

PRACTICE EXAM 4: ISA CERTIFIED ARBORIST SIMULATION

QUESTIONS 1–200

Time limit: 3 hours 30 minutes. Each question has exactly one correct answer. This exam emphasizes scenario-based field judgment and applied reasoning.

1. A tree physiologist measuring water movement through a 60-foot maple on a hot afternoon records approximately 200 gallons of water moving upward in a single day. The energy source powering this movement is:

- A. ATP produced by mitochondria in root cells
- B. Turgor pressure generated within root cortex cells
- C. Osmotic gradients maintained across the vascular cambium
- D. Solar energy driving evaporation at leaf surfaces

2. An arborist examines a wounded oak one year after a pruning cut and finds a rim of new wood growing outward around the wound edge. This new wood was produced by cells that originated in the:

- A. Vascular cambium at the perimeter of the wound
- B. Parenchyma rays within the heartwood
- C. Pith at the center of the original branch
- D. Outer phloem just beneath the bark surface

3. When a tree's carbohydrate reserves are graphed across a full year, the lowest point in a temperate deciduous species typically occurs:

- A. In midwinter during deepest dormancy
- B. In late summer at the end of peak growth
- C. In late spring as new leaves emerge and mature
- D. In early autumn just before leaf drop begins

4. A tree's root system absorbs water and dissolved minerals primarily through:

- A. Large woody structural roots near the trunk
- B. Short-lived non-woody absorbing roots and their associated mycorrhizae
- C. The bark covering the main taproot system
- D. The surface of exposed buttress roots at the base

5. In the CODIT model, which wall is the strongest and most important for preventing decay from spreading into new wood produced after a wound?

- A. Wall 1 resisting vertical spread
- B. Wall 2 resisting inward spread through growth rings
- C. Wall 3 resisting lateral spread through ray tissue
- D. Wall 4 formed by the cambium at the wound perimeter

6. A tree with fully open stomata on a bright summer day is simultaneously:

- A. Losing water vapor and taking up carbon dioxide
- B. Losing oxygen and taking up water vapor
- C. Producing lignin and absorbing ammonia

D. Storing starch and releasing nitrogen compounds

7. The process by which a tree converts stored starch back into simple sugars for use during early spring bud break is regulated primarily by:

A. Fluctuations in atmospheric humidity levels

B. Enzymes activated by rising temperatures and hormonal signals

C. Direct sunlight reaching the inner bark surface

D. Mechanical pressure from swelling buds

8. A tree girdled by a tight plastic tag around its trunk dies over a period of several years. The sequence of physiological failure begins with:

A. Complete blockage of xylem above the girdle site

B. Immediate failure of the cambium beneath the tag

C. Interruption of phloem transport below the girdle

D. Accumulation of oxygen toxicity in the leaf tissues

9. A tree's apical meristem is located at:

A. The very tips of growing shoots and roots

B. The base of the root flare near soil level

C. The vascular cambium along the trunk

D. Scattered throughout the heartwood

10. A mature oak has lost approximately 40 percent of its fine absorbing roots during nearby excavation. The tree's most immediate physiological limitation is:

- A. Inability to produce new phloem tissue
- B. Loss of cambial activity in the trunk
- C. Collapse of apical dominance in the crown
- D. Reduced capacity to absorb water from the soil

11. Lenticels on the bark of a young twig function primarily to:

- A. Store carbohydrate reserves for overwinter survival
- B. Transport sugars downward from leaves above
- C. Allow gas exchange between internal tissues and air
- D. Secrete defensive chemicals against bark beetles

12. The transition from sapwood to heartwood in a mature trunk involves:

- A. Active cell division producing additional conducting vessels
- B. Death of parenchyma cells and deposition of extractives
- C. Conversion of lignin back into soluble sugars
- D. Migration of living cells inward from the cambium

13. A tree leaf that is oriented toward incoming sunlight maximizes photosynthesis primarily through:

- A. Increased stomatal density on the lower surface
- B. Specialized thickening of the waxy cuticle layer
- C. Enhanced transport of sugars through the petiole

D. Greater light capture by chlorophyll in palisade cells

14. Secondary growth in a woody stem produces:

A. New xylem toward the inside and new phloem toward the outside

B. New length at the tips of each growing shoot

C. New leaves at nodes along the expanding branches

D. New roots emerging from the lower trunk area

15. A tree that has been repeatedly defoliated by insects for three consecutive growing seasons is most likely to show:

A. Accelerated height growth due to hormonal rebound

B. Increased resistance to future defoliating pests

C. Significant decline from exhausted carbohydrate reserves

D. Normal growth patterns with no lasting effects

16. Water moves from cell to cell within a root primarily by:

A. Active ATP-driven pumping through membrane channels

B. Passive movement along water potential gradients

C. Mechanical pressure from root hair expansion

D. Convection currents driven by soil temperature

17. A ring-porous tree species differs from a diffuse-porous species in that a ring-porous species:

A. Produces large vessels concentrated in the earlywood of each ring

- B. Lacks vessels entirely and relies only on tracheids
- C. Produces equal-sized vessels scattered uniformly through each ring
- D. Cannot transport water through the outer sapwood

18. A mature tree produces all of the following from atmospheric carbon dioxide EXCEPT:

- A. Cellulose forming the bulk of cell walls
- B. Lignin strengthening woody tissues
- C. Simple sugars used in cellular respiration
- D. Nitrogen compounds in amino acids and proteins

19. Cavitation in the xylem refers to:

- A. Healthy division of cambial cells producing new vessels
- B. Air bubbles forming inside conduits under extreme tension
- C. Hollow spaces created deliberately by the tree for storage
- D. Openings in the leaf cuticle allowing transpiration

20. Which tissue carries sugars from source to sink in a tree?

- A. Xylem composed of dead conducting vessels
- B. Vascular cambium with dividing cells
- C. Phloem composed of living sieve tube members
- D. Pith at the center of the stem

21. A tree's respiration rate generally:

- A. Decreases as temperature increases during summer
- B. Remains constant across all temperature ranges
- C. Depends only on light intensity at the leaf surface
- D. Increases as temperature rises, roughly doubling per 10°C

22. The branch collar visible at the base of a properly attached limb contains:

- A. Interlocking tissues and the cambium that forms Wall 4
- B. A specialized ring of dead protective heartwood
- C. Only phloem cells with no xylem present
- D. Exclusively bark tissue without any living cambium

23. A tree with opposite compound leaves, each leaf bearing 5 to 11 leaflets along a central rachis, is most likely a:

- A. Sugar maple in the soapberry family
- B. Green ash in the olive family
- C. Eastern redbud in the legume family
- D. American beech in the beech family

24. A large shade tree with furrowed dark bark, alternate simple leaves with rounded lobes, and acorns maturing in a single growing season is most likely in the:

- A. Red oak group with pointed lobes
- B. Maple genus with palmate leaves
- C. Hickory genus with compound leaves

D. White oak group with rounded lobes

25. A tree with smooth silver-gray bark, alternate simple leaves with prominent parallel veins, and long pointed winter buds is most likely:

A. American beech in the genus *Fagus*

B. River birch in the genus *Betula*

C. White oak in the genus *Quercus*

D. Sugar maple in the genus *Acer*

26. The principal diagnostic feature that distinguishes a pinnately compound leaf from a branch bearing many simple leaves is:

A. The color of the leaflets along the rachis

B. The angle at which the rachis meets the stem

C. A single bud at the base of the compound leaf's petiole

D. The presence of thorns between successive leaflets

27. A 30-foot space beneath a primary distribution line needs a new planting. The most appropriate mature-height choice is:

A. A pin oak reaching 60 feet at maturity

B. A flowering crabapple reaching 15 feet at maturity

C. A tulip poplar reaching 80 feet at maturity

D. An eastern white pine reaching 70 feet at maturity

28. The correct italicization and capitalization of the scientific name for red maple is:

- A. **ACER RUBRUM** in all capitals
- B. **Acer Rubrum** with both words capitalized
- C. **acer rubrum** in all lowercase
- D. **Acer rubrum** with genus capitalized

29. A nursery tag reads **Gleditsia triacanthos** 'Sunburst'. The word in single quotes indicates:

- A. A cultivar selected for specific traits and propagated clonally
- B. A formal botanical variety found in wild populations
- C. A common name assigned by the nursery industry
- D. A subspecies recognized under international codes

30. Which of the following genera has leaves arranged alternately along the stem?

- A. **Acer** in the maple group
- B. **Fraxinus** in the ash group
- C. **Quercus** in the oak group
- D. **Cornus** in the dogwood group

31. The 10-20-30 rule of urban forest diversity recommends maximum percentages of:

- A. 10% family, 20% genus, 30% species
- B. 10% species, 20% genus, 30% family
- C. 30% species, 20% genus, 10% family
- D. 20% species, 30% genus, 40% family

32. A homeowner wants a native shade tree reaching 60 to 80 feet tall with excellent fall color and tolerance of urban conditions. The most appropriate recommendation from the following list is:

- A. Norway maple, a non-native commonly planted in cities
- B. Siberian elm, a fast-growing introduced species
- C. Tree of heaven, a rapid-growing invasive species
- D. Red oak, a native species with good urban tolerance

33. A deciduous conifer that sheds all its needles each autumn is:

- A. Eastern white pine native to the northeast
- B. Colorado blue spruce native to the Rockies
- C. Bald cypress native to southern wetlands
- D. Eastern red cedar native across the east

34. Identifying a tree in mid-winter without any leaves relies most heavily on:

- A. Bud shape, bark character, and twig features
- B. Leaf scar color on the previous season's shoots
- C. Root flare depth at the soil surface
- D. The presence of nearby companion species

35. Members of the family Rosaceae that are commonly planted as ornamental trees include:

- A. Oaks and beeches in park plantings
- B. Crabapples, hawthorns, and serviceberries
- C. Pines and spruces in evergreen screens

D. Walnuts and hickories in shade landscapes

36. The primary ecological concern with planting Norway maple (**Acer platanoides**) in many parts of North America is that it:

- A. Attracts bark beetles from surrounding forests
- B. Releases compounds that sterilize the soil
- C. Escapes cultivation and displaces native understory plants
- D. Consumes excessive amounts of groundwater

37. A tree's common name can vary by region and by individual, but the binomial scientific name is intended to be:

- A. Decorative and based on local folklore
- B. Based on the tree's commercial timber value
- C. Changed every decade to reflect new research
- D. A single universally recognized identifier

38. An arborist notes that a tree has palmately compound leaves with five leaflets, opposite arrangement, and showy upright flower spikes in spring. The tree is most likely a:

- A. White ash in the olive family
- B. Horse chestnut in the soapberry family
- C. Tulip poplar in the magnolia family
- D. Sweetgum in the witch hazel family

39. Right Tree, Right Place primarily requires the arborist to consider:

- A. Mature size and site conditions together
- B. Only the species preferred by the homeowner
- C. Only the cheapest nursery stock available
- D. Only the color of the fall foliage display

40. A tree displaying whorled leaf arrangement has:

- A. Leaves emerging one at a time along alternating sides
- B. Leaves emerging in pairs directly across from each other
- C. Three or more leaves emerging from one node point
- D. Leaves fused together into a continuous spiral form

41. A soil texture classification of sandy loam indicates that the soil:

- A. Consists almost entirely of very large sand grains
- B. Contains mostly clay with just a small sand fraction
- C. Is dominated by silt particles with minor sand content
- D. Has substantial sand but enough silt and clay to form loam

42. A soil with a pH of 5.0 is:

- A. Ten times more acidic than a soil with pH 6.0
- B. Exactly one unit less alkaline than neutral soil
- C. At the optimal pH for almost all broadleaf trees
- D. Slightly more alkaline than a soil with pH 6.0

43. The term "cation exchange capacity" (CEC) measures a soil's ability to:

- A. Drain excess water from the root zone after storms
- B. Hold and supply positively charged nutrient ions to roots
- C. Support a given population of earthworms per square meter
- D. Resist changes in temperature during daily cycles

44. Mycorrhizal fungi associated with tree roots primarily benefit the tree by:

- A. Producing antibiotics that eliminate all soil pathogens
- B. Fixing atmospheric nitrogen within their hyphal networks
- C. Storing carbohydrates the tree cannot use directly
- D. Extending the effective absorbing surface of the root system

45. A soil structure described as "platy" typically indicates:

- A. Excellent aggregate stability and good drainage
- B. Healthy biological activity producing crumb structure
- C. Compacted layers that restrict water and root movement
- D. Sandy conditions with no meaningful structure

46. A soil probe inserted into a mulched root zone reveals dry conditions six inches below the surface after a week of no rain. The most appropriate response for a mature landscape tree is:

- A. Apply a deep watering across the active root zone
- B. Withhold water to encourage deeper root growth
- C. Apply a heavy dose of nitrogen fertilizer immediately

D. Remove the mulch layer to allow faster drying

47. The most effective long-term practice for improving the organic matter content of a soil around an established tree is:

- A. Repeated deep tilling throughout the root zone
- B. Maintaining a continuous organic mulch layer at the surface
- C. Spraying the soil with dilute hydrogen peroxide
- D. Adding a thin layer of sand every few months

48. Compaction damages tree roots primarily by:

- A. Concentrating salts in the upper soil profile
- B. Raising soil temperatures to lethal levels
- C. Increasing the acidity of the root zone soil
- D. Reducing pore space and available oxygen for respiration

49. Interveinal chlorosis on the newest foliage of a pin oak growing in alkaline soil is most likely caused by:

- A. High pH rendering iron chemically unavailable
- B. Nitrogen deficiency affecting a mobile macronutrient
- C. Excess potassium suppressing magnesium uptake
- D. Sulfur excess from an atmospheric source

50. A proper mulch ring around an established landscape tree should be:

- A. Ten inches deep piled directly against the trunk

- B. A thin half-inch layer scattered throughout the lawn
- C. Two to four inches deep with the trunk base kept clear
- D. Replaced with plastic sheeting to block all moisture

51. A percolation test in a potential planting site shows that water takes 48 hours to fully drain from a one-foot hole. This indicates:

- A. Ideal drainage conditions for any tree species
- B. A significant drainage problem requiring species selection or site modification
- C. Normal drainage found in most urban soils
- D. Excessive drainage that will dry out roots

52. Soil texture cannot be meaningfully altered by amendments because:

- A. Laboratory testing cannot detect texture changes accurately
- B. Texture refers only to the organic component of the soil
- C. Amendments wash away with the next heavy rainfall
- D. The proportions of sand, silt, and clay are physically permanent

53. The ideal soil for most tree species contains approximately what percentage of pore space by volume?

- A. 10 percent as a minimum for healthy growth
- B. 25 percent divided mostly between solids and water
- C. About 50 percent split between water and air
- D. 75 percent composed almost entirely of air

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

- A. Severe compaction that will halt most root growth
- B. Optimal conditions for healthy root development
- C. A normal reading for loamy topsoil in urban areas
- D. An unusually loose and aerated condition

55. The minimum width of a planting hole for a container-grown tree should be approximately:

- A. Exactly the diameter of the root ball
- B. Two to three times the diameter of the root ball
- C. Ten times the diameter of the root ball regardless of site
- D. Fifty times the diameter of the root ball in all soils

56. A newly planted tree should have its root flare positioned:

- A. Well below the surrounding grade for stability
- B. Exactly six inches beneath the final mulch line
- C. At or slightly above the surrounding grade level
- D. Completely buried to protect from frost damage

57. The rule of thumb for establishing a newly planted tree suggests approximately:

- A. One week of establishment per inch of caliper
- B. One month of establishment per inch of caliper
- C. Six months of establishment regardless of size
- D. One year of establishment per inch of caliper

58. Current best practice for backfilling a planting hole is to:

- A. Use the native soil excavated from the hole without amendment
- B. Replace the native soil entirely with purchased potting mix
- C. Mix in equal parts of peat moss and perlite
- D. Layer gravel beneath the root ball for drainage

59. Staking a newly planted tree is generally:

- A. Required for every tree regardless of conditions
- B. Appropriate only when the tree cannot support itself or the site is exposed
- C. Permanent, with stakes remaining in place for life
- D. Only used during the first week after planting

60. A circling root found inside the container of a nursery tree at planting time should be:

- A. Ignored because correction causes more damage
- B. Covered with additional soil to buffer the damage
- C. Cut or straightened before the tree is placed in the hole
- D. Treated with a commercial root hormone spray

61. A proper wire basket removal procedure on a balled-and-burlapped tree is to:

- A. Cut and remove at least the upper portion of the basket after placement
- B. Leave the basket completely intact to preserve the root ball
- C. Remove the entire basket before lowering the tree into the hole
- D. Replace the basket with plastic mesh during planting

62. A tree that fails to establish in its first two growing seasons most commonly suffered from:

- A. Excessive post-planting pruning of the crown
- B. Irrigation applied at the wrong time of day
- C. Rootstock incompatibility with the scion wood
- D. Planting too deep with a buried root flare

63. Watering a newly planted tree should aim to:

- A. Saturate the lawn area every morning for the first month
- B. Keep the root ball and surrounding backfill consistently moist, not saturated
- C. Withhold water entirely for the first three weeks
- D. Apply only fine mist to the leaves each evening

64. The preferred season for transplanting most deciduous trees is:

- A. Dormancy in late fall or early spring
- B. Mid-summer during peak active growth
- C. Immediately after new leaves fully expand
- D. Any month provided adequate water is available

65. Advance root pruning performed one year before a planned transplant serves to:

- A. Reduce the total weight of the future root ball significantly
- B. Eliminate any need for post-transplant watering
- C. Encourage new fibrous root growth inside the future ball
- D. Prevent all soil-borne pathogens from reaching the tree

66. Fertilization of a newly planted shade tree during its first growing season is:

- A. The single most important establishment practice
- B. Required by most municipal planting specifications
- C. Best applied as a concentrated nitrogen drench
- D. Generally unnecessary and sometimes counterproductive

67. When accepting a nursery delivery, an arborist should inspect:

- A. The trunk, crown structure, root flare, and root ball condition
- B. Only the height and caliper listed on the shipping manifest
- C. Only the color of the container used for shipping
- D. Only the written warranty provided with the tree

68. Mulching a newly planted tree provides all of the following benefits EXCEPT:

- A. Conserving soil moisture in the root zone
- B. Supplying all the tree's nitrogen needs for the year
- C. Suppressing competing weeds around the trunk
- D. Moderating soil temperature through the season

69. The most common serious error in planting a container-grown tree is:

- A. Using only native soil as backfill in the hole
- B. Setting the tree too shallow with the flare exposed
- C. Planting too deep so the root flare is buried
- D. Watering the root ball too deeply at planting

70. Twine tied around the trunk of a balled-and-burlapped tree should be:

- A. Left in place because it decomposes quickly
- B. Tightened further for additional stability
- C. Replaced with heavier cord before planting
- D. Removed completely to prevent future girdling

71. A newly installed landscape tree showing drooping foliage three days after planting most likely needs:

- A. Immediate heavy pruning of the entire crown
- B. A deep thorough watering of the root ball and backfill
- C. An application of systemic insecticide to the soil
- D. Replacement with a larger specimen from the nursery

72. The rule of "one year per inch of caliper" applies to which phase of a tree's care?

- A. Routine annual pruning schedules
- B. Fertilizer application frequency
- C. Establishment period after planting
- D. Bark maintenance across the mature trunk

73. The ANSI standard that governs tree pruning practices in the United States is:

- A. ANSI A300 covering tree care operations
- B. ANSI Z133 covering worker safety
- C. ANSI Z60.1 covering nursery stock standards
- D. ANSI Z89.1 covering head protection equipment

74. A correct pruning cut is placed:

- A. Flush with the parent stem to reduce the visible wound
- B. Six inches beyond the branch collar to leave clearance
- C. At the midpoint between branch tip and trunk
- D. Just outside the branch collar, preserving wound response tissue

75. Topping of a mature shade tree is categorically unacceptable because it:

- A. Requires specialized equipment that few crews own
- B. Creates large wounds, depletes reserves, and produces weakly attached sprouts
- C. Cannot be performed without damaging nearby utilities
- D. Is permitted only under ANSI Z133 safety provisions

76. The three-cut method of removing a large branch is used primarily to:

- A. Reduce total labor time for the crew on large limbs
- B. Minimize the amount of sawdust produced during the cut
- C. Prevent bark from tearing down the trunk as the branch falls
- D. Allow the climber to use a smaller chainsaw bar

77. The first cut of the three-cut method is made:

- A. On the underside of the branch, partway through, beyond the final cut
- B. From above the branch at the exact position of the final cut
- C. Straight down through the top of the branch to the collar
- D. Parallel to the trunk to score the bark surface

78. The pruning objective termed "clean" refers to the selective removal of:

- A. All live interior foliage to reduce crown density
- B. Dead, dying, diseased, broken, and weakly attached branches
- C. Every branch larger than two inches in diameter
- D. All lower scaffold limbs below pedestrian height

79. A reduction cut differs from a heading cut in that a reduction cut:

- A. Always requires a chainsaw rather than hand tools
- B. Leaves an arbitrary stub with no lateral nearby
- C. Removes a branch back to a lateral large enough to assume the terminal role
- D. Can only be performed during the dormant season

80. Structural pruning delivers the greatest long-term benefit when performed on:

- A. Senescent trees in their final decade of life
- B. Mature trees with fully established canopies
- C. Recently planted trees still in the establishment phase
- D. Young trees during the juvenile growth phase

81. The maximum percentage of live foliage that should typically be removed from a mature tree in a single pruning session is approximately:

- A. Ten to fifteen percent, less for older or stressed trees
- B. Twenty-five to thirty percent regardless of tree condition
- C. Forty to fifty percent during active growth

D. There is no upper limit for mature healthy trees

82. The branch bark ridge on a properly attached branch is:

- A. A line of dead tissue separating branch from stem wood
- B. A raised line of bark on the upper surface of the branch union
- C. An internal barrier forming inside the heartwood
- D. The decorative outer layer visible only in winter

83. Lion-tailing is a harmful pruning practice in which:

- A. Only dead wood is removed from the interior of the crown
- B. Every crossing branch is cut at its point of contact
- C. The central leader is shortened to a single height
- D. Interior foliage is stripped, concentrating weight at branch ends

84. Pollarding is best described as a pruning technique that:

- A. Requires repeated cuts at the same framework points on an ongoing schedule
- B. Is used only on young trees during establishment
- C. Can be abandoned once the form has been established
- D. Is prohibited by the current ANSI A300 standard

85. Wound dressings applied to pruning cuts have been shown by research to:

- A. Eliminate all risk of decay organisms entering the wound
- B. Accelerate compartmentalization in most tree species

- C. Provide minimal benefit and sometimes slow compartmentalization
- D. Be required under the current ANSI A300 standard

86. In regions with active oak wilt, pruning of oaks should be:

- A. Performed only during warm weather to speed wound closure
- B. Postponed until dormancy to reduce disease transmission risk
- C. Combined with heavy fungicide trunk injection
- D. Avoided entirely under all conditions

87. Subordination pruning is used to:

- A. Eliminate the central leader in favor of multiple trunks
- B. Remove all epicormic sprouts from the trunk area
- C. Cut every lateral branch to exactly the same length
- D. Reduce the growth of a competing stem in favor of a dominant leader

88. The restoration pruning objective applies primarily to trees that have been:

- A. Topped, vandalized, or severely storm-damaged
- B. Recently planted during the establishment phase
- C. Selected for removal within the following year
- D. Designated as heritage specimens by an ordinance

89. A flush cut damages a tree because it:

- A. Uses excessive force from the cutting tool

- B. Leaves an arbitrary stub protruding from the trunk
- C. Removes the branch collar and eliminates Wall 4 formation
- D. Allows too much rainfall to enter the cut surface

90. A stub cut leaves dead wood projecting beyond the branch collar, creating the problem that:

- A. The stub stores valuable reserves for future sprouts
- B. The stub adds useful weight at the branch base
- C. Birds nesting on the stub spread disease widely
- D. The dead stub cannot be compartmentalized and invites decay

91. Bypass pruning blades are preferred over anvil blades for living wood because bypass blades:

- A. Apply more force at a lower cutting angle
- B. Cut cleanly without crushing the stem
- C. Can be sharpened without removing the blade
- D. Are lighter and reduce operator fatigue significantly

92. A pole pruner operated from the ground is most appropriate for:

- A. Small-diameter branches out of reach from the ground without climbing
- B. Cutting branches larger than six inches in diameter
- C. Felling whole trees on steep slopes
- D. Removing all lower branches on mature trees

93. An arborist is asked by a homeowner to "trim up" a mature tree by half to let more light through. The correct professional response is to:

- A. Comply using hand tools exclusively
- B. Remove exactly half the foliage without further discussion
- C. Explain that thinning of that magnitude violates accepted standards
- D. Agree but charge double for the extra work involved

94. When pruning a young tree with a codominant stem problem, the arborist should:

- A. Wait until the tree matures to address the defect
- B. Subordinate or remove the competing stem while it is still small
- C. Apply a wound dressing without cutting anything
- D. Inject the included bark with a chemical agent

95. The raise pruning objective refers to:

- A. Increasing the overall height of the tree crown
- B. Raising the soil grade around the trunk base
- C. Lifting the tree with mechanical equipment for inspection
- D. Removing lower branches to provide vertical clearance

96. A certified arborist should disinfect pruning tools between cuts most importantly when:

- A. Pruning healthy trees for routine maintenance
- B. Working during the dormant winter season only
- C. Pruning trees affected by contagious diseases such as fire blight

D. Using bypass hand pruners on very small twigs

97. A professional pruning specification should include:

- A. The objective, percentage of foliage to remove, and cut diameters
- B. Only the total price for the entire job
- C. Only the climber's personal preferences
- D. Only the brand of chainsaw to be used

98. Bypass loppers are most appropriately used for branches:

- A. Smaller than one-quarter inch in diameter
- B. Up to approximately one and a half to two inches in diameter
- C. Larger than six inches in diameter
- D. Any size encountered during ground work

99. A tree that has been repeatedly topped develops characteristic dense clusters of weakly attached sprouts. These sprouts are:

- A. Strong because they emerged from stored reserves
- B. Identical in structure to normal scaffold branches
- C. Prone to failure as they grow due to shallow bud origins
- D. Resistant to all common wood decay fungi

100. The single most important factor determining whether a pruning wound closes successfully is:

- A. The time of day when the cut is made

- B. The brand of cutting tool used by the climber
- C. The weather conditions during the operation
- D. The placement of the cut relative to the branch collar

101. The first step in diagnosing an unhealthy tree should be to:

- A. Identify the species and understand its normal characteristics
- B. Apply broad-spectrum fungicide as a precaution
- C. Take a cross-section of the trunk for laboratory analysis
- D. Recommend immediate removal to prevent spread

102. A "sign" of a tree disease refers to:

- A. The tree's physiological response such as wilting leaves
- B. A description written in the inspection report
- C. A seasonal symptom that disappears by autumn
- D. Direct evidence of the causal agent such as fruiting bodies

103. A secondary tree pest is best described as one that:

- A. Can attack and kill healthy vigorous trees on its own
- B. Attacks only trees already stressed or weakened by other factors
- C. Is found only in tropical regions of the world
- D. Appears second in the growing season after primary pests

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

- A. Was introduced earlier than other wood-boring insects
- B. Attacks a wider range of tree genera than most borers
- C. Successfully attacks and kills healthy ash trees of all sizes
- D. Reproduces only during regional drought years

105. Integrated Pest Management (IPM) is best understood as:

- A. A decision framework integrating monitoring, thresholds, and multiple tactics
- B. A specific branded organic pesticide product
- C. A complete prohibition on all chemical pesticide use
- D. A method limited exclusively to biological control agents

106. Fire blight is caused by the bacterium *Erwinia amylovora* and affects members of which plant family?

- A. Fagaceae including oaks and beeches
- B. Pinaceae including pines and firs
- C. Sapindaceae including maples and horse chestnuts
- D. Rosaceae including apples, pears, and hawthorns

107. Oak wilt in the red oak group is most rapidly spread by:

- A. Wind dispersing airborne spores across forests
- B. Root grafts and sap-feeding beetles attracted to fresh wounds
- C. Rain splashing from infected foliage to nearby healthy trees

D. Nematodes feeding on the fine absorbing roots

108. A tree exhibits interveinal chlorosis on its newest leaves while older leaves remain green. The most likely cause is:

- A. Iron deficiency, commonly related to high soil pH
- B. Nitrogen deficiency affecting mobile macronutrients
- C. Excess rainfall causing root rot damage
- D. Low calcium interfering with cell wall formation

109. Uniform yellowing that begins on older inner leaves and progresses outward typically indicates deficiency of:

- A. Iron, an immobile micronutrient affected by soil pH
- B. Boron, a trace element critical to cell division
- C. Nitrogen, a mobile macronutrient moved to new growth
- D. Calcium, a structural secondary macronutrient

110. Cupped, twisted, and distorted new leaves appearing suddenly on a mature tree most likely indicate:

- A. An active outbreak of spider mite feeding
- B. Normal fall color development in the early season
- C. Drought stress during an unusually dry period
- D. Exposure to phenoxy herbicide drift or runoff

111. A tree showing delayed decline symptoms three years after nearby construction activity most likely suffered from:

- A. A newly arrived invasive insect species in the region
- B. Root damage during the construction that has now exhausted reserves
- C. A normal aging process unrelated to the construction
- D. Excess rainfall during the current growing season

112. Anthracnose is best described as:

- A. A bacterial disease of the vascular system
- B. A virus transmitted by aphids
- C. A fungal disease producing leaf spots and blotches
- D. A pest insect feeding on the inner bark

113. Armillaria root rot is confirmed by finding:

- A. White mycelial sheets beneath the bark of infected roots
- B. Orange pustules on the upper surface of leaves
- C. Sticky honeydew dripping from small twigs
- D. Hollow tunnels carved into the heartwood

114. Dutch elm disease is a vascular wilt spread primarily by:

- A. Soil nematodes feeding on fine roots
- B. Elm bark beetles and root grafts between adjacent trees
- C. Airborne spores over long distances

D. Rain splash from infected leaves in wet weather

115. Trunk injection of a systemic insecticide is most appropriate when:

- A. The target pest is below ground in the root zone only
- B. Foliar sprays would be cheaper and equally effective
- C. The tree is scheduled for removal within one month
- D. High-value trees need protection from borers that foliar sprays cannot reach

116. The phrase "the label is the law" in pesticide application means that:

- A. Only English-language labels carry legal weight
- B. Labels are advisory guidelines for experienced users
- C. Pesticide labels are legally enforceable federal documents
- D. Labels apply only during the first application on a site

117. When a diagnosed disease has no effective treatment, the arborist should:

- A. Apply experimental treatments without telling the owner
- B. Communicate the diagnosis honestly and recommend appropriate management
- C. Recommend removing all nearby trees as a precaution
- D. Refuse to discuss the finding with the property owner

118. A tree with wilting foliage despite adequate soil moisture most likely has:

- A. A damaged root system unable to absorb the available water
- B. A normal seasonal response to hot afternoon temperatures

- C. A mineral deficiency in the upper leaf canopy
- D. An overabundance of mycorrhizal colonization

119. The Critical Root Zone (CRZ) of a mature tree is commonly calculated as a radius of:

- A. Six inches per inch of trunk diameter at breast height
- B. Two feet per inch of trunk diameter at breast height
- C. One foot per inch of trunk diameter at breast height
- D. Three feet per inch of trunk diameter at breast height

120. Tree protection fencing at a construction site should generally be placed at:

- A. The trunk itself, encircling the bark closely
- B. The dripline regardless of tree size or species
- C. Half the distance between trunk and dripline
- D. The calculated CRZ boundary or further from the trunk

121. Concrete washout performed near a protected tree is harmful because:

- A. The high pH of the washwater can sterilize soil and kill roots
- B. The aggregate particles physically damage absorbing roots
- C. The vibration from mixing disturbs fine root hairs
- D. The cement increases soil fertility in toxic amounts

122. Raising the soil grade significantly over an existing tree's root zone causes:

- A. Immediate death within days of grade change

- B. Accelerated growth from improved moisture
- C. Gradual decline as buried roots lose access to oxygen
- D. Increased resistance to wind storm damage

123. When a utility line must cross a root protection zone, the least damaging installation method is generally:

- A. Conventional open-cut trenching through the root zone
- B. Driving the pipe with heavy vibrating equipment
- C. Surface installation directly on the soil
- D. Directional boring or tunneling beneath the root zone

124. Storage of construction materials within a Tree Protection Zone is:

- A. Permitted if the materials are lightweight only
- B. Prohibited due to soil compaction and root smothering
- C. Required to free up other staging areas on the site
- D. Allowed during dry weather conditions only

125. A pre-construction tree assessment ideally occurs:

- A. Before final design so findings can influence project decisions
- B. Immediately before the demolition begins at the site
- C. After grading is complete and foundations have been poured
- D. Only after trees show obvious symptoms of decline

126. An arborist supervising unavoidable root impact during construction should:

- A. Wait until after excavation to inspect and treat damaged roots
- B. Allow the excavator to tear roots randomly with the backhoe
- C. Apply wound sealant to every visible cut root surface
- D. Make clean cuts with sharp tools at the damage line in advance

127. Post-construction care for a tree damaged during a project should emphasize:

- A. Heavy nitrogen fertilization to force rapid new growth
- B. Aggressive crown reduction to compensate for root loss
- C. Deep watering, mulching, and multi-year monitoring
- D. Immediate trunk injection with systemic fungicide

128. Using the dripline as the outer boundary of a tree protection zone is usually inadequate because:

- A. Actual root systems typically extend well beyond the dripline
- B. Drip patterns are too difficult to survey accurately
- C. Drip lines change shape during different seasons
- D. Drip coverage cannot be enforced legally

129. Delayed decline following construction damage typically becomes visible:

- A. Within hours of the damaging activity ending
- B. Months to several years after the triggering event
- C. Only during the next major drought cycle
- D. Always on the first anniversary of the construction

130. Tree protection fencing on a construction site should be:

- A. Lightweight flagging tape that crews can move freely
- B. Short stakes spaced widely apart for appearance
- C. Painted to match nearby building colors
- D. Sturdy, visible, clearly marked, and maintained throughout construction

131. The single most effective action for protecting a mature tree during construction is:

- A. Applying heavy fertilizer before work begins
- B. Wrapping the trunk in protective foam padding
- C. Excluding all activity from the root zone entirely
- D. Reducing the crown to balance expected root loss

132. Lowering the grade around an established tree primarily causes:

- A. Direct loss of functional roots along with the removed soil
- B. Improved drainage benefits for the deeper root system
- C. Increased nutrient availability from freshly exposed layers
- D. Enhanced wind resistance from the remaining anchorage

133. A baseline tree condition report prepared before construction begins:

- A. Replaces the need for any post-construction monitoring
- B. Documents pre-existing conditions for later comparison
- C. Is used exclusively for billing the client afterward
- D. Satisfies all regulatory requirements automatically

134. A tree showing no visible symptoms one year after construction:

- A. Has fully recovered and requires no further attention
- B. Is certain to fail during the next windstorm event
- C. Can be safely fertilized heavily without concern
- D. Should continue to be monitored for delayed decline

135. Hand excavation or air excavation is appropriate within a Tree Protection Zone when:

- A. Conventional trenching would be cheaper for the contractor
- B. Speed is the most important consideration for the schedule
- C. Roots must be identified and preserved during unavoidable work
- D. The soil is too wet for any other excavation method

136. A tree that has made contact with an energized overhead conductor during construction should be:

- A. Approached immediately for pruning by any experienced worker
- B. Treated as potentially energized until the utility confirms otherwise
- C. Sprayed with water to dissipate the electrical charge
- D. Removed quickly before the contact is officially reported

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

- A. The combination of likelihood of failure and severity of consequences
- B. Any visible defect regardless of targets present nearby
- C. The monetary value of the tree at current market rates
- D. The age of the tree multiplied by its height in feet

138. A Level 2 tree risk assessment is typically:

- A. A rapid drive-by screening of street tree populations
- B. A theoretical analysis based on species and location alone
- C. A detailed visual inspection of an individual tree using basic tools
- D. Advanced laboratory analysis of collected wood cores

139. A Level 1 risk assessment is most appropriate when:

- A. Detailed evaluation of a single specimen is required
- B. Rapid screening of a large tree population is needed
- C. Advanced internal diagnostics are warranted
- D. A full engineering analysis must be completed

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

- A. Emits chemical signals that attract decay fungi
- B. Alters the tree's center of gravity noticeably
- C. Acts as a reservoir for boring insect larvae
- D. Prevents formation of a strong structural union

141. The presence of a fungal fruiting body on a trunk indicates:

- A. Active decay already established within the tree's tissues
- B. A healthy mycorrhizal partnership beneath the bark
- C. Normal seasonal shedding of outer bark tissues
- D. Excess nitrogen from recent fertilizer applications

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

- A. A specific branch marked for removal during pruning
- B. A zone where a tree is expected to fall eventually
- C. Any person, property, or activity that could be affected by a failure
- D. An area of decay that has become externally visible

143. Target occupancy rate in risk assessment refers to:

- A. The number of nearby trees per square acre of land
- B. The monetary value of surrounding real estate
- C. The age of the structures beneath the tree crown
- D. The frequency and duration of target presence in the strike zone

144. A newly developed lean in a previously upright tree, accompanied by fresh soil cracking opposite the lean, indicates:

- A. A cosmetic change without structural significance
- B. Root plate movement and elevated risk of uprooting
- C. Normal phototropic adjustment toward sunlight
- D. Seasonal soil movement unrelated to the tree

145. Sounding a trunk with a mallet is useful for detecting:

- A. Hollow areas and decay columns through changes in sound
- B. The total nitrogen content of the trunk wood
- C. Insect larvae living deep within the heartwood

D. The exact age of the tree in calendar years

146. The TRAQ risk matrix produces an overall rating by combining:

- A. Tree species and trunk diameter at breast height
- B. Property value and site drainage characteristics
- C. Soil conditions and recent rainfall totals
- D. Likelihood of failure and impact with consequences

147. A "probable" likelihood of failure in the TRAQ framework means:

- A. Failure is not expected within the assessment period
- B. Failure could occur but is considered unlikely
- C. Failure is likely to occur during the assessment time frame
- D. Failure has already happened or is actively in progress

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

- A. Minor damage easily repaired at low cost
- B. Moderate damage with small personal injury
- C. No measurable effect on any targets present
- D. Catastrophic property damage, serious injury, or death

149. A tree with an internal cavity may remain structurally sound provided that:

- A. Sufficient intact wood remains around the cavity perimeter
- B. The cavity is smaller than four inches in width

- C. No rainwater ever accumulates inside the cavity
- D. The cavity is located above six feet of ground level

150. Consequences of a tree failure depend on:

- A. Only the size of the falling part involved
- B. Part size, fall height, and nature of the target together
- C. Only the distance between tree and the nearest structure
- D. Only the age of the tree at the time of the failure

151. Residual risk refers to:

- A. The financial cost of insurance premiums
- B. Risk to the worker performing mitigation activities
- C. Risk remaining after mitigation has been implemented
- D. Risk observable only after a tree has been removed

152. A professional tree risk assessment report should include:

- A. Only the final risk rating without supporting detail
- B. The arborist's personal opinions without data
- C. Recommendations for removing every tree evaluated
- D. Scope, defects, targets, mitigation, and residual risk

153. Level 3 risk assessment tools include:

- A. Basic hand pruners and visual observation

- B. Resistograph drilling and sonic tomography
- C. Standard tape measures and calipers
- D. Color photographs taken from ground level

154. Cabling and bracing of mature tree unions:

- A. Reduces but does not eliminate structural risk
- B. Completely eliminates any possibility of failure
- C. Is required on every mature tree by ANSI standard
- D. Requires no further inspection after installation

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

- A. Use highly technical terminology to establish expertise
- B. Recommend only the most expensive mitigation available
- C. Use plain language and respect the owner's decisions
- D. Withhold any information that might cause the owner concern

156. Root defects are difficult to evaluate during risk assessment because:

- A. Root damage always heals spontaneously over time
- B. Roots are below ground and not directly observable
- C. Root defects never produce any above-ground symptoms
- D. Root problems occur only in very young trees

157. Which of the following is NOT a structural defect?

- A. Codominant stems with included bark
- B. An active vertical crack exposing wet wood
- C. A large dead scaffold branch above a parking area
- D. A healthy rounded callus around an old small wound

158. An appropriate mitigation for a moderate-risk branch overhanging a driveway is:

- A. Complete removal of the entire tree as a precaution
- B. Ignoring the situation until the branch fails naturally
- C. Reduction pruning to decrease end weight on the branch
- D. Cabling every branch in the entire upper canopy

159. The principal safety standard for arboricultural operations in the United States is:

- A. ANSI Z133 covering arboricultural safety requirements
- B. ANSI A300 covering pruning practices
- C. ANSI Z60.1 covering nursery stock quality
- D. OSHA 29 CFR 1926 covering general construction

160. The minimum approach distance for an unqualified tree worker to an energized distribution line below 50 kV is:

- A. Three feet in any direction from the conductor
- B. Ten feet in any direction from the conductor
- C. Twenty-five feet in any direction from the conductor

D. One foot in any direction from the conductor

161. A qualified line-clearance arborist is distinguished from an unqualified worker by:

- A. Owning a personal set of insulated rubber gloves
- B. Having experience in residential tree work generally
- C. Possession of a valid bucket truck operator license
- D. Specialized training in electrical hazards and line-clearance methods

162. A climbing helmet used in arboricultural work must include:

- A. A chin strap to retain the helmet during active climbing
- B. An open face design for maximum peripheral vision
- C. A wide brim to block direct overhead sunlight
- D. Reflective tape covering every exterior surface

163. Chainsaw-resistant leg protection stops a running saw by:

- A. Activating a magnetic brake in the saw motor
- B. Producing an audible warning for the operator
- C. Containing fibers that clog the chain on direct contact
- D. Reflecting the moving chain away from the body

164. Hearing protection is generally required when noise levels exceed:

- A. 30 decibels during normal indoor conversation
- B. 50 decibels during quiet outdoor activity

- C. 70 decibels during routine power equipment use
- D. 85 decibels during chainsaw and chipper operation

165. A pre-work job briefing should cover:

- A. Work scope, hazards, PPE, and emergency procedures
- B. Only the lunch break schedule for the crew
- C. Only the pricing of the day's work
- D. Only the personal histories of each worker

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

- A. Only when electrical hazards are present at the site
- B. For essentially all climbing operations with a crew
- C. Only when climbing trees over 100 feet in height
- D. Only on projects contracted for federal agencies

167. Suspension trauma can develop in a climber who:

- A. Ascends a stationary line too quickly
- B. Uses a climbing harness that is too tight
- C. Switches between rope systems during a climb
- D. Remains motionless in a harness for an extended period

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

- A. The bottom edge of the bar near the powerhead

- B. The middle of the cutting bar during normal use
- C. The upper portion of the bar tip
- D. The rear handle where the throttle is operated

169. A chainsaw chain brake is designed to:

- A. Stop the chain when activated manually or by kickback motion
- B. Reduce fuel consumption during idle periods
- C. Prevent engine flooding during cold starts
- D. Control the maximum cutting speed of the bar

170. When operating a chainsaw, the left hand should grip the front handle with:

- A. Only the fingertips for rapid release in emergencies
- B. The thumb wrapped fully around the handle
- C. A loose grip to absorb vibration from the engine
- D. The palm only, with thumb alongside the handle

171. Two-handed operation of a chainsaw is:

- A. Required only when felling large mature trees
- B. Optional depending on operator preference
- C. The standard practice for essentially all operation
- D. Reserved only for cuts above the operator's head

172. Top-handle chainsaws are designed specifically for:

- A. Ground-based felling of large shade trees
- B. Use by inexperienced ground workers on job sites
- C. Cutting firewood at a stationary log pile
- D. Climbing arborist use in the canopy where compact one-handed operation may occur

173. The working load limit of rigging equipment is commonly:

- A. Approximately one-tenth of the rated tensile strength
- B. Approximately one-half of the rated tensile strength
- C. Equal to the rated tensile strength of the rope
- D. Twice the rated tensile strength for safety margin

174. Shock loading in rigging refers to:

- A. The static weight of the largest piece being handled
- B. Dynamic forces generated when a falling piece is suddenly caught
- C. Electrical charge building in a dry rigging rope
- D. The initial lifting force applied to a cut piece

175. The most effective way to reduce peak forces during a rigging catch is to:

- A. Use the smallest-diameter rope that fits the load
- B. Tie the rigging line to a hard anchor with no slip
- C. Use a friction device such as a Port-a-Wrap to allow controlled slip
- D. Position the ground worker beneath the falling piece

176. A block redirecting a rigging load over an anchor experiences approximately:

- A. Half the force of the load being redirected
- B. Exactly the same force as the load itself
- C. A force unrelated to the actual load weight
- D. Twice the force of the load being redirected

177. The hinge in a standard felling cut:

- A. Must be cut completely through before the tree begins moving
- B. Controls the fall direction as the tree commits to falling
- C. Is formed only by the first notch cut from the front
- D. Applies only when felling hollow decayed trees

178. An escape route during felling operations should:

- A. Lead directly beneath the expected fall line
- B. Be improvised at the moment of the actual fall
- C. Be planned and cleared before cutting begins
- D. Be exactly straight behind the feller at all times

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

- A. Vertical splitting of the trunk upward during the back cut
- B. A decorative form intentionally left in the stump
- C. A resting position taken after each difficult cut
- D. A specialty chain used for resinous softwood

180. Chipper operators should feed branches:

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

181. Aerial lift operators working near energized lines must:

- A. Maintain approach distance only at the bucket itself
- B. Rely on the rubber tires to isolate the lift electrically
- C. Approach within one foot for efficient pruning
- D. Maintain the minimum approach distance with both bucket and boom

182. Personal protective equipment should be inspected:

- A. Before every use, with damaged items retired immediately
- B. Only during annual company safety reviews
- C. Only after a known impact or failure event
- D. Only by the original equipment manufacturer

183. ANSI Z133 requires climbing ropes to have a minimum tensile strength of:

- A. 1,800 pounds for residential climbing work
- B. 3,000 pounds for routine arboricultural use
- C. 5,400 pounds for arboricultural climbing applications
- D. 10,000 pounds for any climbing operation

184. A properly tied friction hitch on a climbing rope should:

- A. Lock rigidly and never move under applied load
- B. Be replaced with a new cord after every single use
- C. Slip continuously to allow fast descent
- D. Grip reliably under load while permitting controlled adjustment

185. A worker feeding a chipper who observes a dangerous condition developing should:

- A. Activate the feed control bar or emergency stop immediately
- B. Continue feeding until the current branch is processed
- C. Shout a warning while continuing to push material through
- D. Leave the area and let the machine run until empty

186. The notch in a standard felling cut is cut into the side of the tree:

- A. Opposite the intended fall direction to balance forces
- B. Facing the intended direction of fall
- C. Chosen at random by the feller at the moment
- D. Where the prevailing wind is originating from

187. Refueling a chainsaw should be performed:

- A. While the saw is still running at low idle
- B. Without removing the fuel cap to save time
- C. After stopping the saw and allowing it to cool briefly
- D. With cut-resistant gloves still on the operator's hands

188. A first aid kit on a tree care worksite should:

- A. Be stored in a vehicle parked off the job site
- B. Contain only basic over-the-counter medications
- C. Be carried exclusively by the designated safety officer
- D. Be available on site and stocked for the hazards of the work

189. Urban trees contribute to reducing the urban heat island effect primarily through:

- A. Shading surfaces and evapotranspiration cooling
- B. Absorbing heat directly through their root systems
- C. Reflecting sunlight from specialized waxy leaves
- D. Releasing cool air through their trunk surfaces

190. A complete tree inventory records information on:

- A. Only trees currently scheduled for removal
- B. Every tree within the defined inventory boundary
- C. A statistical sample of the larger tree population
- D. Only trees showing obvious structural defects

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

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

192. The trunk formula method of plant appraisal is most appropriate when:

- A. A replacement tree of identical size is available from a nursery
- B. The tree has no visible structural defects or concerns
- C. The tree is a recently planted nursery specimen
- D. The tree is too large to replace with available nursery stock

193. A typical tree protection ordinance:

- A. Requires mandatory removal of all mature trees eventually
- B. Requires permits for removal of protected trees above a size threshold
- C. Prohibits any pruning whatsoever on private property
- D. Applies only to trees planted by the city public works department

194. Canopy cover goals are typically expressed as:

- A. The total weight of leaves produced each year
- B. The number of mature trees per city block
- C. The percentage of land area covered by tree canopy
- D. The average height of street trees in feet

195. A Tree City USA community must maintain a minimum community forestry program budget of:

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

196. Species rating in the trunk formula method reflects:

- A. The lumber value of the species in today's market
- B. The desirability and suitability of the species in the local area
- C. The exact age of the tree being appraised
- D. The height of the tree in meters above ground

197. When communicating recommendations to a property owner, a certified arborist should:

- A. Use as much technical jargon as possible for credibility
- B. Withhold cost information until after the work is completed
- C. Make final decisions on the owner's behalf without consultation
- D. Present options in plain language and respect the owner's decisions

198. Multiple studies have documented which social or health benefit of urban trees?

- A. Improved mental health outcomes and reduced stress for residents
- B. Increased crime rates in neighborhoods with dense canopy
- C. Elevated asthma incidence across all age groups
- D. Reduced physical activity among people in leafy areas

199. An urban forester advocating for increased canopy before a budget-focused city council should emphasize:

- A. Aesthetic preferences of the forestry staff
- B. Documented dollar value of ecosystem services delivered
- C. The personal favorite tree species of the mayor

D. The simplicity of replacing trees with artificial turf

200. Street trees planted following the 10-20-30 rule primarily:

A. Must all be very slow-growing species

B. Must be purchased from a single approved supplier

C. Protect the community against catastrophic pest-related loss

D. Must include only native species from the immediate region

PRACTICE EXAM 4 — ANSWER KEY AND EXPLANATIONS

1. D — Solar energy drives evaporation at leaf surfaces, generating the tension that pulls water upward through xylem via the cohesion-tension mechanism. The tree expends no metabolic energy on water transport. This is why stomatal closure during drought halts water movement entirely.
2. A — New wood around a wound is produced by the vascular cambium at the perimeter of the injury, which forms Wall 4 of the CODIT model. This cambial layer is the only tissue capable of producing new xylem and phloem. Preserving it during pruning is the biological reason for correct cut placement.
3. C — Reserves reach their lowest point in late spring when new leaves have emerged and matured but have not yet returned more sugar than the refoliation cost. Spring defoliation during this window is particularly devastating. Reserves then rebuild through summer and peak in autumn.
4. B — Short-lived non-woody absorbing roots, along with their mycorrhizal partners, do nearly all the water and nutrient uptake. Large woody roots primarily provide anchorage and transport. This is why mature trees depend so heavily on a healthy fine-root network.
5. D — Wall 4 is formed by the cambium at the wound perimeter and resists the outward spread of decay into new wood produced after the injury. It is the strongest of the four CODIT walls. Preserving the branch collar during pruning is essential because it contains this critical cambium.
6. A — Open stomata simultaneously lose water vapor (transpiration) and take up carbon dioxide for photosynthesis. This trade-off between water loss and carbon gain is the central constraint on tree function. Drought conditions force the tree to close stomata and sacrifice photosynthesis.
7. B — Stored starch is converted back to simple sugars through enzymatic activity triggered by rising temperatures and hormonal signals in early spring. This mobilization fuels bud break before new leaves can contribute photosynthate. The process depends entirely on stored reserves from the previous season.
8. C — A girdling device severs the phloem, interrupting the downward transport of sugars from leaves to roots. The root system gradually starves and loses function, followed by the rest of the tree. Xylem flow continues above the girdle until root failure cascades upward.
9. A — Apical meristems are located at the very tips of growing shoots and roots. They produce primary growth (lengthening) through cell division. Secondary growth (thickening) occurs separately at the vascular cambium along the trunk and branches.

10. D — Loss of fine absorbing roots immediately reduces the tree's capacity to absorb water from the soil. This is why trees with construction root damage often show wilting and drought-like symptoms despite adequate rainfall. Root regeneration is slow and reserves are depleted in the process.
11. C — Lenticels are specialized pores in the bark of young stems and roots that allow gas exchange between internal tissues and the atmosphere. They function like stomata for woody tissues. Covering them with soil or mulch restricts gas exchange and contributes to decline.
12. B — Sapwood transitions to heartwood when living parenchyma cells die and extractives (tannins, resins) are deposited in the cell walls. The resulting heartwood provides structural support and resists decay but no longer conducts water. The transition is a normal aging process.
13. D — Sun-exposed leaves maximize photosynthesis through chlorophyll-containing palisade cells in the upper leaf, which are arranged vertically to capture light efficiently. The palisade layer is the primary site of photosynthesis. Shaded leaves have thinner palisade layers and lower rates.
14. A — Secondary growth produces new xylem toward the inside of the cambium and new phloem toward the outside. This is the source of annual growth rings and trunk thickening. Apical meristems, by contrast, produce length rather than diameter.
15. C — Repeated defoliation forces the tree to use stored carbohydrate reserves to re-leaf each time, progressively exhausting them. After three successive years, reserves are typically depleted and significant decline follows. This is why repeated gypsy moth or caterpillar outbreaks are so damaging.
16. B — Water moves passively along water potential gradients from regions of higher to lower potential, driven ultimately by transpiration pull at leaf surfaces. No ATP is required for water movement itself, though active nutrient uptake requires energy. This is the cohesion-tension mechanism at work.
17. A — Ring-porous species (oaks, ashes, elms) produce large earlywood vessels concentrated in a ring at the beginning of each growing season. Diffuse-porous species (maples, birches) produce smaller vessels scattered uniformly. The distinction affects wood anatomy and water transport patterns.
18. D — Nitrogen compounds in amino acids and proteins come from nitrogen absorbed by the roots from the soil, not from atmospheric CO₂. Cellulose, lignin, and simple sugars are all carbon-based compounds built from atmospheric carbon. This distinction matters for understanding tree nutrition.
19. B — Cavitation is the formation of air bubbles (embolisms) inside xylem conduits when the water column is pulled apart under extreme tension, typically during severe drought. Cavitated conduits no longer transport water. Severe cavitation can cause permanent branch dieback.

20. C — Phloem, composed of living sieve tube members and companion cells, carries sugars from source to sink throughout the tree. The cells must remain alive because sugar transport requires active cellular processes. Xylem, by contrast, transports water through dead conducting vessels.
21. D — Respiration rate increases as temperature rises, roughly doubling for each 10°C increase (Q10 ≈ 2). This is why heat stress compounds drought damage — the tree burns reserves faster. Respiration costs rise while photosynthesis may be declining.
22. A — The branch collar contains interlocking tissues from both the trunk and the branch, along with the cambium that forms Wall 4 after wounding. Preserving the collar intact is essential for proper compartmentalization. Flush cuts destroy the collar and eliminate Wall 4.
23. B — Green ash (*Fraxinus pennsylvanica*) has opposite pinnately compound leaves with typically 5 to 9 leaflets along a central rachis. The olive family (Oleaceae) includes ashes. Maples have simple leaves, redbuds have simple heart-shaped leaves, and beeches have simple toothed leaves.
24. D — White oaks have rounded leaf lobes without bristles and acorns that mature in a single growing season. Red oaks have pointed bristle-tipped lobes and acorns maturing over two seasons. This distinction is the primary difference between the two oak groups.
25. A — American beech (*Fagus grandifolia*) has distinctive smooth silver-gray bark, alternate simple leaves with prominent parallel veins, and characteristic long pointed winter buds shaped like cigars. The combination of features is highly diagnostic. River birches have peeling bark.
26. C — A true compound leaf has a single dormant bud at the base of its petiole where it attaches to the stem. A branch bearing simple leaves has buds at each leaf base but no bud at the branch's base. This single check resolves most confusion.
27. B — A flowering crabapple reaching 15 feet stays safely below a 30-foot distribution line and is a correct application of Right Tree, Right Place. Pin oak, tulip poplar, and white pine all exceed the line height and would create chronic utility conflicts. Mature size governs the decision.
28. D — Binomial nomenclature requires the genus capitalized, specific epithet lowercase, both italicized in print. *Acer rubrum* follows the convention correctly. All-caps, both-capitalized, and all-lowercase forms all violate the rules.
29. A — A name in single quotation marks following a species name indicates a cultivar — a cultivated variety selected and propagated clonally to maintain specific characteristics. 'Sunburst' is a commercial cultivar of honeylocust. Cultivar names are not italicized.
30. C — *Quercus* (oaks) have alternate leaf arrangement. Maples, ashes, and dogwoods all have opposite arrangement (they are three of the four genera in the MAD Horse mnemonic). Remembering which genera are opposite helps narrow identification quickly.
31. B — The 10-20-30 rule limits urban forests to no more than 10% of any single species, 20% of any single genus, and 30% of any single family. The hierarchy protects against both species- and

genus-specific pest threats. Dutch elm disease and emerald ash borer illustrate the rule's importance.

32. D — Red oak (*Quercus rubra*) is a native species with good urban tolerance, excellent fall color, and mature height in the 60 to 80-foot range. It is a staple choice for native shade tree plantings. Norway maple, Siberian elm, and tree of heaven are all non-native and problematic.
33. C — Bald cypress (*Taxodium distichum*) is a deciduous conifer that sheds its needles each autumn. It is one of a small group of deciduous conifers including larch and dawn redwood. Most conifers, including pines, spruces, and junipers, are evergreen.
34. A — Winter identification relies heavily on bud shape, bark character, and twig features, because foliage, flowers, and fruit are absent. These features are reliable enough to support confident identification. Experienced arborists can identify most deciduous trees from twigs alone.
35. B — Rosaceae (the rose family) includes crabapples, hawthorns, serviceberries, cherries, plums, and many other ornamentals. Members of this family are subject to fire blight and share certain pest susceptibilities. Family-level recognition matters in management and diagnosis.
36. C — Norway maple escapes cultivation and displaces native understory plants in forests across much of North America. Its dense shade and shallow roots suppress native vegetation beneath it. This ecological disruption is the primary reason it is classified as invasive.
37. D — The binomial scientific name is intended to be a single universally recognized identifier for each species, regardless of language or region. Common names vary widely and often refer to multiple species. Scientific names provide the precision needed for professional communication.
38. B — Horse chestnut (*Aesculus hippocastanum*) has palmately compound leaves with typically 5 to 7 leaflets, opposite arrangement, and showy upright flower spikes in spring. It belongs to the soapberry family (Sapindaceae) along with maples. It is the "Horse" in the MAD Horse mnemonic.
39. A — Right Tree, Right Place primarily requires the arborist to consider mature size and site conditions together. Mature size, not planting size, governs long-term success. Ignoring either mature dimensions or site conditions is a recipe for future conflicts.
40. C — Whorled leaf arrangement means three or more leaves emerge from a single node. Alternate has one per node, opposite has two across from each other. Whorled is relatively uncommon but distinctive when present.
41. D — Sandy loam is a soil texture with substantial sand content but enough silt and clay to behave as a loam rather than pure sand. It drains well but retains some moisture and nutrients. It is a favorable texture for many tree species.
42. A — The pH scale is logarithmic, so each whole number represents a tenfold change in hydrogen ion concentration. A soil at pH 5.0 is ten times more acidic than a soil at pH 6.0. Understanding this explains why small pH numbers represent large chemical differences.

43. B — Cation exchange capacity measures a soil's ability to hold and supply positively charged nutrient ions (cations) such as calcium, magnesium, potassium, and ammonium on negatively charged surfaces of clay and organic matter. Higher CEC means better nutrient retention.
44. D — Mycorrhizal fungi extend the effective absorbing surface of the root system by sending hyphae far into the surrounding soil. The tree supplies sugars; the fungus supplies access to water and nutrients from a larger volume. The partnership is essential, not optional.
45. C — Platy soil structure consists of horizontal plate-like layers that restrict water movement and root penetration. It typically indicates compaction, often from machinery or heavy foot traffic. Correcting platy structure requires decompaction and organic matter addition.
46. A — Dry soil six inches below the surface in the active root zone warrants deep watering. Shallow frequent watering is inferior to deep periodic watering that reaches the full root zone. This is especially important for mature trees during drought periods.
47. B — Maintaining a continuous organic mulch layer at the soil surface is the most effective long-term practice for building organic matter. Mulch decomposes gradually, enriching the soil without disturbance. Tilling damages existing roots and structure.
48. D — Compaction reduces pore space and the large pores that hold air, starving roots of the oxygen needed for respiration. Roots that cannot respire cannot absorb water or nutrients. This is the primary mechanism by which compaction kills urban trees.
49. A — Iron chlorosis in a pin oak growing in alkaline soil is almost always caused by high pH rendering iron chemically unavailable, not by an actual iron shortage. The iron is present but not in forms roots can absorb. Treatment must address pH or use chelated iron.
50. C — A proper mulch ring is 2 to 4 inches deep with the trunk base kept clear. Deeper layers can suffocate roots; piling against the trunk causes bark decay. The correct shape is a flat ring, not a volcano.
51. B — A drain time of 48 hours in a perc test indicates a significant drainage problem. Water that persists more than 12 to 24 hours signals inadequate drainage that will stress most tree species. Site modification or species selection is required before planting.
52. D — Soil texture is defined by the proportions of sand, silt, and clay, which cannot be meaningfully altered by any realistic amount of amendment. These proportions are determined by parent material and weathering history. Working with existing texture is the only realistic strategy.
53. C — An ideal soil contains approximately 50% pore space by volume, split roughly between water and air, with the remaining 50% as mineral solids and small organic fraction. Pore space is where roots, water, and air reside. Loss of pore space through compaction is a common urban problem.

54. A — Bulk density above approximately 1.7 g/cm³ indicates severe compaction that halts most root growth. A reading of 1.8 is clearly in the severe range. Values below 1.3 generally indicate good structure.
55. B — Planting holes should be at least two to three times the diameter of the root ball to provide a zone of loosened soil for new roots to expand into during establishment. Width matters more than depth. A hole dug just to ball width offers no expansion zone.
56. C — The root flare should sit at or slightly above the surrounding grade at planting. Burying the flare is one of the most common serious planting errors. The correct depth preserves the flare and allows for some settling without burial.
57. D — A widely used rule of thumb is one year of establishment per inch of trunk caliper. A 2-inch caliper tree needs about two growing seasons; a 4-inch caliper tree needs about four. During this period the tree is rebuilding its root system.
58. A — Current best practice is to backfill with unamended native soil excavated from the hole. Research has shown that heavily amended backfill can produce pot-bound conditions in the ground. Soil improvement is better delivered through surface mulching.
59. B — Staking is appropriate only when the tree cannot support itself or the site is particularly exposed to wind. Unnecessary staking produces weaker trunks. Stakes should be removed within one growing season in most cases.
60. C — Circling roots found at planting should be cut or straightened before the tree is placed in the hole. Leaving them in place guarantees they will remain as permanent defects. Correction becomes impossible once the tree is backfilled.
61. A — Current best practice is to cut and remove at least the upper portion of the wire basket after the tree is set in the hole, along with burlap and twine contacting the trunk. Full removal risks damaging the ball. The lower portion can be left in place.
62. D — Planting too deep, burying the root flare, is the most common cause of establishment failure and early decline. The buried flare develops bark decay and girdling root problems. Finding and preserving the true root flare is non-negotiable.
63. B — The goal of establishment watering is to keep the root ball and surrounding backfill consistently moist but not saturated. Both extremes are damaging — dry kills through desiccation and saturation kills through suffocation. Checking soil moisture directly is more reliable than fixed schedules.
64. A — Dormancy — late fall after leaf drop or early spring before bud break — is the preferred transplanting window for most deciduous trees. The tree is not actively transpiring and the stress of root loss is minimized. Summer transplanting carries much higher risk.

65. C — Advance root pruning severs roots at the future root ball line one or more growing seasons before the move. The tree responds by producing new fibrous roots inside the line, which are harvested with the ball and dramatically improve transplant survival.
66. D — Fertilization of a newly planted tree during its first growing season is generally unnecessary and can be counterproductive. A reduced root system cannot effectively use additional nitrogen, and forced top growth exceeds what the roots can support. Withholding is standard practice.
67. A — Nursery stock should be inspected at delivery for trunk condition, crown structure, visible root flare, and root ball condition. Defects identified before acceptance can be avoided by rejecting the tree. Inspection is more than checking the manifest.
68. B — Mulching does not supply all of a tree's nitrogen needs for the year, though it may contribute some nitrogen as it decomposes. Mulching does conserve moisture, suppress weeds, and moderate temperature. The other three benefits are genuine.
69. C — Planting too deep — burying the root flare — is the most common serious error in planting container-grown trees. The buried flare develops bark decay and girdling root problems that can take years to manifest. Finding and preserving the true flare is essential.
70. D — Twine tied around the trunk must be removed completely at planting, because synthetic twine does not decompose and can girdle the trunk as it grows. Assuming twine is biodegradable is a dangerous mistake. A single cut at planting prevents years of later damage.
71. B — A newly planted tree with drooping foliage most likely needs deep watering of the root ball and backfill. The root ball can dry out quickly even in moist surrounding soil, especially in clay. Heavy pruning at this stage would further stress the already-limited system.
72. C — The one year per caliper inch rule applies to the establishment period following planting. During this period the tree is rebuilding the root system lost during transplanting. A 4-inch caliper tree needs about four growing seasons.
73. A — ANSI A300 is the American National Standard for Tree Care Operations and governs pruning practices in the United States. ANSI Z133 addresses safety. The two standards complement each other and together define accepted professional practice.
74. D — A proper pruning cut is placed just outside the branch collar so the cambium at the wound edge can form Wall 4 and compartmentalize the injury. Flush cuts and stubs both damage this mechanism. Correct placement is the biological foundation of good pruning.
75. B — Topping creates large wounds that cannot close, removes excessive foliage, depletes reserves, and produces weakly attached epicormic sprouts. It violates every principle of proper pruning simultaneously. ANSI A300 explicitly prohibits it.

76. C — The three-cut method prevents bark from tearing down the trunk below the cut when a heavy branch falls. A single cut from above causes the falling weight to rip bark downward. The undercut severs this bark pathway in advance.
77. A — 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. The sequence is non-negotiable for branches heavy enough to tear bark.
78. B — Cleaning is the selective removal of dead, dying, diseased, broken, and weakly attached branches. It is one of the five primary pruning objectives recognized by ANSI A300 and is the most common routine objective. It does not involve removing live healthy wood.
79. C — A reduction cut removes a branch back to a lateral large enough (typically at least one-third the diameter of the removed portion) to assume the terminal role. Heading cuts, by contrast, leave arbitrary stubs. Reduction cuts are the basis of the reduce objective.
80. D — Structural pruning during the juvenile phase produces the greatest benefit because small cuts correct defects that would otherwise require much larger, more damaging cuts decades later. The architectural framework is still being established. Waiting until maturity is far less effective.
81. A — Removing no more than 10 to 15% of live foliage in a single session is the general limit for mature trees, with even less for older or stressed specimens. Heavy pruning depletes reserves and produces weakly attached epicormic sprouts. Mature trees cannot be pruned like young ones.
82. B — The branch bark ridge is a raised line of bark on the upper surface of a branch union, running outward along the stem from the crotch. It marks the dividing line between stem and branch tissue and is the reference for correct cut placement.
83. D — Lion-tailing strips interior foliage and leaves foliage only at the branch tips, concentrating weight at the ends. This creates weaker branches than properly distributed thinning and is explicitly discouraged. The pattern removes interior foliage that cushions wind loads.
84. A — Pollarding requires repeated pruning back to the same framework points on an ongoing schedule, usually annually or biennially. It must be maintained once begun. Abandoning a pollarded tree produces weakly attached epicormic growth.
85. C — Research has shown that wound dressings provide minimal benefit and in some cases slow compartmentalization by trapping moisture and creating favorable conditions for decay organisms. Current best practice is to leave pruning cuts unsealed, with narrow exceptions such as oak wilt regions.
86. B — In regions with active oak wilt, pruning of oaks should be postponed until dormancy to reduce the risk of attracting sap-feeding beetle vectors to fresh wounds. Timing is the primary defense. Dormant-season pruning minimizes transmission risk.

87. D — Subordination reduces the growth of a competing stem in favor of a dominant leader, gradually shifting dominance without the wound of outright removal. It is used to correct codominant stems in young trees. The subordinated stem is made progressively smaller over several seasons.
88. A — Restoration pruning develops an acceptable crown structure from sprouts that have emerged after topping, vandalism, or severe storm damage. It is a long-term process requiring multiple visits over years. It cannot undo the original damage but can produce a reasonable structure.
89. C — A flush cut removes the branch collar along with the branch, eliminating the cambium that would have formed Wall 4. The result is a wound that cannot be effectively compartmentalized and provides a direct pathway for decay. The damage cannot be undone.
90. D — A stub cut leaves dead wood projecting beyond the branch collar that the tree cannot compartmentalize. The dead stub becomes an entry point for fungal colonization that eventually reaches the collar and then the trunk itself. Both flush and stub cuts cause lasting damage.
91. B — Bypass blades cut with a scissor-like action between two curved blades, producing clean cuts on living wood without crushing tissue. Anvil blades press the stem against a flat surface and tend to crush, limiting them to dead material. Clean cuts support proper compartmentalization.
92. A — A pole pruner is most appropriate for small-diameter branches out of reach from the ground that do not warrant climbing. Larger branches require more controlled methods. Whole-tree felling and scaffold limb removal require different tools and techniques.
93. C — Removing 50% of live foliage from a mature tree far exceeds the 10 to 15% guideline and would initiate decline. The professional response is to explain that thinning of that magnitude violates accepted standards and propose an appropriate alternative. Good client service does not include damaging the client's tree.
94. B — Codominant stems with included bark should be corrected early, while the tree is young and the cuts are small. Subordination or removal of the competing stem shifts dominance to a single leader. Waiting until maturity requires much larger and more damaging cuts.
95. D — The raise pruning objective refers to selective removal of lower branches to provide vertical clearance beneath the crown for pedestrians, vehicles, or sight lines. It should be done gradually on young trees to avoid producing a disproportionate crown.
96. C — Tool disinfection is most important when pruning trees with known contagious diseases such as fire blight. Disease organisms can be transferred between cuts on contaminated blades. For routine work on healthy trees, disinfection is not generally required.
97. A — A professional pruning specification should include the identified objective, the percentage of live foliage to be removed, the diameter range of cuts, and any specific constraints. Clear

specifications protect the tree, client, and arborist. Incomplete specifications lead to inconsistent results.

98. B — Bypass loppers extend the principle of hand pruners to branches up to approximately one and a half to two inches in diameter, using long handles for mechanical advantage. Smaller branches are better handled by hand pruners. Tool selection should match branch diameter.
99. C — Sprouts from topping emerge from shallow epicormic buds and are attached only at the outer layers of wood rather than deeply anchored. As they grow larger and heavier, the shallow attachment becomes progressively weaker and prone to failure. This is a hallmark problem of topped trees.
100. D — The placement of the cut relative to the branch collar is the single most important factor in whether a pruning wound closes successfully. Correct placement preserves the cambium that forms Wall 4; incorrect placement eliminates it. Tool brand, time of day, and weather are not factors.
101. A — Diagnosis begins with identifying the species and understanding its normal characteristics, because a symptom cannot be evaluated without knowing what a healthy specimen looks like. Jumping to treatment leads to routine misdiagnosis. Species identification is the first step.
102. D — A sign is direct evidence of the causal agent itself — fungal fruiting bodies, visible insects, or confirmed pathogens. Signs are more reliable than symptoms because they point directly to a cause rather than to the tree's response. Diagnosis based on signs is far more defensible.
103. B — A secondary pest attacks only trees that are already stressed, weakened, or declining, and cannot overcome the defenses of a healthy tree. The correct response is to identify the underlying stressor rather than focusing on the pest itself. Most bark beetles and many borers are secondary pests.
104. C — Emerald ash borer is classified as a primary pest because it can successfully attack and kill healthy ash trees of all sizes without requiring the host to be stressed. This distinguishes it from most native wood borers and is why it has devastated ash populations across North America.
105. A — IPM is a decision-making framework that integrates monitoring, action thresholds, multiple control tactics, and outcome evaluation. It is not a specific product or a prohibition on pesticides. The least toxic effective option is preferred when chemical control is warranted.
106. D — Fire blight is caused by the bacterium *Erwinia amylovora* and affects members of the rose family (Rosaceae), including apple, pear, hawthorn, and serviceberry. Family-level recognition matters because susceptibility extends across the family. Sanitation pruning is the standard management.
107. B — Oak wilt spreads through root grafts between adjacent oaks and through sap-feeding beetles attracted to fresh wounds. The beetle-vector pathway makes warm-season pruning of oaks particularly risky in affected regions. Red oak group species are more susceptible than white oaks.

108. A — Iron is an immobile nutrient, and deficiency appears first on new leaves as interveinal chlorosis with green veins. The tree cannot translocate iron from older foliage. In landscape settings, this is almost always a pH-related availability problem, not an actual iron shortage.
109. C — Nitrogen is a mobile macronutrient that the tree translocates from older leaves to support new growth when supply is inadequate. Deficiencies therefore appear first on older inner leaves as uniform yellowing. All mobile-nutrient deficiencies follow this pattern.
110. D — Phenoxy herbicides such as 2,4-D cause characteristic cupping, twisting, and distortion of new growth by mimicking plant growth hormones. The pattern is often most severe on the side of the tree nearest the application source. This symptom combination is diagnostic when paired with application history.
111. B — Delayed decline several years after construction almost always reflects root damage that occurred during the work. Trees mobilize reserves to mask initial injury, and visible symptoms typically appear one to three years later when reserves are exhausted. The connection is often forgotten.
112. C — Anthracnose is a general term for several fungal leaf diseases that produce spots, blotches, and leaf distortion, often followed by premature leaf drop. Most anthracnose infections are cosmetic rather than life-threatening. Sycamore anthracnose is a particularly visible example.
113. A — Armillaria root rot produces characteristic white mycelial sheets (fungal tissue) beneath the bark of infected roots, visible when the bark is peeled back. Honey-colored mushrooms may also appear at the base in fall. Above-ground symptoms include general decline and thinning crown.
114. B — Dutch elm disease is a vascular wilt spread primarily by elm bark beetles carrying fungal spores and by root grafts between adjacent elms. This dual spread pathway is why the disease caused the near-total loss of American elm as a street tree. It remains a threat to surviving elms.
115. D — Trunk injection of systemic insecticides is most appropriate for high-value trees threatened by borers, where foliar sprays would be impractical or ineffective for reaching internal tissues. Injection provides rapid systemic translocation with low environmental exposure. The tradeoff is that each injection wounds the tree.
116. C — "The label is the law" means pesticide product labels are legally enforceable federal documents. Applications must match the uses, rates, sites, and methods authorized on the label, and deviations carry legal and liability consequences. This applies to every licensed applicator.
117. B — When no effective treatment exists, the professional response is to communicate the diagnosis honestly and recommend appropriate management, which may include monitoring, removal, or supportive care. Applying ineffective treatments wastes client resources and delays difficult decisions.

118. A — Wilting despite adequate soil moisture indicates a damaged root system that cannot absorb the water that is present. This pattern is common after construction damage, root rot, severe compaction, or other root injuries. The visible symptom is wilting, but the cause is below ground.
119. C — The CRZ is commonly calculated as a radius of one foot per inch of trunk diameter at breast height. A 24-inch DBH tree has a 24-foot radius CRZ. This formula is the standard reference in ISA Best Management Practices.
120. D — Tree protection fencing should be placed at the calculated CRZ boundary or further from the trunk. Placing fencing at the dripline or closer leaves significant root area exposed to damage. The CRZ formula produces a more conservative and defensible boundary.
121. A — 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. Designated washout locations should be far from protected trees.
122. C — Raising the grade buries existing roots and root flares under added soil, producing gradual decline as buried tissues lose access to oxygen and gradually fail. The effects develop over months or years as reserves are exhausted. The delayed damage is often blamed on unrelated causes.
123. D — Directional boring or tunneling passes a utility beneath the root zone without disturbing the soil at root depth. Conventional open-cut trenching through the CRZ is the most damaging option. Higher equipment cost typically favors boring when tree value is significant.
124. B — Storage of construction materials within a TPZ is prohibited because stockpiles compact the underlying soil and smother roots. This is one of the standard prohibitions enforced by TPZ fencing. Monitoring and approved supervised work are compatible with protection.
125. A — Pre-construction tree assessment should occur before final design, so findings can influence project decisions. Assessment after drawings are complete is reduced to documentation of what has already been decided. Timing matters as much as thoroughness.
126. D — An arborist supervising unavoidable root impacts should make clean cuts with sharp tools at the damage line before excavation begins. Clean cuts produce better wound responses than the tearing and crushing from unprepared excavation. Prepared cuts dramatically improve outcomes.
127. C — Post-construction care includes deep periodic watering, generous mulching, conservative pruning focused on deadwood and safety, and annual monitoring for at least three to five growing seasons. Heavy fertilization and aggressive crown reduction can worsen decline. Patience drives recovery.
128. A — The actual root system of a mature tree typically extends two to three times the crown radius, well beyond the dripline. Using the dripline as the protection boundary leaves most absorbing roots exposed. The CRZ formula produces a more defensible boundary.

129. B — Delayed decline following construction damage typically becomes visible months to several years after the triggering event. Trees mobilize reserves to mask initial injury, and when reserves are exhausted, decline begins. Post-construction monitoring should continue for at least three to five growing seasons.
130. D — Tree protection fencing should be sturdy, visible (brightly colored, at least four feet tall), clearly marked with signage, and maintained throughout construction. Flimsy flagging is routinely moved or ignored. Effective fencing is the operational enforcement of the written protection plan.
131. C — Excluding all activity — traffic, equipment, and materials — from the root zone is the single most effective action during construction. Compaction and root damage are prevented most reliably by keeping activity out entirely. Physical fencing makes exclusion enforceable.
132. A — Lowering the grade removes soil along with any roots growing in it, producing immediate direct loss of functional root tissue. Even a few inches of grade cut across the root zone can remove a large share of absorbing roots. Effects appear sooner than with grade raises.
133. B — A baseline condition report documents pre-existing tree conditions for later comparison. It protects all parties when damage is alleged after construction, allowing actual damage to be distinguished from pre-existing conditions. Baseline documentation is a legal as well as technical necessity.
134. D — A tree showing no visible symptoms one year after construction is not yet out of danger, because delayed decline can appear one to three years later as reserves are exhausted. Monitoring should continue for at least three to five growing seasons. Early apparent survival is not the same as long-term recovery.
135. C — Hand excavation or air excavation allows workers to identify and preserve roots individually rather than severing them blindly. These techniques trade labor cost for root preservation and are appropriate when roots must be crossed. Conventional trenching is cheaper but far more damaging.
136. B — A tree that has contacted an energized line should be treated as potentially energized until the utility confirms de-energization. A branch in contact with a line can energize the entire tree, including trunk and lower branches. Assumptions about automatic breakers are unreliable and unsafe.
137. A — Risk is formally defined as the combination of likelihood of failure and severity of consequences. Neither tree condition nor target presence alone constitutes risk. Both factors must be considered together to produce a meaningful risk rating.
138. C — A Level 2 assessment is a detailed visual inspection of an individual tree, typically performed while walking around it from multiple angles using basic tools such as a mallet and probe. It is the standard level for trees of concern. Level 1 is rapid screening; Level 3 uses advanced instrumentation.

139. B — Level 1 assessment is a rapid limited visual screening used for large tree populations. Its purpose is to identify obvious hazards requiring further evaluation, not to produce detailed analysis. Individual trees of concern warrant Level 2 or 3.
140. D — Included bark between codominant stems prevents the formation of a strong structural union. The attachment becomes progressively weaker as the stems grow, and catastrophic splitting can occur without warning. This is one of the most dangerous structural defects.
141. A — The presence of a fungal fruiting body on a trunk indicates that active decay is already established within the tree's tissues. Fruiting bodies are the reproductive stage of fungi whose vegetative bodies extend into the tree. They warrant closer evaluation but do not automatically mandate removal.
142. C — A target is any person, property, or activity that could be affected by a failing tree or tree part. Targets include pedestrians, vehicles, buildings, utility lines, and outdoor activities. Without targets, even high likelihood of failure does not produce high risk.
143. D — Target occupancy rate formalizes the frequency and duration of target presence within the potential strike zone. Higher occupancy contributes to higher overall risk because failures are more likely to coincide with target presence. A house is constant; a seldom-used trail is rare.
144. B — A new lean combined with fresh soil cracking on the opposite side indicates root plate movement and elevated risk of uprooting failure. Trees showing these signs should be considered at imminent risk. Immediate action may be warranted.
145. A — Sounding the trunk with a mallet produces a solid ringing sound over intact wood and a dull hollow sound over decayed or hollow areas. It is a simple but useful technique for detecting large decay columns that might otherwise be missed visually. It is imprecise but rapid and inexpensive.
146. D — The TRAQ risk matrix combines likelihood of failure and impact (probability that failure will occur and strike a target) with consequences of failure (severity if impact occurs). The combination produces the overall risk rating. Neither factor alone is sufficient.
147. C — A probable likelihood of failure in TRAQ means failure is likely to occur during the assessment time frame under normal conditions. This is distinct from possible (could occur but not likely) and imminent (failure in progress). The four levels are improbable, possible, probable, and imminent.
148. D — The severe consequence level in TRAQ applies to catastrophic property damage, serious injury, or death. Minor consequences involve minor damage or injury; significant consequences fall between. Matching ratings to potential outcomes drives the risk rating to appropriate levels.
149. A — A tree with an internal cavity may still be structurally sound if sufficient intact wood remains around the cavity perimeter to resist bending forces. A common guideline holds that at least one-third of the diameter should remain as sound wood. Cavity size alone does not mandate removal.

150. B — Consequences of failure depend on the size and mass of the failing part, the height from which it would fall, and the nature of the target it would strike — all three factors together. A single factor in isolation cannot predict severity. Context determines outcome.
151. C — Residual risk is the risk that remains after mitigation measures have been implemented. No mitigation eliminates risk entirely — pruned trees can still fail, cabled unions can still split. Clients must understand they are choosing acceptable risk levels, not zero risk.
152. D — A professional risk assessment report should document the scope of the assessment, identified defects, targets, recommended mitigation, and an explicit residual risk statement. Thorough reporting supports defensibility and client decision-making. A single-sentence conclusion is not a professional report.
153. B — Level 3 assessment techniques include resistograph drilling, sonic tomography, static load testing, and other advanced instrumentation. These tools are reserved for high-value trees or situations where Level 2 has left significant uncertainty. Hand pruners and tape measures are not Level 3 tools.
154. A — Cabling and bracing provide supplemental support that reduces but does not eliminate structural risk. The installations require ongoing inspection and maintenance. They are appropriate when defects cannot be addressed by pruning alone and when tree value justifies the cost.
155. C — Effective client communication uses plain language, presents options rather than ultimatums, and respects the owner's decision-making authority. Technical jargon, pressure tactics, and withholding information all damage credibility. The client makes the final decision with the arborist's guidance.
156. B — Root defects are difficult to evaluate because roots are below ground and cannot be directly observed. Arborists rely on indirect indicators such as root plate movement, fungal fruiting bodies at the flare, and construction history. Air excavation can expose the root flare when needed.
157. D — Healthy rounded callus tissue around a small old wound indicates successful compartmentalization and closure. This is evidence of normal healing, not a structural defect. Codominant stems, active cracks, and dead scaffold branches over targets are all genuine defects.
158. C — Reduction pruning to decrease end weight on an overextended branch is a standard mitigation for moderate risk from specific branch defects over targets. It addresses the identified defect without removing the entire tree. Immediate removal is not proportional to moderate risk.
159. A — ANSI Z133 is the American National Standard for Arboricultural Operations — Safety Requirements and is the principal safety standard for tree care work in the United States. ANSI A300 addresses pruning; Z133 addresses safety. The two complement each other.
160. B — The minimum approach distance for unqualified workers to energized distribution lines below 50 kV is 10 feet under ANSI Z133. This is the most commonly cited MAD figure and applies

to the majority of lines encountered in residential and commercial tree work. Unqualified workers may not cross it.

161. D — A qualified line-clearance arborist has completed specialized training in electrical hazards, safe work procedures near energized lines, use of insulated tools, and emergency response to electrical contact. This training cannot be acquired informally or through general experience.
162. A — A climbing helmet must have a chin strap to retain the helmet during active climbing, rigging, and inverted positions. Traditional construction hard hats without chin straps can fall off during dynamic movement. Climbing helmets are purpose-built for aerial work.
163. C — Chainsaw-resistant leg protection contains cut-resistant fibers (ballistic nylon or aramid) that clog the chain of a running saw on contact, stopping the chain before it reaches the leg. The protection is not perfect but dramatically reduces injury severity.
164. D — OSHA requires hearing protection when noise levels exceed 85 decibels, and chainsaw and chipper operation routinely produce noise well above this threshold. Repeated exposure without protection causes progressive and irreversible hearing loss. Many veteran tree workers develop preventable hearing damage.
165. A — A proper job briefing covers work scope, hazards, procedures and precautions, required PPE, worker assignments, and emergency response procedures. It is required under ANSI Z133 and is not optional. Briefings prevent predictable mistakes.
166. B — ANSI Z133 requires aerial rescue capability on every climbing operation with a crew — at least one worker other than the climber must be trained and equipped to perform a rescue. This is not optional and does not depend on tree height or electrical hazards.
167. D — Suspension trauma develops when a climber remains motionless in a harness for an extended period, as reduced venous return causes blood to pool in the legs. It can become life-threatening within 30 minutes. This is why aerial rescue of an unconscious climber is time-critical.
168. C — The kickback zone is the upper portion of the bar tip. Contact between this area and any object can trigger a violent upward and backward reaction. Awareness of tip position throughout every cut is a foundational safety skill.
169. A — The chain brake is designed to stop the chain, either when activated manually by the front handguard or automatically in response to kickback motion. It is an essential safety feature that must be functional on every saw in service. A saw with a nonfunctional chain brake must be removed.
170. B — The left hand should grip the front handle with the thumb wrapped fully around the handle. This grip is stronger and provides better control if the saw moves unexpectedly. It is the standard grip for all chainsaw operation.

171. C — Two-handed operation is the standard grip for essentially all chainsaw operation and is required except in specific climbing situations using top-handle saws. The standard grip provides maximum control and reduces the risk of injury from unexpected saw movement.
172. D — Top-handle chainsaws are designed for compact use and potential one-handed operation during climbing work. They should not be used by untrained workers or for ground-based work better done with a conventional saw. Specific training on top-handle saws is required.
173. A — Working load limit is commonly calculated as approximately one-tenth of the tensile strength of rigging equipment. A rope with 14,000 pounds tensile strength has a WLL of about 1,400 pounds. This margin protects against shock loading and cumulative wear.
174. B — Shock loading is the dynamic force generated when a falling piece is suddenly caught by the rigging rope. Peak forces can be many times the static weight of the piece depending on fall distance and system elasticity. This multiplication is responsible for most equipment failures in rigging.
175. C — Allowing controlled slip through a friction device such as a Port-a-Wrap distributes the energy of the catch over time rather than stopping the load instantly. The result is a dramatically lower peak force compared to a hard tie-off. Every significant rigging operation should include a friction device.
176. D — A block redirecting a rigging load over an anchor experiences approximately twice the force of the load itself, because the block holds both the lifting side and holding side of the rope simultaneously. A 1,000-pound piece produces about 2,000 pounds of force on the anchor. This doubling is a routine source of anchor failure.
177. B — The hinge is the strip of wood between the notch and the back cut that controls fall direction as the tree begins to fall. It must remain intact to guide the tree along the intended fall line. Hinge width should be approximately 10% of trunk diameter.
178. C — An escape route must be planned and cleared before cutting begins and followed immediately as the tree starts to fall. The route should lead away from the tree at about 45 degrees from the fall line on the opposite side. Workers who remain at the stump are in the most dangerous position.
179. A — Barber chair is a vertical splitting of the trunk upward along the grain during the back cut, caused by cutting the hinge too thin or making the back cut too slowly. It can propel trunk sections backward at high speed, killing workers in the fall zone. Leaning hardwoods are particularly prone.
180. B — Chipper operators should feed branches butt end first while standing to the side of the infeed. Standing to the side avoids struck-by hazards from branches that flex or kick back as they enter the feed rollers. Standing directly behind the infeed is a recurring cause of serious injury.

181. D — Aerial lift operators must maintain the minimum approach distance with both the bucket and the boom, because the metal boom is an excellent conductor and can carry electricity from a contacted line throughout the machine. The entire lift structure is a potential conductor.
182. A — PPE must be inspected before every use, and items showing damage, wear, or contamination must be retired immediately and replaced. Continuing to use compromised PPE provides reduced or no protection. Annual inspection alone is inadequate for life-safety equipment.
183. C — ANSI Z133 requires climbing ropes to have a tensile strength of at least 5,400 pounds for arboricultural climbing applications. This value provides the margin needed for the dynamic loads generated during climbing and rigging. Lower-strength ropes are not compatible with the standard.
184. D — A properly tied friction hitch must grip the rope reliably under load while permitting controlled adjustment when the climber changes position. A hitch that slips under load is unsafe; one that locks rigidly prevents smooth climbing. Hitches must be inspected before each climb.
185. A — A worker observing a dangerous condition at a chipper should activate the feed control bar or emergency stop immediately and address the condition before continuing. Every second of delay increases the risk of injury. Feed control bars and emergency stops exist specifically for this purpose.
186. B — The notch is cut into the side of the tree facing the intended direction of fall. It establishes where the tree will pivot as it falls and controls the direction along with the hinge. Cutting the notch on the wrong side produces an unpredictable fall.
187. C — Chainsaws should be stopped and allowed to cool briefly before refueling. Refueling a running or hot saw risks fire from spilled fuel contacting hot components. This is one of the basic safety rules of power equipment handling.
188. D — A first aid kit should be available on every tree care worksite and stocked appropriately for the hazards of the work. This includes supplies for treating chainsaw lacerations, bleeding, and minor injuries that occur routinely in tree work. Storage off-site is inadequate.
189. A — Urban trees reduce the urban heat island effect through shading of surfaces and evapotranspiration cooling. Paved cities can be 5 to 10 degrees warmer than surrounding areas, and tree canopy substantially reduces this difference. The cooling effect lowers air conditioning demand.
190. B — A complete tree inventory records every tree within the defined inventory area, with information on species, size, condition, location, and management needs. Sample inventories cover a statistically representative subset. Complete inventories provide the richest basis for management decisions.
191. C — The i-Tree suite developed by the USDA Forest Service allows communities to estimate the dollar value of ecosystem services — stormwater interception, air quality improvement, carbon

sequestration, and energy savings — provided by their specific tree populations. These numbers transform tree management into documented infrastructure investment.

192. D — The trunk formula method is used when a tree is too large to be practically replaced by nursery stock. It calculates value from trunk cross-sectional area adjusted by species, condition, and location ratings. Smaller trees are appraised using the replacement cost method.
193. B — Tree protection ordinances typically require permits for removal of protected trees above a specified size threshold, with penalties for unauthorized removal. They distinguish between protected and unprotected trees based on size, species, or location. Specific provisions vary between jurisdictions.
194. C — Canopy cover goals are typically expressed as the percentage of land area covered by tree canopy, measured through aerial imagery analysis. They provide a high-level metric for tracking urban forest size and communicating progress to the public. Communities often set specific numerical targets.
195. A — Tree City USA requires a community forestry budget of at least two dollars per capita annually, along with a tree board, tree care ordinance, and Arbor Day observance. The program recognizes baseline commitment to urban forestry. These are the standard criteria.
196. B — Species rating in the trunk formula method reflects the desirability and suitability of the species in the local area. High-quality species well adapted to the location receive higher ratings; invasive or poorly suited species receive lower ones. Regional ISA chapters publish species rating lists.
197. D — Effective client communication presents options in plain language and respects the owner's decision-making authority. Technical jargon, withholding information, and making decisions for the client all damage credibility. The client owns the tree and makes the final decision.
198. A — Multiple studies have found that neighborhoods with more trees show improved mental health outcomes, reduced stress, faster recovery from illness, and increased physical activity. These benefits complement the environmental and economic benefits. The human-health case is increasingly central to urban forestry advocacy.
199. B — A budget-focused council responds to the documented dollar value of ecosystem services and infrastructure savings, not to aesthetic arguments or staff preferences. Matching the message to the audience is basic professional communication. The i-Tree tools provide exactly the quantitative data such audiences require.
200. C — Diverse plantings following the 10-20-30 rule protect communities against catastrophic pest loss when species-, genus-, or family-specific pests arrive. Dutch elm disease and emerald ash borer illustrate why diversity matters. The rule does not require natives, single nurseries, or slow-growing species.