PRACTICE EXAM 2: ISA CERTIFIED ARBORIST SIMULATION

QUESTIONS 1–200

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

1. A forester cuts a 40-year-old oak and observes concentric annual growth rings in cross-section. The tissue responsible for producing those rings is located in the:

A. Phloem layer just inside the outer bark

B. Apical meristem at the tips of each shoot

C. Vascular cambium between the xylem and phloem

D. Cork cambium within the outer protective bark

2. A tree under severe drought closes its stomata during midday. The most immediate physiological consequence is that:

A. Photosynthesis slows as carbon dioxide intake drops

B. Transpiration rises briefly before stabilizing again

C. Phloem loading accelerates throughout the crown

D. Root respiration shuts down across the entire system

3. A climber notices that the outer two inches of a freshly cut trunk are pale while the interior wood is dark reddish-brown. The dark interior tissue:

A. Conducts the majority of the tree's water upward

B. Contains the highest density of living parenchyma cells

C. Represents newly formed xylem from the current season

D. No longer conducts water and is composed of dead cells

4. Which process in a tree is most directly driven by evaporation from leaf surfaces?

A. Phloem transport of sugars to the root system

B. Upward movement of water through xylem conduits

C. Cambial division producing new wood each year

D. Respiration of living sapwood parenchyma cells

5. During a severe defoliation event, a mature maple loses 80 percent of its leaves in June. The most immediate biological cost to the tree is:

A. Drawdown of stored carbohydrate reserves to refoliate

B. Complete collapse of water transport in the xylem column

C. Permanent cessation of all cambial division activity

D. Immediate loss of root absorptive capacity site-wide

6. A tree sustains a shallow wound to its outer bark only. Wall 4 of the CODIT model will form primarily from:

A. Existing parenchyma cells within the heartwood

B. Phloem tissue located just beneath the wound site

C. Cambial cells bordering the perimeter of the wound

D. Sapwood ray cells radiating outward from the pith

7. An arborist observes that a 60-foot pine moves roughly 100 gallons of water per day in midsummer. This movement of water requires:

A. Significant metabolic ATP expenditure by the tree

B. No metabolic energy from the tree itself at all

C. Active pumping by specialized cells in root hairs

D. Turgor pressure generated within the xylem vessels

8. A tree girdled by a wire left from planting dies approximately three years later. The ultimate cause of death is:

A. Loss of xylem water transport above the girdle

B. Failure of the cambium directly at the wound site

C. Accumulation of plant toxins in the phloem above

D. Starvation of the root system from blocked sugar transport

9. In a temperate deciduous tree, stored carbohydrate reserves typically reach their peak:

A. In autumn just before leaf drop occurs

B. In midsummer during peak photosynthetic activity

C. In early spring as buds begin to swell visibly

D. In midwinter during the deepest dormancy period

10. A cross-section of a young woody twig shows several concentric tissues. Moving outward from the center, the correct order is:

A. Pith, phloem, cambium, xylem, outer bark

B. Pith, xylem, cambium, phloem, outer bark

C. Outer bark, cambium, phloem, xylem, pith

D. Xylem, pith, phloem, cambium, outer bark

11. Which of the following statements about heartwood in a mature tree is correct?

A. It is the most metabolically active wood in the trunk

B. It conducts the majority of the upward water flow

C. It produces new phloem cells during each growing season

D. It provides structural support but is composed of dead cells

12. A tree growing in soil with adequate moisture wilts severely on a hot afternoon. The most likely explanation is that:

A. Permanent drought damage has affected the root system

B. Cavitation has occurred in every xylem conduit simultaneously

C. Transpiration rate is temporarily exceeding water absorption

D. Phloem has become blocked by excess sugar production

13. Primary growth occurring at a shoot apical meristem produces:

A. New length at the growing tip of the shoot

B. Increased diameter at the base of the trunk

C. The annual growth rings visible in cross-section

D. New layers of bark on the outer trunk surface

14. The branch collar of a properly attached limb contains tissues that are critical for wound response because it:

A. Stores the highest concentration of carbohydrate reserves

B. Conducts water faster than any other trunk tissue

C. Produces chemical signals that repel attacking insects

D. Holds the cambium that forms Wall 4 after removal

15. A tree species whose mycorrhizal partners have been eliminated by soil fumigation would most likely show:

A. Accelerated shoot growth during the first season

B. Reduced water and nutrient absorption capacity overall

C. Increased resistance to foliar fungal diseases

D. Faster wound closure following any pruning operation

16. Which tissue type in a mature tree is composed of cells that are dead at functional maturity?

A. Phloem sieve tubes near the outer bark

B. Ray parenchyma of the active sapwood

C. Xylem conducting vessels within the sapwood

D. Meristematic cells of the active cambium

17. A tree grown in constant shade develops a narrower crown and thinner trunk than one grown in full sun. This reflects species-level differences primarily in:

A. Photosynthetic rate and carbohydrate production

B. Respiration rate of the woody support tissues

C. Water absorption from the surrounding soil

D. Seasonal dormancy triggers and responses

18. The root flare of a mature tree is best described as:

A. The first three feet of taproot below ground level

B. The transition zone where trunk meets the root system

C. A specialized storage organ found only in certain species

D. The outermost layer of absorbing roots at the dripline

19. A homeowner nails a wooden swing into a branch 8 feet above the ground. Twenty years later, at approximately what height is the nail?

A. Approximately 12 feet as the branch has risen

B. Approximately 10 feet with half the tree's vertical growth

C. Buried entirely as the branch sank under its own weight

D. Still approximately 8 feet because branches do not elongate upward

20. Stomata on the underside of a leaf serve primarily to:

A. Reflect incoming sunlight away from leaf surfaces

B. Anchor the leaf blade firmly to the twig below

C. Regulate gas exchange and water vapor loss

D. Secrete protective waxes onto the cuticle above

21. Which of the following represents the most accurate statement about respiration in trees?

A. It occurs in every living cell, continuously, day and night

B. It occurs only in chlorophyll-containing leaf tissues

C. It stops completely during the dormant winter season

D. It requires sunlight to proceed at a meaningful rate

22. A mature tree loses a major scaffold limb during a severe storm. The biological cost includes all of the following EXCEPT:

A. Loss of photosynthetic capacity that the limb provided

B. An open wound that must be compartmentalized over time

C. A disrupted crown form affecting future growth patterns

D. Immediate collapse of the opposite side's root anchorage

23. A tree shows opposite leaf arrangement, palmately compound leaves with five leaflets, and large conspicuous flower spikes in spring. The most likely genus is:

A. *Fraxinus* in the olive family

B. *Aesculus* in the horse chestnut family

C. *Juglans* in the walnut family

D. *Quercus* in the beech family

24. The MAD Horse mnemonic is useful for identifying trees that share which feature in common?

A. Simple pinnately lobed foliage structure

B. Naked winter buds without any scales

C. Opposite leaf arrangement on their stems

D. Shallow flared root systems near the surface

25. An arborist examining a winter twig finds a cluster of small rounded hairless buds at the tip of each branch. The tree is most likely:

A. A pine in the genus *Pinus*

B. A hickory in the genus *Carya*

C. A birch in the genus *Betula*

D. A white oak in the genus *Quercus*

26. Which of the following features is most useful for identifying a deciduous tree in the middle of winter?

A. Bud shape, leaf scar pattern, and bark character

B. Leaf margin and venation of new season foliage

C. Flower color and fragrance of the inflorescences

D. Fruit ripening patterns from the previous autumn

27. A tree labeled *Acer saccharum* 'Green Mountain' at a nursery indicates:

A. A botanical variety of sugar maple found only in Vermont

B. A specific cultivar of sugar maple selected for particular traits

C. A hybrid between sugar maple and another maple species

D. A subspecies formally recognized by the ISA

28. Which fruit type is characteristic of the genus *Fraxinus*?

A. Single samara with an elongated papery wing

B. Paired samara with two diverging wings

C. Woody cone composed of many scale-like bracts

D. Drupe with a fleshy outer coating over a stone

29. A homeowner wants a tree providing dense summer shade and colorful fall foliage, but the site can only accommodate a tree staying under 40 feet. The most suitable choice is:

A. White oak reaching 80 feet at maturity

B. Silver maple with brittle weak branching

C. Sugar maple cultivar selected for compact form

D. Eastern cottonwood with aggressive surface roots

30. Members of the family Rosaceae are frequently susceptible to which disease?

A. Dutch elm disease transmitted by bark beetles

B. Oak wilt spread through interconnected root grafts

C. Sudden oak death caused by *Phytophthora* species

D. Fire blight caused by *Erwinia amylovora*

31. A tree planted beneath a 30-foot distribution line must have a mature height that stays safely below the conductors. The most appropriate species choice is:

A. Red oak reaching 70 feet at maturity

B. Serviceberry reaching 20 feet at maturity

C. Tulip poplar reaching 90 feet at maturity

D. Pin oak reaching 60 feet at maturity

32. The 10-20-30 rule of urban forest diversity is intended primarily to:

A. Limit the amount spent on any single species of nursery stock

B. Ensure that every neighborhood contains at least three species

C. Protect the community from catastrophic pest-related loss

D. Mandate native species selection in municipal planting projects

33. A tree with alternate simple leaves, strongly serrated margins, triangular leaf shape, and peeling papery white bark is most likely:

A. A paper birch in the genus *Betula*

B. A quaking aspen in the genus *Populus*

C. A sycamore in the genus *Platanus*

D. A basswood in the genus *Tilia*

34. A non-native tree species that has escaped cultivation and caused measurable ecological harm in surrounding natural areas is best termed:

A. Exotic because it originated from another region

B. Introduced because humans brought it to the area

C. Naturalized because it now reproduces on its own

D. Invasive because it causes documented ecological harm

35. Which of the following species is considered invasive in much of eastern North America?

A. Eastern redbud (*Cercis canadensis*)

B. Tree of heaven (*Ailanthus altissima*)

C. American sycamore (*Platanus occidentalis*)

D. Black tupelo (*Nyssa sylvatica*)

36. A compound leaf differs from a simple leaf in that a compound leaf:

A. Consists of multiple leaflets attached to a single rachis

B. Has leaflets that each bear their own dormant bud

C. Falls in sections throughout the active growing season

D. Lacks a true petiole connecting it to the main stem

37. Which of the following statements about binomial nomenclature is correct?

A. The genus name is lowercase and the specific epithet capitalized

B. Both parts of the name are underlined and never italicized

C. Common names take precedence in scientific writing contexts

D. The genus is capitalized, the epithet lowercase, both italicized

38. A landscape architect is planting trees along a new streetscape. Applying the 10-20-30 rule, the species selected should:

A. Come from the same genus for visual consistency

B. Include at least one native and one invasive species

C. Avoid overrepresentation of any single genus or family

D. Be limited to slow-growing species under any conditions

39. Which of the following is an immediate advantage of selecting a native tree species for a new planting?

A. Guaranteed immunity from all local pests and diseases

B. Adaptation to local climate, soils, and ecological relationships

C. Automatic exemption from all municipal planting regulations

D. Documented faster growth than any non-native alternative

40. A pinnately compound leaf is best described as one with:

A. Leaflets radiating from a single point at the end of the petiole

B. Lobes spreading outward like the fingers of an open hand

C. Leaflets arranged along two sides of a central rachis

D. Parallel veins running from base to tip without branching

41. An ideal mineral soil for tree growth contains approximately what proportion of pore space for water and air combined?

A. About 50 percent of the total soil volume

B. About 25 percent of the total soil volume

C. About 75 percent of the total soil volume

D. About 10 percent of the total soil volume

42. A loam soil is defined by containing:

A. Primarily sand particles with a small fraction of clay

B. Primarily clay particles with a small fraction of sand

C. Equal parts rock fragments and decomposed organic matter

D. Roughly balanced proportions of sand, silt, and clay

43. Raising the organic matter content of a soil improves its cation exchange capacity because organic matter:

A. Adds nitrogen directly to the soil solution

B. Has negatively charged surfaces that hold cations

C. Physically traps cations in microscopic pores

D. Converts cations into readily usable gaseous forms

44. A soil sampling plan that collects multiple subsamples across the root zone and combines them into a single composite sample:

A. Produces a representative average of the sampled area

B. Allows separate analysis of each individual spot sampled

C. Is required by law in all jurisdictions across the country

D. Eliminates the need for standardized laboratory procedures

45. A pin oak planted in soil with a pH of 7.8 develops severe interveinal chlorosis on its newest growth. The most accurate explanation is:

A. The soil contains insufficient total iron for tree needs

B. Nitrogen deficiency is suppressing chlorophyll formation

C. High pH renders iron chemically unavailable to the roots

D. Phosphorus is interfering with iron translocation in leaves

46. Which of the following is most likely to occur when heavy clay soil is tilled while wet?

A. Improved soil structure with better aggregate stability

B. Increased earthworm activity in the tilled profile

C. Enhanced root penetration during the next season

D. Destruction of aggregates and formation of compacted clods

47. A mycorrhizal fungus forms a symbiotic relationship with tree roots by:

A. Decomposing dead roots into plant-available nutrients

B. Extending hyphae into soil to increase absorbing surface

C. Producing antibiotics that protect roots from pathogens

D. Fixing atmospheric nitrogen within the root cortex directly

48. A newly installed sidewalk compacted the soil above the root zone of a mature oak. The most immediate effect on the tree is:

A. Reduced oxygen available to root cells for respiration

B. Increased phosphorus availability to any surviving roots

C. Accelerated nitrogen uptake from the compacted layer

D. Improved drainage in the soil immediately below

49. An arborist diagnoses marginal leaf scorch on the older leaves of a maple and suspects potassium deficiency. This deficiency pattern appears on older leaves first because potassium is:

A. Concentrated mostly in the outer bark and phloem

B. Absorbed primarily at night by the mature foliage

C. Bound tightly to clay particles and considered immobile

D. Mobile within the tree and translocated to new growth

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

A. Ten inches deep and piled directly against the trunk

B. One inch spread thinly across the entire lawn area

C. Two to four inches deep with the trunk base kept clear

D. Six inches of fresh grass clippings added each week

51. A field perc test involves digging a hole, filling it with water, and:

A. Measuring the pH of the water as it slowly drains away

B. Timing how long the water takes to fully infiltrate

C. Adding dye to the water to trace any root absorption

D. Counting the earthworms that emerge from the hole

52. Cation exchange capacity (CEC) of a soil primarily determines:

A. How quickly the soil warms up each spring

B. The depth of the topsoil horizon on the site

C. Whether mycorrhizal fungi can colonize the area

D. How much nutrient reserve the soil holds against leaching

53. Which of the following most likely indicates severely compacted mineral soil?

A. Bulk density exceeding approximately 1.7 grams per cubic centimeter

B. Bulk density well below 1.0 grams per cubic centimeter

C. High earthworm populations in the surface horizons

D. Rapid infiltration of water during a standard perc test

54. Soil texture is considered essentially permanent because:

A. Soil texture refers only to the organic matter content

B. Microbial activity regenerates the original texture continuously

C. Proportions of sand, silt, and clay cannot be practically altered

D. Soil texture changes only in response to pH amendments

55. A container-grown tree arrives with roots densely circling the inside of the pot. The correct action at planting is to:

A. Leave the root ball intact to avoid damaging any fine roots

B. Slice or straighten the circling roots before placing in the hole

C. Place the entire container including plastic pot into the hole

D. Return the tree to the nursery as unusable plant stock

56. The width of a planting hole for a container-grown tree should generally be:

A. Exactly the same diameter as the root ball

B. One-half the diameter of the root ball

C. Ten times the diameter of the root ball

D. At least two to three times the root ball diameter

57. Setting a tree so that its root flare sits approximately one inch above the surrounding grade is:

A. Acceptable and often preferable to planting at exact grade

B. A serious error that will kill the tree within two growing seasons

C. Only permitted in heavy clay soils with poor drainage

D. Prohibited under the current ANSI A300 planting standard

58. The estimated establishment period for a newly planted 4-inch caliper tree under normal site conditions is approximately:

A. Two months regardless of species or conditions

B. One full calendar year from the date of planting

C. About four years, using one year per caliper inch

D. Ten to twelve years in most temperate climate zones

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

A. Mix the backfill 50/50 with purchased peat moss

B. Use the native soil excavated from the hole

C. Replace the native soil entirely with sterile potting mix

D. Layer the backfill with alternating sand and compost

60. Staking a newly planted tree should be considered when:

A. The tree cannot stand upright on its own or is exposed to wind

B. The client requests staking for purely aesthetic reasons

C. Any tree is installed regardless of site conditions

D. The tree has been staked continuously in the nursery

61. A balled-and-burlapped tree should be lifted at the planting site by:

A. Grasping the trunk firmly near its base with two hands

B. Wrapping the crown with straps and lifting from above

C. Pulling sharply on one corner of the burlap wrapping

D. Supporting the root ball itself from underneath during the lift

62. Wire baskets on balled-and-burlapped trees should generally be:

A. Left completely intact after the tree has been planted

B. Removed in their entirety before placing the tree in the hole

C. Cut and removed from at least the upper portion after placement

D. Replaced with plastic mesh before the backfill is returned

63. Twine used to secure burlap around a tree's root ball:

A. Should be left in place because it is always biodegradable

B. Must be removed from the trunk to prevent future girdling

C. Can be tightened further to improve root ball stability

D. Serves no purpose at all after nursery delivery is complete

64. Watering a newly planted tree should aim to:

A. Keep the root ball and backfill consistently moist but not saturated

B. Saturate the surface within the planting basin every morning

C. Apply small amounts of water at frequent fixed intervals

D. Maintain the soil in a dry condition to encourage root exploration

65. Applying a heavy nitrogen fertilizer to a newly planted 2-inch caliper tree during its first growing season is:

A. Standard practice to ensure healthy tree establishment

B. Required by most nursery stock warranty programs

C. The most effective way to stimulate new root growth

D. Generally unnecessary and can stress a reduced root system

66. The most common error made when planting container-grown trees is:

A. Selecting a hole location too far from the water source

B. Failing to stake the tree on all four sides after planting

C. Planting the root ball too deep so the root flare is buried

D. Using only unamended native soil as backfill material

67. The ideal season for transplanting most deciduous trees in temperate climates is:

A. During dormancy in late fall or early spring

B. Mid-summer during the period of peak growth

C. Immediately after leaf emergence in late spring

D. At any time provided adequate irrigation is available

68. Advance root pruning of a tree scheduled for transplant is performed to:

A. Reduce the tree's water demand during the actual move

B. Encourage new fibrous root growth within the future root ball

C. Eliminate the need for any post-transplant irrigation

D. Prevent the tree from producing suckers after transplanting

69. A tree watering bag placed around the trunk of a young tree:

A. Delivers balanced fertilizer solution along with irrigation water

B. Provides deep watering across the entire root zone equally

C. Eliminates the need for any other care during establishment

D. Releases water slowly primarily at the base of the trunk

70. The primary purpose of mulching a newly planted tree is to:

A. Moderate soil temperature, conserve moisture, and suppress weeds

B. Provide balanced fertilization for the entire first growing season

C. Prevent all insect pests from reaching the root zone area

D. Serve as a decorative feature clearly visible from the street

71. When a newly planted tree fails to leaf out in its first spring, the most likely cause is:

A. A sudden attack by foliar pests during bud break

B. Inadequate mulch depth around the base of the trunk

C. Root ball desiccation or damage during handling and transport

D. Incorrect species selection for the regional climate

72. The correct depth for a planting hole, measured from the hole bottom to the surrounding grade, should be:

A. Twice the height of the root ball for drainage purposes

B. Equal to the height from root flare to ball bottom, no deeper

C. At least 18 inches below the bottom of the root ball

D. Deep enough to bury the trunk up to its first branches

73. A correct pruning cut is placed:

A. Flush against the parent stem to produce a smooth surface

B. Six inches out from the branch collar to leave a visible stub

C. At the midpoint between the branch tip and the parent stem

D. Just outside the branch collar to preserve wound response tissue

74. The ANSI A300 standard recognizes which of the following as a primary pruning objective?

A. Raise to provide vertical clearance beneath the tree crown

B. Lion-tail to remove all interior foliage from scaffold branches

C. Top to reduce the overall height of a mature tree

D. Strip to remove all lower branches at one time

75. Topping a mature tree is considered unacceptable because it:

A. Requires specialized equipment most crews do not own

B. Cuts are too small to remove meaningful amounts of weight

C. Creates large wounds, depletes reserves, and produces weak sprouts

D. Cannot be performed without damaging underground utility lines

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

A. Is always made with a hand pruner rather than a chainsaw

B. Removes a branch back to a lateral large enough to assume the terminal role

C. Leaves an arbitrary stub without regard to lateral branch position

D. Is only performed during the winter dormant season

77. The three-cut method of removing a large branch consists of:

A. A single bottom cut followed by two finishing passes

B. Three equal-depth cuts made from the top of the branch

C. A top cut, a collar cut, and a finishing bark scrape

D. An undercut, an overcut beyond it, and a final cut at the collar

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

A. On the underside of the branch, partway through, beyond the final cut

B. At the exact position of the final cut from above the branch

C. Straight down from the top of the branch to the collar

D. Parallel to the trunk to score the bark before removal

79. The primary purpose of the three-cut method is to:

A. Reduce the weight of the branch to ease carrying away

B. Prevent bark from tearing down the trunk as the branch falls

C. Speed up the total cutting time required per branch

D. Eliminate the need for climbing to reach high branches

80. The cleaning pruning objective involves the selective removal of:

A. All lateral branches below a certain defined height

B. Approximately 30 percent of the interior live foliage

C. Dead, dying, diseased, broken, and weakly attached branches

D. Every branch that crosses or touches another branch

81. A flush cut damages a tree because it:

A. Applies excessive torque to the chainsaw bar during the cut

B. Requires much more physical effort than a properly placed cut

C. Leaves a projecting stub that cannot be compartmentalized

D. Removes the branch collar and eliminates Wall 4 formation

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

A. 10 to 15 percent, with less for stressed or older specimens

B. 30 to 40 percent for most healthy shade tree species

C. 50 percent to stimulate vigorous new growth afterward

D. There is no meaningful upper limit for mature trees

83. Structural pruning to correct codominant stems delivers the greatest long-term benefit when performed on:

A. Senescent trees in the final decade of their life

B. Mature trees with fully established crown architecture

C. Young trees while still in the juvenile growth phase

D. Recently transplanted trees during active establishment

84. An arborist examines a mature oak in midsummer and is asked whether to prune it. The region has active oak wilt. The correct recommendation is to:

A. Prune immediately using sterilized tools between each cut

B. Postpone pruning until dormancy to reduce disease transmission

C. Prune only the branches smaller than one inch in diameter

D. Refuse to prune the tree at any time during the year

85. Subordination pruning on a young tree is used to:

A. Reduce the growth of a competing stem in favor of a dominant leader

B. Eliminate the central leader to promote a multi-trunk form

C. Remove all deadwood from the interior of the tree crown

D. Permanently head back every scaffold branch to equal length

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

A. Removes all live foliage to stimulate dormant buds into action

B. Is used only on conifers with distinct whorled branching patterns

C. Cannot be reversed once the process has been begun

D. Requires repeated cuts at the same framework points on an ongoing schedule

87. The branch bark ridge is:

A. The bark tissue directly below a wound where callus forms

B. An internal boundary between heartwood and active sapwood

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

D. A nursery defect caused by improper early pruning practices

88. Lion-tailing is considered poor pruning practice because it:

A. Produces cuts too small for effective compartmentalization

B. Strips interior foliage and concentrates weight at branch ends

C. Requires repeated visits that increase the overall project costs

D. Cannot be applied to hardwoods of any species

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

A. Provide minimal benefit and sometimes slow compartmentalization

B. Double the rate of wound closure in most tree species

C. Be required under the current ANSI A300 standards

D. Prevent all fungal entry into freshly exposed wood

90. An arborist wants to reduce the height of a branch competing with the central leader of a young tree. The appropriate technique is to:

A. Remove the competing branch entirely back at the trunk

B. Top the competing branch to any convenient height available

C. Strip all foliage from the competing branch carefully

D. Make a reduction cut to a lateral suitable to assume the terminal role

91. Bypass pruning blades are preferred over anvil blades for live tissue because bypass blades:

A. Apply more force at a lower overall angle of attack

B. Can be sharpened without removing the blade from the tool

C. Cut cleanly without crushing the stem being cut

D. Are lighter and require less wrist strength to operate

92. When pruning oaks in a region with active oak wilt, wound dressings may be applied because:

A. The dressing helps prevent beetle access to fresh wounds during warm months

B. Oaks respond more rapidly to dressed wounds in general

C. Dressings accelerate the compartmentalization response in all species

D. Untreated oak wounds always develop bacterial infections quickly

93. The ANSI A300 standard specifically covers which area of professional tree work?

A. Safety requirements for arboricultural operations

B. Tree, shrub, and other woody plant maintenance practices

C. Nursery stock grading and quality standards

D. Electrical hazards and minimum approach distances

94. A mature tree exhibits three large codominant stems with significant included bark. The most appropriate response is to:

A. Top each stem to reduce weight on the unions immediately

B. Spray systemic fungicide at the unions to strengthen them

C. Leave the tree alone because mature trees cannot be corrected

D. Consider reduction pruning and possibly cabling after risk assessment

95. The primary goal of restoration pruning is to:

A. Return a mature tree to its original young form

B. Remove all epicormic sprouts that have recently appeared

C. Develop an acceptable structure from sprouts after topping or damage

D. Increase overall canopy density back to pre-damage levels

96. Pruning cuts that are made when small tend to:

A. Cause catastrophic failure of the compartmentalization response

B. Close more quickly and with reduced risk of decay

C. Create larger wounds than strictly necessary for the objective

D. Stimulate more aggressive epicormic sprouting than larger cuts

97. A certified arborist is asked to "thin out" a mature tree by 50 percent. The professional response is to:

A. Explain that thinning of this magnitude violates accepted standards

B. Comply with the request using only bypass hand pruners

C. Remove exclusively the smallest interior branches to reach 50 percent

D. Agree to the work and complete it without further discussion

98. A stub cut leaves a length of dead wood projecting beyond the collar. The primary problem is that:

A. The stub adds structural weight to the branch union

B. The stub blocks sunlight from reaching the trunk below

C. Birds nesting on the stub help transmit fungal diseases

D. The dead stub cannot be compartmentalized and invites decay

99. A bypass lopper is most appropriately used for:

A. Branches smaller than three-eighths of an inch in diameter

B. Branches four inches in diameter or larger

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

D. Branches that have already died and become completely brittle

100. The single most important factor in whether a pruning cut heals successfully is:

A. The time of day when the cut is made on the tree

B. The phase of the moon during the cutting operation

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

D. The application of wound dressing immediately afterward

101. An arborist inspecting a tree with dieback in the upper crown should begin the diagnostic process by:

A. Identifying the species and understanding its normal characteristics

B. Immediately collecting foliage samples for laboratory analysis

C. Recommending removal to prevent any spread to nearby trees

D. Applying broad-spectrum fungicide as a precautionary measure

102. The distinction between a sign and a symptom of a tree disorder is that a sign:

A. Refers to the tree's physiological response to a problem

B. Is always more subjective than any symptom can be

C. Can only be identified through laboratory testing procedures

D. Is direct evidence of the causal agent itself

103. A secondary pest differs from a primary pest in that a secondary pest:

A. Is found in fewer geographic regions of North America

B. Attacks only trees that are already stressed or weakened

C. Causes more severe damage to vigorous and healthy trees

D. Reproduces at approximately half the rate of primary pests

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

A. Was introduced earlier than most other wood-boring insects

B. Attacks multiple tree genera rather than just ash species

C. Can successfully attack and kill healthy, vigorous ash trees

D. Reproduces only during periods of regional drought stress

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

A. A decision framework integrating monitoring, thresholds, and multiple tactics

B. A specific brand of organic-certified pesticide products

C. A technique relying exclusively on biological control methods

D. A complete prohibition of any chemical pesticide use

106. Fire blight affects members of which plant family?

A. Pinaceae, including pines and firs

B. Fagaceae, including oaks and beeches

C. Sapindaceae, including maples and horse chestnuts

D. Rosaceae, including apples and hawthorns

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

A. Wind-dispersed spores traveling long distances

B. Nematodes feeding on fine absorbing roots

C. Root grafts and sap-feeding beetles attracted to fresh wounds

D. Rain splash from infected leaves onto healthy bark

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

A. Nitrogen deficiency affecting a highly mobile nutrient

B. Iron deficiency affecting an immobile nutrient in the tree

C. Potassium deficiency appearing on sandy soil sites

D. Calcium excess from previous over-liming of the soil

109. Yellowing that begins on older inner leaves and progresses outward is characteristic of a deficiency in which type of nutrient?

A. A mobile nutrient such as nitrogen

B. An immobile nutrient such as iron or manganese

C. A trace element such as boron or molybdenum

D. A secondary macronutrient such as calcium or sulfur

110. Herbicide damage from phenoxy products such as 2,4-D typically produces:

A. Interveinal yellowing on older foliage only

B. Uniform reddening across the entire tree canopy

C. Large circular brown spots on mature leaves

D. Cupping, twisting, and distortion of new growth

111. A tree that grew normally for three years after construction now shows crown thinning and early fall color. The most likely cause is:

A. A newly arrived invasive insect pest in the area

B. Delayed response to root damage during construction

C. Normal seasonal variation for the species involved

D. Increased rainfall during the current growing season

112. Anthracnose is a general term for leaf diseases caused by:

A. Insect larvae feeding actively on leaf tissues

B. Bacterial pathogens entering through open stomata

C. Fungal pathogens producing spots and blotches on leaves

D. Viral infections transmitted by sucking aphids

113. Armillaria root rot is characterized by the appearance of:

A. White mycelial sheets under the bark of infected roots

B. Orange pustules covering the foliage in late summer

C. Large woody galls at the base of the trunk

D. Black streaking throughout the sapwood column

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

A. Airborne spores traveling hundreds of miles from sources

B. Root contact between adjacent elm species only

C. Soil nematodes feeding on elm root systems

D. Elm bark beetles and root grafts between trees

115. A systemic trunk injection of pesticide is most appropriate when:

A. Foliar sprays would be just as effective at a lower overall cost

B. Protecting high-value trees from borers that foliar sprays cannot reach

C. Treating a tree scheduled for complete removal within weeks

D. Addressing soil-borne pathogens below the injection site depth

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

A. Pesticide labels are legally binding federal documents that must be followed

B. Labels are general guidelines that experienced applicators may adjust

C. Only the English-language version of the label carries legal weight

D. The label applies only on the first day of an application

117. An arborist diagnoses a disease for which no effective treatment exists. The correct action is to:

A. Apply a related pesticide off-label as a best-effort response

B. Refuse to discuss the finding with the property owner

C. Honestly communicate the diagnosis and appropriate management options

D. Recommend immediate removal of all nearby trees on the site

118. A tree showing drought stress symptoms during a period of adequate rainfall most likely has:

A. Normal seasonal wilting that requires no attention from owners

B. Excess irrigation continuously flooding the root zone area

C. A foliar disease closely mimicking standard water stress

D. A damaged root system unable to absorb available water

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

A. Six inches per inch of trunk diameter at breast height

B. One foot per inch of trunk diameter at breast height

C. Two feet per inch of trunk diameter at breast height

D. Three feet per inch of trunk diameter at breast height

120. Tree protection fencing should ideally be placed at:

A. The calculated CRZ boundary or further from the trunk

B. The trunk itself with no intervening space between

C. The dripline regardless of the CRZ calculation

D. Half the distance between the trunk and the dripline

121. Concrete washout performed within a Tree Protection Zone is harmful because:

A. The aggregate physically damages the absorbing root network

B. The mixing process creates vibration that is harmful to trees

C. The high pH of the washwater can sterilize soil and kill roots

D. The drying concrete draws available moisture away from roots

122. Raising the grade significantly around a mature tree causes decline because:

A. The added soil physically crushes roots under its weight

B. The new surface level is too far from atmospheric moisture

C. The fill material introduces pathogens into the root system

D. Buried roots lose access to oxygen and gradually fail

123. The least damaging method for installing a utility line across a Tree Protection Zone is usually:

A. Conventional open-cut trenching at a standard depth

B. Directional boring or tunneling beneath the root zone

C. Surface installation directly across the protected area

D. Hand excavation of a standard-width utility trench

124. Which activity is prohibited within a properly enforced Tree Protection Zone?

A. Storage of construction materials directly on the soil surface

B. Monitoring of tree condition by the assigned project arborist

C. Approved hand excavation conducted under arborist supervision

D. Installation of protective mulch across the root zone area

125. A pre-construction tree assessment ideally occurs:

A. After the grading plan has been finalized and approved

B. Immediately before demolition begins on the project site

C. Before final design so findings can influence project decisions

D. Only after trees show visible signs of construction decline

126. An arborist supervising root pruning in advance of unavoidable trench work should:

A. Allow the excavator to tear roots randomly during the digging

B. Make clean cuts with sharp tools at the damage line beforehand

C. Apply wound dressing to every single cut root end

D. Wait until after excavation to assess any damaged roots

127. Post-construction care for a mature tree that has lost roots during a nearby project includes:

A. Immediate heavy fertilization to force rapid recovery growth

B. Aggressive crown reduction to balance the remaining roots

C. Trunk injection with broad-spectrum systemic fungicide products

D. Deep periodic watering, mulching, and multi-year monitoring

128. The dripline of a mature tree is often an inadequate substitute for a calculated CRZ because:

A. Actual root systems typically extend well beyond the canopy edge

B. Drip patterns change with every rainstorm or irrigation event

C. Drip coverage does not include the trunk area itself

D. Drip measurements require specialized surveying equipment on site

129. Delayed decline in a tree damaged during construction typically becomes visible:

A. Within days of the damaging activity ending on site

B. Immediately at the onset of the following winter season

C. Months to several years after the triggering event

D. Always on the second anniversary of the damage occurring

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

A. Pruned immediately by any qualified crew member on site

B. Treated as potentially energized until the utility confirms otherwise

C. Removed before the contact is reported to any authorities

D. Sprayed with water to dissipate any electrical charge present

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

A. Excluding traffic, equipment, and materials from the root zone entirely

B. Fertilizing heavily before the work begins to build up reserves

C. Pruning the crown severely to reduce tree water demand

D. Injecting the trunk with protective fungicides in advance

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

A. Enhanced drainage benefits across the entire root system

B. Increased nutrient availability in the newly exposed soil layers

C. Improved anchorage as roots are exposed to open air

D. Direct loss of functional roots along with the removed soil

133. A tree assessed before construction that shows no symptoms one year after work is completed:

A. Has fully recovered and requires no further attention at all

B. Is certain to fail during the next major storm event

C. Should continue to be monitored for possible delayed decline

D. Has escaped all possible construction-related damage to its system

134. Hand excavation or air excavation within a CRZ is appropriate when:

A. Conventional trenching is cheaper and readily available to the crew

B. Roots must be identified and preserved during the digging work

C. The soil is too dry for any other excavation method to succeed

D. The project schedule requires the absolute fastest possible work

135. A baseline condition report prepared before construction begins:

A. Documents pre-existing tree conditions for later comparison work

B. Eliminates the need for any post-construction monitoring visits

C. Serves primarily as a marketing document for the arborist firm

D. Satisfies all regulatory requirements automatically by itself

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

A. Removable flagging tape that crews can adjust freely as needed

B. Short stakes that do not interfere with equipment movement paths

C. Chain link material buried underground to prevent cutting damage

D. Sturdy, visible, clearly marked, and maintained throughout work

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

A. The presence of any visible defect on a mature specimen

B. The combination of likelihood of failure and severity of consequences

C. The total monetary value of the tree in dollars

D. The age of the tree multiplied by its measured height

138. A Level 2 tree risk assessment is described as a:

A. Rapid drive-by screening of street tree populations

B. Post-failure investigation using laboratory testing methods

C. Detailed visual inspection of an individual tree using basic tools

D. Theoretical analysis based on species-specific data only

139. A Level 1 tree risk assessment is most appropriate for:

A. Rapid screening of large numbers of trees along streets

B. Detailed evaluation of a single specimen tree of concern

C. Advanced diagnostic work using resistograph drilling equipment

D. Post-incident investigation of a completely failed tree

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

A. Emits chemical signals that weaken the surrounding tissue

B. Acts as a permanent reservoir for various decay organisms

C. Alters the tree's center of gravity toward one stem side

D. Prevents the formation of a strong structural union

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

A. A healthy mycorrhizal association with the host tree

B. Active decay already established within the tree's tissues

C. Seasonal spore production by harmless surface species

D. Excess nitrogen from over-fertilization of the soil

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

A. Any person, property, or activity that could be affected by a failure

B. A defective branch selected for removal during pruning operations

C. The specific zone where a tree is expected to fall someday

D. An area of decay that has become externally visible

143. Target occupancy rate refers to:

A. The number of people injured by trees in a region annually

B. The percentage of lots in a neighborhood containing any trees

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

D. The square footage of impervious surface beneath a tree

144. A newly developed lean in a previously upright tree, with fresh soil cracking on the opposite side, indicates:

A. Normal seasonal adjustment to prevailing wind direction

B. A cosmetic change without any structural significance

C. The tree is growing phototropically toward better sun

D. Root plate movement and elevated risk of uprooting failure

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

A. Driving away wildlife that nest in decay cavities

B. Detecting hollow areas and decay columns by sound

C. Measuring the moisture content of the outer bark

D. Testing whether the species has been correctly identified

146. The TRAQ risk matrix combines which factors to produce an overall rating?

A. Tree species and trunk diameter at breast height

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

C. Likelihood of failure and impact with consequences

D. Soil condition and recent local weather history

147. An appropriate mitigation for a moderate-risk branch extending over a house is:

A. Reduction pruning to decrease end weight on the branch

B. Immediate removal of the entire tree without further assessment

C. No action because moderate risk never warrants any treatment

D. Moving the house to a safer distance from the tree

148. Cabling and bracing systems installed on mature trees:

A. Eliminate all risk from the unions they are installed on

B. Are permanent and require absolutely no future attention

C. Are strictly prohibited under current ANSI A300 standards

D. Reduce but do not eliminate risk and require periodic inspection

149. Residual risk refers to:

A. The financial liability that remains after insurance claims are paid

B. Risk that remains after mitigation measures have been implemented

C. The risk of injury while performing the mitigation work itself

D. Risks that become visible only after complete tree removal

150. A professional tree risk assessment report should include:

A. Only the final risk rating without any supporting explanation

B. The arborist's personal opinions without underlying data

C. Scope, defects, targets, mitigation, and residual risk statement

D. A removal recommendation for every tree that was evaluated

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

A. Use plain language and respect the owner's decision-making authority

B. Use technical jargon to establish greater professional credibility

C. Withhold findings that might cause the owner distress or concern

D. Recommend the most expensive mitigation option that is available

152. Level 3 risk assessment techniques are appropriate when:

A. A Level 1 drive-by has already been completed on the site

B. The tree is small and was recently planted at the location

C. No other trees of the same species exist anywhere nearby

D. Level 2 has left significant uncertainty about internal conditions

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

A. Failure is not expected within the assessment time frame

B. Failure could occur but is considered unlikely in the period

C. Failure is likely to occur during the assessment time frame

D. Failure has already happened or is actively in progress

154. The severe consequence level in TRAQ applies to failures that produce:

A. Minor damage easily repaired with no significant cost

B. Catastrophic property damage, serious injury, or death

C. Moderate damage requiring professional repair but no injury

D. No measurable effect on any person or property at all

155. A tree with a visible trunk cavity may remain structurally sound as long as:

A. Sufficient intact wood remains around the cavity perimeter

B. The cavity is smaller than four inches in total diameter

C. No water accumulates inside the cavity during any rainfall

D. The cavity occurs above the height of six feet

156. Which of the following factors must be considered when evaluating consequences of failure?

A. Only the size of the part that might fail and fall

B. Only the height from which the failing part would fall

C. Only the type of target present beneath the tree crown

D. Part size, fall height, and nature of the target together

157. Root defects are particularly difficult to evaluate during risk assessment because roots:

A. Are small and rarely contribute to structural stability

B. Are below ground and cannot be directly observed visually

C. Never produce any above-ground symptoms or visible indicators

D. Have an unlimited capacity to regenerate after damage occurs

158. Which of the following is NOT a structural defect commonly identified during risk assessment?

A. Codominant stems with obvious included bark inside

B. Active vertical cracks exposing wet internal wood

C. Healthy rounded callus around an old small wound

D. Dead scaffold branches directly over a high-value target

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

A. ANSI A300 for tree care operations

B. OSHA 29 CFR 1910.268 for utility line work

C. NFPA 101 for fire safety in the workplace

D. ANSI Z133 for arboricultural safety requirements

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

A. 10 feet under ANSI Z133 requirements

B. 2 feet 4 inches under ANSI Z133 requirements

C. 50 feet under ANSI Z133 requirements

D. There is no minimum for residential tree work

161. A qualified line-clearance arborist differs from an unqualified worker in that the qualified arborist has:

A. Completed any general arboriculture training course

B. Received specialized training in electrical hazards and line-clearance methods

C. Purchased personal protective equipment for electrical work

D. Worked in the tree care industry for more than 10 years

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

A. A wide flat brim to shield the eyes from the sun

B. An open face design to maximize peripheral vision

C. A chin strap to retain the helmet during active climbing

D. Reflective tape applied to every exterior surface

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

A. Activating an electromagnetic brake in the saw motor

B. Alerting the operator with an audible warning signal

C. Reflecting the moving chain away from the wearer's skin

D. Containing fibers that clog the chain on direct contact

164. Hearing protection is required under OSHA when noise levels exceed:

A. 55 decibels during routine tree care operations

B. 70 decibels during routine tree care operations

C. 85 decibels during routine tree care operations

D. 120 decibels during routine tree care operations

165. A job briefing before tree care work should cover:

A. Only the lunch break schedule for the crew that day

B. Only the specific pruning objectives for each individual tree

C. Work scope, hazards, procedures, PPE, and emergency response

D. The personal histories of each crew member involved

166. Aerial rescue capability on a climbing crew is:

A. Optional depending on tree height and specific site conditions

B. Required by ANSI Z133 and must be maintained by training

C. Provided exclusively by outside emergency services on call

D. Needed only when climbing trees over 80 feet in height

167. Suspension trauma can develop when a climbing arborist:

A. Ascends a stationary rope at an excessive rate of speed

B. Uses a friction hitch that is too loose on the rope

C. Falls to the ground from a broken climbing system

D. Remains motionless in a harness for an extended period

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

A. The upper portion of the bar tip during cutting operations

B. The bottom edge of the bar near the motor housing

C. The middle of the bar length during active cutting

D. The rear handle where the throttle is operated by hand

169. A chainsaw chain brake is designed to:

A. Slow the chain to a smooth idle when not actively cutting

B. Stop the chain when activated manually or by kickback motion

C. Reduce vibration transmitted to the operator's hands and arms

D. Prevent the engine from flooding during cold weather starts

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

A. Only the fingertips to allow a quick release in emergencies

B. The palm alone while the thumb rests alongside the handle

C. The thumb wrapped fully around the underside of the handle

D. Loose contact to absorb vibration coming from the engine

171. Two-handed operation of a chainsaw is the standard practice for:

A. Essentially all ground-based cutting operations on site

B. Only the heaviest felling cuts on very large mature trees

C. Only when operating the saw from within an aerial lift bucket

D. Only when cutting above the operator's head height

172. Top-handle chainsaws are designed specifically for:

A. Ground-based felling of mature shade trees in yards

B. Cutting firewood at a residential home woodlot

C. Processing logs after bucking them on the ground

D. Climbing arborist use where compact one-handed operation may be needed

173. A primary safety feature required on modern chainsaws is:

A. A vibration amplifier built into the rear handle assembly

B. A high-speed throttle lock for extended continuous cutting

C. A functioning chain brake that can be activated in kickback

D. A muffler bypass valve for cold weather engine starting

174. The working load limit (WLL) of rigging equipment is:

A. The force at which the equipment will break in laboratory testing

B. The maximum load the equipment can safely handle in normal use

C. The minimum load required for the equipment to engage friction

D. A theoretical value that applies only to brand-new equipment

175. Working load limit is commonly expressed as approximately what fraction of the equipment's tensile strength?

A. One-tenth of the measured tensile strength

B. One-half of the measured tensile strength

C. Nine-tenths of the measured tensile strength

D. Equal to the measured tensile strength directly

176. Shock loading in rigging refers to:

A. The static weight of a piece being rigged through a block

B. Electrical charge building up in a dry rigging rope

C. The force needed to initially lift a piece from its stem

D. Dynamic forces generated when a falling piece is suddenly caught

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

A. Tie the rigging line to a hard anchor with no slip at all

B. Use a friction device such as a Port-a-Wrap to allow controlled slip

C. Position the ground worker directly beneath the falling piece

D. Use the smallest-diameter rope that can physically hold the load

178. A block that redirects a rigging load over an anchor experiences approximately:

A. Half the force of the load being redirected through it

B. Exactly the same force as the load itself without change

C. Twice the force of the load being redirected through it

D. A force completely unrelated to the actual load weight

179. The hinge in a standard felling cut:

A. Controls the fall direction by holding the tree until it commits

B. Must be cut all the way through before the tree begins to move

C. Is completely severed by the first cut of the notch on the front

D. Applies only to hollow trees with significant interior decay

180. An escape route during felling should:

A. Lead directly beneath the expected fall line of the tree

B. Be left to the feller's judgment at the moment of the fall

C. Be established only on slopes exceeding 30 percent grade

D. Be planned and cleared before cutting begins, to be used as the tree falls

181. Barber chair in tree felling refers to:

A. A specialized stool used during long cutting sessions in the field

B. A decorative form intentionally left in the stump after felling

C. A vertical splitting of the trunk upward during the back cut

D. A type of chainsaw chain designed for resinous conifer wood

182. When feeding a wood chipper, workers should:

A. Stand directly behind the infeed for the best control of material

B. Stand to the side to avoid kickback from flexing material

C. Reach inside the infeed area to push material through the rollers

D. Wear loose clothing that can release if it gets caught

183. Aerial lift operators working near energized lines must:

A. Maintain the minimum approach distance with both the bucket and the boom

B. Treat the metal boom as a perfect electrical insulator

C. Rely on rubber tires to prevent any electrical contact damage

D. Approach within one foot to make the pruning cut possible

184. PPE should be inspected:

A. Once per year at a scheduled annual safety review

B. Only after a known impact event has occurred during work

C. Only by the original equipment manufacturer at return

D. Before every use, with damaged items retired immediately

185. Under ANSI Z133, a climbing rope for arboricultural work must have a tensile strength of at least:

A. 2,500 pounds for standard residential climbing work

B. 5,400 pounds per the current ANSI Z133 standard

C. 1,000 pounds for occasional light climbing use

D. 10,000 pounds for all possible climbing applications

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

A. Be retied only at the very start of each workday

B. Be replaced entirely by a mechanical device whenever possible

C. Lock tightly without allowing any movement under load conditions

D. Grip the rope reliably while permitting controlled adjustment

187. A worker feeding a chipper who sees a dangerous condition develop should:

A. Continue feeding until the current branch is fully processed through

B. Call to a coworker while continuing to push the material through

C. Activate the feed control bar or emergency stop immediately

D. Walk away from the machine and let it run until empty

188. The notch in a standard felling cut is made on which side of the tree?

A. The side directly opposite the intended fall direction

B. On any convenient side chosen by the feller at the time

C. On the side where the prevailing wind is originating from

D. The side facing the intended direction of the fall

189. Urban tree canopies contribute to stormwater management primarily by:

A. Increasing the velocity of runoff from hard surfaces into drains

B. Intercepting rainfall on leaves and bark to slow runoff rates

C. Sealing the ground surface against any rainfall infiltration

D. Evaporating all water before it can reach any soil surfaces

190. A complete tree inventory records information on:

A. Only trees showing visible defects or signs of decline

B. A statistical sample of the total tree population

C. Every tree within the defined inventory area boundaries

D. Trees selected randomly by their GPS coordinates

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

A. Estimate the dollar value of ecosystem services from their trees

B. Identify unknown tree species from uploaded photograph files

C. Predict exactly which trees will fail during future storm events

D. Determine the genetic makeup of urban tree populations

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

A. The tree has no visible defects or structural concerns at all

B. A replacement tree of identical size is available for purchase

C. The tree is a recently planted nursery-grown young specimen

D. The tree is too large to replace with available nursery stock

193. Which of the following is an environmental benefit of mature urban trees?

A. Increased cooling costs for the surrounding buildings

B. Reduced urban heat island through shading and evapotranspiration

C. Amplification of street noise in residential neighborhoods

D. Reduction in property values near large specimens

194. A tree protection ordinance typically:

A. Requires mandatory removal of all mature trees over time

B. Prohibits any pruning of trees growing on private property

C. Requires permits for removal of trees above a defined size

D. Applies only to trees planted by the municipal government itself

195. Canopy cover goals in urban forest management plans are usually expressed as:

A. The percentage of land area covered by the tree canopy

B. The total weight of foliage produced by city trees annually

C. The number of mature specimens visible from major roads

D. The average trunk diameter of street trees in the community

196. A Tree City USA community must maintain all of the following EXCEPT:

A. A tree board or department responsible for ongoing tree care

B. A minimum canopy cover of 40 percent across all neighborhoods

C. A tree care ordinance adopted by the local government

D. An annual Arbor Day observance with an official proclamation

197. Species rating in plant appraisal reflects:

A. The age of the specific tree being formally appraised

B. The height of the tree measured from base to tip

C. The current lumber value of the species in question

D. The desirability and suitability of the species in the local area

198. When presenting tree recommendations to a property owner, a certified arborist should:

A. Use as much technical terminology as possible to establish expertise

B. Withhold cost estimates until after the work has been completed

C. Present options in plain language and respect the owner's decisions

D. Make final decisions on the owner's behalf without consultation

199. Which of the following is a documented social or health benefit of urban trees?

A. Improved mental health outcomes for nearby residents

B. Increased incidence of asthma across all age groups

C. Elevated crime rates in neighborhoods with dense canopy

D. Reduced physical activity among residents of leafy areas

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

A. The personal preferences of the forester and staff members

B. The documented dollar value of ecosystem services delivered

C. The aesthetic appeal of trees shown in glossy photographs

D. The desire of a small number of vocal local residents

PRACTICE EXAM 2 — ANSWER KEY AND EXPLANATIONS

1. C — The vascular cambium between the xylem and phloem produces new xylem toward the inside and new phloem toward the outside each year. This is the tissue responsible for all secondary (diameter) growth and for the annual growth rings. Apical meristems produce length, not diameter.

2. A — Closing stomata halts the intake of carbon dioxide, which is required for photosynthesis. The trade-off between water conservation and carbon gain is the central constraint governing tree function under drought. This is why drought is not merely a wilting problem but a starvation problem.

3. D — Heartwood is the inner, often darker wood composed entirely of dead cells infused with extractives. It no longer conducts water but provides structural support and resists decay. Sapwood is the outer lighter-colored wood that still conducts.

4. B — The cohesion-tension mechanism uses evaporation from leaves to generate tension that pulls water upward through xylem conduits. No metabolic energy is required — the engine is transpiration at the leaf surface. This is why stomatal closure halts water movement entirely.

5. A — Refoliation after severe defoliation draws heavily on stored carbohydrate reserves because the tree must rebuild leaf area before new photosynthesis can contribute. Repeated defoliation in successive years exhausts reserves and can initiate irreversible decline. This is why defoliating insects are so damaging when outbreaks persist.

6. C — Wall 4 is formed by cambial cells bordering the wound after injury and resists outward spread of decay into new wood. It is the strongest of the four CODIT walls. This is why cuts must preserve the branch collar, which contains the cambium that forms Wall 4.

7. B — Water movement through xylem requires no metabolic energy from the tree itself. The cohesion-tension mechanism is driven entirely by evaporation from leaves, with water molecules pulled upward through the cohesive strength of the water column. Trees have no pumping mechanism comparable to an animal's heart.

8. D — Girdling severs the phloem pathway, cutting off the downward transport of sugars from leaves to roots. The roots eventually starve, lose function, and die — and the entire tree follows from the ground up. Xylem water transport continues above the girdle until roots fail.

9. A — Reserves peak in autumn just before leaf drop, after a full growing season of net sugar production has filled storage parenchyma throughout the sapwood and roots. They then decline

slowly through winter and reach their lowest point in late spring after new leaves emerge but before those leaves mature.

10. B — Moving outward from the center: pith (core), xylem (wood), vascular cambium (dividing layer), phloem (inner bark), and outer bark. This is the standard anatomical arrangement of a woody stem. Each tissue has a distinct function in water transport, sugar transport, growth, or protection.

11. D — Heartwood provides structural support but consists entirely of dead cells. It no longer conducts water, stores nutrients, or produces new tissue. Its resistance to decay comes from tannins, resins, and other extractives laid down as sapwood transitions to heartwood.

12. C — Midday wilting in moist soil typically reflects a temporary imbalance in which transpiration exceeds the rate at which the root system can absorb and deliver water. Most trees recover overnight when transpiration drops. This is a normal short-term response, not a sign of permanent damage.

13. A — Primary growth at apical meristems produces new length at the tips of shoots and roots. Secondary growth at the vascular cambium produces increased diameter. Primary and secondary growth occur simultaneously in woody plants but in different locations.

14. D — The branch collar contains the cambium that produces Wall 4 around a pruning wound. Preserving the collar intact is essential to the tree's ability to compartmentalize the injury and resist decay. This is why proper cut placement preserves the collar at all costs.

15. B — Mycorrhizal fungi dramatically extend the effective absorbing surface of the root system. A tree without its mycorrhizal partners loses a major share of its water and nutrient absorption capacity and often shows symptoms of deficiency even when the soil contains adequate nutrients.

16. C — Xylem conducting vessels are dead at functional maturity, forming hollow tubes that transport water through the tree. Because the cells are dead, no metabolic energy is required to maintain them. Phloem, cambium, and parenchyma are all living tissues.

17. A — Shade limits photosynthetic rate and therefore the total carbohydrate production available for growth and storage. This limitation cascades through every aspect of the tree's development. Trees in deep shade remain smaller even when all other conditions are favorable.

18. B — The root flare is the characteristic transition zone where the trunk joins the root system, visible as the widening at the base of a properly planted tree. A visible flare is an indicator of correct planting depth. Burying the flare is one of the most common and harmful planting errors.

19. D — Trees do not elongate their trunks or branches — they only thicken through secondary growth. A nail or attachment at 8 feet remains at 8 feet for the life of the tree, though the wood grows around and sometimes engulfs it. Height growth occurs only at the tips through apical meristems.

20. C — Stomata are pores in the leaf surface that regulate gas exchange, allowing carbon dioxide in for photosynthesis while releasing water vapor through transpiration. The placement on leaf undersides reduces direct exposure to heat and wind. The trade-off between water loss and carbon gain is central to tree function.

21. A — Respiration occurs continuously in every living cell, day and night, throughout the year. Unlike photosynthesis, it requires no light and happens in roots, stems, buds, and leaves alike. Stressed trees continue to respire and consume reserves even when photosynthesis has been compromised.

22. D — Loss of a scaffold limb does not cause immediate collapse of the opposite side's root anchorage. Roots and crown function somewhat independently in the short term, and while the tree's architecture is disrupted, anchorage failure is not a direct consequence. The other options are genuine costs of the injury.

23. B — *Aesculus* (horse chestnut and buckeye) has opposite leaf arrangement, palmately compound leaves typically with 5–7 leaflets, and conspicuous spring flower spikes. It is the "Horse" in the MAD Horse mnemonic. *Juglans* and *Fraxinus* have pinnate compound leaves; oaks have simple leaves.

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

25. D — White oaks (*Quercus alba* group) are distinguished in winter by clusters of small rounded hairless terminal buds. Red oaks have pointed hairy buds; hickories have large terminal buds covered with scales; birches have slender single terminal buds. Winter bud clusters are a reliable diagnostic.

26. A — Winter identification depends on buds (shape, size, color, arrangement), leaf scars, bundle scars, and bark characteristics, because foliage, flowers, and fruit are absent. These features are reliable enough to support confident identification. Experienced arborists can identify most deciduous trees from twigs alone.

27. B — A name in single quotation marks following a species name indicates a cultivar — a cultivated variety selected and propagated to maintain specific characteristics. 'Green Mountain' is a commercial cultivar of sugar maple. Cultivars are not italicized and are not formal botanical varieties.

28. A — *Fraxinus* (ash) produces a single samara with one elongated papery wing attached to a seed. Maples, by contrast, produce paired samaras with two wings. Cones belong to conifers and drupes to genera such as *Prunus*.

29. C — A sugar maple cultivar selected for compact form provides dense shade, reliable fall color, and a mature size compatible with the 40-foot limit. White oak and tulip poplar exceed the size

limit. Silver maple has brittle wood and cottonwood has invasive roots — both poor choices for most residential sites.

30. D — Rosaceae (apples, pears, hawthorns, serviceberries) are frequently susceptible to fire blight caused by *Erwinia amylovora*. This pathogen affects most members of the rose family and is one of the reasons family-level recognition matters in tree care. Dutch elm disease and oak wilt affect specific genera outside Rosaceae.

31. B — A serviceberry reaching 20 feet stays safely below a 30-foot distribution line and is a correct application of Right Tree, Right Place. Red oak, tulip poplar, and pin oak all exceed the conductor height and would create chronic utility conflicts. Mature size, not planting size, governs the decision.

32. C — The 10-20-30 rule protects communities from catastrophic loss when species- or genus-specific pests arrive. Diverse plantings are resilient plantings, and the rule provides a quantitative guideline. Dutch elm disease and emerald ash borer illustrate why diversity matters.

33. A — Paper birch (*Betula papyrifera*) has alternate simple leaves with strongly serrated margins, roughly triangular leaf shape, and the distinctive peeling papery white bark that makes it immediately recognizable. Aspens have rounded leaves; sycamores have mottled bark; basswoods have heart-shaped leaves.

34. D — An invasive species is non-native, has escaped cultivation, and causes measurable ecological harm. Spread alone is not enough; the threshold is documented harm. Exotic, introduced, and naturalized describe different and less damaging categories.

35. B — Tree of heaven (*Ailanthus altissima*) is a widely recognized invasive species in much of eastern North America, escaping urban plantings and colonizing disturbed areas aggressively. It is also the preferred host of the spotted lanternfly. Redbud, sycamore, and tupelo are all native species.

36. A — A compound leaf consists of multiple leaflets attached to a single rachis (central axis). The entire compound leaf, from rachis to final leaflet, is a single leaf. The presence of a bud at the base of the petiole — not at each leaflet — distinguishes compound leaves from branches bearing simple leaves.

37. D — Binomial nomenclature capitalizes the genus, uses lowercase for the specific epithet, and italicizes both parts in print (or underlines them in handwriting). These conventions are universal in scientific writing. Common names are not standardized and take no precedence.

38. C — Applying the 10-20-30 rule means avoiding overrepresentation of any single species, genus, or family in the planting mix. Streetscapes planted in monoculture are vulnerable to catastrophic loss when targeted pests arrive. Diversity is the goal regardless of visual consistency.

39. B — Native species are adapted to local climate, soils, pest pressures, and ecological relationships, which typically translates to lower maintenance requirements and better wildlife support. Claims of automatic pest immunity or guaranteed faster growth are overstatements. Adaptation, not invincibility, is the real advantage.

40. C — Pinnately compound leaves have leaflets arranged along the two sides of a central rachis, like the feathers of a bird. Palmately compound leaves have leaflets radiating from a single point. Ash, hickory, and walnut are pinnately compound; horse chestnut is palmately compound.

41. A — An ideal soil is roughly 50% solids (45% mineral + 5% organic) and 50% pore space, with the pore space divided between water and air. Loss of pore space through compaction is one of the most common urban soil problems. Roots and biological activity both require adequate pore space.

42. D — Loam is defined by roughly balanced proportions of sand, silt, and clay — typically about 40% sand, 40% silt, and 20% clay. It drains adequately, holds enough water, and supports good structure. Loam is the ideal texture for most tree species.

43. B — Organic matter has negatively charged surfaces that attract and hold positively charged cations such as calcium, magnesium, potassium, and ammonium. Building organic matter is the only practical way to raise CEC in sandy soils. Higher CEC means better nutrient retention against leaching.

44. A — A composite sample combining subsamples from multiple locations produces a representative average of the area being tested. A single-spot sample may not reflect overall conditions. Proper sampling is the most important step in soil testing — more important than the analysis itself.

45. C — Iron chlorosis in a pin oak planted in alkaline soil is almost always caused by iron becoming chemically unavailable at high pH, not by an actual shortage of iron. The iron is present but not in forms the tree can absorb. Treatment must address pH or use chelated iron.

46. D — Tilling heavy clay when it is wet destroys soil aggregates and produces dense compacted clods. Wet clay acts as a lubricant that allows particles to slide into denser arrangements. Clay soils should be worked only when they are at the right moisture content.

47. B — Mycorrhizal fungi colonize tree roots and extend their own hyphae into the surrounding soil, dramatically increasing the effective absorbing surface. The tree supplies sugars; the fungus supplies access to water and nutrients from a much larger volume of soil. The partnership is essential, not optional.

48. A — Compacted soil has reduced pore space and fewer large pores to hold air. The immediate effect on the tree is reduced oxygen availability for root respiration. Roots that cannot respire cannot absorb water or nutrients, and decline follows.

49. D — Potassium is a mobile nutrient that the tree translocates from older leaves to newer growth when the supply is inadequate. Deficiency therefore appears first on older leaves, typically as marginal scorch. Mobile-nutrient deficiencies always show this pattern.

50. C — A proper mulch layer is 2 to 4 inches deep with the trunk base kept clear. Deeper layers can suffocate roots and promote rodent damage; piling mulch against the trunk causes bark decay and girdling. The correct mulch is a flat ring, not a volcano.

51. B — A perc test measures how long water takes to drain from a hole dug in the ground, providing a simple field assessment of drainage. Water that persists more than 12 to 24 hours indicates a drainage problem. This test should be done before planting water-sensitive species.

52. D — Cation exchange capacity measures the soil's ability to hold exchangeable cations on negatively charged surfaces of clay and organic matter. Higher CEC means greater nutrient-holding capacity and reduced leaching losses. It is one of the most important soil properties for long-term tree health.

53. A — Bulk density above approximately 1.7 g/cm³ indicates severe compaction that halts most root growth. Values below 1.3 generally indicate uncompacted soil with good structure. Bulk density is a quantitative measure of the compaction that often can only be estimated visually.

54. C — Texture — the proportions of sand, silt, and clay — is essentially permanent because it cannot be meaningfully altered by any realistic amount of amendment. Structure, organic matter, and biological activity can all be improved; texture cannot. This is why working with the existing texture is the only realistic strategy.

55. B — Circling roots found at planting must be sliced or straightened before the tree is placed in the hole, because correction becomes impossible once backfilled. Leaving them in place guarantees a permanent defect that can lead to failure decades later. Vertical slicing of dense root mats is a standard correction.

56. 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 during establishment. A hole dug just to ball width offers no expansion zone. Width matters more than depth.

57. A — Planting with the root flare slightly above grade is acceptable and often preferable to planting at exact grade, because settling is likely and burying the flare is a serious error. A flare one inch above grade accommodates some settling without risk of burial. The flare must never end up below grade.

58. C — Using the rule of approximately one year per inch of trunk caliper, a 4-inch caliper tree requires about four growing seasons to establish. During this period the tree is rebuilding the root system lost during transplanting. Establishment is a long and often underappreciated phase.

59. B — Current best practice is to backfill with unamended native soil excavated from the hole. Research has shown that heavily amended backfill can produce pot-bound conditions in the ground, with roots reluctant to extend into surrounding native soil. Soil improvement is better delivered through surface mulching.

60. A — Staking is appropriate only when necessary — when the tree cannot stand on its own or is in an exposed site. Unnecessary staking produces weaker trunks by depriving them of the mechanical stimulus of flexing in wind. Stakes should be removed within one growing season in most cases.

61. D — Balled-and-burlapped trees 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 for B&B stock.

62. C — Current best practice is to cut and remove at least the upper one-third to one-half 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; leaving the lower portion is acceptable. Roots can grow through remaining wire without significant impediment.

63. B — Twine tied around the trunk must be removed completely at planting, because synthetic twine does not decompose and can girdle the trunk as it grows. Assuming twine is biodegradable is a dangerous error. A single cut at planting prevents years of later damage.

64. A — The goal is to keep the root ball and surrounding backfill consistently moist but not saturated. Both extremes are damaging — dry kills through desiccation and saturation kills through suffocation. Checking soil moisture by probing is more reliable than fixed schedules.

65. D — Fertilizing 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 may exceed what the roots can support. Standard practice is to withhold fertilizer until the tree is established.

66. C — Planting too deep, burying the root flare, is the most common serious planting error and the leading cause of early decline. The buried flare develops bark decay and girdling root problems. Finding and preserving the true root flare is non-negotiable at planting.

67. 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 is possible but carries much higher risk.

68. B — Advance root pruning severs roots at the future root ball line one to two seasons before the move, prompting the tree to produce new fibrous roots inside the line. These regenerated roots are harvested with the ball and dramatically improve transplant survival. It is the single most effective technique for improving transplant success.

69. D — Tree watering bags release water slowly through fabric walls, delivering moisture primarily at the base of the trunk. They are useful for establishment of newly planted trees but do not deliver water across the full root zone. They are not a substitute for mature-tree irrigation.

70. A — Mulching moderates soil temperature, conserves soil moisture, suppresses weed competition, and protects the root zone. It also protects the trunk from mower and string trimmer damage. These combined benefits make mulching the single most valuable establishment practice.

71. C — A newly planted tree that fails to leaf out most likely suffered root ball desiccation or physical damage during handling and transport. Damaged or dried-out roots cannot support bud break and spring growth. Inspection at the time of delivery catches most of these problems before planting.

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

73. D — A proper pruning cut is placed just outside the branch collar so the cambium at the wound edge can form Wall 4 and compartmentalize the injury. Cuts flush to the stem or stubs beyond the collar both damage this mechanism. Correct cut placement is the biological foundation of good pruning.

74. A — Raise is one of the five primary pruning objectives in ANSI A300 (clean, thin, raise, reduce, restore). It refers to removing lower branches to provide vertical clearance. Lion-tailing, topping, and stripping are not recognized objectives and are harmful practices.

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

76. 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. Reduction cuts are the basis of the reduce objective.

77. D — The three-cut method consists of an undercut on the underside beyond the final cut line, an overcut from above slightly farther out, and a final cut at the collar. This sequence prevents bark tearing when the heavy branch falls. Skipping any step can cause the bark to strip down the trunk.

78. A — The first cut is made on the underside of the branch, partway through, several inches beyond the final cut location. This undercut severs the bark pathway so that when the branch falls during the second cut, the bark does not tear downward along the trunk.

79. B — The three-cut method prevents bark from tearing down the trunk below the cut as the heavy branch falls. A single cut from above causes the falling weight to rip bark downward, producing a large open wound well beyond the intended cut. The undercut eliminates this pathway.

80. C — Cleaning is the selective removal of dead, dying, diseased, broken, and weakly attached branches from the crown. It is the most common routine pruning objective and is appropriate for trees of all ages. It does not involve removing live wood for density reduction.

81. D — 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 into the trunk. The damage cannot be undone.

82. A — Removing no more than 10 to 15% of live foliage in a single session is the general limit for mature trees, with even less for older or stressed specimens. Heavy pruning depletes reserves, stimulates weakly attached epicormic sprouts, and often initiates decline. Mature trees cannot be pruned like young ones.

83. C — 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. Waiting until maturity to address structural defects is far less effective.

84. B — In regions with active oak wilt, pruning of oaks should be postponed until dormancy to reduce the risk of attracting sap-feeding beetle vectors to fresh wounds. This is the one specific situation where wound dressings on oaks during warm months may also be justified. Timing is the primary defense.

85. A — Subordination reduces the length and growth of a competing stem in favor of a dominant leader, gradually shifting dominance without the wound of outright removal. It is used to correct codominant stems in young trees. The subordinated stem is made progressively smaller over several seasons.

86. D — Pollarding is a traditional specialty technique in which a young tree is initially headed to establish a permanent framework, and subsequent pruning annually or biennially returns growth to the same framework points. It must be maintained once begun. Abandoning a pollarded tree produces weakly attached epicormic growth.

87. C — 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 along with the collar.

88. B — Lion-tailing strips interior foliage and leaves foliage only at the branch tips, producing a weaker branch than properly distributed thinning. It concentrates weight at the end of the branch and removes interior foliage that cushions wind loads. It is explicitly discouraged under current standards.

89. A — Research has shown that wound dressings and tree paints provide minimal benefit and in some cases slow compartmentalization by trapping moisture and creating favorable conditions for

decay organisms. Current best practice is to leave pruning cuts unsealed, with narrow exceptions such as oak wilt regions.

90. D — A reduction cut to a suitable lateral subordinates the competing branch without removing it entirely, shifting dominance to the central leader gradually. Removing the branch entirely leaves a larger wound; topping is unacceptable; stripping is harmful. Subordination through reduction cuts is the standard technique.

91. 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, making them suitable only for dead material. Clean cuts support proper compartmentalization.

92. A — In oak wilt regions, wound dressings may be applied to fresh oak wounds made during warm months specifically to prevent access by sap-feeding beetle vectors. This is the one well-documented exception to the general rule against wound dressings. Timing and beetle exclusion, not healing, are the reasons.

93. B — ANSI A300 addresses tree, shrub, and other woody plant maintenance practices, including pruning, cabling and bracing, fertilization, and tree protection during construction. ANSI Z133 covers safety requirements. The two standards complement each other and together define accepted professional practice.

94. D — A mature tree with major structural defects should be evaluated through formal risk assessment, with reduction pruning and possibly cabling considered as mitigation after the assessment. Topping is prohibited, fungicides are irrelevant to structural defects, and "leaving the tree alone" ignores a legitimate hazard. Assessment precedes intervention.

95. C — Restoration pruning develops an acceptable crown structure from adventitious sprouts that have emerged after topping, vandalism, or severe storm damage. It is a long-term process requiring multiple visits over years. It cannot undo the original damage but can produce a structurally reasonable outcome.

96. B — Small pruning cuts close more quickly and with reduced risk of decay than large ones. A general guideline holds that wounds under about two inches close readily in most species, while wounds over four inches may never fully close. This is the biological reason to prune early and prune often.

97. A — A request to remove 50% of live foliage from a mature tree exceeds the 10 to 15% guideline by a wide margin and would initiate decline. The professional response is to explain that thinning of this magnitude violates accepted standards and propose an appropriate alternative. Client service does not include damaging the client's tree.

98. D — A stub cut leaves dead wood projecting beyond the branch collar that the tree cannot compartmentalize. The dead stub becomes an entry point for fungal colonization that eventually reaches the collar and then the trunk itself. Both flush cuts and stub cuts produce lasting damage.

99. C — 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 handled by hand pruners; larger branches require hand saws or power equipment. Tool selection should match branch diameter.

100. C — The placement of the cut relative to the branch collar is the single most important factor in whether a pruning wound heals successfully. Correct placement preserves the cambium that forms Wall 4; incorrect placement eliminates it. Time of day, moon phase, and wound dressing are not factors in modern research.

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 without establishing species leads to routine misdiagnosis. Species identification is the first step in every diagnostic framework.

102. D — A sign is direct evidence of the causal agent — fungal fruiting bodies, visible insects, or confirmed pathogens. Signs are more reliable than symptoms because they point directly to a cause rather than to the tree's response. Diagnosis based on signs is far more defensible than diagnosis from symptoms alone.

103. B — A secondary pest attacks only trees that are already stressed, weakened, or declining, and cannot overcome the defenses of a healthy specimen. The correct response to finding a secondary pest is to identify the underlying stressor and address it. Most bark beetles and many borers are secondary pests.

104. C — Emerald ash borer is classified as a primary pest because it can attack and kill healthy, vigorous ash trees without requiring the host to be stressed. This distinguishes it from most native wood borers and is why it has devastated ash populations. Management often requires preventive treatment before symptoms appear.

105. A — IPM is a decision-making framework that integrates monitoring, action thresholds, multiple control tactics, and outcome evaluation. It is not a specific product or a prohibition on pesticides. The least toxic effective option is preferred when chemical control is warranted.

106. D — Fire blight is caused by the bacterium *Erwinia amylovora* and affects members of the rose family (Rosaceae), including apple, pear, hawthorn, and serviceberry. Family-level recognition matters because susceptibility extends across the family. Sanitation pruning well below the visible infection is the standard management.

107. 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. Red oak group species are more susceptible than white oak group species.

108. B — Iron is an immobile nutrient, and deficiencies appear first on new leaves because the tree cannot translocate iron from older foliage. Interveinal chlorosis on new growth is characteristic. In landscape settings this is almost always a pH-related availability problem.

109. A — Mobile nutrients such as nitrogen can be translocated from older tissues to support new growth when supply is inadequate. Deficiencies therefore appear first on older inner leaves as the tree cannibalizes them. Immobile nutrients show the opposite pattern, with symptoms on new growth first.

110. D — Phenoxy herbicides such as 2,4-D cause characteristic cupping, twisting, and distortion of new growth. The pattern is often most severe on the side of the tree nearest the application source. This symptom combination is diagnostic when paired with application history.

111. B — Delayed decline in a tree near prior 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 the reserves are exhausted. The connection to the triggering event is often forgotten.

112. C — Anthracnose is a general term for several fungal leaf diseases that cause dark spots and blotches, often followed by premature leaf drop. Most anthracnose infections are cosmetic rather than life-threatening, though severe years can weaken affected trees. Sycamore anthracnose is a particularly visible example.

113. A — Armillaria root rot is identified by characteristic white mycelial sheets under the bark of infected roots, and by clusters of honey-colored mushrooms appearing at the base of the tree in fall. These fungal structures are direct signs confirming the diagnosis. Above-ground symptoms of general decline appear first.

114. D — Dutch elm disease is a vascular wilt spread primarily by elm bark beetles carrying fungal spores and by root grafts between adjacent elms. This dual spread pathway is why the disease caused the near-total loss of American elm as a street tree. It remains a threat to surviving elms.

115. B — Trunk injection is most appropriate for protecting high-value trees from borers that foliar sprays cannot effectively reach. It provides rapid systemic translocation with low environmental exposure. The tradeoff is that each injection wounds the tree.

116. A — "The label is the law" means pesticide product labels are legally enforceable federal documents. Applications must match the uses, rates, sites, and methods the label authorizes, and deviations carry legal and liability consequences. This applies to every licensed applicator regardless of experience.

117. C — When no cure exists, the professional response is to honestly communicate the diagnosis and recommend appropriate management, which may include monitoring, removal, or supportive care. Applying ineffective treatments wastes client resources and delays difficult decisions. Honesty is part of professional standing.

118. D — Drought symptoms in a tree during adequate rainfall typically reflect a damaged root system that cannot absorb the water available. This pattern is common after construction damage, root rot, severe compaction, or other injuries to the root system. The visible problem is wilting, but the cause is below ground.

119. B — The CRZ is commonly calculated as a radius of one foot per inch of trunk diameter at DBH. A 24-inch DBH tree has a 24-foot radius CRZ. More conservative formulas use 1.5 feet per inch in particularly sensitive situations, but 1:1 is the standard starting point.

120. A — Tree protection fencing should be placed at the calculated CRZ boundary or further from the trunk. Placing fencing closer than the CRZ leaves roots exposed to damage. The dripline alone is inadequate because actual root systems typically extend beyond it.

121. C — The high pH of cement washwater can sterilize soil and kill roots in the affected area. Concrete washout within a TPZ is among the most damaging activities on construction sites and must be explicitly prohibited. Designated washout locations should be far from any protected tree.

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. The effects develop over months or years as the tree's reserves are exhausted. This delayed damage is often blamed on unrelated causes.

123. B — Directional boring or tunneling passes a utility beneath the root zone without disturbing the soil at root depth. Conventional open-cut trenching through the CRZ is the most damaging option. Higher equipment cost typically favors boring when tree value is significant.

124. A — Storage of construction materials directly on the soil surface within a TPZ is explicitly prohibited. Stockpiles compact the underlying soil under their weight and smother roots. Monitoring, approved supervised work, and mulch application are compatible with TPZ protection.

125. C — Pre-construction tree assessment should occur before final design so that findings can influence project decisions. Assessment performed after drawings are complete is reduced to documentation of what has already been decided. Timing matters as much as thoroughness.

126. B — An arborist supervising unavoidable root impacts should make clean cuts with sharp tools at the damage line before excavation begins. Clean cuts produce better wound responses than the tearing and crushing from unprepared excavation. Prepared cuts dramatically improve outcomes.

127. D — Post-construction care includes deep periodic watering, generous mulching, conservative pruning focused on deadwood and safety only, and annual monitoring for at least three to five growing seasons. Heavy fertilization and aggressive crown reduction can worsen decline. Patience and supportive care drive recovery.

128. A — The actual root system of a mature tree typically extends two to three times the crown radius, well beyond the dripline. Using the dripline as the protection boundary leaves most absorbing roots exposed. The CRZ formula produces a more conservative and defensible boundary.

129. C — Delayed decline following construction damage typically becomes visible months to several years after the triggering event. Trees mobilize reserves to mask initial injury, and when reserves are exhausted, decline begins. Post-construction monitoring should continue for at least three to five growing seasons.

130. B — A tree that has contacted an energized line should be treated as potentially energized until the utility confirms de-energization. A branch in contact with a line can energize the entire tree, including the trunk and lower branches. Assumptions about automatic breakers are unreliable and unsafe.

131. A — Excluding all traffic, equipment, and materials from the root zone is the single most effective action during construction. Compaction and root damage are prevented most reliably by keeping activity out entirely. Physical fencing makes the exclusion enforceable on the ground.

132. D — Lowering the grade removes soil along with any roots growing in it, producing immediate loss of functional root tissue. Even a few inches of grade cut across the root zone can remove a large share of the absorbing roots concentrated near the surface. The effects appear sooner than with grade raises.

133. C — A tree showing no symptoms one year after construction is not yet out of danger, because delayed decline can appear one to three years later as reserves are exhausted. Monitoring should continue for at least three to five growing seasons. Early apparent survival is not the same as long-term recovery.

134. B — Hand excavation or air excavation allows workers to identify and preserve roots individually rather than severing them blindly. These techniques trade labor cost for root preservation and are appropriate when significant roots must be crossed. Conventional trenching is cheaper but far more damaging.

135. 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. Baseline documentation is a legal as well as technical necessity.

136. D — Tree protection fencing should be sturdy, visible (brightly colored, at least four feet tall), clearly marked with signage, and maintained throughout construction. Flimsy flagging is routinely moved or ignored. Effective fencing is the operational enforcement of the written protection plan.

137. B — Risk is formally defined as the combination of likelihood of failure and severity of consequences. Neither tree condition nor target presence alone constitutes risk. Both factors must be considered together to produce a meaningful risk rating.

138. C — A Level 2 assessment is a detailed visual inspection of an individual tree, typically performed while walking around and inspecting it from multiple angles using basic tools such as a mallet and probe. It is the standard assessment level for trees of concern. Level 1 is rapid screening; Level 3 uses advanced instrumentation.

139. A — Level 1 assessment is used for rapid screening of large tree populations — typically along streets, through parks, or across properties — to identify obvious hazards requiring further evaluation. It is a limited visual assessment often performed from a distance. Detailed evaluation of individual specimens requires Level 2 or 3.

140. D — Included bark between codominant stems prevents the formation of a strong structural union. The attachment becomes progressively weaker as the stems grow, and catastrophic splitting can occur without warning. This is one of the most dangerous structural defects in mature trees.

141. B — The presence of a fungal fruiting body on a trunk indicates that active decay is already established within the wood. Fruiting bodies are the reproductive stage of fungi whose vegetative bodies extend into the tree's tissues. They do not by themselves mandate removal but always warrant closer evaluation.

142. A — 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 a high likelihood of failure does not produce high risk.

143. 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. A house is constant; a seldom-used trail is rare.

144. D — A new lean combined with fresh soil cracking on the opposite side indicates that the root plate has rotated and anchorage has been compromised. Trees showing these signs should be considered at imminent risk of uprooting failure. Immediate action may be warranted.

145. B — Sounding the trunk with a mallet produces a solid ringing sound over intact wood and a dull hollow sound over decayed or hollow areas. It is a simple but useful technique for detecting large decay columns that might otherwise be missed visually. It is imprecise but inexpensive and rapid.

146. C — The TRAQ risk matrix combines likelihood of failure and impact (the probability that a failure will occur and strike a target) with consequences of failure (the severity if impact occurs). The combination produces the overall risk rating. Neither factor alone is sufficient.

147. A — Reduction pruning to decrease end weight on overextended branches is a standard mitigation for moderate risk from specific branch defects over targets. It addresses the identified defect without removing the entire tree. Immediate removal is not proportional to moderate risk.

148. D — Cabling and bracing provide supplemental support that reduces but does not eliminate risk, and the installations require ongoing inspection and maintenance. They are appropriate when defects cannot be addressed by pruning alone and when tree value justifies the cost. No hardware system produces zero residual risk.

149. 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, not zero risk.

150. C — A professional risk assessment report should document the scope of the assessment, identified defects, targets, recommended mitigation, and an explicit residual risk statement. Thorough reporting supports defensibility and client decision-making. A one-line conclusion does not constitute a professional report.

151. A — Effective communication uses plain language, respects the client's decision-making authority, acknowledges uncertainty honestly, and matches recommendations to actual risk. Technical jargon and paternalism damage credibility. The client owns the tree and makes the final decision.

152. D — Level 3 assessment — resistograph drilling, sonic tomography, static load testing — is appropriate when Level 2 has left significant uncertainty about internal conditions that cannot be resolved visually. The techniques are expensive and reserved for high-value trees. Routine assessment does not require Level 3 tools.

153. C — A probable likelihood of failure in TRAQ means failure is likely to occur during the assessment time frame under normal conditions. This is distinct from possible (could occur but not likely) and imminent (failure in progress). The four levels are improbable, possible, probable, and imminent.

154. B — The severe consequence level in TRAQ applies to catastrophic property damage, serious injury, or death. Minor consequences involve minor damage or injury; significant consequences fall between. Matching consequence ratings to actual potential outcomes determines whether a defect drives the risk rating to the highest levels.

155. A — A tree with a visible cavity may still be structurally sound if enough intact wood remains around the cavity perimeter to resist bending forces. A common guideline holds that branches or trunks are unlikely to fail from decay if at least one-third of the diameter remains as sound wood. Cavity size alone does not mandate removal.

156. D — Consequences of failure depend on the size and mass of the failing part, the height from which it would fall, and the nature of the target it would strike — all three factors together. A single factor in isolation cannot predict severity. Context determines the outcome.

157. B — Root defects are difficult to evaluate because roots are below ground and cannot be directly observed. Arborists must rely on indirect indicators such as root plate movement, fungal fruiting bodies at the flare, and construction history. Air excavation can expose the root flare when necessary.

158. C — Healthy rounded callus tissue around a small old wound indicates successful compartmentalization and closure. This is evidence of normal healing, not a structural defect. Codominant stems, active cracks, and dead scaffold branches over targets are all genuine defects.

159. D — 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 and maintenance; Z133 addresses safety. The two work together.

160. A — The minimum approach distance for unqualified workers to energized distribution lines below 50 kV is 10 feet under ANSI Z133. This is the most commonly cited MAD figure and applies to the majority of lines encountered in residential and commercial tree work. Unqualified workers may not cross this distance.

161. B — A qualified line-clearance arborist has completed specialized training in electrical hazards, safe work procedures near energized lines, use of insulated tools, and emergency response to electrical contact. This training cannot be acquired informally or through general arboricultural experience.

162. C — 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 are not suitable for climbing because they can fall off during dynamic movement. Climbing helmets are purpose-built.

163. D — Chainsaw-resistant leg protection contains cut-resistant fibers (such as ballistic nylon or aramid) that clog the chain of a running saw on contact, stopping the chain before it reaches the leg. The protection is not perfect but dramatically reduces injury severity.

164. C — 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. Many veteran tree workers develop preventable hearing damage.

165. C — A proper job briefing covers the work scope, hazards, procedures and precautions, required PPE, worker assignments, and emergency response procedures. It is required under ANSI Z133 and is not optional even when the crew is in a hurry. Briefings prevent predictable mistakes.

166. B — ANSI Z133 requires that at least one member of a climbing crew other than the climber be capable of performing an aerial rescue. This requirement is not optional, and the rescuer must have training and practice sufficient to execute under emergency conditions. Outside emergency services alone are inadequate.

167. D — Suspension trauma develops when a climber remains motionless in a harness for an extended period, as reduced venous return causes blood to pool in the legs. It can become life-threatening within 30 minutes. This is why aerial rescue of an unconscious climber is time-critical.

168. A — 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. B — The chain brake is designed to stop the chain, either when activated manually by the front handguard or automatically in response to kickback motion. It is an essential safety feature that must be functional on every saw in service. A saw with a nonfunctional chain brake must be removed from service.

170. C — The left hand should grip the front handle with the thumb wrapped fully around the underside of the handle, not positioned alongside it. This grip is stronger and provides better control if the saw moves unexpectedly. It is the standard grip for all chainsaw operation.

171. A — Two-handed operation is the standard for essentially all ground-based chainsaw operation and is required except in specific climbing situations where one-handed top-handle saws are used. The standard grip provides maximum control and reduces the risk of injury from unexpected saw movement.

172. D — Top-handle chainsaws are designed for compact use and potential one-handed operation during climbing work, where two hands are not always available. They should not be used by untrained workers or for ground-based work better done with a conventional saw. Specific training is required.

173. C — A functioning chain brake is the primary safety feature required on modern chainsaws and is designed to stop the chain when activated manually or by kickback. Other safety features include chain catchers, throttle interlocks, and anti-vibration systems. A saw without a functional chain brake must not be used.

174. B — The Working Load Limit is the maximum load that a piece of rigging equipment can safely handle under normal working conditions. It is substantially lower than the tensile strength to provide a safety margin against dynamic loads, wear, and unexpected conditions. Loads should never exceed the WLL.

175. A — Working load limit is commonly calculated as approximately one-tenth of the tensile strength. A rope with 14,000 pounds tensile strength has a WLL of about 1,400 pounds. This margin exists to protect against shock loading and cumulative wear.

176. D — Shock loading is the dynamic force generated when a falling piece is suddenly caught by the rigging rope. Peak forces can be many times the static weight of the piece depending on fall distance and system elasticity. This multiplication is responsible for most equipment failures in rigging.

177. B — Allowing controlled slip through a friction device such as a Port-a-Wrap distributes the energy of the catch over time rather than stopping the load instantly. The result is a dramatically lower peak force compared to a hard tie-off. Every significant rigging operation should include a friction device.

178. C — 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 the holding side of the rope simultaneously. A 1,000-pound piece produces about 2,000 pounds of force on the block anchor. This doubling is a routine source of anchor failure.

179. A — The hinge is the strip of wood between the notch and the back cut that controls fall direction as the tree begins to fall. Hinge width should be approximately 10% of trunk diameter. A properly formed hinge holds the tree on the stump and guides it along the intended fall line.

180. D — An escape route must be planned and cleared before cutting begins and followed immediately as the tree starts to fall. The route should lead away from the tree at about 45 degrees from the fall line on the opposite side. Workers who remain at the stump are in the most dangerous position.

181. C — Barber chair is a vertical splitting of the trunk upward along the grain during a felling cut, caused by cutting the hinge too thin or making the back cut too slowly. It can propel trunk sections backward at high speed, killing workers in the fall zone. Leaning hardwoods are particularly prone.

182. B — Chipper operators should stand to the side of the infeed rather than directly behind it, to avoid being struck by branches that flex or kick back as they enter the feed rollers. Standing in line with the infeed is a recurring cause of serious injury. Reaching into a running chipper is never acceptable.

183. A — Aerial lift operators must maintain the minimum approach distance with both the bucket and the boom, because the metal boom is an excellent conductor and can carry electricity from a contacted line throughout the machine. The entire lift structure is a potential conductor, not just the bucket.

184. D — PPE must be inspected before every use, and items showing damage, wear, or contamination must be retired immediately and replaced. Continuing to use compromised PPE provides reduced or no protection. Annual inspection alone is inadequate for life-safety equipment.

185. B — ANSI Z133 requires climbing ropes to have a tensile strength of at least 5,400 pounds for arboricultural climbing applications. This value provides the margin needed for the dynamic loads generated during climbing and rigging. Lower-strength ropes are not compatible with the standard.

186. D — A properly tied friction hitch must grip the rope reliably under load while permitting controlled adjustment when the climber changes position. A hitch that slips under load is unsafe; one that locks rigidly prevents smooth climbing. Hitches must be inspected before each climb.

187. C — A worker observing a dangerous condition at a chipper should activate the feed control bar or emergency stop immediately and address the condition before continuing. Every second of delay increases the risk of injury. Feed control bars and emergency stops exist specifically for this purpose.

188. D — The notch is cut into the side of the tree facing the intended direction of fall. It establishes where the tree will pivot as it falls and controls the direction along with the hinge. Cutting the notch on the wrong side produces an unpredictable fall.

189. B — Tree canopies intercept rainfall on leaves and bark, with some portion evaporating before reaching the ground and the remainder reaching the soil more slowly. This reduces runoff volume and velocity, lowering the load on storm sewers. A single mature tree can intercept thousands of gallons annually.

190. C — A complete tree inventory records every tree within the defined area, with information on species, size, condition, location, and management needs. Sample inventories cover a statistically representative subset; windshield surveys are rapid visual screens. Complete inventories provide the richest basis for management.

191. A — The i-Tree suite developed by the USDA Forest Service allows communities to estimate the dollar value of ecosystem services — stormwater interception, air quality improvement, carbon sequestration, and energy savings — provided by their specific tree populations. These numbers transform tree management into documented infrastructure investment.

192. D — The trunk formula method is used when a tree is too large to be practically replaced by nursery stock. It calculates value from trunk cross-sectional area adjusted by species, condition, and location ratings. Smaller trees are appraised using the replacement cost method instead.

193. 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. The cooling effect lowers air conditioning demand and makes outdoor spaces usable.

194. C — Tree protection ordinances typically require permits for removal of trees above a specified size and impose penalties for unauthorized removal. They distinguish between protected trees and unprotected trees based on size, species, or location. Specific thresholds vary between jurisdictions.

195. A — Canopy cover goals are typically expressed as the percentage of land area covered by tree canopy, measured through aerial imagery analysis. They provide a high-level metric for tracking

urban forest size and communicating progress to the public. Communities often set specific numerical targets.

196. B — Tree City USA requires a tree board or department, a tree care ordinance, a community forestry program with a budget of at least $2 per capita, and an annual Arbor Day observance with official proclamation. There is no minimum canopy cover requirement. The program recognizes commitment, not coverage targets.

197. D — Species rating reflects the desirability, suitability, and performance of the species in the local area. High-quality species well adapted to the location receive higher ratings; invasive or poorly suited species receive lower ones. Regional ISA chapters publish species rating lists for local use.

198. C — Effective client communication uses plain language, presents options rather than ultimatums, and respects the owner's decision-making authority. Technical jargon and paternalism damage credibility. The client owns the tree and makes the final decision with the arborist's guidance.

199. A — Multiple studies have found that neighborhoods with more trees show improved mental health outcomes, reduced stress, faster recovery from illness, and increased physical activity. These benefits complement the better-known environmental and economic benefits. The human-health case has become increasingly central to urban forestry advocacy.

200. B — A budget-focused council responds to the documented dollar value of ecosystem services and infrastructure savings, not to aesthetic arguments or personal preferences. Matching the message to the audience is basic professional communication. The i-Tree tools provide exactly the quantitative data such audiences require.