PRACTICE EXAM 19: ISA CERTIFIED ARBORIST SIMULATION

PRACTICE EXAM 19 — QUESTIONS 1–200

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

1. If the vascular cambium of a mature tree is actively dividing during the growing season, the correct expected outcome is:

A. Shedding of the outer protective bark each year

B. Formation of new flowers on the mature branches

C. Production of new xylem inward and new phloem outward

D. Extension of the shoot tip in length at each node

2. When transpiration tension develops at leaf surfaces, the direct consequence for water transport is:

A. A continuous water column pulled upward through xylem

B. Active metabolic pumping of water through root cells

C. Complete cessation of sugar movement through the phloem

D. Osmotic reversal forcing water downward to the soil

3. If a tree experiences sustained drought and closes its stomata, the appropriate expected result is:

A. A surge of new shoot growth at the apical meristems

B. Increased transpiration through the closed stomata

C. Acceleration of photosynthesis in the exposed canopy

D. Simultaneous reduction of transpiration and photosynthesis

4. Given that phloem conducts sugars from sources to sinks, the correct tissue description is:

A. Dead cells forming hollow water-conducting tubes

B. Living cells actively transporting sugar solutions

C. Structural wood deposited in the heartwood cylinder

D. Storage cells limited to the central pith only

5. If heartwood forms at the center of a mature trunk, the functional result is:

A. Decay-resistant structural support from deposited extractives

B. Active conduction of water from roots to the canopy

C. Storage of the tree's primary carbohydrate reserves

D. Production of new growth rings toward the pith

6. When a girdling wire severs the phloem of a young tree, the eventual outcome is:

A. Immediate wilting of foliage within the first hours

B. Increased photosynthesis in the upper canopy

C. Activation of nitrogen fixation in the root zone

D. Gradual root starvation from blocked sugar transport

7. If Wall 4 forms after a pruning wound, the correct description of its origin is:

A. Deposition of extractives in the heartwood center

B. Cambium at the wound margin producing new barrier wood

C. Plugging of xylem vessels above the wound site

D. Splitting of the outer bark along the trunk line

8. Given that mycorrhizal fungi colonize most tree roots, the primary benefit to the tree is:

A. Direct fixation of atmospheric nitrogen in root cells

B. Production of antibiotics eliminating soil pathogens

C. Dramatic expansion of absorbing surface area

D. Complete replacement of root hair function underground

9. If a tree loses 50 percent of its canopy in a storm, the direct physiological consequence is:

A. Significant reduction in photosynthesis and carbohydrate production

B. Immediate regrowth of replacement foliage within a week

C. Complete recovery with no measurable stress response

D. Increased structural strength of the remaining scaffold limbs

10. When a tree produces reaction wood in response to a persistent lean, the structural purpose is:

A. Complete death of the cambium on the leaning side

B. Uniform wood production without any adaptive changes

C. Progressively weaker wood at the base of the lean

D. Altered wood structure helping correct the lean

11. If a tree's latent buds remain dormant under the bark, the correct functional description is:

A. Buds that flower once during the first growing season

B. Buds held in reserve until triggered by stress

C. Buds that die within a single growing season

D. Buds that grow immediately into new scaffold branches

12. Given that auxin is produced at the shoot tip, the correct outcome of intact apical dominance is:

A. Acceleration of lateral bud growth throughout the canopy

B. Complete elimination of root growth below ground

C. Suppression of lateral buds below the active tip

D. Triggering of fruit ripening on mature branches

13. If a tree's carbohydrate reserves drop to their annual low, the most likely season is:

A. Late spring after refoliation has consumed stored sugars

B. Early autumn before leaf drop and translocation

C. Mid-summer during peak active photosynthesis

D. Mid-winter during the deepest dormancy period

14. When respiration occurs in a tree's living cells, the correct description is:

A. Production of new sugars from carbon dioxide and water

B. Storage of starch reserves within the heartwood cylinder

C. Release of oxygen only during daylight hours

D. Consumption of stored sugars to release cellular energy

15. If most absorbing roots of a mature tree are located in the upper soil layer, the appropriate depth range is:

A. Below 4 feet in the deeper subsoil horizons

B. Confined to a central taproot beneath the trunk

C. The upper 12 to 18 inches of surface soil

D. Exclusively within the outer dripline area

16. Given that xylem cells are dead at functional maturity, the correct structural outcome is:

A. Continuous metabolic energy required for water transport

B. Hollow tubes conducting water through the cohesion-tension mechanism

C. Active division producing new cells during the growing season

D. Storage of the tree's primary starch reserves

17. If a tree responds to wind flexing at its base, the adaptive structural result is:

A. Greater trunk taper and reaction wood formation

B. Thinner bark with reduced wound response

C. Smaller leaves reducing total sail area

D. Deeper central taproots below the trunk

18. When photosynthesis proceeds in leaf chloroplasts, the correct description of the process is:

A. Breakdown of starch into immediately usable sugars

B. Release of stored energy from existing carbohydrates

C. Passive storage of water from root absorption

D. Light-driven conversion of CO_2 and water into sugars

19. If a tree's starch reserves are stored in living parenchyma, the functional purpose is:

A. Direct structural support of the heaviest branches

B. Energy for refoliation, wound response, and recovery

C. Water conduction from roots to the leaf canopy

D. Production of new chlorophyll for expanding leaves

20. Given that leaf stomata regulate gas exchange, the correct list of gases they manage is:

A. Only water vapor leaving the leaf surface

B. Only carbon dioxide entering the leaf interior

C. Carbon dioxide in, water vapor out, and oxygen out

D. Only oxygen released during photosynthesis

21. If secondary growth adds width to a trunk each year, the tissue responsible is:

A. The central pith producing new xylem cells

B. The outer corky bark splitting and reforming

C. The heartwood expanding outward over time

D. The vascular cambium dividing between wood and bark

22. When a tree closes a wound through compartmentalization, the correct description is:

A. The tree walls off damage with internal barriers rather than regenerating

B. The tree regenerates the lost wood back to its original form

C. The tree replaces every damaged cell with an identical new one

D. The tree dissolves the damaged wood and excretes it externally

23. If a tree has opposite leaves, palmate venation, and paired winged samaras, the correct genus identification is:

A. *Quercus* in the beech family with acorn fruits

B. *Pinus* in the pine family with cone fruits

C. *Acer* in the soapberry family with maple traits

D. *Fraxinus* in the olive family with compound leaves

24. When a tree has rounded leaf lobes without bristles and acorns maturing in one season, the correct classification is:

A. The red oak group of the genus *Quercus*

B. The white oak group of the genus *Quercus*

C. The hickory genus *Carya* of eastern forests

D. The beech genus *Fagus* of temperate forests

25. If a tree has pointed bristle-tipped lobes and two-season acorns, the correct classification is:

A. The red oak group within *Quercus*

B. The white oak group within *Quercus*

C. The ash genus *Fraxinus* with compound leaves

D. The hickory genus *Carya* with nut fruits

26. Given that MAD Horse is a standard identification mnemonic, the correct interpretation is:

A. Genera with palmately compound leaves exclusively

B. Trees with distinctive peeling bark at maturity

C. Conifers that shed their needles each autumn

D. Maples, ashes, dogwoods, and horse chestnut — opposite genera

27. If a tree has palmately compound leaves of five leaflets, opposite arrangement, and upright spring flower spikes, the correct identification is:

A. Black walnut in the walnut family with pinnate leaves

B. Horse chestnut in the soapberry family with palmate leaves

C. Sugar maple in the soapberry family with simple leaves

D. White ash in the olive family with pinnate leaves

28. When a tree has mottled tan and white peeling bark and broad palmate simple leaves, the correct identification is:

A. Norway maple introduced from Europe long ago

B. Shagbark hickory in the walnut family of forests

C. American sycamore in the plane family of floodplains

D. Red oak in the beech family of mixed forests

29. If a conifer sheds all of its needles each autumn, the correct genus identification is:

A. *Pinus* with evergreen bundled needles

B. *Tsuga* with flat evergreen needles

C. *Juniperus* with evergreen scale leaves

D. *Taxodium* with deciduous feathery needles

30. Given that binomial nomenclature requires specific formatting, the correct written form is:

A. *Acer rubrum* with genus capitalized and italicized

B. ACER RUBRUM written in bold capital letters

C. *acer rubrum* written entirely in lowercase

D. *Acer Rubrum* with both words capitalized

31. If a plant name includes a word in single quotation marks following the species, the correct interpretation is:

A. A wild botanical variety from a natural population

B. A formally published Latin subspecies under the code

C. A cultivar selected and propagated clonally

D. The common nursery marketing name only

32. When the 10-20-30 rule is applied to urban forest planning, the correct interpretation is:

A. Maximum percentages of canopy cover in three zones

B. Maximum percentages of species, genus, and family in plantings

C. Minimum percentages of native species on each site

D. Maximum tree heights in three size classes

33. If tree of heaven is identified in a landscape, the correct classification in eastern North America is:

A. A native understory species of eastern forests

B. A short-lived ornamental with no invasive tendency

C. A federally endangered species under protection

D. A non-native invasive species spreading aggressively

34. Given that Right Tree, Right Place is the guiding species selection principle, the correct interpretation is:

A. Matching mature tree characteristics to site conditions

B. Selecting the cheapest available nursery stock first

C. Planting only the largest possible mature species

D. Matching leaf color to the surrounding landscape

35. If the ash genus *Fraxinus* is identified, the correct family placement is:

A. Sapindaceae, the soapberry family with maples

B. Rosaceae, the rose family with apples and pears

C. Oleaceae, the olive family with lilacs and forsythias

D. Pinaceae, the pine family with coniferous members

36. When planting beneath a 25-foot distribution line, the correct species choice is:

A. A red oak reaching 70 feet at maturity

B. A tulip poplar reaching 80 feet at maturity

C. A white oak reaching 80 feet at maturity

D. A crabapple reaching 15 to 20 feet at maturity

37. If identifying a pinnately compound leaf, the correct description is:

A. Leaflets arranged along two sides of a central rachis

B. Leaflets radiating from a single attachment point

C. A single blade with deeply cut lobes along veins

D. Whorled leaves arranged around a single node

38. Given that palmately compound leaves are distinct from pinnate leaves, the correct feature is:

A. Leaflets arranged along a central rachis in pairs

B. Leaflets radiating from a single attachment point

C. A single blade with toothed marginal edges

D. Multiple simple leaves at a single node

39. If a group of trees all have alternate leaf arrangement, the correct example is:

A. Maple, ash, and dogwood in mixed forests

B. Horse chestnut, buckeye, and viburnum combined

C. Oak, hickory, and beech in eastern forests

D. Catalpa, paulownia, and dogwood together

40. When identifying a tree in winter without leaves, the correct primary features are:

A. Leaf margin and venation from the previous year

B. Flower fragrance from the previous growing season

C. Root flare width measured at the soil surface

D. Bud shape, twig features, and bark character

41. If a soil has balanced proportions of sand, silt, and clay, the correct classification is:

A. Clay soil dominated by fine particles throughout

B. Loam soil ideal for most tree species

C. Pure sand with coarse grain structure only

D. Organic soil without any mineral content

42. When soil pH is measured at 7.0, the correct classification is:

A. Neutral at the midpoint of the pH scale

B. Strongly acidic near the lower scale limit

C. Moderately alkaline above the neutral value

D. Off the upper end of the standard scale

43. If cation exchange capacity is described in professional terms, the correct definition is:

A. The total depth of the topsoil horizon layer

B. The annual rainfall received by the site

C. The soil's ability to hold and exchange cations

D. The average temperature profile of the root zone

44. Given that a bulk density reading shows 1.8 g/cm³, the correct interpretation is:

A. Ideal loose soil supporting healthy root growth

B. High cation exchange capacity in the profile

C. Improved drainage across the entire horizon

D. Severe compaction that halts most root growth

45. If an ideal mineral soil is described, the correct approximate pore space percentage is:

A. 10 percent of the total soil volume

B. 50 percent of the total soil volume

C. 75 percent of the total soil volume

D. 90 percent of the total soil volume

46. When preparing a soil test, the correct sampling method is:

A. A composite sample averaging variation across the site

B. A single grab sample from the center of the area

C. A sample limited to surface plant litter only

D. A subsoil-only sample from below five feet

47. If a perc test shows 36 hours of drainage time, the correct interpretation is:

A. Ideal drainage for any tree species available

B. Excessive drainage that dries roots rapidly

C. Soil composed entirely of coarse sand grains

D. Drainage inadequate for most tree species

48. Given that a pin oak shows interveinal chlorosis on new leaves in alkaline soil, the correct cause is:

A. Excess nitrogen from nearby lawn fertilizer

B. Potassium toxicity suppressing magnesium uptake

C. Iron deficiency caused by high soil pH

D. Calcium toxicity from previous over-liming

49. If installing mulch around a landscape tree, the correct specification is:

A. Eight to ten inches piled against the trunk

B. Two to four inches deep with the trunk kept clear

C. A thin dusting less than half an inch deep

D. Plastic sheeting topped with decorative rock

50. When soil compaction is identified in a root zone, the correct mechanism of damage is:

A. Reduced pore space starving roots of oxygen

B. Increased oxygen delivery to the deepest roots

C. Improved drainage through the entire profile

D. Enhanced root penetration throughout the area

51. If a soil has low cation exchange capacity and is sandy, the correct expected behavior is:

A. Very high retention of applied fertilizer nutrients

B. Identical nutrient retention to a clay-rich soil

C. No relationship between texture and nutrient holding

D. Rapid leaching of cation nutrients after fertilization

52. Given that soil texture cannot be meaningfully changed by amendments, the correct long-term strategy is:

A. Adding sand continuously to every clay soil

B. Sterilizing the soil with hydrogen peroxide annually

C. Working with existing texture and building organic matter

D. Replacing all existing soil with new purchased material

53. If applying elemental sulfur to a high-pH soil, the correct expected outcome is:

A. Raising pH toward more alkaline values quickly

B. Lowering pH through microbial oxidation over time

C. No measurable effect on the soil chemistry

D. Sterilizing the soil and halting all activity

54. When a pH of 4.5 is measured in a landscape bed, the correct classification is:

A. Strongly acidic below the neutral value

B. Moderately alkaline above the neutral value

C. Exactly at the neutral midpoint of the scale

D. A reading entirely off the standard scale

55. If digging a planting hole for a container-grown tree, the correct width specification is:

A. Exactly the diameter of the root ball

B. Half the diameter of the root ball

C. Ten times the diameter of the root ball

D. Two to three times the diameter of the root ball

56. When placing a newly planted tree in its hole, the correct flare position is:

A. Six inches below the surrounding finished grade

B. Twelve inches below the existing lawn surface

C. At or slightly above the surrounding grade

D. Completely buried beneath four inches of mulch

57. If backfilling a new planting hole, the correct material to use is:

A. The unamended native soil excavated from the hole

B. Sterilized purchased potting mix exclusively

C. Equal parts peat moss and perlite combined

D. Coarse builder's sand with added lime

58. Given that tree establishment follows a rule of thumb, the correct estimate is:

A. Six months regardless of the caliper at planting

B. Approximately one year per inch of trunk caliper

C. Ten years regardless of the caliper at planting

D. One week with proper initial irrigation

59. If staking is required for a newly planted tree, the correct duration is:

A. Permanently for the entire life of the tree

B. Three to five years minimum in all cases

C. At least a full decade after planting

D. Only when needed and removed within one year

60. When a circling root is discovered inside a container at planting, the correct action is:

A. Leaving it intact to avoid damaging the tips

B. Coating it with rooting hormone before planting

C. Cutting or straightening it before placing in the hole

D. Wrapping it carefully in protective burlap

61. If a wire basket and burlap are present on a B&B tree placed in the hole, the correct action is:

A. Cutting and removing at least the upper portion

B. Leaving the basket completely intact for support

C. Removing the entire basket before lowering

D. Replacing the basket with plastic mesh immediately

62. When lifting a B&B tree into its hole, the correct lifting method is:

A. Grasping the trunk firmly with both hands

B. Supporting the root ball from underneath

C. Wrapping the crown with lifting straps

D. Pulling on the burlap at the top of the ball

63. If establishing a watering schedule for a new tree, the correct target is:

A. Flooding the hole daily for the first month

B. Keeping the root ball dry to force deep rooting

C. Keeping the root ball consistently moist but not saturated

D. Watering only the south side of the trunk

64. Given that fertilization is considered for a newly planted tree, the correct practice during the first growing season is:

A. Heavy nitrogen application to force new growth

B. Monthly foliar sprays of liquid fertilizer solutions

C. Soil drench with balanced commercial product

D. Generally unnecessary and sometimes counterproductive

65. If transplanting a deciduous tree, the correct preferred window is:

A. Dormancy in late fall or early spring

B. Mid-summer during peak active growth

C. Immediately after leaf expansion each spring

D. Any month with adequate irrigation available

66. When advance root pruning is performed before a transplant, the correct expected outcome is:

A. Reduced total weight of the future root ball only

B. Development of new fibrous roots inside the future ball

C. Elimination of any future irrigation requirement

D. Prevention of all future suckers at the trunk

67. If twine is tied around the trunk of a B&B tree at planting, the correct action is:

A. Leaving it in place because it decomposes quickly

B. Tightening it further for additional stability

C. Replacing it with heavier rope before planting

D. Removing it completely to prevent future girdling

68. Given that benefits of mulching are discussed, the correct list includes all of the following EXCEPT:

A. Conserving moisture in the root zone over time

B. Moderating soil temperatures through the seasons

C. Supplying all of the tree's nitrogen needs

D. Suppressing competing weeds at the trunk base

69. If digging a planting hole, the correct depth specification is:

A. Equal to the height from root flare to ball bottom

B. At least twice the height of the root ball

C. Reaching below the tree's lowest scaffold branches

D. Including a layer of gravel at the bottom

70. When inspecting a newly delivered nursery tree, the correct focus is:

A. Only the brand name printed on the nursery container

B. Trunk, crown, root flare, and root ball condition

C. Only the exact weight shown on the delivery manifest

D. Only the width of the wire basket on the ball

71. If a newly planted tree fails to leaf out the following spring, the most likely cause is:

A. Normal winter dormancy still in progress

B. Root ball desiccation during handling or planting

C. A foliar disease on the expanding buds only

D. Inadequate mulch depth at the trunk base

72. Given that a planting hole needs proper width, the correct rationale for extra width is:

A. Reducing the overall labor cost of planting

B. Preventing the root ball from any settling

C. Providing loosened soil for outward root expansion

D. Eliminating the need for establishment irrigation

73. If pruning cuts are placed correctly, the correct location is:

A. Just outside the branch collar and bark ridge

B. Flush with the parent stem for smoothness

C. Six inches beyond the branch collar for safety

D. At the exact midpoint of the branch length

74. When topping is proposed for a mature shade tree, the correct professional response is:

A. Proceeding as a standard pruning objective

B. Explaining that topping is a harmful practice

C. Complying if the client insists on the work

D. Requesting only written authorization first

75. If a heavy branch is being removed with the three-cut method, the correct purpose of the undercut is:

A. Reducing total cutting time per branch removed

B. Allowing use of a much smaller chainsaw bar

C. Preventing bark from tearing down the trunk

D. Eliminating the need for tool sharpening

76. Given that the cleaning pruning objective has a defined scope, the correct description is:

A. Removing all interior live foliage from the crown

B. Cutting back every branch to a uniform length

C. Heading every lateral to force new sprouting

D. Removing dead, dying, diseased, broken, or weak branches

77. If a reduction cut is made on a branch, the correct placement is:

A. Flush with the parent stem for clean removal

B. Back to a lateral large enough to assume the terminal role

C. At the exact midpoint of the branch length

D. Six inches from the branch tip regardless of laterals

78. When structural pruning is most beneficial, the correct life stage is:

A. The juvenile growth phase while cuts are small

B. The final decade of the tree's mature life

C. The first week after initial planting only

D. Every autumn after leaf fall annually

79. If the maximum live foliage removal in a single session is considered, the correct general limit for a mature tree is:

A. 25 to 30 percent during active growth seasons

B. 40 to 50 percent during the dormant season

C. 10 to 15 percent, less for stressed specimens

D. There is no upper limit for healthy mature trees

80. Given that the branch bark ridge is a reference point, the correct description is:

A. An internal barrier within the heartwood cylinder

B. The outer corky layer covering the entire trunk

C. A dead layer separating sapwood from heartwood

D. A raised line of bark on the upper side of a union

81. If lion-tailing is identified on a mature tree, the correct classification of the practice is:

A. A proper application of the thinning objective

B. A harmful practice stripping interior foliage

C. A standard method under ANSI A300 guidelines

D. A required practice on all mature shade trees

82. When pollarding is being considered for a tree, the correct understanding is:

A. A long-term system requiring repeated cuts at framework points

B. A one-time heading cut made at random heights

C. A technique applicable only to conifers and evergreens

D. A substitute for standard cleaning pruning operations

83. If restoration pruning is applied, the correct target situation is:

A. Recently planted trees during normal establishment

B. Trees selected for removal at the end of a project

C. Historic specimens designated by ordinance

D. Trees topped, vandalized, or severely storm damaged

84. Given that subordination pruning is performed, the correct description is:

A. Complete removal of the central leader entirely

B. Removal of all epicormic sprouts from the trunk

C. Reducing a competing stem in favor of a leader

D. Cutting every lateral branch to equal lengths

85. If a flush cut is made on a branch, the correct damage assessment is:

A. Leaves a projecting stub beyond the branch collar

B. Removes the branch collar and Wall 4 tissue

C. Uses excessive force from the cutting tool

D. Causes no measurable harm to the tree

86. When a stub cut is identified at a pruning site, the correct consequence is:

A. Dead wood that cannot be compartmentalized

B. Immediate callus formation at the wound margin

C. Faster healing than a properly placed cut

D. Stronger wound response at the branch base

87. If bypass pruning blades are used on living wood, the correct mechanism is:

A. Anvil-style crushing against a flat surface

B. Serrated sawing across the wood grain

C. Scissor-action clean cutting without crushing

D. Chipper-style grinding into small pieces

88. Given that a pole pruner is selected for a task, the correct use case is:

A. Branches over six inches in diameter overhead

B. Felling small trees on flat ground safely

C. Cutting all lower scaffold branches on a mature tree

D. Small branches out of reach without climbing

89. If a client requests removal of 50 percent of a mature tree's live foliage, the correct response is:

A. Complying using bypass hand pruners only

B. Explaining that the request violates accepted standards

C. Agreeing to the work at a higher price

D. Removing only the smallest interior branches first

90. When codominant stems with included bark are found on a young tree, the correct recommendation is:

A. Correcting early while cuts are small and manageable

B. Waiting until the tree reaches full structural maturity

C. Spraying the union with a systemic fungicide

D. Removing the entire tree as a precautionary measure

91. If a client requests lower branch removal for vehicle clearance, the correct pruning objective name is:

A. Cleaning to remove dead and weak branches

B. Reducing to lower the overall crown height

C. Restoring after previous storm damage events

D. Raising to provide vertical clearance beneath

92. Given that fire blight is present in a landscape, the correct tool-handling practice is:

A. Proceeding without any disinfection of tools

B. Using only anvil-style blades for the cuts

C. Disinfecting pruning tools between cuts

D. Leaving the infected branches entirely untouched

93. If a pruning specification is being written, the correct required element is NOT:

A. The identified pruning objective for the work

B. The climber's personal stylistic preferences

C. The percentage of live foliage to be removed

D. The diameter range of the cuts to be made

94. When bypass loppers are selected, the correct branch diameter range is:

A. Branches up to approximately one and a half to two inches

B. Branches of four to six inches in diameter

C. Branches over eight inches in diameter at the base

D. Branches under a quarter inch in diameter only

95. If a dead branch is removed from a mature tree, the correct objective classification is:

A. Raising to provide vertical clearance below

B. Reducing to lower the overall crown height

C. Cleaning to remove dead and weak branches

D. Restoring after previous severe storm damage

96. Given that wound closure depends on a single most important factor, the correct answer is:

A. The brand of cutting tool used by the climber

B. The weather conditions during the operation

C. The time of day when the cut is performed

D. The placement of the cut relative to the branch collar

97. If current research on wound dressings is cited, the correct finding is:

A. Minimal benefit and sometimes slower healing

B. Acceleration of wound closure in all species

C. Required by current ANSI A300 standards

D. Elimination of any risk of decay entry

98. When oak pruning is scheduled in an oak wilt region, the correct timing is:

A. Warm summer months for faster closure

B. Dormancy to reduce beetle transmission risk

C. Wet rainy days when beetles are less active

D. Any time with sterilized pruning tools

99. If the raise pruning objective is performed, the correct description of the work is:

A. Increasing the overall height of the crown

B. Removing all interior live foliage from the canopy

C. Removing lower branches for vertical clearance beneath

D. Raising the soil grade around the trunk

100. Given that the three-cut method is used on a heavy branch, the correct first cut location is:

A. Straight down through the top of the branch

B. At the exact final cut location from above

C. Parallel to the trunk to score the bark

D. On the underside beyond the final cut line

101. If diagnosing an unhealthy tree, the correct first step is:

A. Identifying the species and understanding normal characteristics

B. Applying broad-spectrum fungicide as a precaution

C. Recommending immediate removal of the tree

D. Collecting a wood core sample for the laboratory

102. When a fungal fruiting body is found on a trunk, the correct classification is:

A. A symptom representing the tree's general response

B. A sign indicating active decay within the tree

C. An observation of no diagnostic significance

D. A laboratory confirmation of a specific pathogen

103. If a tree shows wilting and yellowing leaves, the correct classification of these observations is:

A. Signs revealing the exact causal agent directly

B. Symptoms representing the tree's response

C. Laboratory confirmations of a specific pathogen

D. Fruiting bodies of a fungal organism

104. When distinguishing a primary pest from a secondary pest, the correct feature of a primary pest is:

A. Reproduction only under drought conditions

B. Feeding exclusively on dead or decaying tissue

C. Ability to attack and kill healthy vigorous trees

D. Presence only in remote forested areas

105. If emerald ash borer is classified in current literature, the correct classification is:

A. A primary pest of healthy ash trees of all sizes

B. A saprophyte limited to dead ash wood only

C. A beneficial predator of other insects

D. A secondary pest of stressed ash trees only

106. Given that IPM is defined professionally, the correct description is:

A. A specific brand of organic pesticide product

B. A complete prohibition on all chemical pesticide use

C. A biological control method limited to predators

D. A decision framework using monitoring, thresholds, and tactics

107. If fire blight is diagnosed on a landscape tree, the correct causal organism and host family is:

A. A fungal pathogen affecting the pine family

B. A bacterial pathogen affecting the rose family

C. A viral pathogen affecting the beech family

D. A nematode affecting the soapberry family

108. When oak wilt spreads between adjacent oaks, the correct primary mechanisms are:

A. Wind dispersing spores across long distances

B. Soil nematodes feeding on the fine roots

C. Root grafts and sap-feeding beetles at wounds

D. Rain splashing from infected foliage to others

109. If a pin oak in alkaline soil shows interveinal chlorosis on new leaves, the correct cause is:

A. Iron deficiency caused by high soil pH

B. Nitrogen deficiency from lawn competition

C. Potassium toxicity suppressing magnesium

D. Calcium toxicity from previous over-liming

110. When yellowing begins on older inner leaves and progresses outward, the correct deficient nutrient is:

A. Iron, an immobile micronutrient

B. Calcium, a structural secondary nutrient

C. Boron, a trace element for cell division

D. Nitrogen, a mobile macronutrient

111. If cupping and twisting of new growth is observed on a mature tree, the correct most likely cause is:

A. An active spider mite outbreak in the canopy

B. Normal seasonal fall color development

C. Phenoxy herbicide drift or residual exposure

D. Drought stress during a dry summer period

112. Given that a tree declines three years after nearby construction, the correct most likely cause is:

A. A new invasive insect pest in the region

B. Construction root damage with exhausted reserves

C. Normal aging unrelated to the construction

D. Reduced rainfall during the previous dormant period

113. If anthracnose is diagnosed on a sycamore, the correct disease classification is:

A. A fungal leaf disease producing spots and blotches

B. A bacterial vascular infection of the xylem

C. A viral disease transmitted by aphid vectors

D. A nutrient disorder limited to new foliage

114. When Armillaria root rot is confirmed in the field, the correct diagnostic finding is:

A. Orange pustules on the upper leaf surfaces

B. Sticky honeydew dripping from twig tips

C. Hollow insect tunnels in the heartwood

D. White mycelial sheets beneath the bark

115. If Dutch elm disease spreads from tree to tree, the correct primary mechanism is:

A. Wind carrying fungal spores across distances

B. Soil nematodes feeding on elm fine roots

C. Elm bark beetles and root grafts between trees

D. Rain splashing from infected foliage directly

116. When a high-value ash tree is threatened by emerald ash borer, the correct treatment approach is:

A. Weekly foliar sprays throughout the season

B. Trunk injection of a systemic insecticide

C. Soil drench with an herbicide product

D. No treatment because ash cannot be saved

117. If a pesticide label is consulted before application, the correct legal standing is:

A. Advisory guidelines to follow when convenient

B. Expired one year after first opening the container

C. Binding only during the first application only

D. Legally enforceable federal documents

118. Given that no effective treatment exists for a diagnosed disease, the correct professional response is:

A. Honest communication and appropriate management recommendations

B. Experimental treatments without informed client consent

C. Immediate removal of all nearby trees as a precaution

D. Refusal to discuss the findings with the property owner

119. If calculating the Critical Root Zone of a 24-inch DBH tree, the correct radius is:

A. 6 feet from the trunk outward

B. 12 feet from the trunk outward

C. 24 feet from the trunk outward

D. 48 feet from the trunk outward

120. When placing tree protection fencing, the correct boundary is:

A. The trunk itself encircling the bark closely

B. The CRZ boundary or further from the trunk

C. Halfway between the trunk and the dripline

D. The dripline regardless of tree size

121. If concrete washout occurs inside a Tree Protection Zone, the correct concern is:

A. The high pH of the washwater sterilizing soil

B. The aggregate physically damaging fine roots

C. The vibration disturbing all root hairs

D. The cement setting around the root surfaces

122. Given that the grade is raised 12 inches over a mature tree's roots, the correct predicted outcome is:

A. Immediate tree death within a few hours

B. Stronger anchorage during storm events

C. Improved drainage benefits across the zone

D. Gradual decline as buried roots lose oxygen

123. If a utility line must cross a mature tree's root zone, the correct least-damaging method is:

A. Conventional open-cut trenching at full depth

B. Mechanical auger boring downward from above

C. Directional boring beneath the root zone

D. Surface installation directly on the soil

124. When construction materials are proposed for storage in a TPZ, the correct professional response is:

A. Permitting lightweight materials only in dry weather

B. Prohibiting storage because of compaction damage

C. Requiring storage to free up other staging areas

D. Allowing storage only during weekend hours

125. If a pre-construction tree assessment is scheduled, the correct ideal timing is:

A. Before final design so findings influence decisions

B. After demolition has begun on the site

C. After foundations have been poured and graded

D. Only if trees later show obvious symptoms

126. Given that excavation must unavoidably cross tree roots, the correct field practice is:

A. Allowing the excavator to tear roots randomly

B. Applying wound sealant to every cut root

C. Waiting until after excavation to assess damage

D. Making clean cuts with sharp tools at the damage line

127. If planning post-construction care for a damaged tree, the correct emphasis is:

A. Aggressive crown reduction to balance losses

B. Heavy nitrogen fertilization to force growth

C. Deep watering, mulching, and multi-year monitoring

D. Immediate trunk injection with systemic fungicide

128. When a contractor proposes using only the dripline as protection boundary, the correct objection is:

A. Dripline shape changes seasonally on trees

B. Actual root systems extend well beyond the dripline

C. Drip lines cannot be enforced legally

D. Drip lines are difficult to survey accurately

129. If delayed decline appears after construction damage, the correct expected timing is:

A. Months to several years after the triggering event

B. Within hours of the damaging activity ending

C. Only during the next major drought cycle

D. Always on the first anniversary of the event

130. Given that tree protection fencing is specified, the correct standard is:

A. Lightweight flagging tape crews can move freely

B. Short stakes spaced widely apart for appearance

C. Painted to match nearby buildings on the lot

D. Sturdy, visible, clearly marked, and maintained

131. If asked the single most effective construction protection action, the correct answer is:

A. Wrapping the trunk in protective foam padding

B. Excluding all activity from the root zone entirely

C. Pre-fertilizing heavily before the work begins

D. Reducing the crown to balance expected root losses

132. When lowering the grade around an established tree, the correct expected outcome is:

A. Improved drainage benefits to the deeper roots

B. Better wind anchorage from the remaining roots

C. Direct loss of functional roots with the removed soil

D. Increased nutrient access in newly exposed layers

133. If a baseline tree condition report is prepared before construction, the correct primary purpose is:

A. Documenting pre-existing conditions for later comparison

B. Eliminating any need for later monitoring work

C. Serving exclusively as a billing record

D. Satisfying all regulatory requirements automatically

134. Given that a tree shows no visible symptoms one year after construction, the correct next step is:

A. Assuming full recovery and ending all attention

B. Immediate heavy fertilization to force growth

C. Removing the tree as a precautionary measure

D. Continuing monitoring for several more seasons

135. If hand or air excavation is used in a TPZ, the correct rationale is:

A. Producing the fastest possible excavation speed

B. Identifying and preserving roots during the work

C. Eliminating the need for any arborist supervision

D. Lowering cost compared to mechanical trenching

136. When a tree contacts an energized overhead line, the correct response is:

A. Approaching immediately for pruning by any worker

B. Spraying water to dissipate the electrical charge

C. Treating as energized until the utility confirms otherwise

D. Removing the tree quickly before it is reported

137. If defining risk in formal tree risk assessment, the correct definition is:

A. The combination of likelihood of failure and consequences

B. The presence of any visible defect on the tree

C. The age of the tree multiplied by its height

D. The total monetary value of the tree at market

138. When a Level 1 tree risk assessment is being performed, the correct description is:

A. A detailed single-tree inspection with probe

B. A laboratory analysis of collected wood cores

C. Advanced instrumentation using sonic tomography

D. A rapid limited visual screening of many trees

139. If a Level 2 tree risk assessment is being conducted, the correct description is:

A. A rapid drive-by survey of hundreds of trees

B. A laboratory-based analysis of wood cores

C. A detailed visual inspection of a single tree

D. A theoretical model based only on species

140. Given that Level 3 risk assessment tools are selected, the correct list includes:

A. Standard measuring tape and ground observation

B. Resistograph drilling and sonic tomography

C. Color photographs from a moving vehicle

D. Only a small mallet for basic sounding

141. If codominant stems show included bark, the correct interpretation is:

A. A structurally weak union from trapped bark

B. A normal branching pattern with no concern

C. A feature reducing risk of splitting in wind

D. A condition requiring no professional attention

142. When a fungal fruiting body is observed on a mature trunk, the correct interpretation is:

A. A beneficial mycorrhizal partnership beneath bark

B. Normal seasonal shedding of outer bark layers

C. Excess nitrogen from recent fertilization

D. Active decay already established within the tree

143. If a target is defined in tree risk assessment, the correct definition is:

A. A specific branch identified for pruning removal

B. Any person, property, or activity affected by failure

C. A zone where the tree is expected to fall

D. An area of decay visible from outside the trunk

144. When target occupancy rate is documented, the correct definition is:

A. The number of trees per acre at the site

B. The age of structures beneath the tree canopy

C. The frequency and duration of target presence in the strike zone

D. The total value of nearby real estate parcels

145. If a new lean with fresh soil cracking on the opposite side is observed, the correct interpretation is:

A. Root plate movement and elevated uprooting risk

B. Normal phototropic growth toward available sunlight

C. A cosmetic change without any structural meaning

D. Seasonal soil movement unrelated to the tree

146. Given that a trunk is sounded with a mallet, the correct diagnostic purpose is:

A. Measuring the nitrogen content of the wood

B. Identifying the species from the sound

C. Locating overwintering insect populations

D. Detecting hollow areas through sound changes

147. If the TRAQ risk matrix is applied, the correct two dimensions combined are:

A. Tree species and trunk diameter at breast height

B. Likelihood of failure and impact with consequences

C. Site drainage and measured soil pH

D. Property value and the tree's age in years

148. When a "probable" likelihood of failure is assigned in TRAQ, the correct meaning is:

A. Failure is impossible under any conditions

B. Failure is unlikely but theoretically possible

C. Failure is likely during the assessment period

D. Failure is already occurring or imminent now

149. If the "severe" consequence level in TRAQ is assigned, the correct applied situation is:

A. Minor property damage easily repaired cheaply

B. Moderate damage with no significant injury

C. No measurable effect on any nearby targets

D. Catastrophic damage, serious injury, or death

150. Given that a tree has an internal cavity, the correct condition for possible structural soundness is:

A. Sufficient intact wood around the cavity perimeter

B. The cavity draining water quickly after storms

C. The cavity being smaller than four inches across

D. The cavity being located above six feet from grade

151. If consequences of failure are being evaluated, the correct set of factors is:

A. Only the total weight of the falling part

B. Only the distance to the nearest structure

C. The size of the part, fall height, and target nature

D. Only the calendar age of the tree at failure

152. When residual risk is defined, the correct meaning is:

A. The insurance premium cost on the property

B. Risk remaining after mitigation has been implemented

C. Risk during the mitigation work itself

D. Risk visible only after tree removal has occurred

153. If a professional risk report is being written, it should include all of the following EXCEPT:

A. The scope of the assessment performed

B. Identified defects and nearby targets

C. Recommended mitigation and residual risk

D. A removal recommendation for every tree examined

154. When cabling and bracing are installed on a codominant union, the correct outcome is:

A. Reduction but not elimination of structural risk

B. Complete elimination of all structural risk on the union

C. Required installation under ANSI A300 on every tree

D. No further inspection needed after installation

155. If communicating risk findings to a property owner, the correct approach is:

A. Using highly technical jargon for credibility

B. Recommending only the most expensive option

C. Plain language with respect for the owner's decisions

D. Withholding uncertain information to avoid worry

156. Given that root defects are difficult to evaluate, the correct reason is:

A. Roots always heal spontaneously without any issue

B. Roots are below ground and not directly observable

C. Roots produce no above-ground symptoms ever

D. Roots are only found in very young trees

157. If a healthy rounded callus surrounds an old small wound, the correct classification is:

A. Evidence of successful compartmentalization, not a defect

B. A major structural defect requiring removal

C. An active cavity needing immediate attention

D. A sign of hidden decay beneath the bark

158. When a moderate-risk branch overhangs a driveway, the correct mitigation is:

A. Removing the entire tree as a precautionary measure

B. Ignoring the situation until the branch fails

C. Cabling every branch in the entire crown

D. Reduction pruning to decrease end weight

159. If the principal safety standard for tree care work is cited, the correct standard is:

A. ANSI A300 covering tree pruning and maintenance

B. ANSI Z133 covering arboricultural safety requirements

C. ANSI Z60.1 covering nursery stock standards

D. OSHA 29 CFR 1926 for general construction only

160. When an unqualified worker approaches an energized line below 50 kV, the correct minimum approach distance is:

A. 3 feet in any direction

B. 5 feet in any direction

C. 10 feet in any direction

D. 25 feet in any direction

161. If distinguishing a qualified line-clearance arborist from an unqualified worker, the correct distinguishing feature is:

A. A current license to operate a bucket truck

B. Personal ownership of insulated rubber gloves

C. General landscape design experience only

D. Specialized training in electrical hazards and line work

162. Given that a climbing helmet is used for tree work, the correct required feature is:

A. A chin strap to retain the helmet during climbing

B. A wide brim for blocking direct sunlight

C. An open face design for peripheral vision

D. Reflective tape covering every surface

163. If chainsaw-resistant leg protection is explained, the correct mechanism is:

A. Activating an electromagnetic brake on the saw

B. Reflecting the moving chain away from skin

C. Containing fibers that clog the chain on contact

D. Producing an audible warning to the operator

164. When OSHA's hearing protection threshold is referenced, the correct level is:

A. 30 decibels of normal conversation

B. 85 decibels of typical chainsaw operation

C. 50 decibels of quiet outdoor activity

D. 120 decibels of extreme machinery use

165. If a proper pre-work job briefing is described, the correct elements include:

A. Only the names of all crew members on site

B. Only the lunch break schedule for the day

C. Only the pricing of the day's planned work

D. Work scope, hazards, PPE, and emergency procedures

166. Given that ANSI Z133 covers aerial rescue requirements, the correct application is:

A. Essentially all climbing operations with a crew

B. Only trees over 100 feet in height

C. Only when electrical hazards are present

D. Only on weekends when EMS is delayed

167. If suspension trauma develops in a motionless climber, the correct mechanism is:

A. Climbing rope deterioration from prolonged body heat

B. Blood pooling in the legs and reduced venous return

C. Harness buckle corrosion over time

D. Excessive hot weather exposure alone

168. When the kickback zone of a chainsaw is discussed, the correct location is:

A. The rear handle near the throttle control

B. The middle of the bar during straight cutting

C. The upper portion of the chainsaw bar tip

D. The bottom edge of the bar near the powerhead

169. If the chain brake on a chainsaw is explained, the correct function is:

A. Slowing the chain to idle when not cutting

B. Reducing vibration transmitted to the operator

C. Preventing engine flooding during cold starts

D. Stopping the chain when kickback or hand activates it

170. Given that the proper left-hand chainsaw grip is described, the correct position is:

A. Thumb wrapped fully around the front handle

B. Only fingertip contact for rapid release

C. Loose contact to absorb engine vibration

D. Palm contact only with thumb tucked alongside

171. If two-handed chainsaw operation is discussed, the correct standard is:

A. Optional based on operator preference alone

B. Required only for felling very large trees

C. The standard practice for nearly all saw use

D. Reserved only for cuts above the operator's head

172. When top-handle chainsaws are classified, the correct design purpose is:

A. Cutting firewood at ground level residentially

B. Bucking large logs on flat terrain only

C. Felling full-sized mature forest trees

D. Climbing arborist use up in the canopy

173. If the chain catcher on a chainsaw is described, the correct function is:

A. Sharpening the chain automatically during use

B. Catching the chain if it breaks during cutting

C. Lubricating the chain during long cuts

D. Securing the chain to the bar during transport

174. Given that the working load limit is calculated from tensile strength, the correct approximate ratio is:

A. One-tenth of the rated tensile strength

B. Half of the rated tensile strength exactly

C. Nine-tenths of the rated tensile strength

D. Equal to the rated tensile strength itself

175. If shock loading is defined in rigging, the correct meaning is:

A. The static weight of the largest handled piece

B. Initial lifting force applied to a cut piece

C. Dynamic forces from a falling piece suddenly caught

D. Electrical charge building up in a dry rigging rope

176. When reducing shock loading during a rigging catch, the correct method is:

A. Tying the rigging line to a hard anchor with no slip

B. Using the smallest-diameter rope that fits the load

C. Positioning a ground worker beneath the falling piece

D. Using a friction device to allow controlled slip

177. If a rigging block redirects a load, the correct force on the anchor is:

A. Approximately twice the force of the load itself

B. Exactly half the force of the load itself

C. Precisely the force of the load alone

D. No additional force when properly installed

178. Given that the hinge in a standard felling cut has a purpose, the correct function is:

A. Being cut completely through before the tree falls

B. Controlling fall direction as the tree commits to falling

C. Substituting for a proper notch cut from the front

D. Providing a decorative remnant on the stump

179. If a felling escape route is planned, the correct practice is:

A. Leading directly beneath the falling tree

B. Running exactly straight behind the feller

C. Being planned and cleared before cutting begins

D. Being improvised at the moment of the fall

180. When "barber chair" is mentioned in felling, the correct meaning is:

A. A resting position between difficult cuts

B. A decorative form left in the stump base

C. A specialty chain for resinous softwood species

D. Vertical trunk splitting during the back cut

181. If chipper operators feed branches safely, the correct technique is:

A. Tip first while standing directly behind the infeed

B. Butt end first while standing to the side of the infeed

C. Wearing loose clothing for quick release if needed

D. Only during evening hours to avoid heat

182. Given that an aerial lift operator approaches an energized line, the correct approach distance maintenance applies to:

A. Only the bucket at the outermost reach

B. Only the rubber tires on the ground below

C. Both the bucket and the boom of the lift

D. Only the hydraulic cylinders of the machine

183. If PPE is inspected in professional tree care, the correct frequency is:

A. Before every use, with damaged items retired

B. Only during annual company safety reviews

C. Only after a known impact or failure event

D. Only by the original equipment manufacturer

184. When a climbing rope is selected to meet ANSI Z133, the correct minimum tensile strength is:

A. 1,800 pounds for residential climbing work

B. 3,000 pounds for routine maintenance work

C. 10,000 pounds for any climbing operation

D. 5,400 pounds per the current standard

185. If a friction hitch is tied correctly, the correct expected behavior is:

A. Locking rigidly and never moving under any load

B. Gripping reliably while permitting controlled adjustment

C. Being replaced after every single climb day

D. Slipping continuously to allow rapid descent

186. Given that the feed control bar on a wood chipper is described, the correct function is:

A. Stopping the feed rollers in an emergency situation

B. Indicating the speed of the chipping drum

C. Metering lubricant to the feed roller bearings

D. Switching the chipper between forward and reverse

187. If refueling a chainsaw safely, the correct practice is:

A. Refueling quickly without removing the fuel cap

B. Keeping the saw at low idle during the process

C. Stopping the saw and allowing it to cool briefly

D. Refueling while wearing cut-resistant gloves

188. When a worksite first aid kit is required, the correct standard is:

A. Stored in a vehicle parked off the worksite

B. Containing only over-the-counter medications

C. Carried only by the designated safety officer

D. Available on site and stocked appropriately

189. If urban trees reduce the heat island effect, the correct mechanism is:

A. Releasing methane gas into the atmosphere

B. Shading surfaces and providing evapotranspiration cooling

C. Absorbing heat directly through root systems

D. Reflecting sunlight from waxy leaf surfaces

190. When a complete tree inventory is described, the correct scope is:

A. Every tree within the defined inventory area

B. Only trees scheduled for immediate removal

C. A statistical sample of the total population

D. Only trees with obvious structural defects

191. If quantifying the dollar value of ecosystem services, the correct analytical tool is:

A. A traditional plant taxonomy textbook

B. A nursery stock pricing catalog from suppliers

C. Real estate market valuations of nearby parcels

D. The i-Tree suite of analytical tools

192. Given that a mature tree is too large to replace with nursery stock, the correct appraisal method is:

A. The replacement cost method using nursery prices

B. The ecological benefit method based only on i-Tree

C. The trunk formula method with adjustments

D. The historical cost method based on purchase

193. If a typical tree protection ordinance is described, the correct provision is:

A. Requiring permits for removal of protected trees

B. Banning all pruning by private property owners

C. Requiring mandatory removal of mature trees

D. Applying only to trees planted by the city

194. When canopy cover goals are expressed for a community, the correct format is:

A. The number of trees per square mile of city

B. The percentage of land area covered by canopy

C. The total leaf biomass produced annually

D. The average height of street trees in feet

195. If a community applies for Tree City USA status, the correct minimum budget requirement is:

A. Ten dollars per capita annually

B. Fifty dollars per capita annually

C. One hundred dollars per capita annually

D. Two dollars per capita annually

196. Given that species rating is used in plant appraisal, the correct reflected factor is:

A. The lumber market value of the species

B. The exact calendar age of the tree

C. The desirability and suitability in the local area

D. The current height of the tree in feet

197. If communicating with property owners about recommended work, the correct approach is:

A. Highly technical jargon to display expertise

B. Plain language with respect for the owner's decisions

C. Pressure tactics to close the sale quickly

D. Refusal to provide any pricing estimate

198. When documented social benefits of urban trees are cited, the correct finding is:

A. Improved mental health and reduced stress for residents

B. Increased crime rates in heavily wooded neighborhoods

C. Higher rates of asthma across all age groups

D. Reduced physical activity among nearby residents

199. If presenting to a budget-focused council, the correct most persuasive argument is:

A. The aesthetic preferences of the forestry staff

B. The mayor's personal favorite tree species

C. The simplicity of installing artificial turf

D. The documented dollar value of ecosystem services

200. Given that street trees follow the 10-20-30 rule, the correct primary benefit is:

A. Reducing nursery costs for the community

B. Ensuring every tree grows at the same rate

C. Protecting against catastrophic pest-driven canopy loss

D. Limiting the total number of trees required

PRACTICE EXAM 19 — ANSWER KEY AND EXPLANATIONS

1. C — The vascular cambium divides inward to produce new xylem and outward to produce new phloem, thickening the trunk each year. Heartwood, bark, and pith do not produce new wood. The cambium is the engine of secondary growth.

2. A — Transpiration at leaf surfaces generates tension that pulls water upward through xylem in continuous columns held together by hydrogen bonding. No active metabolic pumping is required. This is the cohesion-tension mechanism of water transport.

3. D — Closing stomata simultaneously reduces transpiration (water loss) and photosynthesis (because CO_2 can no longer enter). This trade-off between water conservation and carbon gain is the central constraint on tree function under heat or drought stress.

4. B — Phloem is living inner-bark tissue that transports sugars from sources to sinks through active cellular processes. Unlike xylem, phloem cells remain alive because sugar transport requires energy. This is the fundamental difference between the two vascular tissues.

5. A — Heartwood provides structural support and resists decay through extractives (tannins, resins) deposited in the dead cell walls. It does not conduct water or store reserves. Sapwood, by contrast, is the outer functional xylem.

6. D — A girdling wire severs the phloem, interrupting downward sugar transport from leaves to roots. The roots gradually starve and lose function, followed by the rest of the tree. Xylem flow continues above the girdle until root failure cascades upward.

7. B — Wall 4 is formed by the cambium at the wound margin and is the strongest of the four CODIT walls. It resists outward spread of decay into new wood produced after the injury. Preserving the branch collar during pruning is essential because it contains this critical cambium.

8. C — Mycorrhizal fungi colonize tree roots and extend hyphae outward into the surrounding soil, dramatically increasing the effective absorbing surface area. The tree supplies sugars; the fungus supplies water and nutrients from a much larger soil volume.

9. A — Losing 50% of the canopy reduces photosynthetic capacity proportionally, significantly reducing carbohydrate production. The tree must draw on reserves to survive and refoliate. Severe canopy loss is a major stressor regardless of species.

10. D — Reaction wood has altered structure and fiber orientation that help counteract a persistent lean. Conifers produce compression wood on the lower side; hardwoods produce tension wood on the upper side. Both responses help correct the lean over time.

11. B — A latent bud is a dormant bud that remains in reserve under the bark until triggered to grow by injury, severe pruning, or other stress. Latent buds are the source of epicormic sprouts following topping or canopy damage.

12. C — Auxin produced at the shoot tip travels downward and suppresses the growth of lateral buds below. Removing the leader interrupts this suppression and releases lateral buds to grow. This is the biological basis for apical dominance.

13. A — Reserves reach their lowest point in late spring after new leaves have emerged but have not yet returned more sugar than the refoliation cost. Spring defoliation during this window is particularly devastating. Reserves rebuild through summer.

14. D — Respiration consumes stored sugars to release energy for cellular function, occurring continuously in every living cell day and night. It is fundamentally different from photosynthesis, which produces sugars. Respiration occurs throughout the year.

15. C — Most absorbing roots are found in the upper 12 to 18 inches of soil where oxygen, water, and nutrients are most available. They often extend two to three times the crown radius. The deep taproot image is inaccurate for mature trees.

16. B — Xylem conducting cells are dead at functional maturity, forming hollow tubes that transport water through the cohesion-tension mechanism without metabolic energy. This design is elegant because no respiration is needed. Phloem, in contrast, must remain living.

17. A — Wind flexing stimulates the cambium to produce reaction wood and develop greater trunk taper at the base. Rigidly staked trees lose this stimulus and develop weaker trunks. Natural mechanical stress builds structural strength.

18. D — Photosynthesis is a light-driven process that converts CO_2 and water into sugars using chlorophyll in leaf chloroplasts. This process powers all tree growth and metabolism. It occurs only in the presence of light.

19. B — Starch reserves stored in parenchyma cells fuel refoliation, wound response, and growth during periods when photosynthesis cannot meet demand. Reserves are essential for recovery from defoliation, drought, and pruning. Reserves peak in autumn and bottom out in late spring.

20. C — Stomata regulate gas exchange in all three directions — carbon dioxide entering for photosynthesis, water vapor exiting as transpiration, and oxygen leaving as a byproduct of photosynthesis. All three flows pass through the same openings.

21. D — The vascular cambium adds width to the trunk each year by producing new xylem inward and new phloem outward. Pith, heartwood, and outer bark are not productive tissues. The cambium is the engine of secondary growth.

22. A — CODIT (Compartmentalization Of Decay In Trees) describes how trees wall off damaged areas with internal barriers rather than regenerating lost tissue. Trees grow over and around wounds rather than repairing them. This is fundamentally different from mammalian wound healing.

23. C — *Acer* (maples) has opposite leaf arrangement, palmate venation, and paired winged samaras characteristic of the genus. Oaks and pines have alternate arrangement; ash has compound leaves. The combination of features is diagnostic for maple.

24. B — 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. These differences are the primary field distinction.

25. A — Red oaks have pointed leaf lobes ending in bristles and produce acorns that mature over two growing seasons. White oaks have rounded lobes without bristles and one-season acorns. Lobe shape is the first identification clue.

26. D — MAD Horse stands for Maples, Ashes, Dogwoods, and Horse chestnut — the common temperate genera with opposite leaf arrangement. Most other broadleaf trees are alternate. This mnemonic eliminates most identification possibilities at a glance.

27. B — Horse chestnut (*Aesculus hippocastanum*) has palmately compound leaves with five leaflets, opposite arrangement, and showy upright spring flower spikes. It belongs to the soapberry family along with maples. It is the "Horse" in the MAD Horse mnemonic.

28. C — American sycamore (*Platanus occidentalis*) is distinguished by mottled tan and white peeling bark and broad palmate simple leaves. The bark alone often allows identification from a distance. Maples have similar leaves but very different bark.

29. D — 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. Pine, hemlock, and red cedar are all evergreen.

30. A — Binomial nomenclature requires the genus capitalized and italicized in print, with the specific epithet lowercase and also italicized. *Acer rubrum* follows the convention correctly. All-caps and all-lowercase forms violate the rules.

31. C — A name in single quotation marks following a species name indicates a cultivar — a cultivated variety selected for specific characteristics and propagated clonally. Cultivar names are not italicized. They differ from botanical varieties found in wild populations.

32. 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 threats at each taxonomic level. Dutch elm disease and emerald ash borer illustrate why diversity matters.

33. D — Tree of heaven (*Ailanthus altissima*) is widely classified as a non-native invasive species in much of eastern North America. It escapes cultivation and colonizes disturbed sites aggressively. It is also the preferred host of the spotted lanternfly.

34. A — Right Tree, Right Place primarily means matching a tree's mature characteristics — size, form, soil and water needs, tolerance — to the conditions of the planting site. Ignoring mature dimensions is the most common species selection error.

35. C — *Fraxinus* (the ash genus) belongs to the olive family Oleaceae, which also includes lilacs and forsythias. Family-level recognition matters for understanding pest susceptibilities. It is not in the pine, rose, or soapberry families.

36. D — A crabapple reaching 15 to 20 feet is appropriate beneath a 25-foot distribution line, leaving safe clearance below the conductors. This is a direct application of Right Tree, Right Place. Larger species would inevitably conflict with the line.

37. A — A pinnately compound leaf has leaflets arranged along two sides of a central rachis, like the feathers of a bird. Palmately compound leaves have leaflets clustered at a single point. Ash, hickory, and walnut are pinnate.

38. B — A palmately compound leaf has leaflets radiating from a single attachment point at the end of the petiole. Horse chestnut is the classic example. Pinnately compound leaves have leaflets arranged along a central rachis.

39. C — Oak, hickory, and beech all have alternate leaf arrangement on their stems. The MAD Horse genera (maple, ash, dogwood, horse chestnut) are opposite. Recognizing alternate vs. opposite narrows identification quickly.

40. D — Winter identification of deciduous trees depends on bud shape, twig features, and bark character because foliage is absent. These features are reliable enough for confident identification. Experienced arborists can identify most deciduous trees from twigs alone.

41. B — Loam is a soil texture with roughly balanced proportions of sand, silt, and clay. It drains adequately, holds enough water, and supports good structure when organic matter is present. Loam is the ideal texture for most tree species.

42. A — A pH of 7.0 is the neutral midpoint of the pH scale, neither acidic nor alkaline. Values below 7.0 are acidic; values above are alkaline. Each whole number represents a tenfold change in hydrogen ion concentration.

43. C — Cation exchange capacity is a measure of the soil's ability to hold and exchange cation nutrients such as calcium, magnesium, and potassium. It primarily depends on clay content and organic matter. Higher CEC means better nutrient retention.

44. D — A bulk density of 1.8 g/cm³ indicates severe compaction that halts most root growth. Values above 1.7 progressively limit root penetration. Values below 1.3 generally indicate good structure.

45. B — 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.

46. A — A composite sample averages variation across the area being tested, producing a representative result. Multiple subsamples are combined before analysis. Proper sampling is the most important step in soil testing.

47. D — A 36-hour drain time indicates inadequate drainage for most tree species. Drainage longer than 12 to 24 hours signals a drainage problem. Site modification or drainage-tolerant species selection is required.

48. C — Iron chlorosis in a pin oak growing in alkaline soil is almost always caused by high pH rendering iron chemically unavailable. The iron is present but not in forms roots can absorb. Treatment must address pH or use chelated iron.

49. B — A proper mulch ring is 2 to 4 inches deep with the trunk kept clear. Deeper layers suffocate roots, and piling mulch against the trunk causes bark decay. The correct shape is a flat ring, not a volcano.

50. A — Compaction reduces pore space and the large pores that hold air, starving roots of oxygen needed for respiration. Roots that cannot respire cannot absorb water or nutrients. This is the primary mechanism by which compaction kills urban trees.

51. D — Sandy soils with low organic matter have low CEC because they have few negatively charged sites to hold cations. Cations leach readily after fertilization. Building organic matter is the only practical way to raise CEC.

52. C — Soil texture is essentially permanent because the proportions of sand, silt, and clay cannot be meaningfully altered. Working with existing texture and building organic matter is the only realistic strategy. Structure, unlike texture, can be improved.

53. B — Elemental sulfur lowers soil pH through microbial oxidation that produces sulfuric acid. The process takes time and depends on soil temperature and moisture. Sulfur is the standard amendment for acidifying alkaline soils.

54. A — A pH of 4.5 is strongly acidic, well below the neutral value of 7.0. At this level, aluminum and manganese toxicity become concerns for many tree species. Each whole number represents a tenfold concentration change.

55. D — 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. 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. A — Current best practice is to backfill with the unamended native soil excavated from the planting hole. Research has shown that heavily amended backfill can produce pot-bound conditions in the ground. Soil improvement is better delivered through surface mulching.

58. B — A widely used rule of thumb is one year of establishment per inch of trunk caliper at planting. A 3-inch caliper tree needs about three growing seasons. During this period the tree is rebuilding its root system.

59. D — Staking should be used only when necessary and removed within one growing season in most cases. Unnecessary or prolonged staking produces weaker trunks. The natural flex of the trunk builds strength and taper.

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 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. B — A balled-and-burlapped tree must be lifted by supporting the root ball from underneath, never by the trunk. Lifting by the trunk can separate the trunk from the ball and destroy the root connection. This is one of the most basic handling rules.

63. C — Establishment watering should 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. 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.

65. 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.

66. B — 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.

67. D — Twine tied around the trunk does not decompose reliably and can girdle the trunk as it grows. Synthetic twine in particular persists indefinitely. A single cut at planting prevents years of later damage.

68. C — Mulching does not supply all of a tree's nitrogen needs, though it may contribute some as it decomposes. Mulching does conserve moisture, moderate temperature, and suppress weeds. The other three benefits are genuine.

69. A — Planting hole depth should equal the distance from the root flare to the bottom of the root ball — no deeper. A deeper hole allows the tree to settle and bury the root flare, producing long-term decline. Width can be generous, but depth must be exact.

70. B — Nursery stock should be inspected at delivery for trunk condition, crown structure, visible root flare, and root ball condition. Defects identified at delivery can be avoided by rejecting the tree. Inspection is more than checking the manifest.

71. B — A tree that fails to leaf out the spring after planting most likely suffered root ball desiccation during handling. Damaged or dried-out roots cannot support bud break. Inspection at delivery and proper handling prevent most of these failures.

72. C — A wide planting hole provides loosened soil for outward root expansion during establishment. A hole dug just to ball width offers no expansion zone for new roots. Width matters more than depth in establishing a new tree.

73. A — A proper pruning cut is placed just outside the branch collar and bark ridge so the cambium at the wound edge can form Wall 4. Flush cuts and stubs both damage this mechanism. Correct placement is the biological foundation of good pruning.

74. B — Topping creates large wounds that cannot close, removes excessive foliage, depletes carbohydrate reserves, and produces weakly attached epicormic sprouts. It violates every principle of proper pruning simultaneously. ANSI A300 explicitly prohibits it.

75. 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.

76. D — Cleaning is the selective removal of dead, dying, diseased, broken, and weakly attached branches from the crown. It is one of the five primary pruning objectives recognized by ANSI A300 and the most common routine objective.

77. B — 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 without regard to laterals.

78. A — Structural pruning during the juvenile phase produces the greatest benefit because small cuts now correct defects that would otherwise require much larger, more damaging cuts decades later. The architectural framework is still being established.

79. C — 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.

80. D — 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.

81. B — Lion-tailing strips interior foliage and concentrates weight at the branch ends, creating weaker branches than properly distributed thinning. The pattern removes interior foliage that cushions wind loads. It is explicitly discouraged under current standards.

82. A — Pollarding is a long-term system requiring repeated cuts at 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.

83. D — 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.

84. C — 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.

85. B — 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.

86. A — 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.

87. C — 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.

88. D — 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 full-canopy work require different tools.

89. B — 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.

90. A — Codominant stems with included bark should be corrected early, while the tree is young and the cuts are small. Subordination or removal shifts dominance to a single leader. Waiting until maturity requires much larger and more damaging cuts.

91. D — The raise objective refers to selective removal of lower branches to provide vertical clearance beneath the crown for pedestrians, vehicles, or sight lines. Raising should be done gradually on young trees to avoid producing a disproportionate crown.

92. 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.

93. B — A professional pruning specification should include the identified objective, the percentage of foliage to be removed, and the diameter range of cuts. The climber's personal preferences are not part of a professional specification — clear specifications protect tree, client, and arborist.

94. A — 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.

95. C — Removing a dead branch is part of the cleaning pruning objective, which is defined as selective removal of dead, dying, diseased, broken, and weakly attached branches. Cleaning is the most common routine pruning objective.

96. 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.

97. A — Research has shown that wound dressings provide minimal benefit and in some cases actually slow compartmentalization by trapping moisture and creating favorable conditions for decay organisms. Current best practice is to leave pruning cuts unsealed.

98. B — In oak wilt regions, 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.

99. C — The raise objective refers to selective removal of lower branches to provide vertical clearance beneath the crown for pedestrians, vehicles, or sight lines. Raising should be done gradually on young trees to avoid producing a disproportionate crown.

100. D — The first cut is made on the underside of the branch (an undercut), 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 heavy branches.

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.

102. B — 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.

103. B — Symptoms are the tree's response to a problem — wilting, yellowing, dieback, thinning. Symptoms indicate that something is wrong but usually do not identify the specific cause. Multiple problems can produce overlapping symptoms.

104. C — A primary pest can attack and kill healthy, vigorous trees on its own without requiring the host to be stressed first. Secondary pests attack only weakened trees. The distinction is critical for management decisions.

105. A — Emerald ash borer is classified as a primary pest because it can successfully attack and kill healthy ash trees of all sizes. This distinguishes it from most native wood borers and is why it has devastated ash populations across North America.

106. D — 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.

107. B — 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.

108. C — 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.

109. 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 alkaline soil, this is almost always a pH-related availability problem.

110. D — 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.

111. C — Cupping and twisting of new growth on a mature tree most likely indicates phenoxy herbicide exposure such as 2,4-D, which mimics plant growth hormones. The pattern is often most severe on the side nearest the application source.

112. 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.

113. A — 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.

114. D — 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.

115. C — 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 pathway is why the disease caused the near-total loss of American elm as a street tree.

116. B — 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.

117. D — "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.

118. A — 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. Honesty is part of professional standing.

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. B — 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. The CRZ formula produces a more 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.

122. D — 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. Symptoms develop over months or years as reserves are exhausted.

123. C — Directional boring 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 under their weight and smother roots. This is one of the standard prohibitions enforced by TPZ fencing.

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.

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.

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. Patience drives recovery.

128. B — 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.

129. A — 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. 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.

131. B — 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.

132. C — 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 can remove a large share of absorbing roots concentrated near the surface.

133. A — 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.

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.

135. B — Hand 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.

136. C — 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.

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.

138. D — Level 1 assessment is a rapid limited visual screening used for large tree populations along streets, through parks, or across properties. Its purpose is to identify obvious hazards requiring further evaluation.

139. 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.

140. 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.

141. A — 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.

142. D — 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.

143. B — 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 failure likelihood does not produce high risk.

144. C — 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.

145. A — 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.

146. D — 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.

147. B — 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.

148. C — A probable likelihood of failure in TRAQ means failure is likely to occur during the assessment time frame under normal conditions. The four levels are improbable, possible, probable, and imminent.

149. 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.

150. 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.

151. C — Consequences of failure depend on the size of the falling 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.

152. B — 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.

153. D — A professional report should document scope, defects, targets, mitigation, and residual risk — but not a removal recommendation for every tree. Recommendations must be proportional to actual risk. Blanket removal recommendations damage professional credibility.

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.

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.

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.

157. A — Healthy rounded callus tissue around a small old wound indicates successful compartmentalization and closure. This is evidence of normal healing, not a structural defect. The tree has successfully walled off the original injury.

158. D — 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.

159. B — 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.

160. C — 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 most lines in residential and commercial tree work.

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.

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.

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 dramatically reduces injury severity.

164. B — OSHA requires hearing protection when noise levels exceed 85 decibels, and chainsaw operation routinely produces noise well above this threshold. Repeated exposure without protection causes progressive and irreversible hearing loss.

165. D — A proper job briefing covers work scope, hazards, procedures and precautions, required PPE, and emergency response procedures. It is required under ANSI Z133 and is not optional. Briefings prevent predictable mistakes.

166. A — ANSI Z133 requires aerial rescue capability on essentially every climbing operation with a crew — at least one worker other than the climber must be trained and equipped to perform a rescue. Outside emergency services alone are inadequate.

167. B — 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.

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. D — The chain brake is designed to stop the chain when activated manually by the front handguard or automatically by kickback motion. It is an essential safety feature that must be functional on every saw in service.

170. A — 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 practice for nearly all chainsaw use and is required except in specific climbing situations using top-handle saws. The standard grip provides maximum control and reduces injury risk.

172. D — Top-handle chainsaws are designed specifically for climbing arborist use up in the canopy, where compact size and potential one-handed operation are required. They should not be used by untrained workers or for ground-based work.

173. B — The chain catcher is a projection beneath the bar designed to catch the chain if it breaks or derails during operation, preventing it from whipping toward the operator. It is one of several safety features on modern chainsaws.

174. 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 wear.

175. C — 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.

176. D — 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.

177. A — 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. This doubling is a routine source of anchor failure.

178. 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.

179. 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.

180. D — 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.

181. 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. Standing directly behind is a recurring cause of serious injury.

182. C — 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.

183. 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.

184. D — 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.

185. B — 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.

186. A — The feed control bar on a wood chipper is a safety device that stops the feed rollers when pressed, allowing the operator to halt material feed in an emergency. It must be functional and within reach.

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.

189. B — 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.

190. A — 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.

191. D — 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 tree populations.

192. C — 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.

193. A — Tree protection ordinances typically require permits for removal of protected trees above a specified size threshold, with penalties for unauthorized removal. Specific provisions vary between jurisdictions.

194. B — 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.

195. D — 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.

196. C — Species rating in plant appraisal 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.

197. B — Effective communication with property owners uses plain language and respects the owner's decision-making authority. Technical jargon, pressure tactics, and refusal to share information all damage credibility. The client makes the final decision.

198. A — Multiple studies have found improved mental health outcomes and reduced stress for residents of neighborhoods with more trees, along with faster recovery from illness and increased physical activity. The human-health case is increasingly central.

199. D — 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.

200. C — Diverse plantings following the 10-20-30 rule protect communities against catastrophic pest-driven canopy loss when species-, genus-, or family-specific pests arrive. Dutch elm disease and emerald ash borer illustrate why diversity matters.