

**Registration form**

**Excavation & Trenching CEU Training Course \$100.00  
Competent Person Course**

Continuing Education Course Only, this course does not include a hands-on or actual training.  
**48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL \$50.00**

**Start and finish dates:** \_\_\_\_\_  
*You will have 90 days from this date in order to complete this course*

**Name** \_\_\_\_\_ **Signature** \_\_\_\_\_  
*I have read and understood the disclaimer notice on page 2. Digitally sign XXX*

**Address** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip** \_\_\_\_\_

**Email** \_\_\_\_\_ **Fax ( )** \_\_\_\_\_

**Phone:**  
**Home ( )** \_\_\_\_\_ **Work ( )** \_\_\_\_\_

**Operator ID #** \_\_\_\_\_ **Exp. Date** \_\_\_\_\_

**Class/Grade** \_\_\_\_\_  
*Please circle/check which certification you are applying the course CEU's/PDH's.*

Water Treatment \_\_\_\_\_ Distribution \_\_\_\_\_ Collection \_\_\_\_\_ Wastewater Treatment \_\_\_\_\_

Competent Person Renewal \_\_\_\_\_ Onsite Installer \_\_\_\_\_ Other \_\_\_\_\_

*Your certificate will be mailed to you in about two weeks.*

**Technical Learning College**  
**PO Box 420, Payson AZ 85547-0420**  
**(928) 468-0665 Fax (928) 272-0747**  
**Toll Free (866) 557-1746**

[info@tlch2o.com](mailto:info@tlch2o.com) Visit us on the web at [www.abctlc.com](http://www.abctlc.com)

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American Express \_\_\_\_\_  
Master Card / Visa Card # \_\_\_\_\_ **Exp. Date** \_\_\_\_\_

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

*We will e-mail you a copy of the certificate of completion.*

## DISCLAIMER NOTICE

I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible. I also understand that this type of study program deals with dangerous conditions and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury caused by this CEU education training course material. I will call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded.

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

Professional Engineers; Most states will accept our courses for credit but we do not officially list the States or Agencies. Please check your State for approval or acceptance.

### State Approval Listing URL...

<http://www.tlch2o.com/PDF/CEU%20State%20Approvals.pdf>

*You can obtain a printed version of the course manual from TLC for an additional \$79.95 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.

***This course is not good for confined space or Competent person certification; this course is only for continuing education purposes. You need a hands-on course for confined space certification. Confined space work/Trenching is very dangerous and this course is not a substitute for classroom training, it is for professional development only.***

**COMPETENT PERSON CEU TRAINING COURSE**  
**Excavation & Trenching CEU Training Course**  
*CUSTOMER SERVICE RESPONSE CARD*

NAME: \_\_\_\_\_

E-MAIL \_\_\_\_\_ PHONE \_\_\_\_\_

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

1. Please rate the difficulty of your course.  
Very Easy    0    1    2    3    4    5    Very Difficult

2. Please rate the difficulty of the testing process.  
Very Easy    0    1    2    3    4    5    Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.  
Very Similar    0    1    2    3    4    5    Very Different

How did you hear about this Course? \_\_\_\_\_

What would you do to improve the course?

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How about the price of the course?

Poor\_\_\_\_ Fair \_\_\_\_ Average \_\_\_\_ Good\_\_\_\_ Great\_\_\_\_

How was your customer service?

Poor\_\_\_\_ Fair \_\_\_\_ Average \_\_\_\_ Good \_\_\_\_ Great\_\_\_\_

Any other concerns or comments.

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### **Rush Grading Service**

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

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.

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# Competent Person CEU Course Answer Key

Name \_\_\_\_\_ Telephone # \_\_\_\_\_

*Please select one answer. You can Bold, Circle, Underline or X your answer.*

- |                 |                 |                  |
|-----------------|-----------------|------------------|
| 1. A B C D E F  | 41. A B C D E F | 81. A B C D E F  |
| 2. A B C D E F  | 42. A B C D E F | 82. A B C D E F  |
| 3. A B C D E F  | 43. A B C D E F | 83. A B C D E F  |
| 4. A B C D E F  | 44. A B C D E F | 84. A B C D E F  |
| 5. A B C D E F  | 45. A B C D E F | 85. A B C D E F  |
| 6. A B C D E F  | 46. A B C D E F | 86. A B C D E F  |
| 7. A B C D E F  | 47. A B C D E F | 87. A B C D E F  |
| 8. A B C D E F  | 48. A B C D E F | 88. A B C D E F  |
| 9. A B C D E F  | 49. A B C D E F | 89. A B C D E F  |
| 10. A B C D E F | 50. A B C D E F | 90. A B C D E F  |
| 11. A B C D E F | 51. A B C D E F | 91. A B C D E F  |
| 12. A B C D E F | 52. A B C D E F | 92. A B C D E F  |
| 13. A B C D E F | 53. A B C D E F | 93. A B C D E F  |
| 14. A B C D E F | 54. A B C D E F | 94. A B C D E F  |
| 15. A B C D E F | 55. A B C D E F | 95. A B C D E F  |
| 16. A B C D E F | 56. A B C D E F | 96. A B C D E F  |
| 17. A B C D E F | 57. A B C D E F | 97. A B C D E F  |
| 18. A B C D E F | 58. A B C D E F | 98. A B C D E F  |
| 19. A B C D E F | 59. A B C D E F | 99. A B C D E F  |
| 20. A B C D E F | 60. A B C D E F | 100. A B C D E F |
| 21. A B C D E F | 61. A B C D E F | 101. A B C D E F |
| 22. A B C D E F | 62. A B C D E F | 102. A B C D E F |
| 23. A B C D E F | 63. A B C D E F | 103. A B C D E F |
| 24. A B C D E F | 64. A B C D E F | 104. A B C D E F |
| 25. A B C D E F | 65. A B C D E F | 105. A B C D E F |
| 26. A B C D E F | 66. A B C D E F | 106. A B C D E F |
| 27. A B C D E F | 67. A B C D E F | 107. A B C D E F |
| 28. A B C D E F | 68. A B C D E F | 108. A B C D E F |
| 29. A B C D E F | 69. A B C D E F | 109. A B C D E F |
| 30. A B C D E F | 70. A B C D E F | 110. A B C D E F |
| 31. A B C D E F | 71. A B C D E F | 111. A B C D E F |
| 32. A B C D E F | 72. A B C D E F | 112. A B C D E F |
| 33. A B C D E F | 73. A B C D E F | 113. A B C D E F |
| 34. A B C D E F | 74. A B C D E F | 114. A B C D E F |
| 35. A B C D E F | 75. A B C D E F | 115. A B C D E F |
| 36. A B C D E F | 76. A B C D E F | 116. A B C D E F |
| 37. A B C D E F | 77. A B C D E F | 117. A B C D E F |
| 38. A B C D E F | 78. A B C D E F | 118. A B C D E F |
| 39. A B C D E F | 79. A B C D E F | 119. A B C D E F |
| 40. A B C D E F | 80. A B C D E F | 120. A B C D E F |

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|------------------|------------------|------------------|
| 121. A B C D E F | 148. A B C D E F | 175. A B C D E F |
| 122. A B C D E F | 149. A B C D E F | 176. A B C D E F |
| 123. A B C D E F | 150. A B C D E F | 177. A B C D E F |
| 124. A B C D E F | 151. A B C D E F | 178. A B C D E F |
| 125. A B C D E F | 152. A B C D E F | 179. A B C D E F |
| 126. A B C D E F | 153. A B C D E F | 180. A B C D E F |
| 127. A B C D E F | 154. A B C D E F | 181. A B C D E F |
| 128. A B C D E F | 155. A B C D E F | 182. A B C D E F |
| 129. A B C D E F | 156. A B C D E F | 183. A B C D E F |
| 130. A B C D E F | 157. A B C D E F | 184. A B C D E F |
| 131. A B C D E F | 158. A B C D E F | 185. A B C D E F |
| 132. A B C D E F | 159. A B C D E F | 186. A B C D E F |
| 133. A B C D E F | 160. A B C D E F | 187. A B C D E F |
| 134. A B C D E F | 161. A B C D E F | 188. A B C D E F |
| 135. A B C D E F | 162. A B C D E F | 189. A B C D E F |
| 136. A B C D E F | 163. A B C D E F | 190. A B C D E F |
| 137. A B C D E F | 164. A B C D E F | 191. A B C D E F |
| 138. A B C D E F | 165. A B C D E F | 192. A B C D E F |
| 139. A B C D E F | 166. A B C D E F | 193. A B C D E F |
| 140. A B C D E F | 167. A B C D E F | 194. A B C D E F |
| 141. A B C D E F | 168. A B C D E F | 195. A B C D E F |
| 142. A B C D E F | 169. A B C D E F | 196. A B C D E F |
| 143. A B C D E F | 170. A B C D E F | 197. A B C D E F |
| 144. A B C D E F | 171. A B C D E F | 198. A B C D E F |
| 145. A B C D E F | 172. A B C D E F | 199. A B C D E F |
| 146. A B C D E F | 173. A B C D E F | 200. A B C D E F |
| 147. A B C D E F | 174. A B C D E F |                  |

Please fax or e-mail the answer key to TLC  
**Western Campus Fax (928) 272-0747.**

**Rush Grading Service**

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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.

Thank you...

## COMPETANT PERSON CEU TRAINING COURSE ASSIGNMENT

When finished, you may e-mail the answers to info@tlch2o.com or fax the answers to (928) 272-0747. In order to successfully pass this course and receive credit, you are required to pass with a score of 75% or better. This assignment is available to you on TLC's Website. If you need any assistance, utilize the Search function in Adobe Acrobat.

Select one answer as it is exactly in the text. Only one answer per question. If the(s) is on an answer, this means the answer is plural or singular.

### Excavation Glossary

1. Fine-grained natural soil that is plastic when moist and hard and brittle when dry. Clay is made up of particles smaller than .0002 millimeters.

- A. Clay
- B. Clumps
- C. Cohesion
- D. Cohesive
- E. Barricades
- F. None of the Above

2. \_\_\_\_\_ are empty spaces between particles of rocks.

- A. Uprights
- B. Vibration
- C. Voids
- D. Wales
- E. Wall Stability
- F. None of the Above

3. An outward swelling in the soil of a trench which may be a warning sign of trench failure.

- A. Loamy Sand
- B. Bulge
- C. Buried Structures
- D. Competent Person
- E. Confined Space
- F. None of the Above

4. Manholes, junction boxes or catch basins beneath the ground, or any other installations that may be encountered during trenching.

- A. Loamy Sand
- B. Bulge
- C. Buried Structures
- D. Competent Person
- E. Confined Space
- F. None of the Above

5. \_\_\_\_\_ are parts of a shoring system. They are positioned horizontally and help to brace vertical beams and supports. Wales can be fastened to studs with nails, clips or brackets.

- A. Uprights
- B. Vibration
- C. Voids
- D. Wales
- E. Wall Stability
- F. None of the Above

6. The relative strength and capacity of walls of a trench.

- A. Uprights
- B. Vibration
- C. Voids
- D. Wales
- E. Wall Stability
- F. None of the Above

7. Heavy lumps or thick groupings of soil.

- A. Clay
- B. Clumps
- C. Cohesion
- D. Cohesive
- E. Barricades
- F. None of the Above

8. The relative ability to clump together, the force holding two like substances together.

- A. Clay
- B. Clumps
- C. Cohesion
- D. Cohesive
- E. Barricades
- F. None of the Above

9. Devices that hold or fasten two or more parts together or in place. Braces are diagonal or horizontal. They may be made of wood or metal.
- A. Heaving
  - B. Braces
  - C. Bracing System
  - D. Benching
  - E. Hardpan
  - F. None of the Above
10. A system of braces which applies pressure against trench walls to stabilize them. A bracing system is part of a trench shoring system used to prevent trench walls from collapsing.
- A. Heaving
  - B. Braces
  - C. Bracing System
  - D. Benching
  - E. Hardpan
  - F. None of the Above
11. A method of cutting back the sides of a trench into horizontal steps to prevent cave-ins.
- A. Heaving
  - B. Braces
  - C. Bracing System
  - D. Benching
  - E. Hardpan
  - F. None of the Above
12. When a soil has grains that hold together and clump well.
- A. Clay
  - B. Clumps
  - C. Cohesion
  - D. Cohesive
  - E. Barricades
  - F. None of the Above
13. Visible warning barriers that keep vehicles and pedestrians from entering a construction site.
- A. Clay
  - B. Clumps
  - C. Cohesion
  - D. Cohesive
  - E. Barricades
  - F. None of the Above
14. A layer of hard subsoil or clay that does not allow water in. Hardpan is classified as a Type A soil.
- A. Heaving
  - B. Braces
  - C. Bracing System
  - D. Benching
  - E. Hardpan
  - F. None of the Above
15. The swelling of a soil.
- A. Heaving
  - B. Braces
  - C. Bracing System
  - D. Benching
  - E. Hardpan
  - F. None of the Above
16. \_\_\_\_\_ are braces or supports within a shoring system. They are placed against beams to resist the pressure of the earth.
- A. Heaving
  - B. Braces
  - C. Bracing System
  - D. Benching
  - E. Jacks
  - F. None of the Above
17. Soil composed of a mixture of sand, clay and silt, with more sand grains than clay or silt. It is classified as a Type C soil.
- A. Loamy Sand
  - B. Bulge
  - C. Buried Structures
  - D. Competent Person
  - E. Confined Space
  - F. None of the Above
18. One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous to employees.
- A. Loamy Sand
  - B. Bulge
  - C. Buried Structures
  - D. Competent Person
  - E. Confined Space
  - F. None of the Above

19. Has authorization to take prompt corrective measures to eliminate hazards.
- A. Loamy Sand
  - B. Bulge
  - C. Buried Structures
  - D. Competent Person
  - E. Confined Space
  - F. None of the Above
20. The \_\_\_\_\_ is trained and knowledgeable about soil analysis and the use of protective systems.
- A. Loamy Sand
  - B. Bulge
  - C. Buried Structures
  - D. Competent Person
  - E. Confined Space
  - F. None of the Above
21. Has limited or restricted means of entry or exit, is large enough for an employee to enter and perform assigned work, and is not designed for continuous occupancy by the employee.
- A. Loamy Sand
  - B. Bulge
  - C. Buried Structures
  - D. Competent Person
  - E. Confined Space
  - F. None of the Above
22. These spaces may include, but are not limited to, underground vaults, tanks, storage bins, pits, and diked areas, vessels, and silos.
- A. Loamy Sand
  - B. Bulge
  - C. Buried Structures
  - D. Competent Person
  - E. Confined Space
  - F. None of the Above
23. A ditch cut around the work site to keep water from entering the trench.
- A. Diversion Ditches
  - B. Fissure
  - C. Gravel
  - D. Drainage System
  - E. Excavation
  - F. None of the Above
24. Pumps, pipe or channel used to drain off rain or groundwater from inside the trench.
- A. Diversion Ditches
  - B. Fissure
  - C. Gravel
  - D. Drainage System
  - E. Excavation
  - F. None of the Above
25. Any man-made cut, cavity, trench or depression in an earth surface, formed by earth removal.
- A. Diversion Ditches
  - B. Fissure
  - C. Gravel
  - D. Drainage System
  - E. Excavation
  - F. None of the Above
26. A long narrow opening or crack in the rock or soil. Fissures are often a sign of trench wall failure.
- A. Diversion Ditches
  - B. Fissure
  - C. Gravel
  - D. Drainage System
  - E. Excavation
  - F. None of the Above
27. Particles that once were large rocks, but have been broken down over time and by the effects of weathering.
- A. Diversion Ditches
  - B. Fissure
  - C. Grain
  - D. Drainage System
  - E. Excavation
  - F. None of the Above
28. The size of the grain of a soil determines the stability and cohesiveness of a soil. The larger the grain, the more unstable the soil.
- A. Diversion Ditches
  - B. Fissure
  - C. Grain
  - D. Drainage System
  - E. Excavation
  - F. None of the Above

29. A loose mixture of pebbles and rock fragments, larger particles than sand.  
 A. Diversion Ditches    D. Drainage System  
 B. Fissure                E. Excavation  
 C. Gravel                 F. None of the Above
30. Tables and charts approved by a registered professional engineer and used to design and construct a protective system.  
 A. Shielding                D. Manufacturer's Tabulated Data  
 B. Registered Professional Engineer    E. Permit Required Confined Space  
 C. Personal Protective Equipment      F. None of the Above
31. Contains or has potential to contain a hazardous atmosphere.  
 A. Shielding                D. Manufacturer's Tabulated Data  
 B. Registered Professional Engineer    E. Permit Required Confined Space  
 C. Personal Protective Equipment      F. None of the Above
32. Contains a material that has the potential for engulfing an entrant.  
 A. Shielding                D. Manufacturer's Tabulated Data  
 B. Registered Professional Engineer    E. Permit Required Confined Space  
 C. Personal Protective Equipment      F. None of the Above
33. Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section.  
 A. Shielding                D. Manufacturer's Tabulated Data  
 B. Registered Professional Engineer    E. Permit Required Confined Space  
 C. Personal Protective Equipment      F. None of the Above
34. Contains any other recognized serious safety or health hazards.  
 A. Shielding                D. Manufacturer's Tabulated Data  
 B. Registered Professional Engineer    E. Permit Required Confined Space  
 C. Personal Protective Equipment      F. None of the Above
35. Includes: safety goggles and glasses, reflective clothing, work gloves, hard hat, safety shoes, rubber boots, earplugs or protectors, face shield and face mask or respirator.  
 A. Shielding                D. Manufacturer's Tabulated Data  
 B. Registered Professional Engineer    E. Permit Required Confined Space  
 C. Personal Protective Equipment      F. None of the Above
36. A person who is registered as a professional engineer in the state where the work is to be performed.  
 A. Shielding                D. Manufacturer's Tabulated Data  
 B. Registered Professional Engineer    E. Permit Required Confined Space  
 C. Personal Protective Equipment      F. None of the Above
37. A type C soil with small, loose grains of disintegrated rock.  
 A. Sand                      D. Shear  
 B. Sandy Loam              E. Sheeting  
 C. Saturation               F. None of the Above
38. Granular soil with enough silt and clay to make it slightly cohesive.  
 A. Sand                      D. Shear  
 B. Sandy Loam              E. Sheeting  
 C. Saturation               F. None of the Above

39. The process of a soil being filled to capacity with moisture.
- A. Sand
  - B. Sandy Loam
  - C. Saturation
  - D. Shear
  - E. Sheeting
  - F. None of the Above
40. A phenomenon which happens when a trench wall is subjected to stress. Fissured cracks widen until a portion of the trench wall breaks off and slides into the trench.
- A. Sand
  - B. Sandy Loam
  - C. Saturation
  - D. Shear
  - E. Sheeting
  - F. None of the Above
41. Durable sheets of metal or wood, which are held firmly against a trench wall to prevent it from caving-in. Sheeting is a component of a trench shoring system.
- A. Sand
  - B. Sandy Loam
  - C. Saturation
  - D. Shear
  - E. Sheeting
  - F. None of the Above
42. A device which provides adequate protection from falling or collapsing earth loads. The trench box is a common form of shielding.
- A. Sand
  - B. Shielding
  - C. Saturation
  - D. Shear
  - E. Sheeting
  - F. None of the Above
43. \_\_\_\_\_ the main method of stabilizing and supporting a trench wall to prevent cave-ins. It consists of uprights, stingers and braces.
- A. Shoring
  - B. Shielding
  - C. Silt
  - D. Silty Clay
  - E. Sloping
  - F. None of the Above
44. A soil which contains fine particles and is very smooth.
- A. Shoring
  - B. Shielding
  - C. Silt
  - D. Silty Clay
  - E. Sloping
  - F. None of the Above
45. A plastic soil that will appear rough or broken when rubbed over the thumb and finger.
- A. Shoring
  - B. Shielding
  - C. Silt
  - D. Silty Clay
  - E. Sloping
  - F. None of the Above
46. The process of cutting back the sides of a trench to avoid a cave-in.
- A. Shoring
  - B. Shielding
  - C. Silt
  - D. Silty Clay
  - E. Sloping
  - F. None of the Above
47. When loose soil begins to run in from the lower part of the wall into the excavation. It is the first step to a wall collapse.
- A. Spoil Pile/Spoilage
  - B. Supports
  - C. Trench Box
  - D. Sloughing
  - E. Soil Type
  - F. None of the Above
48. A system of classifying soils and rock deposits. Soil must be classified by a qualified person as: Stable rock, Type-A, Type-B, Type-C.
- A. Spoil Pile/Spoilage
  - B. Supports
  - C. Trench Box
  - D. Sloughing
  - E. Soil Type
  - F. None of the Above

49. When a soil begins to crack or flake due to pressure, or from moisture from within the trench.  
A. Spoil Pile/Spoilage D. Sloughing  
B. Supports E. Spall  
C. Trench Box F. None of the Above

50. The material that is removed from the excavation.  
A. Spoil Pile/Spoilage D. Sloughing  
B. Supports E. Soil Type  
C. Trench Box F. None of the Above

51. Part of a shoring system which helps to bear the weight of braces and other parts of the shoring system.  
A. Spoil Pile/Spoilage D. Sloughing  
B. Supports E. Soil Type  
C. Trench Box F. None of the Above

52. A prefabricated moveable box usually constructed of metal plates welded to a heavy steel frame. The box is moved along as work progresses. It is able to withstand the forces imposed on it by a cave-in and thereby protects trench workers.  
A. Spoil Pile/Spoilage D. Sloughing  
B. Supports E. Soil Type  
C. Trench Box F. None of the Above

53. The most stable and cohesive type of soil while working at a trench site. Examples are clay, silty clay and hardpan.  
A. Type-A Soil D. Unconfined Compressive Strength  
B. Type-B Soil E. Soil Type  
C. Type-C Soil F. None of the Above

54. \_\_\_\_\_ is next to the most stable soil. Silt, silt loam, sandy loam, medium clay and unstable rock would be good examples of Type-B soils.  
A. Type-A Soil D. Unconfined Compressive Strength  
B. Type-B Soil E. Soil Type  
C. Type-C Soil F. None of the Above

55. The least stable type of soil.  
A. Type-A Soil D. Unconfined Compressive Strength  
B. Type-B Soil E. Soil Type  
C. Type-C Soil F. None of the Above

56. Examples of \_\_\_\_\_ are gravel, loamy sand, soft clay, submerged silt and heavy unstable rock.  
A. Type-A Soil D. Unconfined Compressive Strength  
B. Type-B Soil E. Soil Type  
C. Type-C Soil F. None of the Above

57. Through a variety of tests, a soil's strength is found. The unconfined compressive strength is the soil's measure of bearing capacity and shearing resistance.  
A. Type-A Soil D. Unconfined Compressive Strength  
B. Type-B Soil E. Soil Type  
C. Type-C Soil F. None of the Above

58. Measured as the amount of weight per square foot needed to collapse a soil sample.  
A. Type-A Soil D. Unconfined Compressive Strength  
B. Type-B Soil E. Soil Type  
C. Type-C Soil F. None of the Above

59. Vertical members of a trench shoring system placed in context with the earth. These members usually are not placed in direct contact with one another.

- A. Uprights
- B. Vibration
- C. Voids
- D. Wales
- E. Wall Stability
- F. None of the Above

60. When a soil or excavation site trembles and shakes rapidly due to forces such as loud noises or heavy equipment or traffic.

- A. Uprights
- B. Vibration
- C. Voids
- D. Wales
- E. Wall Stability
- F. None of the Above

#### Competent Person

61. A competent person is one who is capable of \_\_\_\_\_existing hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees; and who has authorization to take prompt corrective measures to eliminate them.

- A. Determine
- B. Specific training
- C. Knowledge
- D. Identifying
- E. Unsanitary, hazardous, or dangerous
- F. None of the Above

62. In order to be a "Competent Person" for the purpose of this standard, one must have specific training in and be \_\_\_\_\_about soils analysis, the use of protective systems and the requirements of 29 CFR Part 1926.650-652 Subpart P.

- A. Determine
- B. Specific training
- C. Knowledgeable
- D. Inspection(s) or Inspect
- E. Unsanitary, hazardous, or dangerous
- F. None of the Above

#### Competent Person Duties

(S) means plural or singular

63. \_\_\_\_\_daily inspections of the protective equipment, trench conditions, safety equipment and adjacent areas.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Performs
- F. None of the Above

64. \_\_\_\_\_ shall be made prior to the start of work and as needed throughout the shift.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Remove(s)
- F. None of the Above

65. \_\_\_\_\_ shall be made after every rainstorm or other hazard occurrence.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Remove(s)
- F. None of the Above

66. \_\_\_\_\_of emergency contact methods, telephone or radio dispatch.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Remove(s)
- F. None of the Above

67. \_\_\_\_\_employees and all other personnel from hazardous conditions and makes all changes necessary to ensure their safety.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Remove(s)
- F. None of the Above

68. \_\_\_\_\_ all employees have proper protective equipment, hard-hats, reflective vests, steel-toed boots, harnesses, eye protection, hearing protection and drinking water.

- A. Determine(s)
- B. Categorize(s)
- C. Insures
- D. Inspection(s) or Inspect
- E. Remove(s)
- F. None of the Above

69. \_\_\_\_\_ soil conditions and conduct visual and manual tests.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Maintain(s)
- F. None of the Above

70. \_\_\_\_\_ the appropriate protection system to be used.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Maintain(s)
- F. None of the Above

71. \_\_\_\_\_ on-site records of inspections and protective systems used.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Maintain(s)
- F. None of the Above

72. \_\_\_\_\_ on site a hazard communication program, Material Safety Data Sheets and a Risk Management Plan if necessary.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Maintain(s)
- F. None of the Above

73. \_\_\_\_\_ current First Aid and CPR certifications. Maintain current confined space certification training.

- A. Determine(s)
- B. Categorize(s)
- C. Knowledge
- D. Inspection(s) or Inspect
- E. Maintain(s)
- F. None of the Above

Scope of Work (S) means plural or singular

74. During excavation work, a competent person shall be on the job site at all times when personnel are working within or around the excavation. This is necessary in order to \_\_\_\_\_ soil conditions, equipment and protection systems employed.

- A. Excavation(s)
- B. Determine(d)
- C. Protection(s)
- D. Inspection(s) or Inspect
- E. Monitor
- F. None of the Above

75. The estimated locations of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installation that reasonably may be expected to be encountered during excavation work, shall be \_\_\_\_\_ prior to opening an excavation.

- A. Excavation(s)
- B. Determine(d)
- C. Protection(s)
- D. Inspection(s) or Inspect
- E. Means of egress
- F. None of the Above

76. Adequate \_\_\_\_\_ shall be taken to protect employees working in excavations, against the hazards posed by water accumulation.

- A. Excavation(s)
- B. Precautions
- C. Protection(s)
- D. Inspection(s) or Inspect
- E. Means of egress
- F. None of the Above

77. \_\_\_\_\_ shall be protected from excavated or other materials, or equipment, that could pose a hazard by falling or rolling into excavations.

- A. Excavation(s)
- B. Determine(d)
- C. Protection(s)
- D. Employees
- E. Means of egress
- F. None of the Above

78. Protection shall be provided by placing and keeping such material or equipment at least two (2') feet from the edge of \_\_\_\_\_.

- A. Excavation(s)
- B. Determine(d)
- C. Protection(s)
- D. Inspection(s) or Inspect
- E. Means of egress
- F. None of the Above

79. A stairway, ladder, or ramp shall be used as a means of \_\_\_\_\_ in trench excavations that are four (4') feet or more in depth.

- A. Excavation(s)
- B. Determine(d)
- C. Protection(s)
- D. Inspection(s) or Inspect
- E. Access or egress
- F. None of the Above

80. The ladder(s), stairway(s), or ramp shall be spaced so that no employee in the trench excavation is more than twenty (25') feet from a \_\_\_\_\_.

- A. Excavation(s)
- B. All personnel
- C. Employees
- D. Properly secured
- E. Means of egress
- F. None of the Above

81. When ladder(s) are employed, the top of the ladder shall extend a minimum of three (3') feet above the ground and shall be \_\_\_\_\_.

- A. Excavation(s)
- B. All personnel
- C. Employees
- D. Properly secured
- E. Means of egress
- F. None of the Above

82. When \_\_\_\_\_ are exposed to vehicular traffic, each employee shall wear a warning vest made with reflective material or high visibility material.

- A. Excavation(s)
- B. All personnel
- C. Employees
- D. Properly secured
- E. Means of egress
- F. None of the Above

83. \_\_\_\_\_ within the construction area shall wear a hard-hat at all times.

- A. Excavation(s)
- B. All personnel
- C. Employees
- D. Properly secured
- E. Means of egress
- F. None of the Above

84. \_\_\_\_\_ shall not be permitted underneath loads handled by lifting or digging equipment.

- A. Excavation(s)
- B. All personnel
- C. Employees
- D. Properly secured
- E. Means of egress
- F. None of the Above

85. \_\_\_\_\_ shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

- A. Excavation(s)
- B. All personnel
- C. Employees
- D. Properly secured
- E. Means of egress
- F. None of the Above

86. In excavations where \_\_\_\_\_ or gaseous conditions exist, or could be reasonably expected to exist, air in the excavation shall be tested.

- A. Excavation(s)
- B. Structures
- C. Employees
- D. Oxygen deficiencies
- E. Gaseous condition exists
- F. None of the Above

87. Where \_\_\_\_\_ (atmospheres containing less than 19.5 percent oxygen) exist, the area must be continuously ventilated until the oxygen levels are above 19.5 percent.

- A. Excavation(s)
- B. Structures
- C. Employees
- D. Oxygen deficiencies
- E. Gaseous condition exists
- F. None of the Above

88. Where a \_\_\_\_\_, the area shall be ventilated until the flammable gas concentration is below 20 percent of the lower flammable limit.

- A. Excavation(s)
- B. Structures
- C. Employees
- D. Oxygen deficiencies
- E. Gaseous condition exists
- F. None of the Above

89. Whenever oxygen deficiencies or gaseous conditions exist or could reasonably exist, the area shall be monitored continuously to assure that \_\_\_\_\_ are protected.

- A. Excavation(s)
- B. Structures
- C. Employees
- D. Oxygen deficiencies
- E. Gaseous condition exists
- F. None of the Above

90. Where the stability of adjoining buildings, walls or other structures are endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of \_\_\_\_\_.

- A. Excavation(s)
- B. Structures
- C. Employees
- D. Oxygen deficiencies
- E. Gaseous condition exists
- F. None of the Above

91. Sidewalks, pavement and appurtenant structures shall not be undermined unless a support system, such as shoring, is provided to protect \_\_\_\_\_ from the possible collapse of such structures.

- A. Excavation(s)
- B. Appurtenant structures
- C. Employees
- D. Oxygen deficiencies
- E. Gaseous condition exists
- F. None of the Above

#### Water Accumulation

92. Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect \_\_\_\_\_ against the hazards posed by water accumulation.

- A. Excavation(s)
- B. Structures
- C. Employees
- D. Oxygen deficiencies
- E. Gaseous condition exists
- F. None of the Above

93. The precautions necessary to protect \_\_\_\_\_ adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

- A. Excavation(s)
- B. Structures
- C. Employees
- D. Oxygen deficiencies
- E. Gaseous condition exists
- F. None of the Above

### Personnel Protection Systems

94. Employees in excavations shall be protected from cave-ins by an adequate \_\_\_\_\_, which shall be inspected by a competent person.

- A. Shield system(s)
- B. Sloping or benching
- C. Requirement(s)
- D. Stable rock
- E. Protective system(s)
- F. None of the Above

95. The use of \_\_\_\_\_ is required for all excavations in excess of five (5') feet, except when the excavation is within stable rock.

- A. Shield system(s)
- B. Sloping or benching
- C. Requirement(s)
- D. Stable rock
- E. Protective system(s)
- F. None of the Above

96. Trench excavation less than five (5') feet in depth may not require the use of protective systems, unless there is evidence of a potential cave-in. The competent person shall determine the need for the use of \_\_\_\_\_ when such conditions exist.

- A. Shield system(s)
- B. Sloping or benching
- C. Requirement(s)
- D. Stable rock
- E. Protective system(s)
- F. None of the Above

97. When \_\_\_\_\_, benching or protective systems are required, refer to requirements in CFR 1926.652 (OSHA Construction Standards).

- A. Shield system(s)
- B. Sloping
- C. Requirement(s)
- D. Stable rock
- E. Protective system(s)
- F. None of the Above

98. Whenever support systems, \_\_\_\_\_, or other protective systems are being used, a copy of the manufacturer's specifications, recommendations, and limitations sheet shall be in written form and maintained at the job site.

- A. Shield system(s)
- B. Sloping or benching
- C. Requirement(s)
- D. Stable rock
- E. Protective system(s)
- F. None of the Above

### Excavation Protection Systems

99. The three basic protective systems for excavations and trenches are sloping and benching systems, \_\_\_\_\_.

- A. Shield system(s)
- B. Sloping or benching
- C. Requirement(s)
- D. Shoring, and shields
- E. Protective system(s)
- F. None of the Above

100. The protective systems shall have the capacity to resist without \_\_\_\_\_ that are intended or could reasonably be expected to be applied to or transmitted to the system. Every employee in an excavation shall be protected from cave-ins by an adequate protective system.

- A. Shield system(s)
- B. Sloping or benching
- C. Requirement(s)
- D. Stable rock
- E. Protective system(s)
- F. None of the Above

Exceptions to using protective system:

101. Excavations that are made entirely in \_\_\_\_\_.

- A. Shield system(s)
- B. Sloping or benching
- C. Excavations(s)
- D. Stable rock
- E. Protective system(s)
- F. None of the Above

102. \_\_\_\_\_ that are less than 5 feet deep and declared safe by a competent person.
- A. Shield system(s)
  - B. Sloping or benching
  - C. Excavations(s)
  - D. Stable rock
  - E. Protective system(s)
  - F. None of the Above

#### Sloping and Benching Systems

There are four options for sloping:

103. Slope to the angle required by the standard for Type C, which is the most \_\_\_\_\_.
- A. Shield system(s)
  - B. Sloping or benching
  - C. Excavations(s)
  - D. Unstable soil type
  - E. Protective system(s)
  - F. None of the Above

104. \_\_\_\_\_ prepared by a registered professional engineer can be utilized.
- A. Shield system(s)
  - B. Sloping or benching
  - C. Excavations(s)
  - D. Stable rock
  - E. Protective system(s)
  - F. None of the Above

105. A registered professional engineer can design a \_\_\_\_\_ plan for a specific job.
- A. Shield system(s)
  - B. Sloping
  - C. Excavations(s)
  - D. Stable rock
  - E. Protective system(s)
  - F. None of the Above

106. \_\_\_\_\_ systems for excavations five (5) to twenty (20) feet in depth must be constructed under the instruction of a designated competent person.
- A. Shield system(s)
  - B. Sloping and benching
  - C. Excavations(s)
  - D. Stable rock
  - E. Protective system(s)
  - F. None of the Above

107. \_\_\_\_\_ systems for excavations greater than twenty (20) feet must be designed and stamped by a registered professional engineer.
- A. Shield system(s)
  - B. Sloping and benching
  - C. Excavations(s)
  - D. Stable rock
  - E. Protective system(s)
  - F. None of the Above

#### Shoring Systems

108. Shoring is another \_\_\_\_\_ or support system.
- A. Shield system(s)
  - B. Sloping or benching
  - C. Excavations(s)
  - D. Shoring
  - E. Protective system(s)
  - F. None of the Above

109. \_\_\_\_\_ utilizes a framework of vertical members (uprights), horizontal members (whales), and cross braces to support the sides of the excavation to prevent a cave-in.
- A. Shield system(s)
  - B. Sloping or benching
  - C. Excavations(s)
  - D. Shoring
  - E. Protective system(s)
  - F. None of the Above

#### Shield Systems (Trench Boxes)

110. \_\_\_\_\_ is the third method of providing a safe workplace. Unlike sloping and shoring, shielding does not prevent a cave-in.
- A. Shield system(s)
  - B. Sloping or benching
  - C. Shields
  - D. Shoring
  - E. Shielding
  - F. None of the Above

111. \_\_\_\_\_ are designed to withstand the soil forces caused by a cave-in and protect the employees inside the structure.

- A. Shield system(s)      D. Shoring
- B. Sloping or benching      E. Shielding
- C. Shields      F. None of the Above

112. Most \_\_\_\_\_ consist of two flat, parallel metal walls that are held apart by metal cross braces.

- A. Shield system(s)      D. Shoring
- B. Sloping or benching      E. Shielding
- C. Shields      F. None of the Above

113. \_\_\_\_\_ design and construction is not covered in the OSHA Standards.

- A. Shield system(s)      D. Shoring
- B. Sloping or benching      E. Shielding
- C. Shields      F. None of the Above

114. \_\_\_\_\_ must be certified in design by a registered professional engineer and must have either a registration plate on the shield or registration papers from the manufacturer on file at the jobsite office.

- A. Shield system(s)      D. Shoring
- B. Sloping or benching      E. Shielding
- C. Shields      F. None of the Above

#### Safety Precautions for Shield Systems

115. \_\_\_\_\_ must not have any lateral movement when installed.

- A. Shield system(s)      D. Shoring
- B. Sloping or benching      E. Shielding
- C. Shields      F. None of the Above

116. Employees will be protected from cave-ins when entering and exiting the shield (examples - ladder within the shield or a properly \_\_\_\_\_ at the end).

- A. Shield system(s)      D. Shoring
- B. Sloping or benching      E. Shielding
- C. Shields      F. None of the Above

117. Employees are not allowed in the \_\_\_\_\_ during installation, removal, or during any vertical movement.

- A. Shield system(s)      D. Shoring
- B. Sloping or benching      E. Shielding
- C. Shield      F. None of the Above

118. Shields can be 2 ft. above the bottom of an excavation if they are designed to resist loads at the full depth and if there are no indications of caving under or behind the \_\_\_\_\_.

- A. Shield system(s)      D. Shoring
- B. Sloping or benching      E. Shielding
- C. Shield      F. None of the Above

119. The shield must extend at least 18 inches above the point where proper \_\_\_\_\_ begins (the height of the shield must be greater than the depth of the excavation).

- A. Shield system(s)      D. Shoring
- B. Sloping      E. Shielding
- C. Shields      F. None of the Above

120. The open end of the shield must be protected from the exposed excavation wall. The wall must be sloped, shored, or shielded. \_\_\_\_\_ can be mounted on the ends of the shield to prevent cave-ins.

- A. Shield system(s)
- B. Sloping or benching
- C. Shields
- D. Shoring
- E. Shielding
- F. None of the Above

#### Personal Protective Equipment

121. It is \_\_\_\_\_ for you to wear a hard hat, safety glasses, and work boots on the jobsite.

- A. OSHA policy
- B. Hazards
- C. Adequate
- D. Safety compliance
- E. Hazard Communication
- F. None of the Above

122. Because of the \_\_\_\_\_ involved with excavations, other personal protective equipment may be necessary, depending on the potential hazards present (examples-goggles, gloves, and respiratory equipment).

- A. OSHA policy
- B. Hazards
- C. Adequate
- D. Safety compliance
- E. Hazard Communication
- F. None of the Above

#### Excavation & Trenching Guidelines

123. \_\_\_\_\_ is mandatory to ensure employee protection when working in or around excavations.

- A. OSHA policy
- B. Hazards
- C. Adequate
- D. Safety compliance
- E. Hazard Communication
- F. None of the Above

124. The competent person(s) must be trained in accordance with the OSHA Excavation Standard, and all other programs that may apply (examples \_\_\_\_\_, Confined Space, and Respiratory Protection), and must demonstrate a thorough understanding and knowledge of the programs and the hazards associated.

- A. OSHA policy
- B. Hazards
- C. Adequate
- D. Safety compliance
- E. Hazard Communication
- F. None of the Above

125. All other employees working in and around the excavation must be trained in the recognition of \_\_\_\_\_ associated with trenching and excavating.

- A. OSHA policy
- B. Hazards
- C. Adequate
- D. Safety compliance
- E. Hazard Communication
- F. None of the Above

Before any work is performed and before any employees enter the excavation, a number of items must be checked and insured:

126. Before any excavation, underground installations must be determined. This can be accomplished by either contacting the local utility companies or the local "one-call" center for the area. All underground utility locations \_\_\_\_\_ be documented on the proper forms.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

127. All overhead hazards (surface encumbrances) that create a hazard to employees \_\_\_\_\_ be removed or supported to eliminate the hazard.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

128. If the excavation is to be over 20 feet deep, it must be designed by a registered professional engineer who is registered in the state where work \_\_\_\_\_be performed.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

129. Adequate protective systems \_\_\_\_\_be utilized to protect employees. This can be accomplished through sloping, shoring, or shielding.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

130. The worksite \_\_\_\_\_be analyzed in order to design adequate protection systems and prevent cave-ins.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

131. There \_\_\_\_\_ also be an excavation safety plan developed to protect employees.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

132. Workers \_\_\_\_\_ be supplied with and wear any personal protective equipment deemed necessary to assure their protection.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

133. All spoil piles \_\_\_\_\_be stored a minimum of two feet from the sides of the excavation. The spoil pile must not block the safe means of egress.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

134. If a trench or excavation is 4 feet or deeper, stairways, ramps, or ladders will be used as a safe means of access and egress. For trenches, the employee \_\_\_\_\_ not have to travel any more than 25 feet of lateral travel to reach the stairway, ramp, or ladder.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

135. No employee \_\_\_\_\_ work in an excavation where water is accumulating unless adequate measures are used to protect the employees.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

136. A competent person \_\_\_\_\_ inspect all excavations and trenches daily, prior to employee exposure or entry, and after any rainfall, soil change, or any other time needed during the shift. The competent person must take prompt measures to eliminate any and all hazards.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

137. Excavations and trenches 4 feet or deeper that have the potential for toxic substances or hazardous atmospheres \_\_\_\_\_ be tested at least daily.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

138. If the atmosphere is inadequate, protective systems \_\_\_\_\_ be utilized.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

139. If work is in or around traffic, employees \_\_\_\_\_ be supplied with and wear orange reflective vests.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

140. Signs and barricades \_\_\_\_\_ be utilized to ensure the safety of employees, vehicular traffic, and pedestrians.

- A. Must
- B. Will
- C. Adequate
- D. Deemed
- E. May
- F. None of the Above

#### Excavation Safety Plan

141. An excavation safety plan is required in written form. This plan is to be developed to the level necessary to \_\_\_\_\_ with the OSHA Excavation Safety Standard and state and local safety standards.

- A. Stable rock
- B. Type A
- C. Type B
- D. Type C
- E. Cohesive soils
- F. None of the Above

#### Soil Classification and Identification

142. The OSHA Standards define \_\_\_\_\_ within the Simplified Soil Classification Systems, which consist of four categories: Stable rock, Type A, Type B, and Type C.

- A. Stable rock
- B. Type A
- C. Type B
- D. Soil classifications
- E. Cohesive soils
- F. None of the Above

143. Stability is greatest in stable rock and decreases through Type A and B to Type C, which is the least \_\_\_\_\_.

- A. Stable
- B. Type A
- C. Type B
- D. Type C
- E. Cohesive soils
- F. None of the Above

144. \_\_\_\_\_ is defined as natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

- A. Stable rock
- B. Type A
- C. Type B
- D. Type C
- E. Cohesive soils
- F. None of the Above

Type A soil is defined as:

145. \_\_\_\_\_ with an unconfined compressive strength of 1.5 tons per square foot (TSF) or greater.

- A. Stable rock
- B. Type A
- C. Type B
- D. Type C
- E. Cohesive soils
- F. None of the Above

146. Cemented soils like caliche and hardpan are considered \_\_\_\_\_.
- A. Stable rock D. Cemented soils
  - B. Type A E. Cohesive soils
  - C. Type B F. None of the Above
147. Soil is NOT \_\_\_\_\_ if: It is fissured.
- A. Stable rock D. Cemented soils
  - B. Type A E. Cohesive soils
  - C. Type B F. None of the Above
148. The soil is subject to vibration from \_\_\_\_\_, pile driving or similar effects.
- A. Stable rock D. Cemented soils
  - B. Type A E. Cohesive soils
  - C. Type B F. None of the Above
149. The soil has been \_\_\_\_\_.
- A. Stable rock D. Cemented soils
  - B. Type A E. Previously disturbed
  - C. Type B F. None of the Above
150. The \_\_\_\_\_ is subject to other factors that would require it to be classified as a less stable material.
- A. Material D. Cemented soils
  - B. Type A E. Cohesive soils
  - C. Type B F. None of the Above
151. The exclusions for \_\_\_\_\_ most generally eliminate it from most construction situations.
- A. Stable rock D. Cemented soils
  - B. Type A E. Cohesive soils
  - C. Type B F. None of the Above
- Type B soil is defined as:
152. \_\_\_\_\_ with an unconfined compressive strength greater than .5 TSF, but less than 1.5 TSF.
- A. Stable rock D. Cemented soils
  - B. Type A E. Cohesive soils
  - C. Type B F. None of the Above
153. \_\_\_\_\_ including angular gravel, silt, silt loam, and sandy loam.
- A. Dry rock D. Previously disturbed
  - B. Type A E. Granular cohesion-less soil
  - C. Type B F. None of the Above
154. The soil has been previously disturbed, except soil classified as \_\_\_\_\_.
- A. Dry rock D. Previously disturbed
  - B. Type A E. Granular cohesion-less soil
  - C. Type C F. None of the Above
155. Soil that meets the unconfined compressive strength requirements of \_\_\_\_\_ soil, but is fissured or subject to vibration.
- A. Dry rock D. Previously disturbed
  - B. Type A E. Granular cohesion-less soil
  - C. Type B F. None of the Above

156. \_\_\_\_\_ that is unstable.
- A. Dry rock
  - B. Type A
  - C. Type B
  - D. Previously disturbed
  - E. Granular cohesion-less soil
  - F. None of the Above

Type C soil is defined as:

157. \_\_\_\_\_ with an unconfined compressive strength of .5 TSF or less.
- A. Dry rock
  - B. Type A
  - C. Type B
  - D. Previously disturbed
  - E. Cohesive soil
  - F. None of the Above

158. \_\_\_\_\_ including gravel, sand and loamy sand.

- A. Dry rock
- B. Type A
- C. Type B
- D. Granular soils
- E. Granular cohesion-less soil
- F. None of the Above

159. \_\_\_\_\_ or soil from which water is freely seeping.

- A. Dry rock
- B. Type A
- C. Type B
- D. Submerged soil
- E. Granular cohesion-less soil
- F. None of the Above

#### Soil Test & Identification

160. The competent person will classify the soil type in accordance with the definitions in Appendix A based on at least one visual and \_\_\_\_\_.

- A. Supporting data
- B. One manual analysis
- C. Changing conditions
- D. Unconfined compressive strength
- E. Cohesiveness and plasticity
- F. None of the Above

161. These tests should be run on freshly excavated samples from the excavation and are designed to determine stability based on a number of criteria: the \_\_\_\_\_, the presence of fissures, the presence and amount of water, the unconfined compressive strength, and the duration of exposure, undermining, and the presence of layering, prior excavation and vibration.

- A. Supporting data
- B. One manual analysis
- C. Changing conditions
- D. Unconfined compressive strength
- E. Cohesiveness
- F. None of the Above

162. The \_\_\_\_\_ are based on methods to determine the presence of clay. Clay, silt, and sand are size classifications, with clay being the smallest sized particles, silt intermediate and sand the largest.

- A. Supporting data
- B. One manual analysis
- C. Changing conditions
- D. Unconfined compressive strength
- E. Cohesion tests
- F. None of the Above

163. Clay minerals exhibit good \_\_\_\_\_ (can be molded). Sand exhibits no elasticity and virtually no cohesion unless surface wetting is present.

- A. Supporting data
- B. One manual analysis
- C. Changing conditions
- D. Unconfined compressive strength
- E. Cohesion and plasticity
- F. None of the Above

164. The degree of \_\_\_\_\_ depend on the amounts of all three types and water.

- A. Supporting data
- B. One manual analysis
- C. Changing conditions
- D. Unconfined compressive strength
- E. Cohesiveness and plasticity
- F. None of the Above

165. The competent person will \_\_\_\_\_ of the excavation to obtain consistent, supporting data along its depth and length.

- A. Perform several tests
- B. One manual analysis
- C. Changing conditions
- D. Unconfined compressive strength
- E. Cohesiveness and plasticity
- F. None of the Above

166. The soil is subject to \_\_\_\_\_ within the scope of an excavation and the moisture content will vary with weather and job conditions.

- A. Supporting data
- B. One manual analysis
- C. Change several times
- D. Unconfined compressive strength
- E. Cohesiveness and plasticity
- F. None of the Above

167. The competent person must also determine the level of protection based on what conditions exist at the time of the test, and allow for \_\_\_\_\_.

- A. Supporting data
- B. One manual analysis
- C. Changing conditions
- D. Unconfined compressive strength
- E. Cohesiveness and plasticity
- F. None of the Above

#### Inspections

168. Daily inspection of excavations, the adjacent areas and protective systems shall be made by the competent person for evidence of a situation that could result in a cave-in, indications of failure of protective systems, \_\_\_\_\_ or other hazardous conditions.

- A. Combustion
- B. Knowledge
- C. Hazardous atmospheres
- D. Inspections
- E. Flammable atmosphere
- F. None of the Above

169. All \_\_\_\_\_ shall be conducted by the competent person prior to the start of work and as needed throughout the shift.

- A. Combustion
- B. Knowledge
- C. Heavier than air
- D. Inspections
- E. Flammable atmosphere
- F. None of the Above

170. \_\_\_\_\_ will be made after every rainstorm or any other increasing hazard.

- A. Combustion
- B. Knowledge
- C. Heavier than air
- D. Inspections
- E. Flammable atmosphere
- F. None of the Above

171. All documented \_\_\_\_\_ will be kept on file in the jobsite safety files and forwarded to the Safety Director weekly.

- A. Combustion
- B. Knowledge
- C. Heavier than air
- D. Inspections
- E. Flammable atmosphere
- F. None of the Above

172. The competent person(s) must be trained in accordance with the OSHA Excavation Standard, and all other programs that may apply (examples Hazard Communication, Confined Space, and Respiratory Protection), and must demonstrate a thorough understanding and \_\_\_\_\_ of the programs and the hazards associated.

- A. Combustion
- B. Knowledge
- C. Heavier than air
- D. Inspections
- E. Flammable atmosphere
- F. None of the Above

173. All other employees working in and around the excavation must be trained in the recognition of hazards associated with \_\_\_\_\_.

- A. Combustion
- B. Knowledge
- C. Heavier than air
- D. Inspections
- E. Trenching and excavating
- F. None of the Above

Excavation and Confined Space Hazards

Flammable Atmospheres

174. A \_\_\_\_\_ generally arises from enriched oxygen atmospheres, vaporization of flammable liquids, byproducts of work, chemical reactions, concentrations of combustible dusts, and desorption of chemicals from inner surfaces of the confined space.

- A. Combustion
- B. Knowledge
- C. Heavier than air
- D. Combustible dusts
- E. Flammable atmosphere
- F. None of the Above

175. An atmosphere becomes flammable when the ratio of oxygen to \_\_\_\_\_ in the air is either too rich or too lean for combustion to occur.

- A. Combustion
- B. Liquid hydrocarbons
- C. Heavier than air
- D. Combustible gases
- E. Combustible material
- F. None of the Above

176. \_\_\_\_\_ or vapors will accumulate when there is inadequate ventilation in areas such as a confined space.

- A. Combustion
- B. Liquid hydrocarbons
- C. Heavier than air
- D. Combustible gases
- E. Flammable atmosphere
- F. None of the Above

177. \_\_\_\_\_ such as acetylene, butane, propane, hydrogen, methane, natural or manufactured gases or vapors from liquid hydrocarbons can be trapped in confined spaces, and since many gases are heavier than air, they will seek lower levels as in pits, sewers, and various types of storage tanks and vessels.

- A. Combustion
- B. Liquid hydrocarbons
- C. Confined space
- D. Combustible gases
- E. Flammable gases
- F. None of the Above

178. In a closed top tank, it should also be noted that lighter than air gases may rise and develop a \_\_\_\_\_ if trapped above the opening.

- A. Combustion
- B. Air gases
- C. Heavier than air
- D. Flammable concentration
- E. Flammable atmosphere
- F. None of the Above

179. The byproducts of work procedures can generate flammable or \_\_\_\_\_ within a confined space.

- A. Explosive conditions
- B. Liquid hydrocarbons
- C. Confined space
- D. Combustible gases
- E. Flammable atmosphere
- F. None of the Above

180. Specific kinds of work, such as spray painting, can result in the release of \_\_\_\_\_ or vapors.

- A. Combustion
- B. Liquid hydrocarbons
- C. Confined space
- D. Explosive gases
- E. Flammable atmosphere
- F. None of the Above

181. Welding in a confined space is a major cause of \_\_\_\_\_ in areas that contain combustible gas.

- A. Combustion
- B. Explosions
- C. Confined space
- D. Combustible gases
- E. Flammable atmosphere
- F. None of the Above

182. Chemical reactions forming flammable atmospheres occur when surfaces are initially exposed to the atmosphere, or when chemicals combine to form\_\_\_\_\_.

- A. Combustion
- B. Liquid hydrocarbons
- C. Flammable gases
- D. Combustible gases
- E. Flammable atmosphere
- F. None of the Above

183. This condition arises when dilute sulfuric acid reacts with iron to form hydrogen or when calcium carbide makes contact with water to form\_\_\_\_\_.

- A. Condition
- B. Liquid hydrocarbons
- C. Acetylene
- D. Combustible gases
- E. Flammable atmosphere
- F. None of the Above

184. Other examples of \_\_\_\_\_that may produce explosions from small amounts of unstable compounds are acetylene-metal compounds, peroxides, and nitrates.

- A. Condition
- B. Flammable deposits
- C. Electrostatic charges
- D. Spontaneous chemical reactions
- E. Flammable atmosphere(s)
- F. None of the Above

185. In a dry state, these compounds have the potential to explode upon \_\_\_\_\_to increased temperature.

- A. Condition
- B. Flammable deposits
- C. Electrostatic charges
- D. Combustible gases
- E. Flammable atmosphere(s)
- F. None of the Above

186. Another class of \_\_\_\_\_that form flammable atmospheres arises from deposits of pyrophoric substances (carbon, ferrous oxide, ferrous sulfate, iron, etc.) that can be found in tanks used by the chemical and petroleum industry.

- A. Condition
- B. Flammable deposits
- C. Electrostatic charges
- D. Chemical reactions
- E. Flammable atmosphere(s)
- F. None of the Above

187. These tanks containing \_\_\_\_\_ will spontaneously ignite upon exposure to air.

- A. Condition
- B. Flammable deposits
- C. Electrostatic charges
- D. Combustible gases
- E. Flammable atmosphere(s)
- F. None of the Above

188. \_\_\_\_\_concentrations are usually found during the process of loading, unloading, and conveying grain products, nitrated fertilizers, finely ground chemical products, and any other combustible material.

- A. Condition
- B. Flammable deposits
- C. Electrostatic charges
- D. Combustible dust
- E. Flammable atmosphere(s)
- F. None of the Above

189. High charges of \_\_\_\_\_, which rapidly accumulate during periods of relatively low humidity (below 50%) can cause certain substances to accumulate electrostatic charges of sufficient energy to produce sparks and ignite a flammable atmosphere.

- A. Condition
- B. Static electricity
- C. Electrostatic charges
- D. Combustible gases
- E. Flammable atmosphere(s)
- F. None of the Above

190. These sparks may also cause explosions when the right air or \_\_\_\_\_to dust or gas mixture is present.

- A. Oxygen
- B. Flammable deposits
- C. Electrostatic charges
- D. Combustible gases
- E. Flammable atmosphere(s)
- F. None of the Above

## Toxic Atmospheres

The sources of toxic atmospheres encountered may arise from the following:

191. The manufacturing process (for example, in producing polyvinyl chloride, \_\_\_\_\_ is used as well as vinyl chloride monomer, which is carcinogenic).

- A. Toxic gases
- B. Carbon monoxide (CO)
- C. Hydrogen chloride
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Flammable atmosphere(s)
- F. None of the Above

192. The product stored [removing decomposed organic material from a tank can liberate toxic substances, such as \_\_\_\_\_].

- A. Toxic gases
- B. Carbon monoxide (CO)
- C. Hydrogen chloride
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Flammable atmosphere(s)
- F. None of the Above

193. The operation performed in the confined space (for example, welding or brazing with metals capable of producing \_\_\_\_\_).

- A. Toxic fumes
- B. Carbon monoxide (CO)
- C. Hydrogen chloride
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Flammable atmosphere(s)
- F. None of the Above

194. During loading, unloading, formulation, and production, mechanical and/or human error may also produce \_\_\_\_\_ which are not part of the planned operation.

- A. Toxic gases
- B. Carbon monoxide (CO)
- C. Hydrogen chloride
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Flammable atmosphere(s)
- F. None of the Above

195. \_\_\_\_\_ is a hazardous gas that may build up in a confined space.

- A. Toxic gases
- B. Carbon monoxide (CO)
- C. Hydrogen chloride
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Flammable atmosphere(s)
- F. None of the Above

196. This odorless, colorless gas that has approximately the same density as air is formed from incomplete combustion of organic materials such as wood, coal, gas, oil, and gasoline; it can be formed from microbial decomposition of organic matter in sewers, silos, and fermentation tanks. \_\_\_\_\_ is an insidious toxic gas because of its poor warning properties.

- A. Toxic gases
- B. Carbon monoxide or (CO)
- C. Sewage treatment plants
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Combustible gas indicator
- F. None of the Above

197. Early stages of \_\_\_\_\_ intoxication are nausea and headache.

- A. Toxic gases
- B. Carbon monoxide or (CO)
- C. Sewage treatment plants
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Combustible gas indicator
- F. None of the Above

198. \_\_\_\_\_ may be fatal at 1000 ppm or 10% in air, and is considered dangerous at 200 ppm or 2%, because it forms Carboxyhemoglobin in the blood which prevents the distribution of oxygen in the body.

- A. Toxic gases
- B. Carbon monoxide or (CO)
- C. Sewage treatment plants
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Combustible gas indicator
- F. None of the Above

199. CO is a relatively abundant colorless, odorless gas, therefore, any untested atmosphere must be suspect. It must also be noted that a safe reading on a combustible gas indicator does not ensure that \_\_\_\_\_ is not present.

- A. Toxic gases
- B. Carbon monoxide or (CO)
- C. Sewage treatment plants
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Combustible gas indicator
- F. None of the Above

200. \_\_\_\_\_ must be tested for specifically.

- A. Toxic gases
- B. Carbon monoxide or (CO)
- C. Sewage treatment plants
- D. Hydrogen sulfide (H<sub>2</sub>S)
- E. Combustible gas indicator
- F. None of the Above

Please fax or e-mail the answer key to TLC  
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