Registration form

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Water Distribution ___ Water Treatment ___ Other _____

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You can obtain a printed version of the course manual from TLC for an additional $169.95 plus shipping charges.

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

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

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

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.
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Notation of any problem or concerns:

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Signature of Proctor

Distribution 202 Answer Key

Name_____

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You can electronically complete this assignment in Adobe Acrobat DC.

Please Circle, Bold, Underline or X, one answer per question. A **felt tipped pen** works best.

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

Signature

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

When Finished with Your Assignment

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

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

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This course contains general EPA's SDWA federal rule requirements. Please be aware that each state implements water / sampling procedures/ safety / environmental / SDWA regulations that may be more stringent than EPA's regulations. Check with your state environmental/health agency for more information. These rules change frequently and are often difficult to interpret and follow. Be careful to be in compliance with your regulatory agencies and do not follow this course for any compliance concerns.

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

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Distribution 202 CEU Training Course Assignment

The Distribution 202 CEU course assignment is available in Word on the Internet for your convenience, please visit www.ABCTLC.com and download the assignment and e-mail it back to TLC.

You will have 90 days from receipt of this manual to complete it in order to receive your Professional Development Hours (PDHs) or Continuing Education Unit (CEU). A score of 70 % or better is necessary to pass this course. If you should need any assistance, please email or fax all concerns and the completed ANSWER KEY to info@tlch2o.com.

Select one answer per question. 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

Water Distribution Section
System Elements
1. 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

2. 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

Butterfly Valve
3. 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

Gate Valves
4. 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

Ball Valves
5. 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
6. 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

Water Pressure

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

8. 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

9. 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

10. 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

Groundwater Treatment/Production System Section
Groundwater and Wells

11. 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

12. 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

13. 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

14. The area above the water table lies the?
A. Unsaturated zone C. Saturated zone
B. Karst D. None of the above

15. The water in the saturated zone is called?
A. Unconfined aquifer(s) C. Water table
B. Groundwater D. None of the above

16. 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

17. 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

18. 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

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

20. A well inside an aquifer is an artesian well.
A. True B. False

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

22. 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?
23. Areas where ground water exists in sufficient quantities to supply wells or springs are called aquifers, this term that literally means?
A. Water table C. Cone of depression
B. Water bearer D. None of the above

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

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

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

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

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

29. 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 C Water soluble limestone
B. Saturated zone D. None of the above

Groundwater Quality

30. 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

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

Water Use or Demand

32. 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

33. The combination of storage reservoirs and distribution lines must be capable of meeting consumers' needs for pressure at all times.
A. True B. False

34. The quantity of water used in any community varies from 100 to 200 gallons per person per day.
A. True B. False

35. 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

36. 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

37. The maximum daily use is approximately 3 to 5 times the average daily use.
A. True B. False

38. 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

Permeability of the Aquifer (K)

39. 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?

40. 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

41. 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?

42. 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

43. 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

44. 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

45. 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

How Wells Are Drilled

46. Drilling fluids are often used during drilling in order to keep the drill bit sharp while drilling is done.

A. True B. False

Basic Rotary Drilling Methods

47. Rotary drilling uses two methods that include: direct and reverse mud rotary, direct air rotary, and?

A. Advanced methods C. Drill through casing driver methods
B. Typical drilling fluid(s) D. None of the above

The Rotary Drill String

48. 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

49. 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

50. 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

Direct Mud Rotary Method

51. 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

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

Drill through Casing Driver Method

53. The drill through casing driver method drives casing into the borehole as the telescoping kelly advances.
A. True B. False

54. According to the text as the borehole is drilled, the cuttings are then collected near?
A. A hammer or roller bit C. The rig
B. The drill string D. None of the above

Auger Boring Methods

55. 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

56. 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

Selecting an Appropriate Well Site

57. Which of the following should be at a lower elevation than the well, and the distances to those contamination sources must be in accordance with the State or Local Water Well Construction Codes?
A. Surface drainage(s) C. All possible sources of contamination
B. Preliminary aquifer parameters D. None of the above

Common Well Construction Specifications

58. Which of the following should always be located and constructed in such a manner that they yield safe water at all times and under all conditions?
A. Water wells C. A pumping test
B. The aquifer D. None of the above

Choice of Casing

59. According to the text, stainless steel casing and screen may be required for one situation, while PVC or low carbon steel may be acceptable in another.
A. True B. False

60. As with casing, the choice of well screen is as important as its placement, the size of the openings in the casing are dependent on the grain size of the filter or?
A. The anticipated flow rate C. Gravel pack
B. The well D. None of the above

Selecting an Optimum Pumping Rate

61. Specific capacities for each of the pumping steps are compared. The highest Sc observed is normally associated with?
A. The anticipated flow rate C. The optimum pumping rate
B. The well D. None of the above

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

Water Storage Introduction

62. 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

63. 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

64. 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

65. 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

66. 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

Steel Reservoirs

67. Steel reservoirs or tanks generally have higher construction and installation costs than concrete, and require less maintenance.

A. True B. False

68. Steel tanks should be inspected once a year and repainted every 5-7 years.

A. True B. False

Water Quality Section

Three Types of Public Water Systems

69. 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

70. Provides water to the same population year-round for example: homes, apartment buildings.

A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

71. Approximately 52,000 systems serving the majority of the U.S. population

A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

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

72. 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

73. Approximately 18,000 water systems
A. TNCWS C. NTNCWSs
B. CWSs D. None of the above

Water Quality Section
Surface (Raw) Water Introduction
74. Water passes runoffs and infiltrates the ground during precipitation; this runoff acquires a wide variety of _____that intensely alters its usefulness.
A. Excess nutrients C. Dissolved or suspended impurities
B. Biological actions D. None of the above

75. _____ enhancement and formation of policy measures (administrative and engineering) revolves around most effective types of treatment methods and/or chemicals.
A. Universal solvent C. Surface water
B. Water quality D. None of the above

Managing Water Quality at the Source
76. Contingent upon the region, source water may have several restrictions of use as part of a Water Shed Management Plan. In some areas, it may be restricted from recreational use, discharge or runoff from agriculture, or_____ .
A. Excess nutrients C. Industrial and wastewater discharge
B. Biological actions D. None of the above

77. Another characteristic of quality control is aquatic plants. The ecological equilibrium in lakes and reservoirs plays a natural part in purifying and sustaining the life of the lake. Certain vegetation removes the excess nutrients that would promote the growth of algae. Too much algae will imbalance the lake and kill fish.
A. True B. False

Physical Characteristics of Water
78. 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 C. Powdered activated carbon and chlorine
B. Sulfides or acids D. None of the above

79. 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 C. Arsenic
B. Colloids D. None of the above

80. pH is the negative logarithm of the hydrogen ion concentration, $[H^+]$, a measure of the degree to which a solution is_____ .
A. Alkalinity C. Hydrogen ion (H^+)
B. Acidic or alkaline D. None of the above

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

Alkalinity

81. 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

82. 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

Turbidity Introduction

83. 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

Turbidity MCL

84. An MCL for turbidity established by the EPA because _____interferes with disinfection. This characteristic of water changes the most rapidly after a heavy rainfall.

A. Conductivity
B. Turbidity
C. Temperature
D. None of the above

85. The temperature variation of a sample, a scratched or unclean sample tube in the nephelometer and selecting an incorrect wavelength of a light path may be conditions caused by an inaccurate _____ measurement.

A. Conductivity
B. Turbidity
C. Temperature
D. None of the above

Dissolved Oxygen

86. The level of dissolved oxygen in natural waters is often a direct indication of quality, since aquatic plants produce oxygen, while microorganisms generally consume it as they feed on _____.

A. Pollutants
B. Organic matter
C. E. coli bacteria
D. None of the above

87. At low temperatures, the _____is increased, so that in winter, concentrations as high as 20 ppm may be found in natural waters; during summer, saturation levels can be as low as 4 or 5 ppm.

A. Dissolved oxygen
B. Thermal stratification
C. Solubility of oxygen
D. None of the above

88. _____ is essential for the support of fish and other aquatic life and aids in the natural decomposition of organic matter.

A. Dissolved oxygen
B. Thermal stratification
C. Solubility of oxygen
D. None of the above

pH Testing Section

89. When an atom loses _____and thus has more protons than electrons, the atom is a positively-charged ion or cation.

A. A proton
B. Charge
C. An electron
D. None of the above

90. 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

91. 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

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

93. _____ are determined using a concentration cell with transference, by measuring the potential difference between a hydrogen electrode and a standard electrode such as the silver chloride electrode.
A. Primary pH standard values C. pH measurement(s)
B. Alkalinity D. None of the above

94. Mathematically, pH is the negative logarithm of the activity of the (solvated) hydronium ion, more often expressed as the measure of the?
A. Electron concentration C. Hydronium ion concentration
B. Alkalinity concentration D. None of the above

95. Which of the following terms for aqueous solutions can be done with a glass electrode and a pH meter, or using indicators?
A. Primary sampling C. Determining values
B. Measurement of pH D. None of the above

96. Alkalinity is the name given to the quantitative capacity of an aqueous solution to neutralize an?
A. Acid C. Bond formation
B. Base D. None of the above

97. The pH scale is traceable to a set of standard solutions whose pH is established by US EPA.
A. True B. False

98. 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?
A. End-point pH C. pH measurement(s)
B. Alkalinity D. None of the above

99. For strong acids and bases no calculations are necessary except in extreme situations. The pH of a solution containing a weak acid requires the solution of a quadratic equation. The pH of a solution containing a weak base may require the?
A. Solution of a cubic equation C. Excess of alkaline earth metal concentrations
B. Non-linear simultaneous equations D. None of the above

100. Alkalinity is a measure of this missing term and can be interpreted in terms of specific substances only when the chemical composition of the sample is known.
A. Universal indicator C. Excess of alkaline earth metal concentrations
B. An aggregate property of water D. None of the above

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

101. Since pH is a logarithmic scale, a difference of one pH unit is equivalent to _____difference in hydrogen ion concentration
A. 1 C. 10
B. .1 D. None of the above

102. Which of the following terms measurements is used in the interpretation and control of water and wastewater treatment processes?
A. Acid C. Hydrogen bond formation
B. Alkalinity D. None of the above

Objections to Hard Water
Scale Formation
103. 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
104. 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

Langelier Saturation Index
105. The Langelier Saturation index (LSI) is an evenness scale derived from the theoretical concept of saturation and provides an indicator of the degree of saturation of water with respect to calcium carbonate. It can be shown that the Langelier saturation index (LSI) approximates the base 10 logarithm of the _____saturation level.
A. Magnesium carbonate C. Calcite
B. Calcium carbonate D. None of the above

More on the Stage 2 DBP Rule
106. Which of the following rules focuses on public health protection by limiting exposure to DBPs, specifically total trihalomethanes and five haloacetic acids, which can form in water through disinfectants used to control microbial pathogens?
A. Stage 2 DBP rule C. Long Term 2 Enhanced Surface Water Treatment Rule
B. Stage 1 DBPR D. None of the above

107. Safe Drinking Water Act (SDWA) has been highly effective in protecting public health and has evolved to respond to new and emerging threats to safe drinking water.
A. True B. False

Are THMs and HAAs the only disinfection byproducts?
108. The presence of TTHM and HAA5 is representative of the occurrence of many other chlorination DBPs; thus, an increase of TTHM and HAA5 generally indicates an increase of DBPs from chlorination.
A. True B. False

All disinfectants form DBPs in one of two reactions:
109. Chorine and chlorine-based compounds (halogens) react with organics in water causing the hydrogen atom to substitute other atoms, resulting in halogenated by-products.
A. True B. False

110. Secondary by-products are formed when multiple disinfectants are used.
A. True B. False

111. The EPA Surface Water Treatment Rule (SWTR) requires systems using public water supplies from either surface water or groundwater under the direct influence of surface water to disinfect.
A. True B. False

Public Health Concerns
112. Results from toxicology studies have shown several DBPs (e.g., bromodichloromethane, bromoform, chloroform, dichloroacetic acid, and bromate) to be inert to laboratory animals.
A. True B. False

Disinfection Byproduct Research and Regulations Summary
113. _____is unquestionably the most important step in the treatment of water for drinking water supplies.
A. DBP(s) C. Disinfection
B. Turbidity (particle) D. None of the above

Controlling Disinfection Byproducts
114. Treatment techniques are available that provide water suppliers the opportunity to maximize potable water safety and quality while minimizing the risk of _____.
A. DBP risks C. Disinfectants and DBPs
B. Turbidity (particle) D. None of the above

Absorption
115. Activated carbon can be used to absorb _____ that react with disinfectants to form byproducts.
A. Inorganic coagulants C. Soluble organics
B. Most contaminants D. None of the above

Membrane Technology
116. Membranes, used historically to desalinate brackish waters, have also demonstrated excellent removal of _____.
A. THMs and HAAs C. Natural organic matter
B. Optimization of pH D. None of the above

Bacteriological Monitoring Section

Organisms Descriptors and Meanings
117. Organo means...
A. Rock C. Light
B. Organic D. None of the above

118. Auto means...
A. Without air C. Self (Inorganic carbon)
B. With air D. None of the above

119. Aerobic means...
A. Without air C. Self (Inorganic carbon)
B. With air D. None of the above

120. Chemo means...
A. Rock C. Chemical
B. Organic D. None of the above

121. Hetero means...
A. Feed or nourish C. Light
B. Other (Organic carbon) D. None of the above

122. Anaerobic means...
A. Without air C. Self (Inorganic carbon)
B. With air D. None of the above

Contaminants that may be present in sources of drinking water include:
123. 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

124. 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

125. 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

TCR
126. 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

127. 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

128. Coliform contamination may occur anywhere in the system, possibly due to problems such as; high pressure conditions, line fluctuations, or wells, and therefore routine monitoring is required.
A. True B. False

Routine Sampling Requirements
129. Total coliform samples must be collected by PWSs at sites which are representative of water quality throughout the distribution system according to a written sample siting plan subject to state review and revision.
A. True B. False

130. For PWSs collecting more than one sample per month, collect total coliform samples at regular intervals throughout the month, except that ground water systems serving 4,900 or fewer people may collect all required samples on a single day if the samples are taken from different sites.
A. True B. False

131. Each total coliform-positive (TC+) routine sample must be tested for the presence of heterotrophic bacteria.
A. True B. False

132. If any TC+ sample is also E. coli-positive (EC+), then the EC+ sample result must be reported to the state by the end of the month that the PWS is notified.
A. True B. False

133. If any routine sample is TC+, repeat samples are required. – PWSs on quarterly or annual monitoring must take a minimum of one additional routine samples (known as additional routine monitoring) the quarter following a TC+ routine or repeat sample.
A. True B. False

134. Reduced monitoring is general available for PWSs using only surface water and serving 1,000 or fewer persons that meet certain additional PWS criteria.
A. True B. False

Dangerous Waterborne Microbes
135. Which of the following are microscopic organisms that live in the intestines of warm-blooded animals? They also live in the waste material, or feces, excreted from the intestinal tract. When fecal coliform bacteria are present in high numbers in a water sample, it means that the water has received fecal matter from one source or another.
A. Fecal coliform bacteria C. Shigella dysenteriae
B. Cryptosporidium D. None of the above

Bacteriological Monitoring Introduction
136. Which of the following are usually harmless, occur in high densities in their natural environment and are easily cultured in relatively simple bacteriological media?
A. Indicator bacteria C. Viruses
B. Amoebas D. None of the above

137. Indicators in common use today for routine monitoring of drinking water include total coliforms, fecal coliforms, and?
A. Cryptosporidium C. Escherichia coli (E. coli)
B. Protozoa D. None of the above

Microbial Regulations
138. One of the key regulations developed and implemented by the United States Environmental Protection Agency (USEPA) to counter pathogens in drinking water is the Surface Water Treatment Rule.
A. True B. False

Basic Types of Water Samples
139. 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:
140. 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

141. 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

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

142. 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

143. 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

144. Noncommunity and nontransient noncommunity public water systems will sample at the same frequency as a like sized community public water system if:
1. It has more than 1,000 daily population and has ground water as a source, or
2. It serves 25 or more daily population and utilizes surface water as a source or ground water under the direct influence of surface water as its source.
A. True B. False

Maximum Contaminant Levels (MCLs)
145. There are two types of MCL violations for coliform bacteria. The first is for total coliform; the second is an acute risk to health violation characterized by the confirmed presence of fecal coliform or E. coli.
A. True B. False

Positive or Coliform Present Results
146. If you are notified of a positive coliform test result you need to contact either the Drinking Water Program or your local county health department within 72 hours, or by the next business day after the MCL compliance violation
A. True B. False

147. With a positive total coliform sample, after you have contacted an agency for assistance, you will be instructed as to the proper repeat sampling procedures and possible corrective measures for solving the problem. It is very important to initiate the _____as the corrective measures will be based on those results.
A. Perform routine procedures C. Corrective measures
B. Repeat sampling immediately D. None of the above

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

Heterotrophic Plate Count (Spread Plate Method)
149. Which of the following provides a technique to quantify the bacteriological activity of a sample?
A. Colonies C. Heterotrophic Plate Count
B. Agar D. None of the above

Total Coliforms
150. This MCL is based on the presence of total coliforms, and compliance is on a daily or weekly basis, depending on your water system type and state rule.
A. True B. False

151. For systems which collect fewer than _____ samples per month, no more than one sample per month may be positive. In other words, the second positive result (repeat or routine) in a month or quarter results in a MCL violation.
A. 40 C. 200
B. 100 D. None of the above

The following are acute violations:
152. Which determines a violation of nitrate?
A. Presence C. MCLG
B. MCL D. None of the above

Revised Total Coliform Rule (RTCR) Summary
153. 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

154. 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

155. 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

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

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

158. 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

159. 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

160. 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

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

162. 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

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

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

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

166. 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

Waterborne Pathogen Section - Introduction
Giardia lamblia

167. Which of the following bugs has been responsible for more community-wide outbreaks of disease in the U.S. than any other, and drug treatment are not 100% effective?
A. Giardia lamblia C. Giardiasis
B. Cryptosporidiosis D. None of the above

Waterborne Bacterial Diseases

168. Campylobacteriosis outbreaks have most often been associated with food, especially chicken and un-pasteurized milk, as well as un-chlorinated water. These organisms are also an important cause of “travelers’ diarrhea.” Medical treatment generally is not prescribed for campylobacteriosis because recovery is usually rapid.
A. True B. False

169. Cholera, Legionellosis, salmonellosis, shigellosis, yersiniosis, are other bacterial diseases that can be transmitted through water. All bacteria in water are readily killed or inactivated with chlorine or other disinfectants.
A. True B. False

170. Campylobacteriosis is the most common diarrheal illness caused by bacteria. Other symptoms include abdominal pain, malaise, fever, nausea and vomiting; and begin three to five days after exposure. The illness is frequently over within two to five days and usually lasts no more than 10 days.
A. True B. False

Chain of Custody Procedures

171. If both parties involved in the transfer must sign, date and note the time on the chain of custody record, this is known as?
A. TC Plan C. Samples transfer possession
B. Sample siting plan D. None of the above

172. The recipient will then attach the _____showing the transfer dates and times to the custody sheets. If the samples are split and sent to more than one laboratory, prepare a separate chain of custody record for each sample.
A. Shipping invoices C. Sample siting plan
B. Chain of custody release D. None of the above

Summary

173. Factors in Chlorine Disinfection: Concentration and Contact Time

In an attempt to establish more structured operating criteria for water treatment disinfection, the CXT concept came into use in _____.

A. 1970 C. 1980
B. 1950 D. None of the above

174. Based on the work of several researchers, _____ values [final free chlorine concentration (mg/L) multiplied by minimum contact time (minutes)], offer water operators guidance in computing an effective combination of chlorine concentration and chlorine contact time required to achieve disinfection of water at a given temperature.

A. CT C. CXT
B. XCT D. None of the above

175. The CXT formula demonstrates that if an operator chooses to decrease the chlorine concentration, the required contact time must be lengthened.

A. True B. False

176. Similarly, as higher strength chlorine solutions are used, contact times may be increased.

A. True B. False

177. While useful, statistics derived from surveillance systems do not reflect the true incidence of waterborne disease outbreaks because many people who _____ from such diseases do not consult medical professionals.

A. Fall ill C. Are asymptomatic
B. Die D. None of the above

Understanding Cryptosporidiosis

178. Cryptosporidium in humans largely since _____ and the start of the AIDS epidemic, Cryptosporidium is able to cause potentially life-threatening disease in the growing number of immunocompromised patients.

A. 1982 C. 2001
B. 1990 D. None of the above

179. Cryptosporidium was the cause of the largest reported drinking water outbreak in U.S. history, affecting over 400,000 people in Milwaukee in April 1993. More than _____ deaths are attributed to this outbreak. Cryptosporidium remains a major threat to the U.S. water supply (Ibid.).

A. 1,000 C. 100
B. 500 D. None of the above

180. Key provisions of the Long Term _____ Enhanced Surface Water Treatment Rule include source water monitoring for Cryptosporidium; inactivation by all unfiltered systems; and additional treatment for filtered systems based on source water

A. 2 C. 1
B. A D. None of the above

Understanding Giardia lamblia

Giardia lamblia can be transmitted to humans through drinking water that might otherwise be considered pristine.

A. True B. False

Disinfection Section

Chlorine's Appearance and Odor

182. 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

183. 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

184. 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

185. 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

186. 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

187. 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

188. 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

189. What is formed when chlorine is 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

190. 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

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

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

193. 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

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

195. 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

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

197. 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
198. The hypochlorite ion is a much weaker disinfecting agent than Hypochlorous acid, about 100 times less effective.
A. True B. False

199. 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

200. 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

Types of Residual
201. 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
202. What is OSHA's PEL?
A. 10 PPM C. 1,000 PPM
B. 1 PPM D. None of the above

203. Gaseous chlorine is about _____ times heavier than air.
A. 1.5 C. 2.5
B. 10 D. None of the above

Alternate Disinfectants - Chloramine

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

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

Chlorine Dioxide

205. 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
B. Chlorine dioxide
C. Ammonia residual(s)
D. None of the above

Ozone

206. 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
B. T10 value
C. Contact time
D. None of the above

Pump and Motor Section

Common Hydraulic Terms

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

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

208. Which of the following definitions is pressure above zero absolute, i.e. the sum of atmospheric and gauge pressure?

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

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

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

210. 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
B. Head, Static
C. Head
D. None of the above

Pumps

211. Pumps are excellent examples of?

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

212. 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

213. 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

Basic Water Pump
214. 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

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

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

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

218. 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

219. 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

220. 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

221. 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

222. Which of the following terms 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

223. 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

224. 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

225. 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

226. 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

227. 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

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

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

230. Which of the following terms, provide both a seal at the column pipe joints and keep the shaft aligned within the column?
A. Column pipe C. Lantern ring
B. Spider bearings D. None of the above

231. Often an electric motor that is connected to the _____by a keyway and nut.
A. Drive shaft C. Sprocket
B. Rotor D. None of the above

232. Where electricity is not readily available, fuel powered engines may be connected to the drive shaft by a?
A. Gear C. Right angle drive gear
B. Drive shaft D. None of the above

233. Oil and water lubricated systems will have a strainer attached to the _____to prevent sediment from entering the pump.
A. Intake C. Inboard
B. Diaphragm D. None of the above

There are three main types of diaphragm pumps:
234. In the first type, the _____with one side in the fluid to be pumped, and the other in air or hydraulic fluid.
A. Vapor bubbles C. Diaphragm is sealed
B. Chamber pressure D. None of the above

235. The diaphragm is flexed, causing the volume of the pump chamber to increase and decrease.
A. True B. False

Safety Section

Confined Space Entry Program

Purpose

236. 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

237. 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:

238. 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

239. 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

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

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

242. A permit required confined space (permit space) contains a material that has _____.
A. Unauthorized entrants C. The potential for engulfing an entrant
B. Non-hazardous atmospheres D. None of the above

243. A permit required confined space (permit space) has an internal configuration such that _____ could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
A. An entrant C. An internal configuration
B. Hazardous atmosphere D. None of the above

244. A permit required confined space (permit space) contains any other recognized serious safety or _____.
A. Engulfing an entrant C. Health hazard
B. Hazardous atmospheres D. None of the above

245. Each _____ must be marked "Confined Space - Entry Permit Required".
A. Permit-Required Confined Space C. Entry or exit
B. Hazardous atmosphere D. None of the above

Confined Space Hazards

246. Fatalities and injuries constantly occur among construction workers who are required to enter _____.

A. An exterior configuration
C. Confined spaces
B. Non-hazardous atmospheres
D. None of the above

247. Workers encounter both inherent and _____ within confined workspaces.

A. An internal configuration
C. Hazardous atmosphere
B. Induced hazards
D. None of the above

Inherent Hazards

248. _____ are associated with specific types of equipment and the interactions among them. These hazards can be electrical, thermal, chemical, mechanical, etc.

A. Inherent hazards
C. Recognized serious safety or health hazards
B. Hazardous atmospheres
D. None of the above

Induced Hazards

249. _____ result from a multitude of incorrect decisions and actions that occur during the actual construction process.

A. Induced hazards
C. Build-up of explosive gases
B. Below-grade locations
D. None of the above

250. Some examples of induced hazards are: omission of protective features, physical arrangements that may cause unintentional worker contact with electrical energy sources, oxygen-deficient atmospheres created at the bottom of pits or shafts, lack of safety factors in structural strength, and _____.

A. Common confined spaces
C. Extreme temperatures
B. Flammable atmospheres
D. None of the above

Typical Examples of Confined Workspaces

251. Confined workspaces in construction contain _____.

A. Purging agents
C. Both inherent and induced hazards
B. Below-grade location
D. None of the above

Vaults

252. Workers must enter _____ found on the construction jobsite to perform a number of functions.

A. Common confined spaces
C. A variety of vaults
B. Hazards
D. None of the above

Oxygen-Deficient Atmosphere

253. The ever-present possibility of _____ is one of the major problems confronting construction workers while working in vaults.

A. A common confined space
C. An oxygen-deficient atmosphere
B. Vaults
D. None of the above

Explosive or Toxic Gases, Vapors, or Fumes

254. _____ produce toxic fumes which are confined in the limited atmosphere of a confined space.

A. Purging agents
C. Welding and soldering
B. Below-grade locations
D. None of the above

Pipe Assemblies

255. The pipe assembly is one of the _____ encountered throughout the construction site,

A. Electrical shock risks
B. Ventilation ducts
C. Most frequently unrecognized types of confined spaces
D. None of the above

256. Once inside a pipe assembly, workers are faced with _____, often caused by purging with argon or another inert gas.

A. Nitrogen purge or dry air
B. Collection places
C. Potential oxygen-deficient atmospheres
D. None of the above

Ventilation Ducts

257. Ventilation ducts create a _____ which moves heated and cooled air and exhaust fumes to desired locations in the plant.

A. Collection place
B. Complex network
C. Shortcut to other areas
D. None of the above

Tanks

258. Tanks are _____ that are used for a variety of purposes, including the storage of water and chemicals.

A. Nitrogen purge locations
B. Collection places
C. Another type of confined workspace
D. None of the above

259. 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

260. Heat in tanks may cause _____, particularly on a hot day.

A. Heat prostration
B. Equipment failure
C. Problems with pumps
D. None of the above

Permitted Confined Space Entry Program

261. Subpart P (of OSHA's Construction Regulations – refer to page 60) applies to all _____ in the earth's surface.

A. Open excavations
B. Vaults
C. Pits
D. None of the above

Permit Required Confined Space Entry General Rules

262. According to the text, only authorized and trained employees may enter a_____ or act as safety watchmen/attendants.

A. Hazard
B. Pipe
C. Confined space
D. None of the above

Excavation and Trenching Section

263. According to the text, the _____ was revised because excavating is the most dangerous of all construction operations.

A. Competent rule
B. OSHA excavation standard
C. Emergency rule
D. None of the above

264. OSHA also revised the _____ to clarify the requirements.

A. Competent rule
B. Existing standard
C. Protective equipment standard
D. None of the above

265. The performance criteria in the new standard provides employers with options when classifying soil and when selecting methods to protect the _____ from cave-ins.
A. Competent person C. Construction equipment
B. Employee D. None of the above

266. 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

267. 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

268. 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

269. 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

270. 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

271. 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

272. 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

273. 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

274. 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

275. 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

276. 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
277. 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

278. 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

279. _____ 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

280. 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

281. 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

282. 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

283. 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

284. 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

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

286. 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

287. 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

Personnel Protective Systems
288. 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
289. 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

Sloping and Benching Systems
290. 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

291. 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

Shoring Systems
292. _____ is another protective system that utilizes a framework of vertical members, horizontal members, and cross braces to support the sides of the excavation to prevent a cave-in.
A. Shoring
B. Tabulated data
C. Lateral support
D. None of the above

Shield Systems (Trench Boxes)
293. Shielding is the third method of providing a safe workplace in excavations. Unlike sloping and shoring, _____ does not prevent a cave-in.
A. Shielding
B. Tabulated data
C. Soil testing
D. None of the above

Safety Precautions for Shield Systems

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

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

Personal Protective Equipment

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

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

Excavation & Trenching Guidelines

296. 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

Hazard Controls

297. Knowing the location of underground installations is a good idea because it could make the work go faster.

A. True B. False

298. 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
B. Barricades
C. Spoil piles
D. None of the above

299. 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
B. Safe area
C. Benched area
D. None of the above

300. 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
B. Water
C. Spoil
D. None of the above

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.

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