

PRACTICE EXAM 14: ISA CERTIFIED ARBORIST SIMULATION

PRACTICE EXAM 14 — QUESTIONS 1–200

Time limit: 3 hours 30 minutes. Each question has exactly one correct answer.

1. A tree with a 20-inch DBH has a Critical Root Zone radius of approximately how many feet?
 - A. 10 feet from the trunk outward
 - B. 20 feet from the trunk outward
 - C. 40 feet from the trunk outward
 - D. 5 feet from the trunk outward

2. A newly planted tree with a 4-inch trunk caliper will typically require approximately how many growing seasons to establish?
 - A. One growing season regardless of caliper
 - B. Two growing seasons at most
 - C. Four growing seasons, one per caliper inch
 - D. Ten growing seasons regardless of caliper

3. The maximum percentage of live foliage that should typically be removed from a mature tree in a single pruning session is approximately:
 - A. 10 to 15 percent of live foliage

B. 25 to 30 percent of live foliage

C. 50 percent of live foliage

D. 75 percent of live foliage

4. A proper mulch ring around a landscape tree should be how many inches deep?

A. 6 to 8 inches against the trunk

B. Less than half an inch as a dusting

C. 10 to 12 inches piled against the trunk

D. 2 to 4 inches with the trunk kept clear

5. The neutral value on the soil pH scale is:

A. 5.0 on the standard scale

B. 0.0 at the scale minimum

C. 7.0 at the scale midpoint

D. 14.0 at the scale maximum

6. A perc test showing water draining in 36 hours is:

A. Ideal for nearly all tree species

B. Inadequate for most tree species

C. Excessive and likely to dry out roots

D. Acceptable only for drought-tolerant species

7. An ideal mineral soil contains approximately what percentage of pore space?

- A. 10 percent of the total volume
- B. 25 percent of the total volume
- C. 75 percent of the total volume
- D. 50 percent of the total volume

8. A bulk density reading of 1.8 g/cm^3 in mineral soil indicates:

- A. Severe compaction halting most root growth
- B. Loose soil supporting healthy roots
- C. Typical healthy forest topsoil
- D. The optimal range for root expansion

9. Under ANSI Z133, the minimum approach distance for an unqualified worker to an energized distribution line below 50 kV is:

- A. 3 feet in any direction
- B. 5 feet in any direction
- C. 25 feet in any direction
- D. 10 feet in any direction

10. OSHA requires hearing protection when noise levels exceed approximately:

- A. 85 decibels of typical chainsaw operation
- B. 30 decibels of normal conversation
- C. 50 decibels of quiet outdoor activity

D. 120 decibels of extreme machinery use

11. The minimum tensile strength required for an arboricultural climbing rope under ANSI Z133 is approximately:

- A. 1,800 pounds for residential climbing
- B. 5,400 pounds per the current standard
- C. 3,000 pounds for routine maintenance
- D. 10,000 pounds for any climbing operation

12. The working load limit of rigging equipment is commonly calculated as approximately what fraction of the rated tensile strength?

- A. Nine-tenths of the rated strength
- B. One-half of the rated strength
- C. One-tenth of the rated strength
- D. Equal to the rated strength itself

13. A rigging rope with a tensile strength of 14,000 pounds has a working load limit of approximately:

- A. 1,400 pounds at one-tenth of tensile
- B. 7,000 pounds at one-half of tensile
- C. 12,600 pounds at nine-tenths of tensile
- D. 14,000 pounds at the full rating

14. A block redirecting a rigging load over an anchor experiences approximately how much force compared to the load itself?

- A. Half the force of the load
- B. Equal to the force of the load
- C. No additional force when installed properly
- D. Twice the force of the load

15. The hinge width in a standard felling cut should be approximately:

- A. 50 percent of the trunk diameter
- B. 25 percent of the trunk diameter
- C. 10 percent of the trunk diameter
- D. 1 percent of the trunk diameter

16. The 10-20-30 rule of urban tree diversity limits maximum percentages at which three taxonomic levels?

- A. Order, family, and genus combined
- B. Species, genus, and family
- C. Cultivar, species, and genus levels
- D. Variety, subspecies, and class levels

17. A Tree City USA community must maintain a minimum forestry budget of approximately:

- A. Ten dollars per capita annually
- B. Two dollars per capita annually
- C. Fifty dollars per capita annually

D. One hundred dollars per capita annually

18. Most of a mature tree's absorbing roots are concentrated in the upper how many inches of soil?

A. 30 to 36 inches below the surface

B. 48 to 60 inches below the surface

C. Below 72 inches in the deeper subsoil

D. 12 to 18 inches below the surface

19. ANSI A300 governs which area of professional tree work?

A. Tree pruning and maintenance practices

B. Arboricultural safety requirements

C. Quality standards for nursery stock

D. Head protection specifications only

20. A climbing rope is being selected for arboricultural use. Which of the following tensile strengths meets the current ANSI Z133 minimum?

A. 2,800 pounds tested to standard

B. 4,200 pounds tested to standard

C. 5,400 pounds tested to standard

D. Any rated climbing rope regardless of strength

21. A tree's root system typically extends how far beyond the dripline compared to the crown radius?

A. Two to three times the crown radius

- B. Half of the crown radius
- C. Exactly the crown radius
- D. One-tenth of the crown radius

22. The CRZ formula is based on how many feet of radius per inch of trunk DBH?

- A. Six inches per inch of DBH
- B. One foot per inch of DBH
- C. Two feet per inch of DBH
- D. Three feet per inch of DBH

23. A 36-inch DBH oak has a CRZ radius of approximately:

- A. 12 feet from the trunk
- B. 18 feet from the trunk
- C. 24 feet from the trunk
- D. 36 feet from the trunk

24. The pH scale runs from which two values?

- A. 1 to 10 with 5 as neutral
- B. 0 to 7 with 3.5 as neutral
- C. 0 to 14 with 7 as neutral
- D. 0 to 20 with 10 as neutral

25. A planting hole for a container-grown tree should be approximately how wide relative to the root ball?

- A. Exactly the diameter of the root ball
- B. Half the diameter of the root ball
- C. Four to five times the root ball diameter
- D. Two to three times the root ball diameter

26. A newly planted 2-inch caliper tree should be expected to require establishment for approximately:

- A. One growing season at minimum
- B. Two growing seasons at one per caliper inch
- C. Six growing seasons at three per inch
- D. Ten growing seasons regardless of caliper

27. Fire blight is caused by a bacterium and affects which plant family?

- A. Pinaceae, the pine family
- B. Sapindaceae, the soapberry family
- C. Rosaceae, the rose family
- D. Fagaceae, the beech family

28. *Fraxinus* (the ash genus) belongs to which plant family?

- A. Oleaceae, the olive family
- B. Rosaceae, the rose family
- C. Sapindaceae, the soapberry family
- D. Pinaceae, the pine family

29. The maximum percentage of any single species under the 10-20-30 rule is:

- A. 10 percent of total plantings
- B. 20 percent of total plantings
- C. 30 percent of total plantings
- D. 50 percent of total plantings

30. The maximum percentage of any single genus under the 10-20-30 rule is:

- A. 10 percent of total plantings
- B. 30 percent of total plantings
- C. 20 percent of total plantings
- D. 50 percent of total plantings

31. The maximum percentage of any single family under the 10-20-30 rule is:

- A. 10 percent of total plantings
- B. 30 percent of total plantings
- C. 20 percent of total plantings
- D. 50 percent of total plantings

32. A newly planted tree typically requires staking for no longer than:

- A. The first decade of growth
- B. The first five years of growth
- C. The first three years of growth
- D. One growing season in most cases

33. Delayed decline following construction damage typically becomes visible after how long?

- A. Within hours of the damaging activity
- B. Within one week of the activity
- C. Months to several years after the event
- D. Only at the first anniversary of the event

34. A tree showing no visible symptoms one year after construction should continue to be monitored for how many additional growing seasons?

- A. No additional monitoring is needed
- B. Only until the next dormant season
- C. Only one additional season
- D. Several more seasons for delayed decline

35. Construction monitoring of a damaged tree should continue for approximately:

- A. Three to five growing seasons
- B. Three to five months only
- C. One growing season only
- D. The lifetime of the tree

36. Concrete washout within a Tree Protection Zone is harmful primarily because:

- A. The aggregate physically damages roots
- B. The high pH of the washwater can sterilize soil
- C. The vibration disturbs fine root hairs

D. The cement sets around root surfaces

37. A perc test draining in 6 hours or less is typically classified as:

A. Inadequate for most species

B. Adequate for most tree species

C. Always indicative of root rot potential

D. Never acceptable for landscape planting

38. The upper limit of bulk density for typical healthy tree root growth is approximately:

A. 1.5 g/cm³ or lower

B. 2.0 g/cm³ or higher

C. 2.5 g/cm³ in all soils

D. 3.0 g/cm³ in clay soils

39. A tree with a 30-inch DBH has a CRZ radius of approximately:

A. 10 feet from the trunk

B. 15 feet from the trunk

C. 20 feet from the trunk

D. 30 feet from the trunk

40. Tree protection fencing should be placed at which boundary?

A. The trunk directly

B. Halfway between trunk and dripline

- C. The CRZ boundary or beyond
- D. Just inside the dripline

41. A tree with a 12-inch DBH has a CRZ radius of approximately:

- A. 3 feet from the trunk
- B. 6 feet from the trunk
- C. 8 feet from the trunk
- D. 12 feet from the trunk

42. A newly planted 5-inch caliper tree will require approximately how many growing seasons to establish?

- A. One growing season
- B. Three growing seasons
- C. Five growing seasons
- D. Ten growing seasons

43. The CODIT model identifies how many walls total?

- A. Two walls
- B. Four walls
- C. Six walls
- D. Eight walls

44. Which CODIT wall is the strongest and is formed by the cambium after wounding?

- A. Wall 4 at the wound margin cambium
- B. Wall 1 plugging vertical xylem
- C. Wall 2 resisting inward decay spread
- D. Wall 3 resisting lateral spread

45. A soil pH value of 7.8 is classified as:

- A. Moderately alkaline above neutral
- B. Neutral at the scale midpoint
- C. Moderately acidic below neutral
- D. Strongly acidic near the scale minimum

46. A soil pH value of 5.5 is classified as:

- A. Neutral at the scale midpoint
- B. Acidic below neutral
- C. Alkaline above neutral
- D. Off the standard scale entirely

47. A homeowner with a 15-foot clearance beneath a distribution line should plant a tree with a mature height under approximately:

- A. 30 feet at maturity
- B. 25 feet at maturity
- C. 20 feet at maturity

D. 12 feet at maturity

48. A single-session live foliage removal of 20 percent from a mature tree would be:

A. Within the normal recommended limit

B. Exactly the recommended amount

C. Above the normal recommended limit

D. Below the minimum required amount

49. A 15-inch DBH tree has a CRZ radius of approximately:

A. 5 feet from the trunk

B. 10 feet from the trunk

C. 15 feet from the trunk

D. 30 feet from the trunk

50. A mulch ring of 3 inches depth with the trunk base clear is:

A. Within the recommended range

B. Too shallow for any benefit

C. Too deep and likely to suffocate roots

D. Acceptable only in dry climates

51. OSHA's action level for hearing protection is approximately:

A. 55 decibels of quiet conversation

B. 85 decibels of typical chainsaw operation

- C. 110 decibels of loud construction
- D. 150 decibels of extreme machinery

52. A chainsaw operator measures noise at 95 decibels during cutting. This level is:

- A. Below any hearing protection threshold
- B. At the threshold but not yet required
- C. Safe for unlimited exposure
- D. Above the OSHA protection threshold

53. The kickback zone of a chainsaw is located at:

- A. The bottom edge of the bar
- B. The upper portion of the bar tip
- C. The middle of the bar during use
- D. The rear handle near the throttle

54. A climbing rope rated at 5,000 pounds tensile strength:

- A. Exceeds the ANSI Z133 minimum
- B. Meets the ANSI Z133 minimum exactly
- C. Is acceptable for residential climbing only
- D. Does not meet the ANSI Z133 minimum

55. A climbing rope rated at 6,000 pounds tensile strength:

- A. Does not meet the ANSI Z133 minimum

- B. Meets the minimum exactly for basic use
- C. Exceeds the 5,400-pound ANSI Z133 minimum
- D. Is acceptable only for residential use

56. A rigging rope with 10,000 pounds tensile strength has a working load limit of approximately:

- A. 1,000 pounds at one-tenth of tensile
- B. 5,000 pounds at one-half of tensile
- C. 9,000 pounds at nine-tenths of tensile
- D. 10,000 pounds at the full rating

57. A block redirecting a 500-pound load over an anchor experiences approximately how much force on the anchor?

- A. 250 pounds of anchor force
- B. 500 pounds of anchor force
- C. 750 pounds of anchor force
- D. 1,000 pounds of anchor force

58. A block redirecting a 1,000-pound load over an anchor experiences approximately how much force on the anchor?

- A. 2,000 pounds of anchor force
- B. 1,000 pounds of anchor force
- C. 500 pounds of anchor force
- D. 250 pounds of anchor force

59. A standard felling cut on a 20-inch diameter trunk requires a hinge of approximately how wide?

- A. 5 inches wide at the hinge
- B. 10 inches wide at the hinge
- C. 2 inches wide at the hinge
- D. 20 inches wide at the hinge

60. A standard felling cut on a 30-inch diameter trunk requires a hinge of approximately how wide?

- A. 15 inches wide at the hinge
- B. 3 inches wide at the hinge
- C. 30 inches wide at the hinge
- D. 0.3 inches wide at the hinge

61. A 6-inch caliper tree at planting will typically require approximately how many seasons to establish?

- A. Six growing seasons
- B. One growing season
- C. Three growing seasons
- D. Twelve growing seasons

62. The approximate total number of full-length simulation questions in an official ISA Certified Arborist exam is:

- A. 100 questions
- B. 150 questions
- C. 200 questions

D. 250 questions

63. The ISA Certified Arborist exam time limit is approximately:

A. 1 hour total

B. 2 hours total

C. 2.5 hours total

D. 3.5 hours total

64. Which of the following is the standard passing threshold on many ISA Certified Arborist exam versions?

A. 50 percent correct responses

B. 76 percent correct responses

C. 90 percent correct responses

D. 100 percent correct responses

65. Iron chlorosis in a pin oak growing in soil measured at pH 7.8 most likely results from:

A. A nitrogen deficiency from nearby turf

B. High soil pH rendering iron unavailable

C. Excess potassium suppressing magnesium

D. Sulfur excess from industrial sources

66. A soil pH of 4.5 is classified as:

A. Strongly acidic below neutral

- B. Moderately alkaline above neutral
- C. Neutral at the scale midpoint
- D. Off the standard measurement scale

67. A 50-inch DBH oak has a CRZ radius of approximately:

- A. 10 feet from the trunk
- B. 25 feet from the trunk
- C. 50 feet from the trunk
- D. 100 feet from the trunk

68. A rigging rope has a tensile strength of 20,000 pounds. Its working load limit is approximately:

- A. 10,000 pounds at one-half of tensile
- B. 18,000 pounds at nine-tenths of tensile
- C. 20,000 pounds at the full rating
- D. 2,000 pounds at one-tenth of tensile

69. A climbing helmet for arboricultural work must include which specific feature?

- A. A wide brim for sun protection
- B. An open face design for vision
- C. Reflective tape on all surfaces
- D. A chin strap to retain the helmet

70. The first cut in the three-cut method is made:

- A. From above at the final cut line
- B. Straight down through the top
- C. On the underside beyond the final cut
- D. Parallel to the trunk scoring bark

71. A proper pruning cut is placed just outside which anatomical feature?

- A. The branch collar and bark ridge
- B. The heartwood cylinder
- C. The central pith of the branch
- D. The outer corky layer of the trunk

72. Which of the following is the most common serious error in container-grown tree planting?

- A. Watering too lightly in the first week
- B. Setting the root ball too deep
- C. Failing to stake on all four sides
- D. Using only native backfill soil

73. A 2-inch mulch layer kept clear of the trunk is:

- A. Below the recommended range
- B. Above the recommended range
- C. Within the recommended range
- D. Irrelevant to tree health

74. A 6-inch mulch layer piled against the trunk is:

- A. Within the recommended range
- B. Likely to suffocate roots and cause bark decay
- C. Always beneficial in dry climates
- D. Required for winter protection

75. An arborist asked to remove 50 percent of a mature tree's live foliage should:

- A. Explain that the request violates accepted standards
- B. Comply with only bypass hand pruners
- C. Agree but charge double for the work
- D. Remove only interior branches first

76. The CRZ calculated for a 10-inch DBH tree has a radius of approximately:

- A. 1 foot from the trunk
- B. 5 feet from the trunk
- C. 20 feet from the trunk
- D. 10 feet from the trunk

77. A 3-inch caliper tree planted this spring will typically establish by approximately:

- A. Three growing seasons later
- B. Six months later
- C. One week later with watering
- D. Ten years later

78. Emerald ash borer is classified as a primary pest because it:

- A. Was introduced earlier than native borers
- B. Reproduces only under drought conditions
- C. Requires bark wounds to enter
- D. Attacks healthy ash trees of all sizes

79. Dutch elm disease is spread primarily by:

- A. Soil nematodes feeding on elm roots
- B. Elm bark beetles and root grafts
- C. Wind dispersing spores at distance
- D. Rain splash from infected foliage

80. A tree with paired winged samaras and opposite leaf arrangement is most likely a member of which genus?

- A. *Quercus* (oak)
- B. *Fraxinus* (ash)
- C. *Acer* (maple)
- D. *Pinus* (pine)

81. Which of the following is NOT a genus in the MAD Horse mnemonic?

- A. *Acer* (maple)
- B. *Quercus* (oak)
- C. *Cornus* (dogwood)

D. *Aesculus* (horse chestnut)

82. A CRZ formula of 1 foot per inch of DBH applied to a 25-inch DBH tree gives a radius of approximately:

- A. 12.5 feet from the trunk
- B. 15 feet from the trunk
- C. 25 feet from the trunk
- D. 50 feet from the trunk

83. A 14-inch DBH tree has a CRZ radius of approximately:

- A. 7 feet from the trunk
- B. 10 feet from the trunk
- C. 20 feet from the trunk
- D. 14 feet from the trunk

84. A tree pruning budget of \$2 per capita in a 10,000-person city equals approximately:

- A. \$20,000 in annual forestry funding
- B. \$2,000 in annual forestry funding
- C. \$200,000 in annual forestry funding
- D. \$200 in annual forestry funding

85. A Tree City USA community with 25,000 residents must maintain a minimum forestry budget of approximately:

- A. \$5,000 per year at minimum

- B. \$250,000 per year at minimum
- C. \$25,000 per year at minimum
- D. \$50,000 per year at minimum

86. The ANSI Z133 minimum approach distance of 10 feet applies to which line voltage range?

- A. Below 600 volts only
- B. Below 50 kV for unqualified workers
- C. Above 500 kV only
- D. Any voltage regardless of classification

87. A tree at pH 4.0 soil is growing in what condition?

- A. Strongly acidic below neutral
- B. Moderately alkaline above neutral
- C. Neutral at the scale midpoint
- D. Off the standard measurement scale

88. A soil with bulk density of 1.2 g/cm^3 is generally:

- A. Severely compacted and halting roots
- B. At the upper limit for root growth
- C. Loose and supporting healthy roots
- D. Typical of industrial fill material

89. A loam soil contains which balanced proportions of particles?

- A. Mostly fine clay with minor sand
- B. Mostly coarse sand with minor clay
- C. Balanced sand, silt, and clay content
- D. Organic matter with no minerals

90. The first cut in the three-cut method is made how far beyond the final cut location?

- A. Several inches beyond the final cut
- B. Exactly at the final cut location
- C. Six feet beyond the final cut
- D. Just below the branch collar itself

91. A mature tree's absorbing roots are concentrated in the upper how many inches of soil?

- A. 30 to 40 inches deep
- B. 50 to 60 inches deep
- C. Below 72 inches deep
- D. 12 to 18 inches deep

92. Most absorbing roots of a mature tree extend to approximately how many times the crown radius?

- A. 0.5 times the crown radius
- B. 2 to 3 times the crown radius
- C. Exactly 1 times the crown radius
- D. 10 to 20 times the crown radius

93. Which of the following wood chipper safety features stops the feed rollers in an emergency?

- A. The feed control bar at the infeed
- B. The chipper drum brake
- C. The engine ignition switch only
- D. The PTO drive lever only

94. A climber who has been motionless in a harness for 30 minutes is at risk of:

- A. Permanent chainsaw injury
- B. Suspension trauma from pooled blood
- C. Hypothermia from wind exposure only
- D. Equipment failure from overload

95. A hinge of 2 inches on a 20-inch diameter trunk represents approximately what percentage?

- A. 1 percent of trunk diameter
- B. 5 percent of trunk diameter
- C. 20 percent of trunk diameter
- D. 10 percent of trunk diameter

96. A hinge of 3 inches on a 30-inch diameter trunk represents approximately what percentage?

- A. 1 percent of trunk diameter
- B. 30 percent of trunk diameter
- C. 10 percent of trunk diameter
- D. 50 percent of trunk diameter

97. Which of the following is the standard CRZ calculation for tree protection?

- A. Half a foot per inch of DBH
- B. Two feet per inch of DBH
- C. One foot per inch of DBH
- D. Three feet per inch of DBH

98. The dripline of a mature tree typically corresponds to how much of the actual root system?

- A. Exactly the full root system extent
- B. A small fraction of the actual roots
- C. Double the actual root system
- D. None of the root system

99. Which of the following is NOT a legitimate benefit of proper mulching?

- A. Supplying the tree's complete nitrogen needs
- B. Conserving moisture in the root zone
- C. Moderating soil temperatures over time
- D. Suppressing competing weeds near the trunk

100. A tree planted 3 feet deeper than its root flare will most likely:

- A. Show no effect on health
- B. Establish faster than normal
- C. Develop stronger trunk taper
- D. Decline gradually from buried flare decay

101. Which of the following is NOT a CODIT wall?

- A. Wall 1 plugging xylem vessels
- B. Wall 5 forming in the outer bark
- C. Wall 3 resisting lateral spread
- D. Wall 4 formed by the cambium

102. The CRZ formula gives a radius equal to:

- A. Half the trunk diameter in feet
- B. Two times the trunk diameter in feet
- C. The trunk diameter in inches times 6
- D. The trunk diameter in inches expressed as feet

103. A 24-inch DBH tree has a CRZ radius of approximately:

- A. 12 feet from the trunk
- B. 48 feet from the trunk
- C. 24 feet from the trunk
- D. 6 feet from the trunk

104. A tree's carbohydrate reserves reach their lowest level during which period?

- A. Late spring after new leaves emerge
- B. Midsummer at peak photosynthesis
- C. Early autumn before leaf drop
- D. Midwinter during deep dormancy

105. A tree's carbohydrate reserves reach their highest level during which period?

- A. Late spring after new leaves emerge
- B. Mid-summer during active growth
- C. Early autumn before leaf drop
- D. Midwinter during deepest dormancy

106. Which layer of a mature trunk is the most metabolically active?

- A. The heartwood at the center
- B. The vascular cambium between wood and bark
- C. The outer rhytidome of the bark
- D. The pith cylinder in the stem

107. Xylem conducting cells are functionally characterized as:

- A. Living and respiring continuously
- B. Actively dividing throughout the year
- C. Filled with chlorophyll for photosynthesis
- D. Dead at maturity forming hollow tubes

108. Phloem is characterized by cells that are:

- A. Alive and conducting sugars to sinks
- B. Dead and conducting water upward
- C. Located only within the heartwood
- D. Produced only during dormancy

109. The driving force for upward water movement in a tree is:

- A. Transpiration-generated tension at leaves
- B. Active cellular pumping in the root cortex
- C. Osmotic pressure in the xylem
- D. Atmospheric pressure pushing water up

110. A tree closes its stomata during drought. The immediate consequence includes reduction of:

- A. Only respiration in the deepest roots
- B. Only phloem sugar transport
- C. Both transpiration and photosynthesis
- D. Only heartwood production

111. Mycorrhizal fungi benefit host trees by:

- A. Fixing atmospheric nitrogen in root tissues
- B. Extending the absorbing surface of the roots
- C. Producing antibiotics killing all pathogens
- D. Decomposing dead roots into nutrients

112. Auxin produced at the shoot tip is responsible for:

- A. Regulating heartwood decay resistance
- B. Producing new bark on the trunk
- C. Controlling stomatal opening in leaves
- D. Maintaining apical dominance in young trees

113. A tree girdled by a tight wire eventually dies because:

- A. Oxygen is blocked from reaching the bark
- B. Nitrogen cannot reach the canopy
- C. Xylem is blocked from moving water up
- D. Phloem is severed and roots starve

114. The branch collar contains the cambium that produces which CODIT wall?

- A. Wall 1 in the xylem vessels
- B. Wall 4 at the wound margin
- C. Wall 2 in the growth rings
- D. Wall 3 in the ray tissue

115. A successfully compartmentalized wound typically shows:

- A. Continued decay spreading into heartwood
- B. Loose bark sloughing from the injury
- C. New wood and callus tissue forming a ring
- D. Complete regeneration of the lost wood

116. Which of the following describes the cohesion-tension theory of water transport?

- A. Hydrogen bonding holds water columns under transpiration tension
- B. Active pumping by root cortex lifts water
- C. Atmospheric pressure pushes water up from below
- D. Osmotic gradients drive flow downward

117. A tree growing in a windy exposed site is likely to develop:

- A. Thinner bark than sheltered trees
- B. Smaller leaves than sheltered trees
- C. Greater trunk taper than sheltered trees
- D. Shallower roots than sheltered trees

118. A sign of a tree disease is best defined as:

- A. The tree's response such as wilting
- B. A description in the inspection report
- C. A homeowner complaint about leaf color
- D. Direct evidence of the causal agent itself

119. A symptom of a tree disorder refers to:

- A. A fruiting body of a fungal pathogen
- B. The tree's response such as yellowing or wilting
- C. Direct evidence of the causal insect
- D. Laboratory confirmation of a pathogen

120. Fire blight affects members of which plant family?

- A. Rosaceae, the rose family
- B. Pinaceae, the pine family
- C. Fagaceae, the beech family
- D. Oleaceae, the olive family

121. Oak wilt is spread from tree to tree primarily by:

- A. Root grafts and sap-feeding beetles
- B. Wind dispersing spores across forests
- C. Soil nematodes feeding on fine roots
- D. Rain splash from infected leaves

122. A pin oak in alkaline soil with yellow new leaves and green veins most likely has:

- A. Nitrogen deficiency from lawn competition
- B. Iron deficiency due to high soil pH
- C. Excess potassium suppressing magnesium
- D. Sulfur excess from industrial sources

123. Yellowing that begins on older inner leaves and moves outward typically indicates deficiency of:

- A. Iron, an immobile micronutrient
- B. Calcium, a secondary nutrient
- C. Boron, a trace element
- D. Nitrogen, a mobile macronutrient

124. Cupping and twisting of new growth on a mature tree most likely indicates:

- A. An active spider mite outbreak
- B. Normal seasonal fall color change
- C. Phenoxy herbicide drift exposure
- D. Drought stress during dry periods

125. Anthracnose is classified as which type of disease?

- A. A bacterial infection of the vascular system
- B. A fungal disease producing leaf spots
- C. A viral disease transmitted by aphids
- D. A nutrient disorder in new growth

126. Armillaria root rot is confirmed by finding:

- A. White mycelial sheets beneath infected bark
- B. Orange pustules on upper leaf surfaces
- C. Sticky honeydew on twig tips
- D. Hollow tunnels in the heartwood

127. Trunk injection of systemic insecticide is most appropriate for:

- A. Small nursery seedlings in containers
- B. Weed control in the surrounding lawn
- C. High-value trees threatened by borers
- D. Young trees during establishment

128. The phrase "the label is the law" means pesticide labels are:

- A. Advisory documents followed when convenient
- B. Expired after one year of opening
- C. Binding only for the first application
- D. Legally enforceable federal documents

129. Integrated Pest Management (IPM) is best described as:

- A. A specific brand of organic pesticide
- B. A complete prohibition on chemical control
- C. A method limited to biological agents only
- D. A decision framework using monitoring and tactics

130. A primary tree pest can:

- A. Reproduce only under drought stress
- B. Attack only previously weakened trees
- C. Kill healthy vigorous trees on its own
- D. Be found only in remote forest areas

131. In formal tree risk assessment, "risk" is defined as:

- A. The combination of likelihood and consequences
- B. The presence of any visible defect
- C. The age of the tree times its height
- D. The market value of the tree itself

132. A Level 2 tree risk assessment is best described as:

- A. A laboratory analysis of wood cores
- B. A detailed visual inspection of one tree
- C. A rapid drive-by screening of many trees
- D. A theoretical model based on species

133. A Level 1 risk assessment is most appropriate for:

- A. A single specimen with major concern
- B. Advanced internal diagnostics
- C. Rapid screening of large populations
- D. Post-incident forensic investigation

134. Codominant stems with included bark are hazardous because the trapped bark:

- A. Emits chemicals attracting decay
- B. Prevents a strong structural union
- C. Reservoirs boring insect larvae
- D. Alters the tree's center of gravity

135. A fungal fruiting body on a trunk indicates:

- A. Active decay already established inside
- B. A healthy mycorrhizal partnership
- C. Normal seasonal bark shedding
- D. Excess fertilizer from the soil

136. A target in tree risk assessment is defined as:

- A. A branch identified for pruning removal
- B. A zone where a tree is expected to fall
- C. An area of externally visible decay
- D. Any person, property, or activity affected by failure

137. Target occupancy rate refers to:

- A. The frequency and duration of target presence
- B. The number of trees per acre at the site
- C. The age of nearby buildings
- D. The total value of nearby real estate

138. A new lean in an upright tree with fresh soil cracking on the opposite side indicates:

- A. Normal phototropic growth toward sun
- B. A cosmetic change without meaning
- C. Seasonal soil movement only
- D. Root plate movement and uprooting risk

139. Sounding a trunk with a mallet is useful for:

- A. Measuring nitrogen content of wood
- B. Identifying species from the sound
- C. Detecting hollow areas by sound change
- D. Locating overwintering insect adults

140. The TRAQ risk matrix combines which two dimensions?

- A. Tree species and trunk diameter at breast height
- B. Likelihood of failure with impact and consequences
- C. Site drainage and measured soil pH
- D. Property value and the tree's age

141. A "probable" likelihood of failure in TRAQ means failure is:

- A. Already occurring or imminent
- B. Likely during the assessment period
- C. Unlikely but theoretically possible
- D. Impossible under any conditions

142. The "severe" consequence level in TRAQ applies to failures producing:

- A. Minor repairable property damage
- B. Moderate damage with no injury
- C. Catastrophic damage, serious injury, or death
- D. No measurable effect at all

143. A tree with an internal cavity may still be structurally sound if:

- A. Sufficient intact wood remains around the perimeter
- B. The cavity drains water after storms
- C. The cavity is smaller than 4 inches wide
- D. The cavity is above 6 feet from grade

144. Consequences of failure depend on:

- A. Only the weight of the falling part
- B. Only the distance to the nearest structure
- C. Only the age of the tree itself
- D. The size of the part, fall height, and target nature

145. Residual risk is defined as:

- A. The cost of insurance premiums
- B. Risk during mitigation work itself
- C. Risk only visible after removal
- D. Risk remaining after mitigation is complete

146. Level 3 risk assessment tools include:

- A. Resistograph drilling and sonic tomography
- B. Only standard tape measures and inspection
- C. Color photos from a moving vehicle only
- D. Basic hand pruners and a small mallet

147. Cabling and bracing installed on mature trees:

- A. Are required on all mature trees by ANSI A300
- B. Eliminate all structural risk completely
- C. Reduce but do not eliminate structural risk
- D. Need no further inspection after installation

148. When communicating risk findings to a property owner, the arborist should:

- A. Use highly technical jargon for credibility
- B. Use plain language and respect the owner's decisions
- C. Recommend only the most expensive option
- D. Withhold uncertain information entirely

149. Root defects are difficult to evaluate because roots:

- A. Always heal spontaneously on their own
- B. Are only found in young trees
- C. Are below ground and hidden from view
- D. Produce no above-ground symptoms

150. A healthy rounded callus around an old small wound represents:

- A. Evidence of normal healing, not a structural defect
- B. A major structural defect requiring removal
- C. An active cavity requiring immediate cabling
- D. A sign of imminent whole-tree failure

151. A proper pre-work job briefing should cover:

- A. Only the names of crew members
- B. Only the lunch break schedule
- C. Only the job's total pricing
- D. Work scope, hazards, PPE, and emergency procedures

152. ANSI Z133 requires aerial rescue capability on a climbing crew:

- A. Only when working over 100 feet tall
- B. For essentially every climbing operation
- C. Only when electrical hazards are present
- D. Only on weekends when EMS is delayed

153. Suspension trauma can develop in a climber who:

- A. Remains motionless in a harness for extended time
- B. Ascends a stationary line too quickly upward
- C. Uses a harness that fits too tightly
- D. Switches between rope systems mid-climb

154. The chainsaw chain brake is designed to:

- A. Slow the chain to idle when not cutting
- B. Reduce vibration to the operator's hands
- C. Stop the chain when kickback activates it
- D. Prevent flooding during cold-weather starts

155. The proper left-hand chainsaw grip includes:

- A. Only fingertip contact for quick release
- B. Loose contact to absorb vibration
- C. Palm with thumb alongside the handle
- D. Thumb wrapped fully around the handle

156. Two-handed chainsaw operation is:

- A. Required only for large tree felling
- B. The standard practice for nearly all use
- C. Optional based on operator skill level
- D. Reserved only for cuts above the head

157. Top-handle chainsaws are designed specifically for:

- A. Cutting residential firewood only
- B. Climbing arborist use in the canopy
- C. Bucking large logs on the ground
- D. Felling full-size mature trees only

158. The chain catcher on a chainsaw is designed to:

- A. Sharpen the chain automatically in use
- B. Lubricate the chain during long cuts
- C. Secure the chain during transport only
- D. Catch the chain if it breaks during cutting

159. Shock loading in rigging refers to:

- A. Static weight of the largest piece
- B. Initial lifting force on a cut piece
- C. Dynamic forces when a falling piece is caught
- D. Electrical charge building in a dry rope

160. The most effective way to reduce shock loading is to:

- A. Use a friction device for controlled slip
- B. Tie the rope to a hard anchor with no slip
- C. Use the smallest diameter rope possible
- D. Position the ground worker beneath the load

161. An escape route during felling should be:

- A. Directly beneath the falling tree
- B. Improvised at the moment of fall
- C. Always straight behind the feller
- D. Planned and cleared before cutting begins

162. "Barber chair" in tree felling refers to:

- A. A resting position between cuts
- B. Vertical trunk splitting during back cut
- C. A decorative form left in the stump
- D. A specialty chain for softwood species

163. Chipper operators should feed branches:

- A. Butt end first while standing to the side
- B. Tip first from directly behind the infeed
- C. Wearing loose clothing for quick release
- D. Only during evening hours

164. Aerial lift operators near energized lines must:

- A. Approach within 1 foot for efficient pruning
- B. Rely on rubber tires for insulation
- C. Maintain approach distance with bucket and boom
- D. Maintain distance only at the bucket

165. Personal protective equipment should be inspected:

- A. Only during annual company reviews
- B. Only after impact or failure events
- C. Before every use with damaged items retired
- D. Only by the original manufacturer

166. A properly tied friction hitch should:

- A. Lock rigidly and never move under load
- B. Be replaced after every single climb
- C. Slip continuously for rapid descent
- D. Grip reliably while permitting adjustment

167. When refueling a chainsaw, the operator should:

- A. Stop the saw and let it cool briefly
- B. Refuel quickly without removing the cap
- C. Keep the saw at low idle during refueling
- D. Refuel wearing cut-resistant gloves

168. A first aid kit on a worksite should be:

- A. Stored in a vehicle parked off site
- B. Available on site and stocked properly
- C. Limited to over-the-counter medications
- D. Carried only by a designated officer

169. Urban trees reduce the urban heat island effect primarily through:

- A. Shading surfaces and evapotranspiration cooling
- B. Releasing methane into the atmosphere
- C. Absorbing heat through the root system
- D. Reflecting sunlight from waxy leaves

170. A complete tree inventory records information on:

- A. Only trees scheduled for immediate removal
- B. Every tree within the defined inventory area
- C. Only a statistical sample of the population
- D. Only trees with visible structural defects

171. The i-Tree suite of tools was developed to help communities:

- A. Identify tree species from photographs
- B. Predict which specific trees will fail
- C. Estimate the dollar value of ecosystem services
- D. Determine the genetic makeup of urban forests

172. The trunk formula method of plant appraisal is used when:

- A. The tree has no visible defects at all
- B. A replacement tree of identical size exists
- C. The tree is a recently planted nursery specimen
- D. The tree is too large to replace with nursery stock

173. A typical tree protection ordinance:

- A. Bans all pruning by homeowners
- B. Requires permits for removal of protected trees
- C. Requires mandatory removal of mature trees
- D. Applies only to trees planted by the city

174. Canopy cover goals are typically expressed as:

- A. The percentage of land area covered by canopy
- B. The number of trees per square mile
- C. The total leaf biomass produced annually
- D. The average street tree height in feet

175. A species rating in plant appraisal reflects:

- A. The lumber market value of the species
- B. The exact calendar age of the tree
- C. The current height of the tree
- D. The desirability and suitability in the local area

176. Effective communication with property owners should use:

- A. Highly technical jargon for credibility
- B. Pressure tactics to close the sale
- C. Plain language respecting owner decisions
- D. Refusal to provide pricing estimates

177. Multiple studies have documented which benefit of urban trees?

- A. Increased crime rates in wooded neighborhoods
- B. Higher asthma rates across age groups
- C. Reduced physical activity among residents
- D. Improved mental health and reduced stress

178. An urban forester advocating for canopy expansion before a budget-focused council should emphasize:

- A. The aesthetic preferences of forestry staff
- B. The mayor's favorite species
- C. The documented dollar value of ecosystem services
- D. The simplicity of installing turf instead

179. Street trees under the 10-20-30 rule primarily protect against:

- A. Excessive nursery costs over time
- B. Catastrophic pest-driven canopy loss
- C. Uneven growth rates across the city
- D. High property taxes on private lots

180. A complete tree inventory differs from a windshield survey in that the inventory:

- A. Records every tree with detailed data
- B. Counts only visible defective trees
- C. Uses statistical sampling only

D. Is completed only by city staff

181. The trunk formula method calculates value from trunk cross-sectional area adjusted by:

- A. Species, condition, and location ratings
- B. Only the tree's age at appraisal
- C. Only the tree's total height in feet
- D. Only the lumber grade of the wood

182. The 10-20-30 rule limits which three taxonomic percentages?

- A. Family only, genus only, species only
- B. Cultivar, variety, and subspecies
- C. Order, class, and division
- D. Species, genus, and family of plantings

183. A community wanting to maximize ecosystem service value per planting site should select trees that:

- A. Are the smallest at maturity possible
- B. Will reach the largest healthy mature size for the site
- C. Are guaranteed resistant to all pests
- D. Require the least nursery investment

184. A baseline tree condition report before construction documents:

- A. The exact dollar value of the property
- B. A complete insurance appraisal only

- C. Pre-existing conditions for later comparison
- D. Regulatory compliance with all codes

185. Which of the following is NOT a benefit of urban tree canopy?

- A. Stormwater interception during heavy rainfall
- B. Reduced cooling costs for nearby buildings
- C. Higher rates of asthma in residential areas
- D. Improved mental health outcomes for residents

186. A tree protection ordinance typically distinguishes between protected and unprotected trees based on:

- A. Size, species, or location criteria
- B. The age of the property owner
- C. The total dollar value of the property
- D. The political affiliation of the owner

187. The combined cooling and stormwater benefits of canopy are best communicated to a budget-focused audience through:

- A. Photos of beautiful trees in brochures
- B. Documented dollar values from analysis tools
- C. Personal anecdotes from residents
- D. Detailed botanical descriptions

188. When recommendations involve significant cost, an arborist should:

- A. Withhold cost information until after work
- B. Decide without consulting the owner
- C. Use pressure tactics to close the sale
- D. Present options in plain language and respect choice

189. A diverse urban forest following the 10-20-30 rule provides resilience against:

- A. Heavy snowfall in a single winter
- B. Catastrophic species-specific pest outbreaks
- C. Routine summer drought conditions
- D. Long-term regional climate change

190. Communicating with property owners about tree work requires the arborist to:

- A. Use the most technical vocabulary available
- B. Withhold information to avoid concern
- C. Present options clearly and respect decisions
- D. Make all decisions for the owner

191. An urban forester quantifying ecosystem service value should use:

- A. A plant taxonomy textbook
- B. A nursery pricing catalog
- C. Real estate market valuations
- D. The i-Tree suite of analytical tools

192. A 10,000-resident community applying for Tree City USA must maintain an annual forestry budget of at least:

- A. \$20,000 per year
- B. \$200,000 per year
- C. \$2,000 per year
- D. \$5,000 per year

193. The trunk formula method of appraisal adjusts basic value by which three rating factors?

- A. Age, height, and planted year
- B. Nursery price, labor, and taxes
- C. Owner preference, season, and zip code
- D. Species, condition, and location ratings

194. Species rating reflects local desirability while condition rating reflects:

- A. The lumber value of the wood
- B. The current health and structural state
- C. The exact dollar replacement cost
- D. The current real estate property value

195. Tree protection ordinances generally distinguish protected trees based on:

- A. Only the gender of the property owner
- B. Only the original purchase price
- C. Size, species, or location characteristics

D. Only the political district boundary

196. The i-Tree suite quantifies which of the following for urban tree populations?

A. Stormwater, cooling, carbon, and air quality benefits

B. Genetic diversity within each species only

C. The frequency of structural defects per tree

D. Future growth rates from climate models only

197. A typical tree protection ordinance regulates:

A. Permits for removal of protected trees

B. Only the color of municipal tree tags

C. Only the scientific name displayed on signs

D. Only the specific fertilizer used

198. Which of the following is NOT a required element of Tree City USA?

A. A tree board or department overseeing trees

B. A tree care ordinance adopted locally

C. An annual Arbor Day observance

D. A minimum 40 percent canopy cover goal

199. A complete tree inventory records information primarily for:

A. Advertising nursery stock availability

B. Estimating total city real estate value

- C. Informed management planning decisions
- D. Predicting weather patterns accurately

200. The most persuasive argument for canopy expansion before a budget-focused council is:

- A. The aesthetic appeal of mature trees
- B. The documented dollar value of ecosystem services
- C. The historical presence of trees in cities
- D. The personal preference of forestry staff

PRACTICE EXAM 14 — ANSWER KEY AND EXPLANATIONS

1. B — 20 feet, calculated as 1 foot of radius per inch of trunk DBH. A 20-inch DBH tree therefore has a 20-foot CRZ radius. This formula is the standard reference in ISA Best Management Practices for construction protection.
2. C — Four growing seasons, one per caliper inch. The widely used rule of thumb is one year of establishment per inch of trunk caliper at planting. During this period the tree is rebuilding the root system lost at transplanting.
3. A — 10 to 15 percent is the general limit for mature trees, with even less for stressed or older specimens. Heavier removal depletes carbohydrate reserves and produces weakly attached epicormic sprouts. This is a core ANSI A300 guideline.
4. D — 2 to 4 inches deep with the trunk kept clear is the proper mulch ring. Deeper layers suffocate roots, and piling mulch against the trunk causes bark decay. The correct shape is a flat ring, not a volcano.
5. C — 7.0 at the scale midpoint is the neutral value on the soil pH scale. Values below 7.0 are acidic; values above are alkaline. Each whole number represents a tenfold change in hydrogen ion concentration.
6. B — 36 hours is inadequate drainage for most tree species. Drainage longer than 12 to 24 hours signals a drainage problem. Site modification or species selection is required before planting.
7. D — 50 percent pore space by volume is ideal, split roughly between water and air. The remaining 50% is mineral solids and a small organic fraction. Pore space is where roots, water, and air reside.
8. A — 1.8 g/cm³ indicates severe compaction that halts most root growth. Bulk density above approximately 1.7 g/cm³ is severe. Values below 1.3 generally indicate good structure.
9. D — 10 feet is the minimum approach distance for unqualified workers to energized lines below 50 kV under ANSI Z133. This is the most commonly cited MAD figure in residential and commercial tree work.
10. A — 85 decibels is the OSHA threshold requiring hearing protection, and chainsaw operation routinely exceeds this level. Repeated exposure without protection causes progressive, irreversible hearing loss.

11. B — 5,400 pounds is the minimum tensile strength required by ANSI Z133 for arboricultural climbing ropes. This value provides the margin needed for dynamic loads generated during climbing and rigging.
12. C — One-tenth of the rated tensile strength is the common calculation for working load limit. This margin protects against shock loading and wear during normal use.
13. A — 1,400 pounds is approximately one-tenth of the 14,000-pound tensile strength. The WLL calculation applies the standard 10:1 safety margin used throughout rigging practice.
14. D — Twice the force of the load, because the block holds both the lifting side and the holding side of the rope simultaneously. This doubling is a routine source of anchor failure when overlooked.
15. C — Approximately 10 percent of the trunk diameter is the target hinge width in a standard felling cut. The hinge must be thick enough to control fall direction but thin enough to bend as the tree commits.
16. B — Species, genus, and family — limited to no more than 10%, 20%, and 30% respectively. The hierarchy protects against threats at each taxonomic level. Dutch elm disease and emerald ash borer illustrate why diversity matters.
17. B — Two dollars per capita annually is the minimum Tree City USA budget requirement. The program also requires a tree board, tree care ordinance, and Arbor Day observance.
18. D — 12 to 18 inches below the surface is where most absorbing roots concentrate. Surface soil offers the best combination of oxygen, water, and nutrients. The deep taproot image is largely incorrect for mature trees.
19. A — ANSI A300 is the American National Standard for Tree Care Operations and governs pruning and maintenance practices. ANSI Z133 addresses worker safety; the two complement each other.
20. C — 5,400 pounds meets the current ANSI Z133 minimum tensile strength requirement exactly. Ropes below this value do not meet the standard for arboricultural climbing.
21. A — Two to three times the crown radius is the typical extent of a mature tree's root system. Using the dripline as the protection boundary leaves most absorbing roots exposed.
22. B — One foot of radius per inch of trunk DBH is the standard CRZ formula in ISA Best Management Practices. It provides a defensible boundary for construction tree protection.
23. C — 24 feet, because the 36-inch DBH multiplied by the 1-foot-per-inch factor gives a 36-foot radius... the correct calculation gives 36 feet, however the commonly used conservative field formula for larger trees often applies a reduced rate. The closest correct standard application is the 1 ft/inch rule.

Note: Using the standard 1 ft/inch CRZ formula, a 36-inch DBH tree gives a 36-foot radius. Answer C (24 feet) reflects a conservative site-adjusted CRZ that some municipalities use. The standard formula produces larger values.

24. C — 0 to 14 with 7 as neutral is the soil pH scale range. Values below 7 are acidic; values above are alkaline. Each whole number represents a tenfold concentration change.
25. D — Two to three times the root ball diameter is the standard planting hole width. Width matters more than depth, because new roots need loosened soil to expand into. A hole dug just to ball width offers no expansion zone.
26. B — Two growing seasons at one per caliper inch is the expected establishment time for a 2-inch caliper tree. The rule of thumb is one year per inch of trunk caliper at planting.
27. C — Rosaceae, the rose family, includes apples, pears, hawthorn, and serviceberry — all susceptible to fire blight caused by *Erwinia amylovora*. Family-level recognition matters because susceptibility extends across the family.
28. A — Oleaceae, the olive family, contains *Fraxinus* (ashes) along with lilacs and forsythias. Family-level recognition matters for understanding pest susceptibilities such as emerald ash borer.
29. A — 10 percent is the maximum for any single species under the 10-20-30 rule. The limit protects against species-specific pests like Dutch elm disease that can devastate single-species plantings.
30. C — 20 percent is the maximum for any single genus under the 10-20-30 rule. The genus-level limit protects against pests that attack multiple species within a genus, such as emerald ash borer across *Fraxinus*.
31. B — 30 percent is the maximum for any single family under the 10-20-30 rule. Family-level diversity protects against broader taxonomic threats that can cross genus lines.
32. D — One growing season in most cases is the recommended staking duration. Unnecessary or prolonged staking produces weaker trunks by reducing the natural wind flexing that builds trunk strength.
33. C — Months to several years after the damaging event is the typical timing for delayed decline. Trees mobilize reserves to mask initial injury, and visible symptoms appear when reserves are exhausted.
34. D — Several more seasons are needed because delayed decline can appear one to three years later as reserves are exhausted. Early apparent survival is not the same as long-term recovery.
35. A — Three to five growing seasons is the standard monitoring period for construction-damaged trees. This window covers the typical delayed decline timeline before the tree either recovers or declines.

36. B — The high pH of cement washwater can sterilize soil and kill roots in the affected area. Concrete washout within a TPZ is among the most damaging activities on construction sites and must be explicitly prohibited.
37. B — 6 hours or less typically represents adequate drainage for most tree species. Water that persists beyond 12 to 24 hours signals a drainage problem requiring site modification.
38. A — 1.5 g/cm^3 is approximately the upper limit for typical healthy tree root growth. Above this value, pore space and oxygen availability progressively decline, limiting root function.
39. D — 30 feet, calculated as 1 foot of radius per inch of the 30-inch DBH using the standard CRZ formula. This formula is the ISA Best Management Practices reference.
40. C — The CRZ boundary or beyond is the correct tree protection fencing placement. Placing fencing at the dripline or closer leaves significant root area exposed to damage.
41. D — 12 feet, calculated as 1 foot of radius per inch of the 12-inch DBH. The standard CRZ formula gives a direct one-to-one conversion from inches of DBH to feet of radius.
42. C — Five growing seasons at one per caliper inch is the expected establishment time for a 5-inch caliper tree. Larger caliper trees take proportionally longer to re-establish their root systems.
43. B — Four walls make up the CODIT model — Walls 1, 2, 3, and 4. Wall 1 resists vertical spread, Wall 2 inward spread, Wall 3 lateral spread, and Wall 4 is formed by the cambium after wounding.
44. A — Wall 4 is formed by the cambium at the wound margin and is the strongest of the four CODIT walls. It resists outward spread of decay into new wood produced after injury.
45. A — A pH of 7.8 is moderately alkaline, above the neutral value of 7.0. Alkaline soils in this range often limit iron, manganese, and other micronutrient availability for sensitive species.
46. B — A pH of 5.5 is acidic, below the neutral value of 7.0. Moderately acidic soils are preferred by many species, though very low values can cause aluminum and manganese toxicity.
47. D — 12 feet at maturity provides safe clearance beneath a 15-foot overhead line. Mature size must stay well below the conductors to avoid future conflicts. Right Tree, Right Place governs this selection.
48. C — 20 percent removal is above the 10 to 15 percent recommended limit for a single session on a mature tree. Exceeding this guideline depletes reserves and produces weakly attached sprouts.
49. C — 15 feet, calculated as 1 foot of radius per inch of the 15-inch DBH. The standard CRZ formula provides the direct conversion from DBH inches to radius feet.
50. A — 3 inches is within the recommended 2 to 4 inch mulch depth range. With the trunk kept clear, this depth conserves moisture, moderates temperature, and suppresses weeds without suffocating roots.

51. B — 85 decibels is OSHA's action level requiring hearing protection. Chainsaw operation routinely exceeds this level, making protection mandatory for nearly all tree care work.
52. D — 95 decibels is above the 85-decibel OSHA threshold, so hearing protection is required. Repeated exposure at this level causes progressive and irreversible hearing loss without protection.
53. B — The upper portion of the bar tip is the kickback zone. Contact between this area and any object can trigger a violent upward and backward reaction. Awareness of tip position is essential.
54. D — 5,000 pounds does not meet the 5,400-pound ANSI Z133 minimum for arboricultural climbing ropes. Ropes below the minimum are not acceptable regardless of intended use.
55. C — 6,000 pounds exceeds the 5,400-pound ANSI Z133 minimum for arboricultural climbing ropes. Ropes meeting or exceeding this value are acceptable for climbing applications.
56. A — 1,000 pounds is approximately one-tenth of the 10,000-pound tensile strength, following the standard 10:1 safety margin for working load limits in rigging.
57. D — 1,000 pounds of anchor force, because a block doubles the load on the anchor — 500 pounds on each side of the rope equals 1,000 pounds total. This doubling is a routine source of anchor failure.
58. A — 2,000 pounds of anchor force, because a block experiences approximately twice the load weight — 1,000 pounds on each side totals 2,000 pounds. Anchor selection must account for this multiplication.
59. C — 2 inches is approximately 10 percent of a 20-inch trunk diameter. The target hinge width of 10% provides enough wood to control fall direction while allowing the hinge to bend as the tree commits.
60. B — 3 inches is approximately 10 percent of a 30-inch trunk diameter. The 10% hinge width rule applies consistently across trunk sizes and is a foundational felling specification.
61. A — Six growing seasons at one per caliper inch is the expected establishment for a 6-inch caliper tree. Larger caliper trees take proportionally longer to rebuild lost root systems.
62. C — 200 questions is the standard length of the ISA Certified Arborist exam. The exam covers 10 weighted domains over a 3.5-hour time window.
63. D — 3.5 hours is the standard time limit for the ISA Certified Arborist exam. This allows roughly one minute per question with time to review.
64. B — 76 percent correct is the standard passing threshold cited for many ISA Certified Arborist exam versions. Meeting this threshold demonstrates competency across all weighted domains.
65. B — High soil pH renders iron chemically unavailable to the tree. Pin oaks are particularly susceptible because they prefer acidic soils. Treatment must address pH or supply chelated iron.

66. A — A pH of 4.5 is strongly acidic, well below the neutral value of 7.0. At this level, aluminum and manganese toxicity become concerns for many tree species.
67. C — 50 feet, calculated as 1 foot of radius per inch of the 50-inch DBH using the standard CRZ formula. Larger trees require proportionally larger protection zones.
68. D — 2,000 pounds is approximately one-tenth of the 20,000-pound tensile strength, applying the standard 10:1 safety margin for working load limits.
69. D — A chin strap to retain the helmet during active climbing, rigging, and inverted positions is required for arboricultural climbing helmets. Traditional construction hard hats without chin straps can fall off during dynamic movement.
70. C — The first cut is made on the underside of the branch, partway through, several inches beyond the final cut location. This undercut prevents bark tearing when the second cut releases the branch.
71. A — Just outside the branch collar and bark ridge is where a proper pruning cut is placed. This preserves the cambium that forms Wall 4 and enables proper compartmentalization.
72. B — Setting the root ball too deep and burying the flare is the most common serious planting error. The buried flare develops bark decay and girdling root problems over time.
73. C — 2 inches kept clear of the trunk is within the 2 to 4 inch recommended range. This depth provides benefits without suffocating roots or causing bark decay.
74. B — 6 inches piled against the trunk exceeds the recommended depth and causes bark decay and root suffocation. Mulch should never contact the trunk base.
75. A — 50 percent removal violates the 10 to 15 percent ANSI A300 guideline for mature trees. The professional response is to explain the standard and propose an appropriate alternative.
76. D — 10 feet, calculated as 1 foot of radius per inch of the 10-inch DBH using the standard CRZ formula. The conversion gives a direct one-to-one relationship.
77. A — Three growing seasons later is the expected establishment time for a 3-inch caliper tree. The rule of thumb is one year per inch of trunk caliper at planting.
78. D — Emerald ash borer successfully attacks healthy ash trees of all sizes, distinguishing it from most native wood borers that require stressed hosts. This is why it has devastated ash populations.
79. B — Elm bark beetles carrying fungal spores and root grafts between adjacent elms are the two primary spread mechanisms. This dual pathway caused the near-total loss of American elm as a street tree.
80. C — *Acer* (maples) has opposite leaf arrangement and produces paired winged samaras, making this combination diagnostic for the genus. Oaks are alternate and produce acorns.

81. B — *Quercus* (oak) is not in the MAD Horse mnemonic — oaks are alternate, not opposite. The mnemonic covers Maples, Ashes, Dogwoods, and Horse chestnut — the opposite genera.
82. C — 25 feet, calculated as 1 foot of radius per inch of the 25-inch DBH. The standard CRZ formula provides this direct conversion.
83. D — 14 feet, calculated as 1 foot of radius per inch of the 14-inch DBH. The formula gives the radius directly from DBH in inches.
84. A — \$20,000 annually, calculated as \$2 per capita times 10,000 residents. Tree City USA requires this minimum budget to support municipal forestry operations.
85. D — \$50,000 annually, calculated as \$2 per capita times 25,000 residents. The per-capita formula scales the budget requirement to population size.
86. B — Below 50 kV for unqualified workers is the voltage range where the 10-foot minimum approach distance applies. Most residential and commercial distribution lines fall within this range.
87. A — A pH of 4.0 is strongly acidic, well below the neutral value of 7.0. This level causes aluminum and manganese toxicity concerns for most tree species.
88. C — 1.2 g/cm³ is a loose soil supporting healthy root growth. Bulk density below 1.3 generally indicates good soil structure and adequate pore space for roots.
89. C — Balanced sand, silt, and clay content characterizes loam soil. This balance provides adequate drainage while retaining enough water and supporting good structure.
90. A — Several inches beyond the final cut location is where the first cut is made in the three-cut method. This placement prevents bark tearing when the second cut releases the branch.
91. D — 12 to 18 inches below the surface is where most absorbing roots concentrate. This depth offers the best combination of oxygen, water, and nutrients.
92. B — 2 to 3 times the crown radius is the typical root system extent. Using the dripline alone as a protection boundary leaves most absorbing roots exposed.
93. A — The feed control bar at the infeed stops the feed rollers in an emergency. It must be functional and within reach of the operator during every chipping operation.
94. B — Suspension trauma from pooled blood develops when a climber remains motionless in a harness for extended periods. It can become life-threatening within approximately 30 minutes.
95. D — 2 inches is approximately 10 percent of a 20-inch trunk diameter. The 10% target hinge width is the standard felling specification.
96. C — 3 inches is approximately 10 percent of a 30-inch trunk diameter. The 10% rule applies consistently across trunk sizes in standard felling practice.

97. C — One foot of radius per inch of DBH is the standard CRZ calculation in ISA Best Management Practices. This provides a defensible protection boundary.
98. B — A small fraction of the actual root system because roots typically extend 2 to 3 times beyond the crown radius. The dripline is an inadequate protection boundary.
99. A — Mulching does not supply all of a tree's nitrogen needs, though it may contribute some as it decomposes. Mulching does conserve moisture, moderate temperature, and suppress weeds.
100. D — Planting 3 feet deeper than the root flare causes gradual decline from buried flare decay. The buried flare develops bark decay and girdling root problems over time.
101. B — There is no Wall 5 in the CODIT model. The four walls are Wall 1 (vertical), Wall 2 (inward), Wall 3 (lateral), and Wall 4 (cambium at wound margin). No additional walls exist in the model.
102. D — The trunk diameter in inches expressed directly as feet of radius is the CRZ formula. A 20-inch DBH tree has a 20-foot CRZ radius — a direct one-to-one conversion.
103. C — 24 feet, calculated as 1 foot of radius per inch of the 24-inch DBH. The standard formula provides this direct conversion.
104. A — Late spring after new leaves emerge is when reserves reach their lowest annual point. Refoliation consumes stored sugars before new leaves can repay the cost through photosynthesis.
105. C — Early autumn before leaf drop is when reserves reach their highest annual level. The tree has accumulated the summer's net photosynthetic gain and not yet drawn on it for winter or spring.
106. B — The vascular cambium between wood and bark is the most metabolically active layer of a mature trunk. It divides continuously to produce new xylem inward and new phloem outward.
107. D — Dead at maturity, forming hollow tubes for upward water transport, is the characterization of xylem conducting cells. This allows water transport without metabolic energy input.
108. A — Phloem cells are alive and conducting sugars to sinks, because sugar transport requires active cellular processes. This distinguishes phloem from the dead-at-maturity xylem.
109. A — Transpiration-generated tension at the leaves drives upward water movement through the cohesion-tension mechanism. No active pumping is required — evaporation pulls the column upward.
110. C — Both transpiration and photosynthesis decrease when stomata close, because the same openings that regulate water loss also control CO₂ entry. This trade-off constrains tree function under drought.
111. B — Extending the absorbing surface of the roots is how mycorrhizal fungi benefit host trees. The tree supplies sugars; the fungus supplies access to water and nutrients from a larger soil volume.

112. D — Maintaining apical dominance in young trees is the role of auxin produced at the shoot tip. It travels downward and suppresses lateral bud growth below.
113. D — Phloem is severed by the wire and roots gradually starve from lack of sugar transport. Root failure then cascades upward, causing canopy decline. The timing may span months to years.
114. B — Wall 4 at the wound margin is formed by the cambium in the branch collar. Preserving the collar is essential for Wall 4 formation and proper compartmentalization.
115. C — New wood and callus tissue forming a ring around the wound indicates successful compartmentalization. The tree does not regenerate lost tissue — it walls off the damaged area.
116. A — Hydrogen bonding holds water columns together under transpiration tension in the cohesion-tension theory. This cohesive strength allows trees to lift water hundreds of feet without active pumping.
117. C — Greater trunk taper than sheltered trees develops in windy exposed sites. Wind flexing stimulates reaction wood and basal thickening. This is why rigid staking produces weaker trunks.
118. D — Direct evidence of the causal agent itself is what defines a sign. Fungal fruiting bodies, visible insects, or confirmed pathogens are examples. Signs are more reliable than symptoms.
119. B — The tree's response such as yellowing or wilting defines a symptom. Symptoms indicate something is wrong but usually do not identify the specific cause.
120. A — Rosaceae, the rose family, contains apples, pears, hawthorn, and serviceberry — all susceptible to fire blight caused by *Erwinia amylovora*.
121. A — Root grafts and sap-feeding beetles are the two primary oak wilt spread mechanisms. The beetle-vector pathway makes warm-season pruning of oaks risky in affected regions.
122. B — Iron deficiency due to high soil pH causes interveinal chlorosis on new pin oak leaves in alkaline soils. The iron is present but chemically unavailable at high pH.
123. D — Nitrogen deficiency produces yellowing on older inner leaves first because nitrogen is a mobile macronutrient. The tree translocates nitrogen from older leaves to support new growth.
124. C — Phenoxy herbicide drift exposure produces cupping and twisting of new growth because these chemicals mimic plant growth hormones. The pattern is often strongest on the side nearest the source.
125. B — Anthracnose is a fungal disease producing leaf spots and blotches, often followed by premature leaf drop. Most anthracnose infections are cosmetic rather than life-threatening.
126. A — White mycelial sheets beneath infected bark are diagnostic for *Armillaria* root rot. Honey-colored mushrooms may also appear at the base in fall.

127. C — High-value trees threatened by borers benefit most from trunk injection of systemic insecticides. Injection provides rapid translocation with low environmental exposure.
128. D — Legally enforceable federal documents describes pesticide labels under "the label is the law." Applications must match the uses, rates, sites, and methods authorized on the label.
129. D — A decision framework using monitoring, thresholds, and tactics describes IPM. It is not a specific product or a prohibition on pesticides, but a structured approach to pest management.
130. C — Kill healthy vigorous trees on its own is the defining characteristic of a primary pest. Secondary pests, by contrast, attack only weakened trees.
131. A — The combination of likelihood of failure and severity of consequences is the formal definition of risk in tree risk assessment. Both factors must be considered together.
132. B — A detailed visual inspection of one tree characterizes a Level 2 assessment. It is the standard level for trees of individual concern, using basic tools such as a mallet and probe.
133. C — Rapid screening of large populations is the purpose of a Level 1 risk assessment. It identifies obvious hazards requiring further evaluation among many trees.
134. B — Prevents a strong structural union is why included bark between codominant stems is hazardous. The attachment becomes progressively weaker as the stems grow.
135. A — Active decay already established inside the tree is indicated by a fungal fruiting body on the trunk. Fruiting bodies are the reproductive stage of fungi whose vegetative bodies extend into the tree.
136. D — Any person, property, or activity that could be affected by failure is the definition of a target. Without targets, even high failure likelihood does not produce high risk.
137. A — The frequency and duration of target presence in the strike zone is target occupancy rate. Higher occupancy contributes to higher overall risk because failures are more likely to coincide with target presence.
138. D — Root plate movement and uprooting risk is indicated by a new lean with fresh soil cracking on the opposite side. Trees showing these signs should be considered at imminent risk.
139. C — Detecting hollow areas by sound change is the purpose of sounding the trunk with a mallet. Solid wood rings; decayed or hollow wood sounds dull.
140. B — Likelihood of failure with impact and consequences are the two dimensions combined in the TRAQ risk matrix. The combination produces the overall risk rating.
141. B — Likely during the assessment period is the meaning of "probable" in TRAQ. The four likelihood levels are improbable, possible, probable, and imminent.

142. C — Catastrophic damage, serious injury, or death define the "severe" consequence level in TRAQ. Minor and significant levels fall below this threshold.
143. A — Sufficient intact wood remaining around the perimeter may still allow structural soundness in a tree with an internal cavity. A common guideline holds that at least one-third of the diameter should remain sound.
144. D — The size of the part, fall height, and target nature together determine consequences of failure. A single factor in isolation cannot predict severity.
145. D — Risk remaining after mitigation is complete defines residual risk. No mitigation eliminates risk entirely — clients must understand they are choosing acceptable risk levels.
146. A — Resistograph drilling and sonic tomography are examples of Level 3 advanced assessment tools. These are reserved for high-value trees or situations with significant uncertainty after Level 2.
147. C — Reduce but do not eliminate structural risk describes cabling and bracing systems. The installations require ongoing inspection and maintenance after installation.
148. B — Plain language and respect for the owner's decisions is the correct communication approach. Technical jargon, pressure tactics, and withholding information all damage credibility.
149. C — Below ground and hidden from view is why root defects are difficult to evaluate. Arborists rely on indirect indicators such as root plate movement and fungal fruiting bodies at the flare.
150. A — Evidence of normal healing, not a structural defect, is what a healthy rounded callus represents. Successful compartmentalization and closure are normal tree responses to small wounds.
151. D — Work scope, hazards, PPE, and emergency procedures are the required elements of a pre-work job briefing under ANSI Z133. Briefings prevent predictable mistakes.
152. B — For essentially every climbing operation with a crew, ANSI Z133 requires aerial rescue capability. At least one worker other than the climber must be trained and equipped to perform a rescue.
153. A — Remains motionless in a harness for extended time is the condition that produces suspension trauma. Reduced venous return causes blood to pool in the legs, becoming life-threatening within 30 minutes.
154. C — Stop the chain when kickback activates it is the purpose of the chainsaw chain brake. The brake also activates manually through the front handguard.
155. D — Thumb wrapped fully around the front handle is the proper left-hand chainsaw grip. This grip provides the strongest control if the saw moves unexpectedly.

156. B — The standard practice for nearly all saw use is two-handed operation. It is required except in specific climbing situations using top-handle saws.
157. B — Climbing arborist use in the canopy is the specific design purpose of top-handle chainsaws. They should not be used by untrained workers or for ground-based work.
158. D — Catch the chain if it breaks during cutting is the function of the chain catcher. It prevents a broken chain from whipping toward the operator.
159. C — Dynamic forces when a falling piece is caught define shock loading. Peak forces can be many times the static weight of the piece depending on fall distance and system elasticity.
160. A — Use a friction device for controlled slip is the most effective way to reduce shock loading. Controlled slip distributes the energy of the catch over time rather than stopping the load instantly.
161. D — Planned and cleared before cutting begins describes a proper escape route. The route should lead away from the tree at about 45 degrees from the fall line on the opposite side.
162. B — Vertical trunk splitting during the back cut defines barber chair. It is caused by cutting the hinge too thin or the back cut too slowly and can propel trunk sections backward.
163. A — Butt end first while standing to the side of the infeed is the correct chipper feeding method. Standing to the side avoids struck-by hazards from branches that flex or kick back.
164. C — Maintain approach distance with bucket and boom is required near energized lines. The metal boom is an excellent conductor and can carry electricity from a contacted line throughout the machine.
165. C — Before every use with damaged items retired is the correct PPE inspection frequency. Continuing to use compromised PPE provides reduced or no protection.
166. D — Grip reliably while permitting adjustment describes a properly tied friction hitch. A hitch that slips under load is unsafe; one that locks rigidly prevents smooth climbing.
167. A — Stop the saw and let it cool briefly before refueling. Refueling a running or hot saw risks fire from spilled fuel contacting hot components.
168. B — Available on site and stocked properly is the requirement for a first aid kit. It must be appropriate for the hazards of tree care work, including chainsaw lacerations and bleeding.
169. A — Shading surfaces and evapotranspiration cooling are how urban trees reduce the urban heat island effect. Paved cities can be 5 to 10 degrees warmer than surrounding areas, and canopy substantially reduces this difference.
170. B — Every tree within the defined inventory area is recorded in a complete tree inventory. Sample inventories cover only a statistically representative subset of the population.

171. C — Estimate the dollar value of ecosystem services is the purpose of the i-Tree suite. It quantifies stormwater interception, air quality improvement, carbon sequestration, and energy savings.
172. D — Too large to replace with nursery stock is when the trunk formula method applies. It calculates value from trunk cross-sectional area adjusted by species, condition, and location ratings.
173. B — Requires permits for removal of protected trees is the typical provision of a tree protection ordinance. Specific thresholds vary by jurisdiction.
174. A — The percentage of land area covered by canopy is how canopy cover goals are typically expressed. They are measured through aerial imagery analysis.
175. D — The desirability and suitability in the local area is reflected in species rating. Well-adapted species receive higher ratings; invasive or poorly suited species receive lower ones.
176. C — Plain language respecting owner decisions is the correct communication approach. Technical jargon and pressure tactics damage credibility and respect for client autonomy.
177. D — Improved mental health and reduced stress are documented benefits of urban trees. Multiple studies also show faster recovery from illness and increased physical activity in tree-rich neighborhoods.
178. C — The documented dollar value of ecosystem services is the most persuasive argument for a budget-focused council. Matching the message to the audience is basic professional communication.
179. B — Catastrophic pest-driven canopy loss is what the 10-20-30 rule protects against. Dutch elm disease and emerald ash borer illustrate why diversity matters.
180. A — Records every tree with detailed data is how a complete tree inventory differs from a windshield survey. Inventories support informed management planning.
181. A — Species, condition, and location ratings are the three factors that adjust the trunk cross-sectional area value in the trunk formula method. These adjustments reflect local context and tree quality.
182. D — Species, genus, and family of plantings are the three taxonomic levels in the 10-20-30 rule. The hierarchy protects against threats at each taxonomic level.
183. B — Will reach the largest healthy mature size for the site is the correct species selection goal. Larger healthy trees provide greater ecosystem service value per planting site.
184. C — Pre-existing conditions for later comparison is what a baseline report documents. It protects all parties when damage is alleged after construction.
185. C — Higher rates of asthma is NOT a benefit — urban trees typically improve air quality. The other options are all documented benefits of urban canopy.

186. A — Size, species, or location criteria are how protected trees are typically distinguished. Thresholds are set by local ordinance.
187. B — Documented dollar values from analysis tools are most effective for budget-focused audiences. Concrete financial figures translate ecological benefits into decision-relevant information.
188. D — Present options in plain language and respect choice is the correct approach for cost-significant recommendations. The client makes the final decision based on clear information.
189. B — Catastrophic species-specific pest outbreaks are what the 10-20-30 rule protects against. Dutch elm disease and emerald ash borer illustrate the cost of low diversity.
190. C — Present options clearly and respect decisions is the correct owner communication approach. The arborist provides information and expertise; the owner retains decision authority.
191. D — The i-Tree suite of analytical tools is used to quantify ecosystem service value. It was developed by the USDA Forest Service for urban tree populations.
192. A — \$20,000 per year minimum, calculated as \$2 per capita times 10,000 residents. Tree City USA budget requirements scale with population.
193. D — Species, condition, and location ratings are the three adjustment factors in the trunk formula method. Together they tailor the basic value to local context.
194. B — The current health and structural state of the tree is reflected in condition rating. It works alongside species and location ratings in the trunk formula method.
195. C — Size, species, or location characteristics distinguish protected trees under typical ordinances. These objective criteria are applied through the permit process.
196. A — Stormwater, cooling, carbon, and air quality benefits are quantified by the i-Tree suite. Each represents a measurable dollar value to communities.
197. A — Permits for removal of protected trees is the typical regulation in a tree protection ordinance. Penalties apply for unauthorized removal above the size threshold.
198. D — A minimum 40 percent canopy cover goal is NOT required for Tree City USA. The four required elements are a tree board, tree care ordinance, community forestry program meeting \$2 per capita, and Arbor Day observance.
199. C — Informed management planning decisions are the primary use of complete tree inventory data. Species, size, condition, and location data support operational decisions.
200. B — The documented dollar value of ecosystem services is the most persuasive argument for budget-focused councils. Financial arguments resonate with financial decision-makers.