B. Hazardous atmospheres D. None of the above

198. A permit required confined space (permit space) contains or has a potential to contain a _____.
A. Recognized internal machine C. Entry or exit
B. Hazardous atmosphere D. None of the above

199. A permit required confined space (permit space) contains any other recognized serious safety or _____.
A. Engulfing equipment C. Health hazard
B. Non-hazardous atmospheres D. None of the above

Confined Space Hazards

200. Fatalities and injuries constantly occur among construction workers who are required to enter _____.
A. An external configuration C. Confined spaces
B. Non-hazardous atmosphere D. None of the above

Tanks

201. Tanks are _____ that are used for a variety of purposes, including the storage of water and chemicals.
A. Nitrogen purge locations C. Another type of confined workspace
B. Collection places D. None of the above

202. According to the text, oxygen-deficient atmospheres, along with toxic and explosive atmospheres created by the substances stored in the tanks, present hazards to workers.
A. True B. False

203. Heat in tanks may cause _____, particularly on a hot day.
A. Heat prostration C. Problems with pumps
B. Equipment failure D. None of the above

204. The _____ often requires workers to climb ladders to reach high places on the walls of the tank.
A. Electrical shock potential C. Nature of the tank's structure
B. Ventilation duct D. None of the above

Sumps

205. Workers may encounter _____ when entering sumps.
A. Nitrogen purge or dry air C. An oxygen-deficient atmosphere
B. Problems with pumps D. None of the above

(S) Means the answer can be plural or singular in nature

Excavation and Trenching Section

206. Although employers have options when meeting some of the requirements, _____ must realize that the employee must be protected at all times.

A. Competent persons C. Contractors
B. Employers D. None of the above

207. Professional engineers will be required in some situations to plan or design the excavation and/or method of protecting the worker.

A. True B. False

Competent Person

208. Competent person means one who is capable of identifying existing hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees. The _____ has authorization to take prompt corrective measures to eliminate identified hazards.

A. Competent person C. Watchman
B. Contractor D. None of the above

209. A _____ must have specific training in and be knowledgeable about soils analysis, the use of protective systems and the requirements of 29 CFR Part 1926.650-652 Subpart P.

A. Competent person C. Watchman
B. Contractor D. None of the above

210. Everyone is required to practice _____ one a year.

A. Competent person training C. Emergency procedures
B. Rescue training exercises D. None of the above

Competent Person Duties

211. The competent person performs daily inspections of the protective equipment, _____, safety equipment, and adjacent areas.

A. Work progress C. Trench conditions
B. Construction Crew D. None of the above

212. The competent person shall make _____ prior to the start of work and as needed throughout the shift.

A. Personnel assignments C. Inspections
B. Training available D. None of the above

213. The competent person shall make _____ after every rainstorm or other hazard occurrence.

A. Inspections C. Protective equipment available
B. Training available D. None of the above

214. The competent person must have knowledge of _____, telephone or radio dispatch.

A. Personnel assignments C. Emergency contact methods
B. Work schedules D. None of the above

215. The competent person removes employees and _____ from hazardous conditions and makes all changes necessary to ensure their safety.

A. Competent persons C. Protective equipment
B. All other personnel D. None of the above

216. The competent person makes sure that all _____ have proper protective equipment, hard-hats, reflective vests, steel-toed boots, harnesses, eye protection, hearing protection and drinking water.
A. Competent persons C. Employees
B. Contractors D. None of the above

Scope of Work
217. According to the text, during excavation work a competent person shall be on the job site at all times when personnel are working within or around the _____.
A. Competent person C. Excavation
B. Contractors D. None of the above

218. Prior to opening an excavation, the estimated locations of _____ that reasonably may be expected to be encountered during excavation work shall be determined.
A. Unauthorized persons C. Underground utility installations
B. Employees D. None of the above

219. _____ shall be taken to protect employees against the hazards posed by water accumulation in the excavation.
A. Additional care C. Ladders
B. Adequate precautions D. None of the above

220. According to the text, employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations.
A. True B. False

221. In trench excavations that are four (4') feet or more in depth, a stairway, ladder, or ramp shall be used as a _____.
A. Tool C. Bridge
B. Means of access or egress D. None of the above

222. The Ladder(s), stairway(s), or ramp shall be spaced so that no employee in the trench excavation is more than fifty (50') feet from a means of egress.
A. True B. False

223. When excavations are made in vehicular traffic areas, _____ shall wear a warning vest made with reflective material or highly visibility material.
A. Competent persons C. Rescue personnel
B. Each employee D. None of the above

224. The air shall be tested in excavations where _____ exist, or could be reasonably expected to exist.
A. Limited visibilities C. Oxygen deficiency or gaseous conditions
B. Employees D. None of the above

225. When the atmosphere contains less than 19.5 percent oxygen, the area must be continuously ventilated until the _____.
A. Excavation is closed C. Oxygen levels are above 19.5 percent
B. Employees enter the space D. None of the above

(S) Means the answer can be plural or singular in nature

226. Where a _____, the area shall be ventilated until the flammable gas concentration is below 20 percent of the LFL (lower flammable limit).
A. Competent person requires monitoring
B. Gaseous condition exists
C. Worker encounters fumes
D. None of the above

227. Whenever _____ exist or could reasonably exist, the air must be monitored continuously to assure that workers are protected.
A. Traffic conditions
B. Excavations
C. Oxygen deficiency or gaseous conditions
D. None of the above

228. Where the stability of adjoining buildings, walls or other structures are _____, shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.
A. Not a concern
B. Not mentioned in the specifications
C. Endangered by excavation operations
D. None of the above

229. In situations where sidewalks, pavement and appurtenant structures may be undermined, a support system such as shoring must be provided to protect _____ from the possible collapse of such structures.
A. Unauthorized persons
B. Employees
C. Vehicles
D. None of the above

Personnel Protective Systems

230. According to the text, employees in _____ shall be protected from cave-ins by an adequate protective system, which shall be inspected by a competent person.
A. Excavations
B. Vehicles
C. Protective systems
D. None of the above

Excavation Protection Systems

231. There are three basic protective systems for excavations and trenches. They are sloping and benching systems, _____, and shields.
A. Shoring
B. Ramps
C. Attendants
D. None of the above

232. Every employee in an excavation or trench shall be protected from _____ by an adequate protective system.
A. Unauthorized persons
B. Cave-ins
C. Polluted air
D. None of the above

Sloping and Benching Systems

233. An option for sloping is to slope to the angle required by OSHA Construction Standards for Type C, which is the most _____.
A. Unstable soil type
B. Stable soil type
C. Porous soil type
D. None of the above

234. Another option for sloping is to first determine the soil type, then use the table provided in Appendix B of the standard to determine the _____.
A. Maximum allowable angle
B. Porosity
C. Protective system to be used
D. None of the above

Shield Systems (Trench Boxes)

235. Shielding is the third method of providing a safe workplace in excavations. Unlike sloping and shoring, _____ does not prevent a cave-in.

A. Shielding C. Soil testing
B. Tabulated data D. None of the above

236. Shields are designed to _____, thereby protecting the employees working inside the structure.

A. Withstand the soil forces caused by a cave-in C. Bend but not break
B. Keep water out of the excavation D. None of the above

237. Design and construction of _____ is not covered in the OSHA Standards.

A. Sloping and benching systems C. Protective systems
B. Shielding D. None of the above

Safety Precautions for Shield Systems

238. There must not be any lateral movement of _____ when installed.

A. Sloping and benching systems C. Ladders
B. Shields D. None of the above

239. To protect employees from cave-ins when entering and exiting the shield, a ladder within the _____ or a properly sloped ramp at the end shall be provided.

A. Shield C. Tabulated data
B. Jobsite D. None of the above

240. According to the text, employees are not allowed in the _____ during installation, removal, or during any vertical movement.

A. Sloping and benching systems C. Vicinity of the excavation
B. Shield D. None of the above

241. Shields can be installed 2 ft. above the bottom of an excavation, provided that they are designed to _____.

A. Tabulated data C. Be easily removed
B. Resist loads at the full depth D. None of the above

242. The exposed excavation wall at the _____ must be sloped, shored, or shielded.

A. Excavation site C. Traffic side of the excavation
B. Open end of the shield D. None of the above

Personal Protective Equipment

243. _____ requires that employees wear a hard hat, safety glasses, and work boots on the jobsite.

A. The contractor C. Recommended practice
B. OSHA policy D. None of the above

Excavation & Trenching Guidelines

244. Procedures and guidelines for the protection of employees working in and around excavations and trenches must be in compliance with OSHA Standards described in Subpart P (CFR 1926.650) for the construction industry.

A. True B. False

(S) Means the answer can be plural or singular in nature

245. According to the text, the competent person(s) must be trained in accordance with the OSHA Excavation Standard, and all other programs that may apply, and must demonstrate a thorough understanding and knowledge of the programs and the hazards associated.
A. True B. False

246. All other employees working in and around the excavation must be trained to recognize the hazards associated with _____.
A. OSHA Standards C. Personal protective equipment
B. Trenching and excavating D. None of the above

Hazard Controls
247. Knowing the location of underground installations is a good idea because it could make the work go faster.
A. True B. False

248. All overhead hazards (surface encumbrances) must be removed or supported to _____.
A. Meet OSHA Standards C. Eliminate the hazard
B. Make trenching and excavating easier D. None of the above

249. If _____ will be over 20 feet deep, it must be designed by a registered professional engineer.
A. An excavation C. Construction equipment
B. A means of access or egress D. None of the above

250. _____, such as sloping, shoring, or shielding, will be utilized to protect employees.
A. Adequate protective systems C. Soil testing
B. Soil classifications D. None of the above

251. An excavation safety plan must be developed to protect employees.
A. True B. False

252. Workers must be supplied with, and wear, any _____ deemed necessary to protect them while working in excavations.
A. Uniforms C. Personal protective equipment
B. Apparel D. None of the above

253. All _____ must be stored at least two (2) feet from the sides of the excavation. The spoil pile must not block the safe means of egress.
A. Safety plans C. Spoil piles
B. Barricades D. None of the above

254. If a trench or excavation is 4 feet or deeper, stairways, ramps, or ladders must be provided as a safe means of access and egress. Employees working in trenches must not have to travel any more than 25 feet laterally to reach a _____.
A. Stairway, ramp, or ladder C. Benched area
B. Safe area D. None of the above

255. No employee will be permitted to work in an excavation where _____ is accumulating unless adequate protection measures are used to protect the employees.
A. Construction debris C. Spoil
B. Water D. None of the above

256. All excavations and trenches must be inspected daily by a _____, prior to employee exposure or entry. Trenches and excavations will also be inspected after any rainfall, soil change, or any other time needed during the shift.
A. Professional engineer C. Competent person
B. Supervisor D. None of the above

257. When excavations and trenches 4 feet or deeper have the potential for toxic substances or _____, the air will be tested at least daily.
A. Cave-ins C. Hazardous atmospheres
B. Unauthorized workers D. None of the above

258. If work is in or around traffic, _____ must be utilized to ensure the safety of employees, vehicular traffic, and pedestrians.
A. Signs and barricades C. Additional personnel
B. Soil classifications D. None of the above

Excavation Safety Plan
259. A written excavation safety plan is required. This plan is to be developed to the level necessary to ensure complete compliance with the _____ and state and local safety standards.
A. Professional engineer's requirements C. Protective systems
B. OSHA Excavation Safety Standard D. None of the above

Soil Classification and Identification
260. The Simplified Soil Classification System defined by OSHA Standards consists of four categories: _____, Type A, Type B, and Type C.
A. Stable rock C. Stiff clay
B. Gravel D. None of the above

261. Type A soils are _____ with an unconfined compressive strength of 1.5 tons per square foot (TSF) or greater.
A. The least stable C. Field tested
B. Cohesive soils D. None of the above

262. Examples of Type A soils are _____ like caliche and hardpan.
A. Cemented soils C. Uncommon soils
B. Soil classifications D. None of the above

Soil Test & Identification
263. The competent person will classify the _____ according to the definitions in Appendix A of the OSHA standard based on at least one visual and one manual analysis.
A. Shields C. Cohesion tests
B. Soil type D. None of the above

264. Soil classification tests should be run on freshly excavated samples from the excavation and are designed to determine soil stability based on a number of criteria.
A. True B. False

265. Clay, silt, and sand are _____. Clay particles are the smallest, silt particles are intermediate, and sand particles are the largest.
A. Very cohesive C. Size classifications
B. Corrosive D. None of the above

266. The degree of _____ and plasticity of a soil depend on the amounts of clay, silt, sand, and water present.
A. Compatibility C. Durability
B. Cohesiveness D. None of the above

267. The soil in an excavation is subject to change several times within the scope of a project and the _____ will vary with weather and job conditions.
A. Shields C. Moisture content
B. Shoring D. None of the above

268. According to the text, the competent person must also determine the level of protection based on what conditions exist at the time of the test, and _____.
A. Available equipment C. Allow for changing conditions
B. Tabulated data D. None of the above

Shielding
269. Shielding does not prevent cave-ins. Instead, it protects the workers in the event of a cave-in.
A. True B. False

270. When placed in an excavation, shields have sufficient structural strength to support the _____, thereby protecting the employees in the trench.
A. Nearby structures C. Force of a cave-in should one occur
B. Construction vehicles D. None of the above

271. Most _____ have two flat, parallel metal walls which are held apart by metal cross braces which are placed at the ends of the “box.” This allows for the installation of pipe within the interior dimensions of the shield.
A. Shields C. Shoring systems
B. Reputable manufacturers D. None of the above

272. An operation where a contractor excavates just enough trench to install the shield, then sets a joint of pipe, then excavates further, then pulls the shield forward to install another joint while the first is being backfilled, is known as “_____”.
A. Shielding C. Standard practice
B. Cut and cover D. None of the above

273. Workers must exit the shield during its installation, removal, or _____.
A. Inclement weather C. During vertical movement
B. Soil testing D. None of the above

274. The excavation wall at the _____ should be sloped, shored or shielded off to prevent a cave-in from the end.
A. Side of the shield C. Open end of the shield
B. End of the job D. None of the above

(S) Means the answer can be plural or singular in nature

275. If the excavation will be deeper than the _____, attached shields of the correct specifications may be used. As an alternate, the excavation may be sloped back to the maximum allowable angle from a point 18 inches below the top of the shield.
A. Planned depth C. Designed depth
B. Shield is tall D. None of the above

Inspections
276. The excavations, adjacent areas, and protective systems shall be inspected daily by the _____.
A. Contractor C. Competent person
B. Employees D. None of the above

277. During inspections, the competent person shall look for evidence of a situation that could result in a cave-in, indications of _____, hazardous atmospheres or other hazardous conditions.
A. Failure of protective systems C. OSHA compliance
B. Poor workmanship D. None of the above

278. All _____ shall be conducted by the competent person prior to the start of work, as needed throughout the shift, and after every rainstorm or other increasing hazard.
A. Inspections C. OSHA compliance inspections
B. Writing of excavation reports D. None of the above

Water Quality Section

Three Types of Public Water Systems
279. Provides water to the same population year-round for example: homes, apartment buildings.
A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

280. Approximately 85,000 systems
A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

281. Provides water where people do not remain for long periods of time for example: gas stations, campgrounds.
A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

282. Approximately 52,000 systems serving the majority of the U.S. population
A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

283. Provides water to the same people at least six months a year, but not all year (for example: schools, factories, churches, office buildings that have their own water system)
A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

Physical Characteristics of Water

284. Physical characteristics are the elements found that are considered alkali, metals, and non-metals such as carbonates, fluoride,_____. The consumer relates it to scaling of faucets or staining.

A. pH and alkalinity
B. Sulfides or acids
C. Powdered activated carbon and chlorine
D. None of the above

285. Total Dissolved Solids (TDS) is not a primary pollutant; it is a gauge of appealing water characteristics such as hardness and an indication of an assortment of chemical contaminants that might be present, such as?

A. Turbidity
B. Colloids
C. Arsenic
D. None of the above

286. pH is the negative logarithm of the hydrogen ion concentration, [H^+], a measure of the degree to which a solution is_____ .

A. Alkalinity
B. Acidic or alkaline
C. Hydrogen ion (H^+)
D. None of the above

287. _____ is a substance that can give up a hydrogen ion (H^+); a base is a substance that can accept H^+.

A. Acid
B. Base
C. Acidic or alkaline
D. None of the above

288. The more acidic a solution the greater the hydrogen ion concentration and the lower the pH; a pH of 7.0 indicates neutrality, a pH of less than 7 indicates acidity, and a pH of more than 7 indicates _____.

A. Acid
B. Base
C. Alkalinity
D. None of the above

Alkalinity

289. Alkalinity of water is its acid-neutralizing capacity. It is the sum of all the titratable bases. The measured value may vary significantly with the end-point pH used.

A. True B. False

290. Alkalinity is a measure of _____and can be interpreted in terms of specific substances only when the chemical composition of the sample is known.

A. Hydrogen ion (H^+)
B. Alkaline earth metal
C. An aggregate property of water
D. None of the above

291. Alkalinity is substantial in many uses and treatments of natural waters and wastewaters. Because the alkalinity of many surface waters is primarily a function of carbonate, bicarbonate, and hydroxide content, it is taken as an indication of the concentration of these constituents. The measured values also may include contributions from borates, phosphates, silicates or other bases if these are present.

A. True B. False

Turbidity Introduction

292. One physical feature of water is turbidity. A measure of the cloudiness of water caused by_____. The cloudy appearance of water caused by the presence of tiny particles.

A. Suspended particles
B. Variations
C. Temperature fluctuation
D. None of the above

293. High levels of turbidity may inhibit with proper water treatment and monitoring. If high quality raw water is low in turbidity, there will be a reduction in water treatment costs. Turbidity is unwanted because it causes health hazards.
A. True B. False

294. The turbidity in natural surface waters is composed of a large number of sizes of particles. The sizes of particles can be changing constantly, depending on precipitation and _____ factors.
A. MCL C. Temperature
B. Manmade D. None of the above

295. When heavy rains transpire, runoff into streams, rivers, and reservoirs occurs, causing turbidity levels to increase. In most cases, the particle sizes are relatively large and settle relatively quickly in both the water treatment plant and the source of supply. However, in some instances, fine, colloidal material may be present in the supply, which may cause some difficulty in the coagulation process.
A. True B. False

pH Testing Section
296. When an atom loses _____and thus has more protons than electrons, the atom is a positively-charged ion or cation.
A. A proton C. An electron
B. Charge D. None of the above

297. Measurement of pH for aqueous solutions can be done with a glass electrode and a pH meter, or using indicators like strip test paper.
A. True B. False

298. In chemistry, pH is a measure of the acidity or basicity of an aqueous solution. Solutions with a pH greater than 7 are said to be acidic and solutions with a pH less than 7 are basic or alkaline.
A. True B. False

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

300. The pH scale is logarithmic and therefore pH is?
A. An universal indicator C. An excess of alkaline earth metal concentrations
B. A dimensionless quantity D. None of the above

Objections to Hard Water
Scale Formation
301. Hard water forms scale, usually_____, which causes a variety of problems. Left to dry on the surface of glassware and plumbing fixtures, including showers doors, faucets, and sink tops; hard water leaves unsightly white scale known as water spots.
A. Magnesium carbonate C. Calcite
B. Calcium carbonate D. None of the above

Secondary Standard

302. TDS is most often measured in parts per million (ppm) or milligrams per liter of water (mg/L). The normal TDS level ranges from _____

A. 50 ppm to 1,000 ppm C. 50 ppm to 100 ppm
B. 5 ppm to 10 ppm D. None of the above

303. The Environmental Protection Agency (EPA), which is responsible for drinking water regulations in the United States, has identified TDS as a secondary standard, meaning that it is a voluntary guideline. While the United States set legal standards for many harmful substances, TDS, along with other contaminants that cause aesthetic, cosmetic, and technical effects, has only a guideline.

A. True B. False

What are Disinfection Byproducts (DBPs)?

304. Which of the following form when disinfectants used to treat drinking water react with naturally occurring materials in the water?

A. Chloramines C. Disinfection byproducts (DBPs)
B. Humic and fulvic acids D. None of the above

305. Total trihalomethanes and haloacetic acids are widely occurring _____ formed during disinfection with chlorine and chloramine.

A. Gases C. Classes of DBPs
B. Substances D. None of the above

Bacteriological Monitoring Section

Contaminants that may be present in sources of drinking water include:

306. Which of the following like salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming?

A. Radioactive contaminants C. Inorganic contaminants
B. Pesticides and herbicides D. Microbial contaminants

307. Which of the following may come from a variety of sources such as agriculture, urban stormwater run-off, and residential uses?

A. Radioactive contaminants C. Inorganic contaminants
B. Pesticides and herbicides D. Microbial contaminants

308. Which of the following, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife?

A. Microbial contaminants C. Inorganic contaminants
B. Pesticides and herbicides D. All of the above

309. Which of the following can be synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can come from gas stations, urban stormwater run-off, and septic systems?

A. Organic chemical contaminants C. Inorganic contaminants
B. Pesticides and herbicides D. Microbial contaminants

310. Which of the following can be naturally occurring or be the result of oil and gas production and mining activities?

A. Radioactive contaminants C. Inorganic contaminants
B. Pesticides and herbicides D. Microbial contaminants

Background

311. Coliform bacteria and chlorine residual are the only routine sampling and monitoring requirements for small ground water systems with chlorination. The coliform bacteriological sampling is governed by the Coliform Reduction amendment of the SDWA.

A. True B. False

TCR

312. The TCR recommends most of the Public Water Systems (PWS) to monitor their distribution system for bacteria according to the written sample sitting plan for that system.

A. True B. False

313. The sample sitting plan identifies sampling frequency and locations throughout the distribution system that are selected to be representative of conditions in the entire system.

A. True B. False

Basic Types of Water Samples

314. It is important to properly identify the type of sample you are collecting.

A. True B. False

The three (3) primary types of samples are:

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

A. Repeat C. Routine
B. Special D. None of the above

316. A PWS fails to take every required repeat sample after any single TC+ sample

A. Trigger: Level 1 Assessment C. All of the above
B. Trigger: Level 2 Assessment D. None of the above

317. A PWS incurs an E. coli MCL violation.

A. Trigger: Level 1 Assessment C. All of the above
B. Trigger: Level 2 Assessment D. None of the above

318. A PWS collecting at least 40 samples per month has greater than 5.0 percent of the routine/repeat samples in the same month that are TC+.

A. Trigger: Level 1 Assessment C. All of the above
B. Trigger: Level 2 Assessment D. None of the above

319. A PWS has a second Level 1 Assessment within a rolling 12-month period.

A. Trigger: Level 1 Assessment C. All of the above
B. Trigger: Level 2 Assessment D. None of the above

320. A PWS on state-approved annual monitoring has a Level 1 Assessment trigger in 2 consecutive years.

A. Trigger: Level 1 Assessment C. All of the above
B. Trigger: Level 2 Assessment D. None of the above

321. A PWS collecting fewer than 40 samples per month has 2 or more TC+ routine/ repeat samples in the same month.

A. Trigger: Level 1 Assessment C. All of the above
B. Trigger: Level 2 Assessment D. None of the above

Revised Total Coliform Rule (RTCR) Summary

322. EPA published the Revised Total Coliform Rule (RTCR) in the Federal Register (FR) on February 13, 2013 (78 FR 10269). It is the revision to the 1989 Total Coliform Rule (TCR).
A. True B. False

323. The RTCR upholds the purpose of the 1989 TCR to protect public health by ensuring the duplicity of the drinking water distribution system and monitoring for the absence of microbial contamination.
A. True B. False

324. The RTCR establishes criteria for systems to qualify for and stay on for special increased monitoring, which could reduce water system problems for better system operation.
A. True B. False

325. The water provider shall develop and follow a sample-siting plan that designates the PWS's collection schedule. This includes location of_____.
A. Routine and repeat water samples C. Microbial contamination
B. Reduced monitoring D. Repeat water samples

326. The water provider shall collect _____on a regular basis (monthly, quarterly, annually). Have samples tested for the presence of total coliforms by a state certified laboratory.
A. Routine water samples C. Microbial contamination
B. Reduced monitoring D. Repeat water samples

327. PN is required for violations incurred. Within required timeframes, the PWS must use the required health effects language and notify the public if they did not comply with certain requirements of the RTCR. The type of _____ depends on the severity of the violation.
A. CCR(s) C. MCL violation
B. PN D. TC+ routine or repeat sample

328. The RTCR requires public water systems that are vulnerable to microbial contamination to identify and fix problems.
A. True B. False

329. The water provider shall collect repeat samples (at least 3) for each TC+ positive routine sample.
A. True B. False

330. For PWSs on quarterly or annual routine sampling, collect additional routine samples (at least 3) in the month after a _____ .
A. CCR(s) C. Total coliform positive samples
B. PN D. TC+ routine or repeat sample

331. PWSs incur violations if they do not comply with the requirements of the RTCR. The violation types are essentially the same as under the TCR with few changes. The biggest change is no acute or monthly MCL violation for _____only.
A. CCR(s) C. Total coliform positive samples
B. PN D. TC+ routine or repeat sample

332. Community water systems (CWSs) must use specific language in their CCRs when they must conduct an assessment or if they incur_____.
A. CCR(s) C. An E. coli MCL violation
B. PN D. TC+ routine or repeat sample

333. The water provider shall analyze all _____ that are total coliform positive (TC+) for E. coli.
A. Routine or repeat water samples C. Microbial contamination
B. Reduced monitoring D. Repeat water samples

334. The RTCR requires public water systems (PWSs) to meet a legal limit for E. coli, as demonstrated by required monitoring.
A. True B. False

335. The RTCR suggests the frequency and timing of required microbial testing based on, public water type and source water type.
A. True B. False

Disinfection Key
336. The RTCR requires 99.99% or 4 log inactivation of _____ .
A. Enteric viruses C. Giardia lamblia cysts
B. Crypto D. None of the above

337. The RTCR requires 99% or 2 log inactivation of _____ .
A. Enteric viruses C. Giardia lamblia cysts
B. Crypto D. None of the above

338. The RTCR requires 99.9% or 3 log inactivation of _____.
A. Enteric viruses C. Giardia lamblia cysts
B. Crypto D. None of the above

339. The RTCR requires the chlorine residual leaving the plant must be = or _____ mg/L and measurable throughout the system.
A. > 0.2 C. 0.2
B. 2.0 D. None of the above

Advanced Water Treatment Section

340. Water contains _____ of which impart a quality known as hardness.
A. TDS C. Various amounts of dissolved minerals
B. Conductivity D. None of the above

341. The precipitation process is generally known as the?
A. Softening C. Lime process or lime soda process
B. Chemical pretreating D. None of the above

342. Which of the following can be accomplished using membrane technology, electrodialysis, distillation, and freezing. Of these, the membrane methods seem to have the greatest use potential.
A. Alkalinity C. Softening
B. Precipitation D. None of the above

Occurrence of Hard Water

343. Which of the following is caused by soluble, divalent, metallic cations, (positive ions having valence of 2)?

A. Hard water
C. Carbonate hardness
B. Permanent hardness
D. None of the above

344. Water hardness varies considerably and is due to different geologic formations, and is also a function of the contact time between water and?

A. Low pH
C. Limestone deposits
B. Carbonate-noncarbonate
D. None of the above

Types of Hardness

345. Hardness can be categorized by either of two methods: calcium versus magnesium hardness and?

A. Carbonate hardness
C. Carbonate versus non-carbonate hardness
B. Temporary hardness
D. None of the above

Carbonate-Noncarbonate Distinction

346. According to the text, the carbonate-noncarbonate distinction, is based on hardness from either the bicarbonate salts of calcium or the _____involved in causing water hardness.

A. $CaCO_3$
C. Normal salts of calcium and magnesium
B. Water hardness
D. None of the above

Nanofiltration (NF) Section

347. Nanofiltration is a relatively recent membrane filtration process used most often with low total dissolved solids water with the purpose of softening (polyvalent cation removal) and removal of _____such as natural organic matter and synthetic organic matter.

A. Process liquid
C. Disinfection by-product precursors
B. Chloride and sodium
D. None of the above

348. Nanofiltration is also becoming more widely used in food processing applications and for _____and partial (monovalent ion) demineralization.

A. Process liquid
C. Natural organic matter and synthetic organic matter
B. Simultaneous concentration
D. None of the above

349. Nanofiltration membranes have pore sizes from 1-10 nanometers, smaller than that used in microfiltration and?

A. Reverse osmosis or RO
C. Ultrafiltration
B. Microfiltration or MF
D. None of the above

350. Which of the following terms are controlled by pH, temperature and time during development with pore densities ranging from 1 to 106 pores per cm^2?

A. Gentle molecular separation
C. Pore dimensions
B. Tracking
D. None of the above

351. Membranes made from polyethylene terephthalate are referred to as_____ , named after the way the pores on the membranes are made.
A. Track-etch membrane(s) C. Alumina membranes
B. Membrane-etch D. None of the above

Disinfection Section

Chlorine's Appearance and Odor

352. Chlorine is a greenish-yellow gas it will condense to an amber liquid at approximately _____F or at high pressures.
A. -29.2 degrees C. 29 degrees
B. – 100 degrees D. None of the above

353. Prolonged exposures to chlorine gas may result in?
A. Moisture, steam, and water C. Olfactory fatigue
B. Odor thresholds D. None of the above

Chlorine Gas

Pathophysiology

354. As far as chlorine safety and respiratory protection, the intermediate _____of chlorine accounts for its effect on the upper airway and the lower respiratory tract.
A. Effects of Hydrochloric acid C. Water solubility
B. Vapor from Chlorine gas D. None of the above

355. Respiratory exposure to _____ may be prolonged because its moderate water solubility may not cause upper airway symptoms for several minutes.
A. Hydrochloric acid C. Plasma exudation
B. Chlorine gas D. None of the above

356. The odor threshold for chlorine gas is approximately?
A. 0.3-0.5 parts per million (ppm) C. 3-5 parts per million (ppm)
B. 3 parts per million (ppm) D. None of the above

Mechanism of Activity

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

Early Response to Chlorine Gas

358. If you mix ammonia with chlorine gas, this compound reacts to form_____.
A. Chloramine gas C. Sulfuric gas
B. Chlorine gas D. None of the above

Reactivity

359. Cylinders of chlorine may burst when exposed to elevated temperatures. When there is Chlorine in solution, this forms?
A. Hydrogen sulfide C. A corrosive material
B. Oxomonosilane D. None of the above

360. What is formed when chlorine comes in contact with combustible substances (such as gasoline and petroleum products, hydrocarbons, turpentine, alcohols, acetylene, hydrogen, ammonia, and sulfur), reducing agents, and finely divided metals?
A. Fires and explosions C. Moisture, steam, and water
B. Odor thresholds D. None of the above

361. Contact between chlorine and arsenic, bismuth, boron, calcium, activated carbon, carbon disulfide, glycerol, hydrazine, iodine, methane, oxomonosilane, potassium, propylene, and silicon should be avoided.
A. True B. False

362. Chlorine reacts with hydrogen sulfide and water to form this substance?
A. Hydrogen sulfide C. Chlorinates
B. Hydrochloric acid D. None of the above

363. According to the text, chlorine is also incompatible with?
A. Plastic C. Moisture, steam, and water
B. Palladium D. None of the above

Flammability
364. When there is a fire that involves Chlorine, the firefight should be fought downwind from the minimum distance possible.
A. True B. False

365. Keep unnecessary people away; isolate the hazard area and deny entry. For a massive fire in a cargo area, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from the area and let the fire burn. Emergency personnel should stay out of low areas and Ventilate closed spaces before entering.
A. True B. False

366. The effectiveness of chlorination depends on the _____ of the water, the concentration of the chlorine solution added, the time that chlorine is in contact with the organism, and water quality.
A. Chlorine residual C. Oxygen
B. Chlorine demand D. None of the above

367. Chlorine may not be available for disinfection because _____ in the water (like iron, manganese, hydrogen sulfide, and ammonia).
A. pH increases C. Required contact time
B. Part of it combines with other chemicals D. None of the above

368. The amount of chlorine required to achieve disinfection and that reacts with the other chemicals is the?
A. Chlorine residual C. Free chlorine residual
B. Chlorine demand D. None of the above

369. Which term is used when disinfection decreases, as the concentration of the chlorine increases?
A. pH increases C. Required contact time
B. Chlorine level and water quality D. None of the above

370. Chlorination is more effective as?
A. Water temperature increases C. Water cools down
B. Chlorine demand D. None of the above

371. Chlorination becomes more alkaline and is less effective as the?
A. Water's pH increases C. Required contact time is maximized
B. Water quality increases D. None of the above

372. Chlorination is less effective in?
A. Clear water C. Day time
B. Cloudy (turbid) water D. None of the above

373. By adding a little more chlorine to what is already sufficient, this action will generally result in _____that can be measured easily.
A. pH increases C. Required contact time
B. A free chlorine residual D. None of the above

Chlorination Chemistry
374. The hypochlorite ion is a much weaker disinfecting agent than Hypochlorous acid, about 100 times less effective.
A. True B. False

375. According to the text, pH and temperature affect the ratio of hypochlorous acid to hypochlorite ions. As the temperature is decreased, the _____increases.
A. Reduction Ratio C. "CT" disinfection concept
B. Ratio of hypochlorous acid D. None of the above

376. Under normal water conditions, hypochlorous acid will also chemically react and break down into the hypochlorite ion.
A. True B. False

377. Although the ratio of _____ is greater at lower temperatures, pathogenic organisms are actually harder to kill.
A. Hypochlorous acid C. Total chlorine
B. The amount of chlorine D. None of the above

378. If all other things were equal, _____ and a lower pH are more conducive to chlorine disinfection.
A. Lower pH C. Higher water temperatures
B. Hypochlorous acid D. None of the above

379. All three forms of chlorine produce Sodium hypochlorite when added to water.
A. True B. False

380. Hypochlorous acid is a strong acid but a weak disinfecting agent. The amount of hypochlorous acid depends on the pH and temperature of the water.
A. True B. False

Chlorine DDBP

381. These term means that chlorine is present as Cl, HOCl, and OCl^- is called _____, and that which is bound but still effective is _____.

A. Free available chlorine and Total
B. Free and Residual
C. Free available chlorine and Combined Chlorine
D. None of the above

382. Chloramines are formed by reactions with?

A. Acid and Cl_2 C. Folic Acid and Cl2
B. Ammonia and Cl_2 D. None of the above

Types of Residual

383. Which of the following is all chlorine that is available for disinfection?

A. Chlorine residual C. Total chlorine
B. Chlorine demand D. None of the above

Chlorine Exposure Limits

384. What is OSHA's PEL?

A. 10 PPM C. 1,000 PPM
B. 1 PPM D. None of the above

385. Chlorine's Physical and chemical properties: A yellowish green, nonflammable and liquefied gas with an unpleasant and irritating smell.

A. True B. False

386. Liquid chlorine is about _____ times heavier than water

A. 1.5 C. 2.5
B. 10 D. None of the above

387. Gaseous chlorine is about _____ times heavier than air.

A. 1.5 C. 2.5
B. 10 D. None of the above

Alternate Disinfectants - Chloramine

388. It is recommended that Chloramine be used in conjunction with a stronger disinfectant. It is best utilized as a?

A. Chloramine C. Stable distribution system disinfectant
B. T10 value disinfectant D. None of the above

389. In the production of _____, the ammonia residuals in the finished water, when fed in excess of stoichiometric amount needed, should be limited to inhibit growth of nitrifying bacteria.

A. Dry sodium chlorite C. Ammonia residual(s)
B. Chloramines D. None of the above

Chlorine Dioxide

390. Which term provides good Giardia and virus protection but its use is limited by the restriction on the maximum residual of 0.5 mg/L ClO_2/chlorite/chlorate allowed in finished water?

A. Chlorinated byproducts C. Ammonia residual(s)
B. Chlorine dioxide D. None of the above

391. If chlorine dioxide is being used as an oxidant, the preferred method of generation is to entrain or _____ into a packed reaction chamber with a 25% aqueous solution of sodium chlorite ($NaClO_2$).
A. Chloramine C. Chlorine dioxide
B. Chlorine gas D. None of the above

392. Which chemical is explosive and can cause fires in feed equipment if leaking solutions or spills are allowed to dry out?
A. Dry sodium chlorite C. Ammonia
B. Chlorine dioxide D. None of the above

393. Chlorine dioxide may be used for either taste or odor control or as a?
A. Chloramine D. Gas
B. Pre-disinfectant D. None of the above

394. Total residual oxidants (including chlorine dioxide and chlorite, but excluding Chlorine dioxide) shall not exceed 0.50 mg/L during normal operation or 0.30 mg/L (including chlorine dioxide, chlorite and chlorate) during periods of extreme variations in the raw water supply.
A. True B. False

Ozone

395. Ozone is a very effective disinfectant for both Giardia and viruses
A. True B. False

396. When determining Ozone CT (contact time) values must be determined for the ozone basin alone; an accurate _____ must be obtained for the contact chamber, and residual levels.
A. Residual C. Contact time
B. T10 value D. None of the above

397. Ozone does not provide a system residual and should be used as a primary disinfectant only in conjunction with?
A. Dry sodium chlorite C. Free and/or combined chlorine
B. Chlorine dioxide D. None of the above

398. Ozone does not produce chlorinated byproducts (such as trihalomethanes) but it may cause an increase in such byproduct formation if it is fed ahead of free chlorine; ozone may also produce its own oxygenated byproducts such as $Cl_2 + NH_4$.
A. True B. False

399. Ozonation must include adequate ozone leak detection alarm systems, and an ozone off-gas destruction system.
A. True B. False

400. UV is used to remove traces of ozone and chloramines from the finished water
A. True B. False

When Finished with Your Assignment

REQUIRED DOCUMENTS
Please scan the **Registration Page, Answer Key, Survey and Driver's License** and email these documents to info@TLCH2O.com.

IPhone Scanning Instructions
If you are unable to scan, take a photo of these documents with your **iPhone** and send these photos to TLC, info@TLCH2O.com.

FAX
If you are unable to scan and email, please fax these to TLC, if you fax, call to confirm that we received your paperwork. **(928) 468-0675**