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Distribution Basics Answer Key

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

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PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.

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Distribution Basics 1 CEU Training Course Assignment

The Distribution Basics 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.

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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. Globe valves should only the only valve used in an Arterial system for main line isolation.
A. True B. False

Butterfly Valve

2. 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

3. 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

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

Common Rotary Valves

7. 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

Water Pressure

8. 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

9. For ordinary domestic use, water pressure should be between 25 and 45 psi.

A. True B. False

10. 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

11. 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

12. 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

13. The combination of storage reservoirs and distribution lines must be capable of meeting consumers' needs for pressure at all times.

A. True B. False

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

A. True B. False

15. 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

16. 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

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

A. True B. False

18. 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

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

Groundwater Treatment/Production System Section

Groundwater and Wells

19. 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

20. The area above the water table lies the?

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

21. The water in the saturated zone is called?

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

22. 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

23. 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

24. 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

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

A. True B. False

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

A. True B. False

27. 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

28. Sandstone may become so highly cemented or recrystalized that all of the original space is filled, in this case, the rock is no longer a porous medium and is known as?

A. Unconfined aquifer(s) C. Fractured aquifer(s)
B. Porous media D. None of the above

29. Clay has many spaces between its grains, but the spaces are not large enough to permit free movement of water.

A. True B. False

30. 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

31. When well pumping begins, water begins to flow towards the well in contrast to the natural direction of groundwater movement.

A. True B. False

32. 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

33. 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

34. 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

35. 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

36. 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?

37. 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

Does Groundwater Move?

38. 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

Groundwater Quality

39. 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

How Does Groundwater Become Contaminated?

40. 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 C. Unsaturated zone
B. Saturated zone D. None of the above

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

41. 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. Synthetic organic chemical(s)
B. Groundwater
C. Permeable zones
D. None of the above

Water Well Reports and Hydrogeology

Hydrogeologic Data

42. 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 subsurface, what the properties are of the various geologic units below the surface, and how fast and in what direction ground water is moving.

A. True
B. False

Nature of the Aquifer

43. 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
B. Water table
C. Permeability area
D. None of the above

44. 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
B. Water table
C. Permeability zone
D. None of the above

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

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

Pump and Motor Section

Common Hydraulic Terms

46. 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

47. 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

48. Which of the following definitions is the force per unit area, usually expressed in pounds per square inch?

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

49. 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

50. 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

51. 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

52. 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

53. 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

54. Sea level pressure is approximately 2.31 pounds per square inch absolute, 1 bar = .433psi.
A. True B. False

General Pumping Fundamentals

55. 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

56. 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

57. Pumps are excellent examples of?
A. Hydrostatics C. Multi-stage pumps
B. Quasi-static devices D. None of the above

58. 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

59. 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

Pump Categories

60. 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

Basic Water Pump

61. 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

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

63. 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):
64. 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
65. The water production well industry almost exclusively uses Turbine pumps, which are a type of centrifugal pump.
A. True B. False

66. 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

67. 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

68. 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

69. 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

70. 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

71. 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

72. 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

73. 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

74. 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

75. 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

There are three main types of diaphragm pumps:
76. 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

77. 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

Water Quality Section

Three Types of Public Water Systems
78. 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

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

80. 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

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

Managing Water Quality at the Source
82. 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

83. 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

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

Physical Characteristics of Water

84. 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

85. 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

86. 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

87. _____ 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

88. 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

Bacteriological Monitoring Section

Organisms Descriptors and Meanings

89. Litho means...

A. Rock
B. Organic
C. Light
D. None of the above

90. Organo means...

A. Rock
B. Organic
C. Light
D. None of the above

91. Auto means...

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

92. Chemo means...

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

93. Hetero means...

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

94. Anaerobic means...

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

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

95. 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

96. 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. None of the above

97. 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. None of the above

TCR

98. 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

99. 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

100. 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

101. 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

102. 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

103. Each total coliform-positive (TC+) routine sample must be tested for the presence of heterotrophic bacteria.

A. True B. False

104. 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

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

105. 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

106. 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
107. Which of the following is a parasite that enters lakes and rivers through sewage and animal waste. It causes cryptosporidiosis, a mild gastrointestinal disease. The disease can be severe or fatal for people with severely weakened immune systems.
A. Coliform Bacteria C. Giardia lamblia
B. Cryptosporidium D. None of the above

108. Which of the following are not necessarily agents of disease, fecal coliform bacteria may indicate the presence of disease-carrying organisms, which live in the same environment as the fecal coliform bacteria.
A. Fecal coliform bacteria C. Shigella dysenteriae
B. Cryptosporidium D. None of the above

Bacteriological Monitoring Introduction
109. 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

110. 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

111. According to the text, the routine microbiological analysis of your water is for?
A. Contamination C. Coliform bacteria
B. Colloids D. None of the above

The three (3) primary types of samples are:
112. 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

113. 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

114. 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

115. 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

116. 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

Positive or Coliform Present Results
117. 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

Revised Total Coliform Rule (RTCR) Summary
118. 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

119. 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

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

Disinfection Section
Chlorine's Appearance and Odor
121. 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

Chlorine Gas
Pathophysiology
122. 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

123. 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

124. 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

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

Types of Residual

126. 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

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

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

129. Liquid chlorine is about _____ times heavier than water
A. 1.5 C. 2.5
B. 10 D. None of the above

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

Alternate Disinfectants - Chloramine

131. 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

Chlorine Dioxide

132. 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

Ozone

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

134. 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

135. 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

136. 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

Safety Section

Confined Space Entry Program -Purpose

137. 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

138. 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:

139. 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

140. 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

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

142. 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

143. A permit required confined space (permit space) contains a material that has _____.
A. Authorized entrants C. The potential for engulfing an entrant
B. Hazardous atmospheres D. None of the above

144. 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

145. 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

146. 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

Permitted Confined Space Entry Program
147 Subpart P (of OSHA's Construction Regulations – refer to page 60) applies to all _____ in the earth's surface.
A. Open excavations C. Pits
B. Vaults D. None of the above

148. According to the text, all trenches are _____.
A. Too narrow for work C. Safe for short term work
B. Excavations D. None of the above

149. According to the text, all excavations are _____.
A. Permit-required C. Access passages
B. Not trenches D. None of the above

Permit Required Confined Space Entry General Rules
150. According to the text, only authorized and trained employees may enter a _____ or act as safety watchmen/attendants.
A. Hazard C. Confined space
B. Pipe D. None of the above

Irritant (Corrosive) Atmospheres
151. According to the text, irritant or corrosive atmospheres can be _____.
A. Primary irritants C. Divided into primary and secondary groups
B. Combustible gases D. None of the above

Oxygen Deprivation
152. Oxygen deprivation is a form of _____.
A. Oxygen deprivation C. Combustion
B. Asphyxiation D. None of the above

153. The first sign of hypoxia (oxygen deprivation) is deterioration to night vision, which occurs when the _____ level falls to 17%.
A. Argon C. Irritant gases
B. Oxygen D. None of the above

Excavation and Trenching Section
154. According to the text, the _____ was revised because excavating is the most dangerous of all construction operations.
A. Competent rule C. Emergency rule
B. OSHA excavation standard D. None of the above

155. 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

156. 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

157. 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
158. 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

159. 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

160. 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
161. 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

162. 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

163. 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

164. 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

165. 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

166. 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
167. 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

168. 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

169. _____ 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

170. 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

171. 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

172. 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

173. 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 C. Worker encounters fumes
B. Gaseous condition exists D. None of the above

Personnel Protective Systems
174. Requirements for sloping, benching or protective systems are found in _____.
A. Safety Manuals C. CFR 1926.652 (OSHA Construction Standards)
B. Tabulated data D. None of the above

175. Whenever support systems, _____, or other protective systems are being used, a written copy of the manufacturer's specifications, recommendations, and limitations sheet shall be available at the job site.
A. Shield systems C. Ramps
B. Tabulated data D. None of the above

Excavation Protection Systems

176. 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

177. 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

178. 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

179. 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

180. Another option for sloping is to utilize _____ prepared by a registered professional engineer.

A. Instructions
B. Tabulated data
C. Standards
D. None of the above

Shoring Systems

181. _____ 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)

182. 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

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

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

Safety Precautions for Shield Systems

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

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

185. 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

Personal Protective Equipment
186. _____ 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
187. 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

188. 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

189. 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
190. Knowing the location of underground installations is a good idea because it could make the work go faster.
A. True B. False

Excavation Safety Plan
191. 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
192. 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

193. 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

Soil Test & Identification

194. 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
B. Soil type
C. Cohesion tests
D. None of the above

Shielding

195. Shielding does not prevent cave-ins. Instead, it protects the workers in the event of a cave-in.

A. True
B. False

196. When placed in an excavation, shields have sufficient structural strength to support the _____, thereby protecting the employees in the trench.

A. Nearby structures
B. Construction vehicles
C. Force of a cave-in should one occur
D. None of the above

197. 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
B. End of the job
C. Open end of the shield
D. None of the above

198. 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
B. Shield is tall
C. Designed depth
D. None of the above

Inspections

199. The excavations, adjacent areas, and protective systems shall be inspected daily by the _____.

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

200. 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
B. Poor workmanship
C. OSHA compliance
D. None of the above