**Contractor Exam**

**Concrete Interlocking Pavers and Segmental Retaining Wall**

1. In the USDA Soil Classification system, *soil* particle sizes fall into three groups: sand, silt, and clay.
2. True
3. False
4. Excess fines in the bedding layer will slow the drainage of water from the bedding sand; lubricate the larger particles, causing the sand and pavers to rut under traffic.
5. True
6. False
7. The ICPI recommends compacting the bedding sand after the pavers are placed on it.
   1. True
   2. False
8. Ends of geotextile fabric should overlap by at least:
   1. 16 inches
   2. 12 inches
   3. 6 inches
   4. 8 inches
9. With a higher density from compaction, soils and base are better able to support loads.
   1. True
   2. False
10. Woven Soil Stabilization Fabric should always be used between the sub-base and the aggregate base.
    1. True
    2. False
11. As foundations under pavements, all clays perform equally.
    1. True
    2. False
12. The aggregate base should stop at the edge restraint and not extend beyond it if the restraint is the type designed to sit directly on the base.
    1. True
    2. False
13. Daily time sheets are used by the foreman to record all labor and materials by job function for each day on a given job.
    1. True
    2. False
14. The COVER of the job jacket should list:
    1. Project Name
    2. Contact Persons w/phone and email.
    3. Project Address
    4. All the above
15. The pyramid-shaped laying face technique used to help keep joint lines straight and create square corners is called the 3-4-5 method.
    1. True
    2. False
16. Concrete pavers for streets and parking lots should have an aspect ratio (length to thickness) of no greater than:
    1. 3:1
    2. 6:1
    3. 5:1
17. 3 1/8 inch (80 mm) thick pavers provide a greater rotational interlock than 2 3/8 (60 mm) thick pavers.
    1. True
    2. False
18. The minimum recommended base thickness (after compaction) for residential driveways on well-drained soil is:
    1. 3 inch (7.5cm)
    2. 4 inch (10cm)
    3. 6 inch (15 cm)
    4. 5 inch (13 cm)
19. Geotextile fabric is not particularly useful on jobs on clay soils.
    1. True
    2. False
20. Paving slabs are the same thickness as pavers and interlock in a similar fashion.
    1. True
    2. False
21. The ratio of a paving units overall length to its thickness is called the
    1. Size ratio
    2. Aspect ratio
    3. Plan ratio
    4. Unit ratio
22. To achieve maximum density, knowing the optimum moisture content of the soil is very important.
    1. True
    2. False
23. Interlock in interlocking concrete pavement is achieved by the shape of a paver only.
    1. True
    2. False
24. To ensure that paver joints run straight throughout a typical project, snap chalk lines perpendicular to the laying face into the sand with a chalk box string every six to ten feet (2-3 m)
    1. True
    2. False
25. Geotextiles allow you to decrease the total base thickness that would normally be used for a given application
    1. True
    2. False
26. Edge restraints can be made of a variety of materials including concrete, plastic, stone, aluminum, and steel.
    1. True
    2. False
27. Using typical smaller compaction equipment requires that aggregate base to be compacted in 2-4” lifts.
    1. True
    2. False
28. The initial paver compaction can be done after the jointing sand is placed or spread into the joints.
    1. True
    2. False
29. If the base material is too dry, water should be added to each lift prior to compaction.
    1. True
    2. False
30. Interlocking concrete pavements are designed to distribute the loads only within the concrete pavers.
    1. True
    2. False
31. It is important to check the depth of sand in the paver joints after vibrating sand into them to ensure full joints and proper interlock among the pavers.
    1. True
    2. False
32. The chiseled/rounded edge around the perimeter of the paver face is known as a:
    1. Flange
    2. Spacer bar
    3. Joint
    4. Chamfer
33. Settlement of interlocking concrete pavements is more likely to occur next to corners, edge restraints, catch basins and utility structures.
    1. True
    2. False
34. Interlocking concrete pavements can move slightly from normal movement in the soil and from seasonal changes in moisture without losing their load-spreading ability.
    1. True
    2. False
35. The main purpose of the chamfer on a paver is to:
    1. Reduce the potential for chipping the paver face
    2. Maintain a minimum space between pavers.
    3. Look more attractive.
    4. Hide efflorescence.
36. A paving unit with aspect ratio (length to thickness) of 5:1 is acceptable in areas subject to constant tire traffic:
    1. True
    2. False
37. Which of these is a basic type of interlock?
    1. Vertical
    2. Horizontal
    3. Rotational
    4. All the above
38. String lines (or chalk lines) may be used to check the squareness of a corner by using the:
    1. 1-2-3 triangle
    2. 3-4-5 triangle
    3. 4-5-6 triangle
    4. 2-3-4 triangle
39. Some sandy soils have such high bearing capacities that an aggregate base is not required.
    1. True
    2. False
40. Geotextile is optional for overlays over concrete or asphalt.
    1. True
    2. False
41. In U.S. and Canadian product standards for concrete pavers, a paver has a maximum aspect ratio of:
    1. 4:1
    2. 2:1
    3. 3:1
    4. None of the above
42. Running bond patterns provide greater resistance to horizontal creep than herringbone patterns.
    1. True
    2. False
43. Over well-drained soils, the minimum base thickness (after compaction) for sidewalks, patios and pedestrian areas is.
    1. 6 inches (150 mm)
    2. 4 inches (100 mm)
    3. 8 inches (200 mm)
    4. 2 inches (50 mm)
44. ICPI recommends a nominal thickness for the bedding sand layer of:
    1. 2 inches (50 mm)
    2. ½ inches (13 mm)
    3. 1 inches (25 mm)
    4. 1 ½ inches (40 mm)
45. Clay soils can be most efficiently and effectively compacted by:
    1. A reversible plate compactor or a sheepsfoot roller
    2. A small hand tamper.
    3. A static roller
    4. A forward plate compactor used to compact pavers.
46. During paver compaction it is best to start near the center of an area and compact gradually out to the perimeter.
    1. True
    2. False
47. Slow lateral movement of pavers (over a long duration) from horizontal forces such as braking tires is called:
    1. Horizontal interlock
    2. Vertical interlock
    3. Horizontal creep
    4. Rotation
48. Prior to sealing pavers, best practices state a contractor should:
    1. Thoroughly clean paver surface
    2. Re-sweep any sand loss in paver joints.
    3. Allow pavers to thoroughly dry.
    4. All the above
49. Standard Polymeric Sand can be applied in wet or dry conditions?
    1. True
    2. False
50. It may be necessary to back roll your Penetrating Sealer if you have clefted paver surfaces?
    1. True
    2. False
51. Concrete pavers and concrete paving slabs are two products which spread applied loads differently.
    1. True
    2. False
52. Improper edge restraint is a common factor affecting the loss of interlock. Another common reason for loss of interlock is:
    1. Loss of jointing sand
    2. Thickness of bedding sand
    3. Strength of geotextile
    4. None of the above
53. Joint sand stabilizers are recommended in areas with concentrated surface runoff. Other areas where joint stabilizers should be considered are:
    1. High wind areas
    2. Applications with tumbled products or products with wider joints
    3. High slope areas
    4. All the above
54. Edge restraints hold the pavers tightly together, enabling a consistent interlock of the units across the pavement.
    1. True
    2. False
55. The ground below the SRW (Segmented Reinforced Wall) system:
    1. Must be strong enough to support the SRW system.
    2. Impacts the amount of potential settlement the SRW may undergo.
    3. Both A&B
    4. None of the above
56. A slope below the wall does not influence the SRW stability.
    1. True
    2. False
57. What is the minimum recommended wall embedment?
    1. 3 inches (75 mm)
    2. 6 inches (150 mm)
    3. 12 inches (300 mm)
    4. 18 inches (450 mm)
58. What is the function of the leveling pad?
    1. Provides uniform, level surface for placement of SRW units.
    2. Provides support for SRW units by distributing their weights over a wider area
    3. In some cases, provides a drainage zone at the base of the wall
    4. All the above
59. What is the recommended minimum thickness of a compacted aggregate leveling pad?
    1. 3 inches (75 mm)
    2. 6 inches (150 mm)
    3. 8 inches (200 mm)
    4. 12 inches (300 mm)
60. The leveing pad should extend a minimum of \_\_\_\_ beyond the front and back faces of the segmental retaining wall units.
    1. 4 inches (100 mm)
    2. 6 inches (150 mm)
    3. 8 inches (200 mm)
    4. 12 inches (300 mm)
61. What is the recommended minimum drainage pipe diameter?
    1. 2 inches (50 mm)
    2. 4 inches (100 mm)
    3. 6 inches (150 mm)
    4. 8 inches (200 mm)
62. The first course of wall units must be leveled front to back and side to side.
    1. True
    2. False
63. Where should you start building your wall?
    1. The highest leveling pad elevation
    2. The lowest leveling pad elevation
64. The front textured face of an SRW unit is the recommended location for checking wall alignment with a string line
    1. True
    2. False
65. Each SRW unit must be moved forward toward the face of the wall to engage pins, connectors, shear keys, or concrete lips prior to placing and compacting backfill.
    1. True
    2. False
66. What type of equipment is recommended for compacting gravel near or within 3 ft of the wall face?
    1. Vibratory plate compactor
    2. Sheep-foot compactor
    3. Ride-on vibratory roller compactor
    4. Jumping jack tamp compactor.
67. Gravels do not require to be compacted as they are self-compacting
    1. True
    2. False
68. What are considerations when selecting compacting equipment?
    1. Site access
    2. Type of soil
    3. Closeness to the SRW units
    4. All the above
69. What is the minimum distance from the back of the wall unit where heavy compaction equipment should not be used?
    1. 1 foot (300 mm)
    2. 3 feet (1 m)
    3. 5 feet (1.5 m)
    4. No minimum
70. What is the recommended minimum compaction requirement for SRW construction?
    1. 85% standard Proctor density
    2. 90% standard Proctor density
    3. 95% standard Proctor density
    4. 100% standard Proctor density
71. The soil moisture content (amount of water in the soil) affects the ability to properly compact the soil.
    1. True
    2. False
72. Smaller compaction equipment can attain the same compaction with the same lift thicknesses as larger compactors
    1. True
    2. False
73. Soil reinforcement can be defined as “horizontal layers of geosynthetic that unifies the soil to create a composite mass.”
    1. True
    2. False
74. Most soil reinforcement (geogrid) products have the same strengths in both directions.
    1. True
    2. False
75. For typical SRW construction, what is the recommended minimum geogrid reinforcement length?
    1. 40% of the wall
    2. 70% of the wall
    3. 60% of the wall
    4. 100% of the wall
76. When placing geogrid at curves or corners, what is the minimum soil cover when two layers of geogrid overlap?
    1. 1 inch (25 mm)
    2. 3 inches (75 mm)
    3. 5 inches (125 mm)
    4. 7 inches (175 mm)
77. What is the minimum soil cover before operating equipment over a layer of geogrid?
    1. 2 inches (50 mm)
    2. 4 inches (100 mm)
    3. 6 inches (150 mm)
    4. 8 inches (200 mm)
78. The primary strength direction in the geosynthetic reinforcement is rolled out \_\_\_\_ to the wall face
    1. Perpendicular (away from wall)
    2. Parallel (along the wall face)
79. Prior to backfilling and compacting, the geosynthetic reinforcement is pulled taut-removing slack and wrinkles-and secured.
    1. True
    2. False
80. It is recommended to secure cap units using an approved construction adhesive in accordance with the cap unit manufacturer’s recommendations.
    1. True
    2. False
81. It is recommended to secure cap units using an approved construction adhesive in accordance with the cap unit manufacturer’s recommendations.
    1. True
    2. False
82. There are two (2) basic categories of segmental wall systems: gravity walls and reinforced soil walls
    1. True
    2. False
83. What influences the stability of gravity SRWs?
    1. Weight, depth and batter of the SRW unit
    2. Type of backfill soil.
    3. Top slope or surcharge load
    4. All the above
84. The size, mass, and setback of an SRW unit in a gravity wall influences that wall’s resistance to movement
    1. True
    2. False
85. A gravity SRW using clay backfill soils can be constructed to a height greater than a gravity SRW using gravel backfill soils
    1. True
    2. False
86. Proprietary estimating charts are recommended for \_\_\_\_\_\_\_\_\_\_\_\_.
    1. Estimating material quantities
    2. Estimating extent of excavation
    3. Construction of a wall
    4. Both A and B
87. When constructing tiered retaining walls, locating the upper tier a distance equal to 2 times the height of the lower tier away from the lower tier reduces the influence of the upper tier on the stability of the lower tier.
    1. True
    2. False
88. Dimensional tolerance is most critical for which block dimension?
    1. Length (parallel to wall face)
    2. Width or depth (perpendicular to wall face)
    3. Height
    4. All the above
89. Roadway or driveway traffic is an example of a live load.
    1. True
    2. False
90. A building behind the SRW represents what type of surcharge load?
    1. Dead load
    2. Live load
    3. All the above
    4. None of the above
91. Snow piles (placed on top if retaining walls during snow clearing operations) affect wall stability in what manner?
    1. Creates an additional load that may not have been considered in the design.
    2. Creates a source of water that may not have been considered in the design.
    3. Creates no additional concern for wall stability.
    4. Both A and B
92. What can influence the strength of soil?
    1. Compaction
    2. Water
    3. Type of soil
    4. All the above
93. The strength of gravel is greater than that of clay.
    1. True
    2. False
94. During construction, it is recommended to grade behind the wall in a manner that diverts water away from the back of the wall facing units.
    1. True
    2. False
95. What effect can water have on soil?
    1. Reduces the strength of the soil.
    2. Increases the lateral pressure exerted on the wall.
    3. Increases the strength of the soil.
    4. A and B
    5. B and C
96. Field changes to reinforcement length, type, and spacing are acceptable without review by the Engineer of Record.
    1. True
    2. False
97. All gravity SRWs are limited to wall heights less than 4 feet (1.2m).
    1. True
    2. False
98. If the wall batter is the same, the use of heavier, deeper (front to back) SRW units allows for construction.
    1. True
    2. False
99. Poorly compacted water saturated soils can exert a lateral load \_\_\_\_\_\_\_\_.
    1. Equal to that of soil alone.
    2. Half the lateral pressure applied by soil alone.
    3. 1.5 to 2 times the lateral pressure applied by soil alone.
    4. 5 to 6 times the lateral pressure applied by soil alone.
100. During excavation, care should be taken so as not to undermine or jeopardize the stability of the adjacent structures?
     1. True
     2. False
101. If compaction operations are altering wall alignment, it is acceptable to not compact near the wall face and continue with wall construction.
     1. True
     2. False
102. Professional/engineering review is recommended when considering tiered retaining walls.
     1. True
     2. False
103. In what manner should the soil placement and compaction proceed?
     1. From the start of wall to the end of wall
     2. From the tail of the geosynthetic reinforcement to the SRW unit.
     3. Within 3’ of the wall face first, then backfill area second.
     4. Sequence and direction of soil placement and compaction is not important.
104. Utilities that pass through the reinforced soil zone pose what type(s) of risk?
     1. Potential source of subsurface water
     2. Potential zone of localized settlement
     3. Potential risk for cutting soil reinforcement during future access activities.
     4. All the above.